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BAU

RESEARCH REPORT 2019-2020

1960 YEARS

جامعة بيروت العربية

BEIRUT ARAB UNIVERSITY

RESEARCH REPORT 2019

2020 THE YEAR OF CHALLENGES

PRESIDENT'S MESSAGE

It is in the heart of our strategy at Beirut Arab University to support research excellence and prepare researchers to lead the way in the different research areas. BAU has become a place to stimulate creativity and collaboration, as well as to nurture innovative ideas. Through collaboration with other Universities, local and international, government and industrial stakeholders, we, at BAU, are making momentous enhancements to fundamental knowledge and understanding in different research areas. Our agreement with the National Council for Scientific Research (CNRS) to provide joint grants to BAU faculty is an achievement aimed at supporting and motivating research production at our University.

To further enhance BAU's visibility, collaboration opportunities and partnerships, research is concentrated around four main research themes with specified subthemes that are recognized and adopted across the Faculties. These themes are aligned with the United Nations Sustainable Development Goals (SDGs).

Our University has become a repository for the transfer of knowledge, technology and expertise. The research environment at BAU fosters innovation and endorses our researchers' vision to seek new territories and be leaders in their respective fields.

Prof. Amr Galal El Adawi
President of Beirut Arab University

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INTRODUCTION

At BAU, we offer a rich research environment, in which students and academic staff are encouraged to embark on new research topics which are in some cases locally focused and deal with community needs, others which have a global reach, and many of which are increasingly interdisciplinary in nature.

BAU's capacity to deliver practical, innovative research opportunities is growing rapidly. This process addresses the talent and dedication of our professors, administrators and students working on projects in all of our Faculties. Our mission is to help BAU become a leader in experiential learning-to support opportunities for all of our students to work in different research fields.

This year has definitely been challenging worldwide with the outbreak of the corona virus, and even more so with the onset of the financial crisis in Lebanon. Yet, despite all these challenges, BAU rose to the occasion and maintained the increase in the quantity and quality of research projects performed; also several research projects on the topic of COVID-19 were conducted. The overall research production at BAU was hardly affected due to the hard work and diligence of its faculty, which was both notable and commendable. BAU faculty from all disciplines also continued to target highly-ranked journals to publish their work.

As we continuously progress towards becoming a unique research-driven teaching university, this annual report documents the research outcome of the academic staff throughout the academic year 2019-2020.

Prof. Hania Nakkash
Dean of Graduate Studies and Research

BAU RESEARCH THEMES

At BAU, we have identified four thematic research areas that guide our research and help us bring our expertise to pursue the answers of key questions of our age in the fields of Science, Art and Social Science.

THEME 1	Health and Wellbeing
THEME 2	Science and Technology
THEME 3	Society, Culture and Human Behavior
THEME 4	Reative Sustainable Development

To choose our research themes we have examined the national and international research strategies, we have used advanced bibliometric tools, and we have sought the opinions of international thought leaders.

Our four research themes motivate our researchers to explore new ideas, challenge opinions, inquire, create and disseminate new knowledge to be placed at the service of Lebanon and the world. Each Faculty at BAU has also identified its own subthemes which pinpoint the specific research direction and interests of each Faculty as shown in the tables below. We place great importance on giving our students numerous opportunities to study with our researchers and to develop their own research careers and guide them to conduct community-based research.

HEALTH AND WELLBEING

Faculty of Human Sciences	- Quality of Life and Life Style - Personality and Well-being
Faculty of Law & Political Science	- Employee Rights and Workplace Environment حقوق العمال وبيئة العمل - Recent Development of Medical Responsibility/Liability (Civil-Criminal and Administrative) (التطورات المعاصرة للمسؤولية الطبية (المدنية-الجنائية + الإدارية)
Faculty of Business Administration	- Environmental Economics
Faculty of Architecture – Design & Built Environment	- Quality of Life in the Built Environment
Faculty of Engineering	- Energy and Environment - Materials Engineering - Advances in Technology
Faculty of Science	- Human Disorders at the Molecular Level - Industrial and Medical Microbiology
Faculty of Pharmacy	- Drug Discovery - Therapies - Clinical Pharmacy and Practice
Faculty of Medicine	- Epidemiology of Communicable and Non-communicable Disease - Molecular Biology and Therapeutics of Diseases - Women and Health - Medical Education
Faculty of Dentistry	-Oral Health Related Quality of Life - Esthetics and Oral Rehabilitation - Management of Musculoskeletal Disorders
Faculty of Health Sciences	- Illness and Therapy - Medical Education - Prevention and Health Promotion

SCIENCE AND TECHNOLOGY

Faculty of Human Sciences	- Impact of Communication Technology on Social Relationships - Library Information Systems - Record Management Systems - Digital Repository - Web 2 Application in Libraries
Faculty of Law & Political Science	- Informatics Crimes جرائم المعلوماتية - E-transactions + E-Banking المعاملات الإلكترونية + المصرف الإلكتروني - E- Procedures (E- Arbitration, Mechanization of Procedures) أصول المحاكمات الإلكترونية (التحكيم الإلكتروني - مكننة الإجراءات)
Faculty of Business Administration	- Information and Communication Technology in Business
Faculty of Architecture – Design & Built Environment	- Digital Technology in Architecture
Faculty of Engineering	- Construction, Planning, and Design - Energy and Environment - Applied Mathematics and Computational Sciences - Materials Engineering - Advances in Technology - Simulation, Modeling and Design
Faculty of Science	- Mathematical and Computational Science - Advanced Materials - Environmental Studies - Software and Computing
Faculty of Pharmacy	- Drug Delivery and Development
Faculty of Medicine	- Digital Technology in Healthcare
Faculty of Dentistry	- Laser Application in Dentistry - Towards Digital Dentistry - Regenerative Endodontics
Faculty of Health Sciences	- Food Technology and Processing

SOCIETY, CULTURE AND HUMAN BEHAVIOR

Faculty of Human Sciences	- Personality and Behavior - History and Heritage - Language and Literature - Information Literacy - Media - Societal Change
Faculty of Law & Political Science	- Corporate Social Responsibility (in the Scope of Recent Development in the Corporate Law) المسؤولية الاجتماعية للشركات في إطار التطورات المعاصرة في قانون الشركات - Social Justice between Constitutional Text and Application العدالة الاجتماعية: بين النص الدستوري والتطبيق - The Effect of Economic Changes in the Criminal Behavior أثر المتغيرات الاقتصادية على السلوك الجرمي - Recent Developments in the Civil and Criminal Procedures and Accomplished Justice التطورات المعاصرة في أصول المحاكمات الجنائية والعدالة الناجزة - Development, International Crisis and the Contemporary Politics in the International Public Law (Human Rights, Criminal, Environmental, Economic and Financial), in the International Relations and in the State التطورات والأزمات الدولية والسياسية المعاصرة في القانون الدولي العام (حقوق الإنسان، الإنساني، الجنائي، البيئي، الاقتصادي والمالي) والعلاقات الدولية والدول.
Faculty of Business Administration	- Human Behavior in Organizations
Faculty of Architecture – Design & Built Environment	- Theories, History, and Humanities in Architecture
Faculty of Engineering	- Construction, Planning and Design - Energy and Environment - Advances in Technology - Engineering Management
Faculty of Medicine	- Traditional and Alternative Medicine - Healthcare Jurisdictions and Policies - Healthy Lifestyles in Individuals and Community
Faculty of Dentistry	- Preventive and Community Dentistry - Child Management

CREATIVE SUSTAINABLE DEVELOPMENT

Faculty of Human Sciences	- Human Development - The Role of the Public Library in Sustainable Development, Hospitals and Prisons
Faculty of Law & Political Science	- Legal Protection for the Environment (Criminal, Civil and Administrative) الحماية القانونية للبيئة (مدنية - جنائية - إدارية) - Role of NGO's in the Sustainable Development/ the Role of Local Bodies in the Sustainable Development دور المنظمات غير الحكومية في التنمية المستدامة/دور الهيئات المحلية في التنمية المستدامة - Balanced Development, Cultural, Social and Economical in the Lebanese Constitution الإنماء المتوازن، ثقافياً، اجتماعياً واقتصادياً في الدستور اللبناني
Faculty of Business Administration	- Sustainability in Business
Faculty of Architecture – Design & Built Environment	- Environmental Studies and Sustainability in Architecture
Faculty of Engineering	- Construction, Planning, and Design - Energy and Environment - Advances in Technology
Faculty of Dentistry	- Sustainable Development Dentistry - Environmental Sustainability

TABLE 1

Research Output for the Academic Year 2019-2020 Classified According to Type of Publication

Faculty	Academic Journal Articles	Conference Proceedings	Books	Book Chapters	Total
Human Sciences	4	1			5
Law and Political Science	2		2		4
Business Administration	9		1	1	11
Architecture Design and Built Environment	18	1		1	20
Engineering	35	15		1	51
Science	115	11	1	1	128
Pharmacy	37				37
Medicine	10				10
Dentistry	18				18
Health Sciences	56				56

TABLE 2

Publications for the Academic Year 2019-2020 Classified According to Journal Ranking and Indexing

Faculty	Q1	Q2	Q3	Q4	Books/Book Chapters	APJ*/BAU Journal	Conference Proceedings	No Quartile Assigned	Total
Human Sciences		1				2	1	1	5
Law and Political Science					2		1	1	4
Business Administration		2		1	2	4		2	11
Architecture Design and Built Environment		1			1	14	1	3	20
Engineering	11	6	6	2	1	7	15	3	51
Science	42	33	24	5	2	5	11	6	128
Pharmacy	17	3	3	1		5		8	37
Medicine	1	1	3	1		4			10
Dentistry	1	3	2			6		6	18
Health Sciences	16	18	7	4		8		3	56

*Architecture & Planning Journal ISSN: 2079-4096

Faculty of Human Sciences

ACADEMIC JOURNAL ARTICLES

Author(s) Abdel-Khalek A., **El Nayal M.**

ARTICLE TITLE	**Death Anxiety in Lebanese College Students in 1998 and 2015**
JOURNAL	**Death Studies**
YEAR	2019
PUBLICATION INFO	43(9): 542-546
THEME / SUBTHEME	Health and Wellbeing/ Personality and Well-being
ABSTRACT	The present investigation sought to explore the difference in death anxiety between two different samples of students who studied at the same university in Lebanon in 1998 and 2015. Based on the changes in the social, economic, and political conditions that took place over these 17 years, it is possible to predict the change in death anxiety during this period. The participants in the 1998 study included 228 undergraduates, whereas the 2015 sample consisted of 292 students. All participants responded to Templer›s Death Anxiety Scale (DAS). Sex-related differences on the DAS were statistically significant in the 1998 group where women obtained a higher mean than the men. The t-test was significant at 0.001. Among women, the 2015 group obtained a significantly lower mean score than did their female counterparts in the 1998 group, whereas the difference between the two years in men was not significant. In sum, the hypothesis of the study was partially verified, i.e., a change in death anxiety level in some groups has happened as a result of the passage of time and other factors. In this case, death anxiety may be considered a fluid entity influenced by different environmental conditions.

* Names in Bold Indicate BAU Authors

Author(S) **Iskandarani N.**

ARTICLE TITLE	**L'enjeu de L'ecriture Dans Mer Méditerranee de Louis-Philippe Dalembert: Dénonciation ou Mise en Garde?**
JOURNAL	**BAU Journal-Society, Culture and Human Behavior**
YEAR	2020
PUBLICATION INFO	2(1): 1-7
THEME / SUBTHEME	Society, Culture and Human Behavior/ Language and Literature
ABSTRACT	Louis-Philippe Dalembert, a Mauritian writer, published in 2019 his novel Mur Méditerranée that sheds the light on an actual issue: the migration crisis. To write this novel, the author was inspired by a real event that occurred in July 2014: the rescue story of illegal migrants by the Danish oil tanker Torm Lotte. In his novel, Louis-Philippe Dalembert portrays three women: Sembar Eritrean, Chochana the Nigerian, and Dima the Syrian; each of them flees the violence that rages in her country and throws herself into a ship that crosses the Mediterranean and leads migrants to Europe. Dalembert, deeply touched by the tragedy of illegal migration, denounces the brutality of smugglers, pitying the fate of migrants deceived by the European dream. The novel raises the issue of the writer›s responsibility in a changing world: what is his purpose from presenting the suffering of passengers in details, the nightmare they endure on one hand and the horror of Mafia who exploit them on the other hand? Does he want to ring alarm bells, or to advice the candidates in exile to stay in their country and save their dignity and their humanity? Does he want to denounce mafia and the discrimination and racism of the extreme right in Europe? In order to answer these questions, we will proceed in a social analysis, as it appears in the novel to study the responsibility of the writer; we will also refer to the functions of language because the transmitted message expresses directly emotional reactions of the narrator, facing the suffering of the passengers, to impose a precise reaction from the receiver of the message, while showing that the act of inscribing this human tragedy into literature makes the characters so close and so human and that social responsibility goes beyond the writer›s frame to engage the different actors in society. Louis-Philippe Dalembert, a Mauritian writer, published in 2019 his novel Mur Méditerranée that sheds the light on an actual issue: the migration crisis. To write this novel, the author was inspired by a real event that occurred in July 2014: the rescue story of illegal migrants by the Danish oil tanker Torm Lotte. In his novel, Louis-Philippe Dalembert portrays three women: Sembar Eritrean, Chochana the Nigerian, and Dima the Syrian; each of them flees the violence that rages in her country and throws herself into a ship that crosses the Mediterranean and leads migrants to Europe. Dalembert, deeply touched by the tragedy of illegal migration, denounces the brutality of smugglers, pitying the fate of migrants deceived by the European dream. The novel raises the issue of the writer›s responsibility in a changing world: what is his purpose from presenting the suffering of passengers in details, the nightmare they endure on one hand and the horror of Mafia who exploit them on the other hand? Does he want to ring alarm bells, or to advice the candidates in exile to stay in their country and save their dignity and their humanity? Does he want to denounce mafia and the discrimination and racism of the extreme right in Europe?

ABSTRACT In order to answer these questions, we will proceed in a social analysis, as it appears in the novel to study the responsibility of the writer; we will also refer to the functions of language because the transmitted message expresses directly emotional reactions of the narrator, facing the suffering of the passengers, to impose a precise reaction from the receiver of the message, while showing that the act of inscribing this human tragedy into literature makes the characters so close and so human and that social responsibility goes beyond the writer›s frame to engage the different actors in society.

Author(S) **El-Nayal M., Alaeddine H.**

ARTICLE TITLE	**Mental Health Among University Students**
JOURNAL	**BAU Journal-Society, Culture and Human Behavior**
YEAR	2020
PUBLICATION INFO	1(2): 1-10
THEME / SUBTHEME	Society, Culture and Human Behavior/ Personality and Behavior
ABSTRACT	The study entitled "Mental Health in a Sample of University Students in Lebanon" aims at examining the differences in an important variable, namely mental health, between male and female university students. Mental health is a general trend that aims at preserving an individual's mental health, their mental functions, as well as to protect them from mental disorders and reduce the rate of occurrence, to attain a healthy personality. To achieve the objectives of the study, the Arabic Scale of Mental Health, developed by Abdel-Khalek (2016) was administered to a sample that consisted of 249 students at Beirut Arab University, from various disciplines, of which there were 114 males and 145 females, of age ranging from 18 to 21. It is worth noting that the scale has been used in a large number of studies in different countries of the Arab World, and demonstrates good psychometric characteristics in Egyptian, Kuwaiti and Lebanese samples. In this study, the reliability coefficient was calculated using a sample of students (n=100), and the coefficient was 0.89, while the alpha coefficient was 0.96. Means and SD were used, as well as t-test to calculate the differences between means in the interpretation of the results. The findings of the study showed that there are no significant differences in mental health between male and female university students. The findings of the study were interpreted in the light of previous studies and the social circumstances of the sample in Lebanon.

Author(s) Abdel–Khalek A., **El Nayal M.**

ARTICLE TITLE	**Optimism, Self-Efficacy and Subjective Well-being as Predictors of Health Behavior Among University Students**
JOURNAL	**Annals of Arts and Social Sciences**
YEAR	2019
PUBLICATION INFO	40(537): 1-145
THEME / SUBTHEME	Health and Wellbeing/ Personality and Well-being
ABSTRACT	This study aimed to examine the relationship between healthy behaviour, self-efficacy, optimism, and subjective well-being, and to explore healthy behaviour predictors. The sample included (370) Lebanese students from Beirut Arab University, aged between 17 and 22 years. The results showed that women had a significantly higher mean scores than men in healthy behaviour, while men had a higher mean scores than women in self-rating of both mental health and happiness. All correlation coefficients among the study scales were statistically significant and positive for both sexes. The principal components analysis, followed by the Varimax orthogonal rotation, extracted two factors namely «subjective well-being and optimism», and «self-efficacy and healthy behaviour» in men, and «subjective well-being», «self-efficacy, optimism and healthy behaviour» in women. Using regression analysis, the healthy behaviour predictors were as follows: optimism, self-efficacy, and physical health in men as well as self-efficacy, and physical health in women. The present study, thus, indicated the significant relationship between healthy behaviour, self-efficacy, and optimism, which are considered predictors of healthy behaviour.

Faculty of
Law
and Political Science

ACADEMIC JOURNAL ARTICLES

Author(S) **Darwish T.**

ARTICLE TITLE	**الجرائم المتعلقة بالمرأة بين قانون العقوبات اللبناني ونظام روما**
JOURNAL	**مجلة الدراسات القانونية**
YEAR	2019
PUBLICATION INFO	1: 215-307
THEME / SUBTHEME	Society, Culture and Human Behavior/ Development, International Crisis and the Contemporary Politic in the International Public Law (Human Rights, Criminal, Environmental, Economic and Financial), in the International Relations and in the State
ABSTRACT	هل يختلف إجرام الرجل عن إجرام المرأة؟ من الحقائق العلمية الثابتة أن إجرام المرأة يختلف عن إجرام الرجل، وقد أثبتت الإحصاءات الجنائية هذه الحقيقة، إلا أن تفسير نتائجها مختلف عليه بين العلماء، فقد دلّت الإحصاءات الجنائية اختلاف إجرام المرأة عن إجرام الرجل كماً ونوعاً ووسيلة: من حيث الكم: ثبت أن إجرام الرجل يفوق خمسة أمثال إجرام المرأة، وفي بعض الأحيان يصل إلى عشرة أمثال إجرامها. من حيث النوع: دلت الإحصاءات على أن هناك جرائم لا تقع إلا من النساء أو يكون حظها منه كبير بالنسبة للرجال، وجرائم أخرى يقل وقوعها من النساء. من حيث وسيلة ارتكاب الجريمة: يغلب على إجرام النساء استخدام الحيلة والدهاء والخديعة بينما يغلب على إجرام الرجال استخدام العنف والاعتماد على القوة العضلية. من خلال ما سبق نطرح التساؤل التالي: ما هو المعيار المعتمد لتحديد الجرائم المتعلقة بالمرأة في ظل اختلافها عن الرجل؟ يتحدد معيار معرفة الجرائم المتعلقة بالمرأة بنظرنا والمستخدم في هذا البحث وإن كان نسبياً لعدم تخصيص المشرع الجزائي في لبنان جريمة أو جرائم خاصة بالمرأة، بتوافر العناصر التالية: ١. كم ارتكاب الجريمة؛ ٢. نوع الجريمة؛ ٣. وسيلة ارتكاب الجريمة؛ ٤. الطبيعة الجسدية للمرأة؛ ٥. الطبيعة الاجتماعية للمرأة؛ ٦. نص التجريم والعقاب.

ABSTRACT

إذن، إن الجرائم المتعلقة بالمرأة هي: جرائم الأسرة التي تتضمن: جريمة الزنا وجريمة الإجهاض، جرائم الجنس التي تتضمن: جريمة الحض على الفجور وجريمة الدعارة، جرائم الاعتداء على العِرض التي تتضمن: جريمة الاغتصاب وجريمة الفحشاء، جرائم الاستغلال والعنف الجسدي التي تتضمن: جريمة الاتجار بالأشخاص وجريمة العنف ضد المرأة.
ولكن، ما هو التقسيم العلمي المعتمد لدراسة هذه الجرائم؟
إن التقسيم الأقرب للدراسة برأينا ولو أنه تقسيم نسبي غير جامع مانع هو تقسيم الجرائم المتعلقة بالمرأة من حيث ارتكاب الفعل واستقبال الفعل، وبتفصيل أدق هو اعتبار المرأة فاعل للجريمة أو مجني عليها.
ومن خلال كل ما سبق بيانه نطرح الإشكالية القانونية التالية التي أجبنا عليها خلال طيات هذا البحث:
ما هو المضمون القانوني للجرائم المتعلقة بالمرأة بحسب ارتكابها للجريمة أو استقبالها في ظل القواعد القانونية في قانون العقوبات اللبناني ونظام المحكمة الجنائية الدولية (نظام روما)؟

Author(s) **Mourad A.**

ARTICLE TITLE	**Democratic Elections and Sustainable Development: The Case of Electoral District and Representation in Lebanon**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-8
THEME / SUBTHEME	Creative Sustainable Development/ Balanced Development, Cultural, Social and Economical in the Lebanese Constitution
ABSTRACT	The 2030 Agenda for Sustainable Development addresses democracy in Sustainable Development Goal 16 recognizing the indivisible links between peaceful societies and effective, accountable and inclusive institutions. Sustainable Development Goal 16 calls on UN Member States to promote responsive, inclusive, participatory and representative decision-making, and to build effective, accountable and transparent institutions at all levels. Thus, Elections are an integral part of the Sustainable Development Goal 16: "Peace, Justice and Strong Institutions" offer specific guidelines to tackle imperative challenges such as building effective, accountable and inclusive institutions; guaranteeing election integrity and trust; and ensuring responsive, inclusive, participatory and representative decision-making at all levels. In Lebanon, the new electoral law adopted a proportional system with a preferential vote and divided Lebanon into 15 constituencies. Referring to the Goal 16 «Peace, Justice and Effective Institutions», the paper aims to address the political representation issue in Lebanon, and its connection with the division of constituencies. Furthermore, the paper will demonstrate that the proportional electoral system adopted for the 2018 elections did not allow a mitigation of the repercussions of the divisions on the electoral results, but rather widely amplified them.

BOOKS

Author(s) **Darwish T.**

BOOK TITLE	**الأحداث في لبنان** **دراسة في قانون حماية الأحداث المخالفين للقانون أو المعرضين للخطر ٤٢٢\٢٠٠٢**
PUBLISHER	**منشورات الحلبي الحقوقية**
YEAR	2019
ISBN	9786144013229
THEME / SUBTHEME	Society, Culture and Human Behavior/ Development, International Crisis and the Contemporary Politic in the International Public Law (Human Rights, Criminal, Environmental, Economic and Financial), in the International Relations and in the State
ABSTRACT	لا شك أن نظام العدالة الجنائية الفعّال والمنصف، هو الذي يحترم الحقوق الأساسية للمشتبه به والجاني فضلاً عن الحقوق الأساسية للضحية. وإذا كان الطفل في مواجهة نظام العدالة الجنائية ضحيةً أو شاهداً، أو في نزاع مع القانون. فيصبح هذا النظام ذو طابع خاص، لأن الطفل يختلف عن الراشد في نموه البدني والنفسي وفي احتياجاته العاطفية والتعليمية، وتشكل هذه الفوارق وغيرها الأساس الذي يقوم عليه قضاء الأحداث. ولما كانت ظاهرة إجرام الحدث هي نتيجة تظافر العوامل البيئية الاجتماعية (الأسرة، المدرسة، الأصدقاء، الحروب)، والعوامل النفسية (الانفعال، العاطفة، الأمراض النفسية)، والعوامل الثقافية (التعليم، ووسائل الإعلام، الفهم الخاطئ للدين)، والعوامل الاقتصادية (الفقر، التشرد)، فالحدث ما هو إلا طفل اجتمعت ظروف عديدة جعلته يدخل في متاهة الإجرام فيتحول من طفل إلى حدث مخالف للقانون، فالحدث يُصنع ولا يولد لذلك يحتاج إلى قواعد خاصة ترعاه وتتناسب مع احتياجاته ومتطلباته. ومراعاةً لذلك لحظّ المشرّع اللبناني قواعد قانونية خاصة للحدث في قانون العقوبات اللبناني وقانون أصول المحاكمات الجزائية، ثم أصدر المرسوم الاشتراعي رقم ١١٩ بتاريخ ١٦ أيلول ١٩٨٣ ، المعني بحماية الأحداث المنحرفين؛ وسمى المجرم غير الراشد بالحدث المنحرف، وفي مستهل الألفية الجديدة صدر قانون حماية الأحداث المخالفين للقانون أو المعرضين للخطر بتاريخ ١٣ حزيران ٢٠٠٢؛ ملغياً المرسوم ١١٩ من العام ١٩٨٣، مطلقاً مسمى الحدث المخالف للقانون أو المعرض للخطر على المجرم غير الراشد. فما هي القواعد القانونية (الموضوعية والإجرائية) التي تطبق على الحدث المخالف للقانون حال ارتكابه جرماً من جهة وما هي الأحكام القانونية (الموضوعية والإجرائية) التي تطبق على الحدث المُعرض للخطر، في ظل تناثر النصوص القانونية وغياب النص في بعض المواطن واختلاف الحدث المُعرض للخطر عن المخالف للقانون؟

Author(s) **Darwish T.**

BOOK TITLE	**القانون الموضوعي واجب التطبيق أمام المحكمة الخاصة بلبنان (دراسة انتقادية)**
PUBLISHER	**منشورات الحلبي الحقوقية**
YEAR	2019
ISBN	9786144019306
THEME / SUBTHEME	Society, Culture and Human Behavior/ Development, International Crisis and the Contemporary Politic in the International Public Law (Human Rights, Criminal, Environmental, Economic and Financial), in the International Relations and in the State
ABSTRACT	نشأت المحكمة الخاصة بلبنان بناءً على طلب الحكومة اللبنانية من منظمة الأمم المتحدة بإنشاء محكمة ذات طابع دولي لمحاكمة جميع من تثبت مسؤوليتهم عن الجريمة الإرهابية التي أودت بحياة رئيس الوزراء اللبناني السابق رفيق الحريري وآخرين، واستجابةً لهذا الطلب تم الاتفاق بين الأمم المتحدة والجمهورية اللبنانية على إنشاء هذه المحكمة بقرار مجلس الأمن الدولي ١٧٥٧ من العام ٢٠٠٧. وإن المحكمة الخاصة بلبنان تمارس ولايتها وفقاً لنظامها الأساسي المرفق بقرار مجلس الأمن رقم ١٧٥٧؛ والذي حدد اختصاصها بالمادة الأولى منه والتي نصت على ما يلي: ينصبّ الاختصاص الرئيسي للمحكمة الخاصة بلبنان على محاكمة الأشخاص المسؤولين عن الهجوم الذي وقع في ١٤ شباط /فبراير ٢٠٠٥ والذي أدى إلى مقتل رئيس الوزراء اللبناني الأسبق رفيق الحريري وإلى مقتل أو إصابة أشخاص آخرين. وإذا رأت المحكمة أن هجمات أخرى وقعت في لبنان في الفترة بين الأول من تشرين الأول/أكتوبر ٢٠٠٤ و ١٢ كانون الأول/ديسمبر ٢٠٠٥، أو في أي تاريخ لاحق آخر يقرره الطرفان (الأمم المتحدة والجمهورية اللبنانية) ويوافق عليه مجلس الأمن؛ وهي هجمات متلازمة وفقا لمبادئ العدالة الجنائية وأن طبيعتها وخطورتها مماثلتان لطبيعة وخطورة الهجوم الذي وقع في ١٤ شباط/فبراير ٢٠٠٥، فتكون المحكمة صاحبة الاختصاص بمحاكمة الأشخاص المسؤولين عن تلك الهجمات. نستنتج إذن: أن المحكمة الخاصة بلبنان ذات اختصاص رئيسي في محاكمة المسؤولين عن هجمات إرهابية متعددة تم ارتكابها في لبنان؛ الأمر الذي دفعنا لطرح التساؤل التالي: • ماهي الطبيعة القانونية للمحكمة الخاصة بلبنان؟ وبمعرفة الطبيعة القانونية للمحكمة الخاصة بلبنان يتبادر لنا التساؤل التالي: • مما تتشكل المحكمة الخاصة بلبنان؟ وبفهم التشكيل القانوني للمحكمة الخاصة بلبنان نطرح التساؤل التالي: • ما هو القانون الجنائي واجب التطبيق أمام المحكمة الخاصة بلبنان؟

Faculty of

Business Administration

ACADEMIC JOURNAL ARTICLES

Author(S) **Nassredine S., Easa N.**

ARTICLE TITLE	**Antecedents of Career Development Success: Insights into 10 Years of Research**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-24
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	This paper intends to review a flow of previous literature on the antecedents of career development success over ten years, from 2008 to 2018. A systematic literature review has been employed to extract the constitution of literature. A total of 41 relevant articles have been extracted from 16 different top ranked journals. Drawing on the literature, a conceptual model is provided as a clear depiction of what has been studied. Specifically, dependent, independents, mediators, and moderators variables are determined. The systematic literature review identifies six main themes; leadership, organizational and individual commitment, talent management, human resources management practices, career management strategy, and learning and development, determining antecedents of career development success. Literature in this area have offered much attention to both of the Exchange Theory and the Social Learning Theory. The paper advances the career development literature by presenting one of the fewest attempt to systematically review antecedent of career development, with a conceptual framework.

* Names in Bold Indicate BAU Authors

Author(S) **Semaan N., Beydoun A., Mostapha N.**

ARTICLE TITLE	**Competitive Advantage and Performance, The Role of Value and Rareness of Resources and Capabilities: The Case of Lebanese SMEs**
JOURNAL	**European Journal of Business and Management**
YEAR	2020
PUBLICATION INFO	12(18): 122-134
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	This research aims to examine the competitiveness and the strategic behavior of the Lebanese SMEs, through their possession and exploitation of strategic resource-capability combination attributes. A sample of 285 Lebanese SMEs were obtained through the use of a survey questionnaire and the non-probability sampling to collect primary and quantitative data. The results show that for Lebanese SMEs, not all resources-capabilities are of equal importance when creating competitive advantage. They indicate that only organizational resource-capability combinations are considered as strategic assets and related to differentiation advantage, financial resource-capability combinations are only considered as strategic assets and related to cost advantage, and that cost and differentiation advantage are both related to performance.There were some problems concerning the data collection due to the fact that the Lebanese SMEs owners are not familiar with the research. In fact, this study may have positive implications on the Lebanese SMEs managers' decisions, where this study can be considered as a guideline that will help them revise their strategic choices, behaviors, capabilities and resources, vis-à-vis of competition and to readjust their strategy if it does not work well. Indeed, the value of this research is that it is the first to empirically study the Resource-Based View in Lebanon from the Lebanese SMEs context, which is considered as suitable context, given its crucial contribution to the whole economy. It is one of the rare studies that reflects SMEs challenges and problems that inhibit them from improving their performance.

Author(S) **Al Kadi S., Easa N.**

ARTICLE TITLE	**Employee Personality Traits and Reactions to Psychological Contract Breach in the Lebanese Context**
JOURNAL	**BAU Journal-Society, Culture and Human Behavior**
YEAR	2020
PUBLICATION INFO	2(1): 1-19
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	The aim of this paper is to examine the influence of employee personality traits on the response to a psychological contract breach within the Lebanese context. It specifically examines the influence of various typologies on job satisfaction, trust, loyalty, organizational commitment, and delves deeper into the result of having the psychological contract breached. A total of 30 comprehensive interviews were conducted in order to examine employee reactions to breach of the psychological contract, along with a qualitative analysis of their personality according to the Big Five personality trait model. The findings demonstrate that the concept of a "psychological contract" is not familiar within the Lebanese context. The relationship between one's personality trait and the response to the psychological contract breach are also new concepts within the Lebanese context. The findings suggest that there is a strong relationship between employee personality traits and the response to the perceived psychological contract breach. For example, findings show that those who consider themselves to be extraverts and the neuroticisms have the most aggressive reaction to the breach of the psychological contract.

Author(S) **Mokhtar E.,** Elharidy A.

ARTICLE TITLE	**Family Control and Earnings Management: An Empirical Analysis of the Lebanese Banking Sector**
JOURNAL	**International Journal of Accounting and Financial Reporting**
YEAR	2019
PUBLICATION INFO	9(4): 124-147
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations

ABSTRACT

This study aims to examine the relationship between board of directors' characteristics, family control and earnings management practices in Lebanese commercial banks during 2008 to 2016. The characteristics of the board of directors are board size and role duality. Also, the study aims to identify earnings management practices during and after the global financial crisis. Earnings management was measured using discretionary accruals estimated by loan losses provision. The population for the study consists of Lebanese commercial banks registered with the Banque du Liban, which provided 182 bank/year observations during the study period. The results of the study indicate that Lebanese commercial banks with a relatively larger family control are more involved in earnings management practices. The study demonstrates that self-interest overrides common interests, leading the controlling family to maximize its own benefits at the expense of minority owners, resulting in more earnings management practices. In addition, capital adequacy and board size have significant positive influence on earnings management. Earnings management practices were not affected by role duality and bank size. Further, maintaining profitability was found to have a significant impact on earnings management practices. Finally, the results of the study indicate that Lebanese commercial banks became involved in earnings management practices after the global financial crisis compared to the period during the crisis.

Author(s) **Taher H.**

ARTICLE TITLE	**Financial Development and Economic Growth Impact on the Environmental Degradation in Lebanon**
JOURNAL	**International Journal of Energy Economics and Policy**
YEAR	2020
PUBLICATION INFO	10(3): 311-316
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	The study aims to examine the influence of financial development and economic growth on environmental degradation in Lebanon. Several theoretical and empirical studies on the relationship between the financial development and economic growth on carbon emissions showed conflicting findings. This research focus on studying the impact of both the financial development and economic growth on environmental degradation in Lebanon. The findings indicate that financial development and economic growth both have significant and positive impact on the carbon dioxide emissions using some control variables like fossil energy consumption, trade openness and urbanization. Also, the results showed a significant impact for the control variables on carbon emissions. This suggests crucial implications for policy-makers. The study recommends that the policy makers in Lebanon should push the financial institutions to invest more in green and friendly environment projects which will lead to minimize the carbon dioxide emissions.

Author(s) **Al Ahmad S., Easa N., Mostapha N.**

ARTICLE TITLE	**Knowledge Sharing and Innovation at the Lebanese Banking Industry**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-18
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	Knowledge is considered the main critical resource for competitive advantage. By encouraging a knowledge-sharing culture within service settings such as banks, the quality of service is enhanced and the opportunities for innovation is created. This research seeks to test the relationship between knowledge sharing (KS) and innovation. A quantitative and explanatory analysis was done by using Structural equations modeling (SEM) to investigate the effect of KS on process and product innovation. Research data were collected through a survey method. The sample result was determined through a probability stratified sampling technique of about 310 employees at 27 banks in Lebanon. The findings confirmed the vital role played by KS in enhancing innovation. The main implications of the research emphasize that knowledge sharing is the most important predictor of process innovation followed by product innovation. The findings highlight how KS produces better outcomes for banks by mobilizing employees to engage in the innovation of products and processes. It is recommended that banks promote KS by establishing a suitable climate that helps employees to meet and communicate ideas effectively. This motivates them to get involve in process and product innovation, by stimulating them to look for novel ideas and adopt advanced technologies. These findings extend the understanding of the processes through which sharing knowledge stimulate innovation, and also stress on the benefits gained by cultivating knowledge sharing processes to generate more innovative outcomes.

Author(s) **Mahboub R.**

ARTICLE TITLE	**The Determinants of Forward-Looking Information Disclosure in Annual Reports of Lebanese Commercial Banks**
JOURNAL	**Academy of Accounting and Financial Studies Journal**
YEAR	2019
PUBLICATION INFO	23(4): 1-18
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	Nowadays disclosure of information is not restricted to financial information in the context of financial reports, but they often reveal a bunch of non-financial information –such as forward looking information to influence the decisions of users. For this purpose, this research investigates empirically the factors that may affect the extent to which forward-looking information is disclosed in the narrative sections of the annual reports of a sample of 29 Lebanese commercial banks for the period 2017-2008. This information will aid bank shareholders to make informed decision about the bank›s future performance. Disclosure index methodology was adopted for each bank in the sample. The results indicate that three of the bank specific characteristics i.e., size, leverage and age have an insignificant association with the level of forward-looking information disclosure; whereas profitability, liquidity, and capital expenditures are found to have a positive effect on the level of this disclosure. The results of this research can be valuable not only for academics wishing to improve their knowledge about forward- looking information disclosure, but also for managers and regulators wishing to set up new policies in Lebanon and other developing countries in particular. Consequently, the research recommends Lebanese commercial banks to provide more forward-looking information in their annual reports to efficiently decrease informational asymmetries between the management and owners of the banks.

Author(s) **Al Ahmad S., Easa N., Mostapha N.**

ARTICLE TITLE	**The Effect of Transformational Leadership on Innovation: Evidence from Lebanese Banks**
JOURNAL	**European Research Studies Journal**
YEAR	2019
PUBLICATION INFO	22(4): 215-240
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	**Purpose** Transformational leadership (TL) has been recognized as one of the most important factor influencing innovation. It is argued that this style plays an essential role in developing the process, structure and climate for organizations to become innovative. This research aims to examine the impact of TL on two aspects of innovation namely product and process innovation. **Design/Methodology/Approach** The quantitative and explanatory analysis was taken by using the Structural equations modeling (SEM) with AMOS 20 to examine the relationship between TL and innovation. Research data were collected through a survey method. The sample result was determined by the probability stratified sampling technique of about 310 employees at 27 banks in Lebanon. **Findings** The findings confirmed the importance of TL in enhancing innovation in banking sector. The main implication of the research highlights that individualized consideration is the most important predictor of product and process innovation followed by, inspirational motivation and idealized influence, respectively, whereas, intellectual stimulation has insignificant influence on product and process innovation. **Practical Implications** Findings point to how transformational style of leadership produce better outcomes for the banks by mobilizing employees to engage in innovative products and processes. **Originality/Value** These findings extends the understanding of the processes through which transformational styles of leadership stimulate innovation, and also highlight the benefits gained by cultivating more transformational styles of leadership to generate more innovative outcomes.

Author(s) **Raad G., Easa N.**

ARTICLE TITLE	**Workgroup Diversity and Employees Work Performance: Insights into Lebanon**
JOURNAL	**BAU Journal-Society, Culture and Human Behavior**
YEAR	2020
PUBLICATION INFO	2(1): 1-18
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	**Purpose** The aim of the current study is to examine the relationship between workgroup diversity and employee work performance in Lebanon. **Design-Methodology-Approach** The study used a sample of 187 employees from 18 service organizations in Lebanon that employ diverse workgroups, and a convenience sampling technique was employed as well. Nevertheless, the respondents were requested to designate their level of agreement or disagreement with a number of statements using 5 points Likert scale, which was divided into two sections, comprised of 57 questions. **Findings** The results have shown that there was a significant and positive relationship between workgroup diversity and employees' performance in terms of task performance, organizational citizenship behaviour, and creative performance. Specific details and practical implications are intoduced. Research limitations and recommendations are also presented.

BOOKS

Author(s) **Mahboub R.**

BOOK TITLE	**Impression Management in Accounting Communication of MENA Banks: Impression Management Using Discretionary Narrative Disclosure Strategies of Banks' Annual Reports in the MENA Region**
PUBLISHER	**Scholars' Press**
YEAR	2020
ISBN	9786138914938
THEME / SUBTHEME	Society, Culture and Human Behavior/ Human Behavior in Organizations
ABSTRACT	Recent scandals and corporate failures have shaken the confidence of investors in financial reporting. Thus, investors and other stakeholders called for greater transparency by better information disclosure via annual reports. Due to the fact that the annual report, especially the narrative section, stands for an essential part of the information used by investors and other stakeholders, it is vital that this information reflects a true and fair view of the business. However, literatures have indicated that the information disclosed in those sections was altered in a way to affect readers' perceptions and their investment decisions, specifically used for impression management purposes. Impression management involves the manipulation of information to depict a specific image and it is generally aimed at developing a more advantageous view of an organization's performance than is warranted. Thus, impression management conflicts with the purpose of accounting, which is to display objectively financial performance in a neutral, unbiased way.

BOOK CHAPTERS

Author(S) **Abdul Al R., Mostafa R.**

BOOK CHAPTER	**Entrepreneurial Motivation and Firm Performance in Lebanon**
BOOK TITLE	**Go-to-Market Strategies for Women Entrepreneurs**
YEAR	2019
PUBLISHER	Emerald Publishing Limited
ISBN	9781789732900
THEME / SUBTHEME	Creative Sustainable Development/ Sustainability in Business
ABSTRACT	This exploratory research examines the effect of motivational factors on the firm performance of women entrepreneurs in Lebanon. An interview questionnaire was used to collect data from 110 women entrepreneurs. Findings of the multiple regression model indicated three women entrepreneurial motivations (internal locus of control, self-efficacy, and financial success) were positively related to firm performance. Other entrepreneurial motivations that were explored (need for achievement, desire for independence, and passion) appeared to have no significant positive relation with firm performance. Generally, this exploratory research suggests that theories regarding women entrepreneurship derived from developed countries should be examined carefully before being used in developing country settings like Lebanon.

Faculty of Architecture

Design and Built Environment

ACADEMIC JOURNAL ARTICLES

Author(S) **El Daghar K.**

ARTICLE TITLE	**Conservation Techniques of Architectural Heritage and Private Property Legal Rights – Case Study Alexandria, Egypt**
JOURNAL	**International Journal Of Environmental Science and Sustainable Development**
YEAR	2020
PUBLICATION INFO	DOI: 10.21625/essd.v5i1.715
THEME / SUBTHEME	Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture
ABSTRACT	Conservation projects of architectural heritage primarily aim at preserving the cultural character and protecting the historical and value buildings through a set of techniques/ approaches and concepts that deal with valuable urban heritage. These concepts and approaches are sometimes a major obstacle to community development. Thus, for a better understanding of the debate over conservation versus development in terms of ownership and private property legal rights, the study will review the classification of different techniques by applying them at the level of architecture, urban and society. Hence, these have been classified into three basic levels: building, urban and community, whereby policies for each type will be reviewed. These arguments will be discussed within the Alexandrian experience in architectural heritage listing and management. Moreover, the study also explores evaluation criteria of historical and value buildings, clarifying the attempts to conserve the architectural heritage in Alexandria. The study focuses mainly on the conflict between conservation techniques and concept of private property legal rights, and hence, proposing some future measure to address the conflict of interests between conservation on one hand and private property ownership legal rights on the other. In addition, it will present some recommendations for preserving the unique architectural style of the Mediterranean Sea that distinguishes the city of Alexandria. It will also adhere to the remains of this heritage by taking into consideration the legal rights of private property, which can contribute to the conservation techniques of architectural heritage for Alexandria.

Author(s) **El Daghar K.**

ARTICLE TITLE	**Critical Thinking and Collaborative Problem-Solving for Improving Education Performance – Case Study Thermal Retrofit to Ensure Health and Wellbeing of Historic Built Environment in Lebanon**
JOURNAL	**International Journal Of Environmental Science and Sustainable Development**
YEAR	2020
PUBLICATION INFO	DOI: 10.21625/essd.v5i1.716
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	The global ecological crisis is an indispensable issue that needs to be solved. The importance of developing critical thinking and communication skills in teaching-learning methods will help to enhance education performance; as well, the students would become informed participants in environmental decision-making. Lebanon is suffering from multiple ecological problems due to the environmental mismanagement, particularly energy problems. For this reason, training the Lebanese students mainly in architecture schools should to think critically about environmental issues, and using collaborative problem-solving as one of teaching-learning methods and techniques, which will be directly reflected in finding solutions to the problem under investigation. The researcher aims to experiment and apply this method in a history of architecture class at faculty of architecture, to improve the environmental quality of health and wellbeing in historical built environment. This will increase the awareness for conservation aspects of architectural heritage in students, on the one hand. In addition to spread the spirit of teamwork, to facilitate the concept of integrated design process between the different disciplines when practicing professional life, on the other hand. Therefore, the study aims to produce a new methodology for integrating teaching-learning method in architecture, presenting various international attempts of thermal retrofit in historical built environment, guiding the architectural students to follow the same approach of such projects, which will save energy in a country that has a major problem in electricity. The case study is based on a real problem in a realistic situation in Tripoli old Souks at north Lebanon, in which the instructor and the students will analyze and propose some solutions of building thermal retrofit within this historical context, using collaborative problem-solving strategy that could clarifying its reversal extent on the validity of health and wellbeing with the continuity of conserving the architectural heritage.

Author(s) **Farahat B.**

ARTICLE TITLE	**Employing Sustainable Development Concepts to Revitalize the Historic Urban Quarter of Al-Muizz Street, Cairo, Egypt**
JOURNAL	**APJ-Architecture and Planning Journal**
YEAR	2020
PUBLICATION INFO	26(1): 1-16
THEME / SUBTHEME	Science and Technology/ Theories, History, and Humanities in Architecture
ABSTRACT	Historical preservation helps keep communities beautiful, vibrant and livable, and gives people a stake in their surroundings, for the fact that such historical and valuable places provide a sense of stability and a tangible link with the past (historichawaii.org Feb.2020). Historical places constitute a valuable front for cities with a well-known identity that lasted for centuries. Focusing on developing these places to ensure their sustainability and preserving their history constitutes a mission that has impact not only on the urban environment but also on people using it. Fundamentally, cities bring creative and productive people together helping them to do what they do best: exchange, create and innovate. Culture lies at the heart of urban renewal and innovation.(Culture: urban future: global report on culture for sustainable urban development, Unesco 2016). Al-Muizz Street, an urban space in Cairo, Egypt is the study of this research that aims, first, to assess the current situation of the case study and its physical conditions. Second, to employ new concepts of sustainability in order to revitalize and preserve the cultural heritage of Cairo city, and to propose sustainable design based on the field survey, in order to achieve the best development. Al-Muizz Street constitutes a history that is worth preserving and developing because of its importance in the city life cycle. By being the lifeline of Cairo, restoring life to it, helps ensure an active living and a healthy environment for people.

Author(S) **Fadel, I., Halabi M., Mohsen H., Youssef M.**

ARTICLE TITLE	**Guidelines for Sustainable Construction Methods to Build Over Difficult Topographies**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-16
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	Sustainable construction development is a recent term that is required to create an eco-friendly built environment using renewable and recyclable resources and to reduce energy consumption and waste within protecting the natural environment. This term means such an improvement that pleases the current requirements without limitation of the prospect of sustaining requirements in future. Many problems face builders while executing projects, especially these projects were decided to be built over difficult topographies, such as rivers, falls, inclinations, caves, ridges, cliffs, and mountains. Construction challenges to build a project over a difficult topography are diverse starting by executing piles, retaining walls, conserving stability, and choosing the proper sustainable materials that can withstand the natural environmental factors. This paper sheds the light on the potential of any site›s certain criteria; mostly its topography and slope on the provision of sustainable and ecological buildings. It seeks to recognize the sustainable and ecological variables of site topography, consuming a set of characteristics for each building type. The main aim of this research is to propose guidelines of sustainable construction methods that can be used to enable builders to build over difficult topographies, particularly on mountains. The research therefore depended on a scientific methodology through analyzing a sort of literature sources to structure a theoretical base, and then certain parameters were concluded. These parameters were used to analyze a concentrated case study on a site attaching (Beaufort Castle-Chkif), located in Arnoun South of Lebanon. Data of this field-work was conducted by site-visits, capturing photos, interviews, and questionnaire. This site is envisioned to be tested for building projects over sloped contour lines of Chkif Mountain. The paper provides an application for the development of the guidelines for passive and sustainable capability on favorite orientations on the buildings in difficult sloped areas with respect to the climatic local data, Application of the idea of the sustainable and ecological development in the building construction will be an origin of engineering and scientific inspiration for many coming years. One of the conclusion points is the preferable typology of projects to be built over mountains is touristic and entertainment activity to attract people. The sloped contour lines may be employed to be a potential not threat.

Author(S) **Felix M.**

ARTICLE TITLE	**Heritage Cities After Wars: Between Tradition and Innovation-A Case Study o Beirut in Lebanon**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-13
THEME / SUBTHEME	Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture
ABSTRACT	Urban heritage is one of the most important aspects that identify a city's history and evolution. Rebuilding cities after war is a concept that takes into consideration several aspects of maintaining a visual memory of urban heritage. A proper understanding of heritage aspects and elements should be considered in new extensions and the redesigning of old parts of cities, especially after wars. Beirut in Lebanon is one of the Middle Eastern cities that have been rehabilitated and rebuilt successfully after suffering from several wars. This research discusses and analyses conservation approaches that have been used in old parts of Beirut city and the evolution of the approaches to rebuilding buildings, from tradition to innovation, that have been applied in the downtown Beirut district. This research aims to analyse downtown Beirut as a benchmark for the reconstruction of countries destroyed after war. Furthermore, the approaches that have been used in reconstructing the new buildings of downtown Beirut heritage are categorized in order to establish the link between the elevations of traditional buildings and newly constructed buildings, while maintaining the concept of a visual memory of urban heritage.

Author(S) **Omar O., Al-Sarrag N.**

ARTICLE TITLE	**Impact of Contaminated Interior Finishing Materials on the Educational Buildings**
JOURNAL	**BAU Journal -Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-13
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

ABSTRACT

This paper focuses on the impact of indoor finishing material contaminations such as Formaldehyde (HCHO) and Volatile organic compounds (VOCS). These contaminations are reflected through harmful effects on the health of occupants in the indoor environment, reflecting negatively on the comfort, satisfaction, and productivity of inhabitants in the indoor environment. The research focuses particularly on educational buildings as a case study and the effect of contaminations in a design studio located in a faculty building of a university in Debbieh, Lebanon. During the first year of building use, the study checked the concentration of (HCHO) and (VOCS) through the use of an air quality meter in different periods of time. Following the tests, the study implemented a new method to discharge contaminations prior to occupants using the building. This document leads to the technical process to release contaminations, becoming a guideline for further professional practice. The research combines theoretical with the applicable methods to offer the best practices for releasing such contaminations.

Author(S) **Omar O.**

ARTICLE TITLE	**Intelligent Systems for Functional Improvement of Buildings**
JOURNAL	**International Journal of Environmental Science and Development**
YEAR	2020
PUBLICATION INFO	11(5): 244-250
THEME / SUBTHEME	Science and Technology/ Digital Technology in Architecture
ABSTRACT	The design and development of sustainable environments can be considered as a shared duty, especially in the current state of climate change and ecological awareness. The role of a few major stakeholders, such as architects, in ensuring a reliable and suitable environment design is even more critical, as the construction industry currently consumes half the energy sources globally. Therefore, improving the way in which our environment is designed challenges certain cultural systems, such as education for future architects and engineers, which currently demonstrates evident limitations. The digital transformation is increasingly affecting all aspects of life. This research focuses on new development strategies for improving functionality in existing buildings through enhancing students' ability to think critically in the face of environmental challenges, using digital processing tools to achieve a sustainable building. The research approaches are both quantitative and qualitative, with an emphasis on problem-solving (ARCH463: Intelligent Buildings). Four steps have been followed: literature review; assessment and analysis; guidelines creation; and tests and simulations. One of the results of this research is to create development strategies for the functional improvement of an existing building through promoting course and interest in the students of an elective course (ARCH463: Intelligent Buildings) in the second level of architecture in the Faculty of Architecture, Beirut Arab University, Beirut, Lebanon. Another outcome will be the practical effectiveness of new technology devices in sustainable intelligent building in the Arab countries.

Author(S) **El Khoury C., Sukkarieh R.**

ARTICLE TITLE	**Interactive Playscapes: Explorative Design and Robotic Fabrication Techniques**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-11
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	This research focuses on material-based practices and explorations by utilizing the carbon fiber fabric performance characteristics as a significant driver in the design and fabrication strategies. While the integrative aspects of computational design have been extensively used for the inclusion of environmental, manufacturing, or economic considerations, material information should be similarly employed as a generative driver. The paper describes and evaluates a full-scale prototype of installation for social play actuated in the heart of Beirut city, hence integrating material research with methodologies optimizing fabrication techniques for complex, performance-driven structures. The introduction of carbon fiber composites into the construction sector defines potential challenges to the design process, knowing that these components need to be light and cost-effective in their production. At the same time, advanced technologies, such as digital fabrication, need to dwell upon their limitations regarding time optimization, material restrictions, and relations between automated and manual labor. Many applications show that carbon fiber system has proven to be a novel building material to improve structures. Regarding the fabrication techniques utilized, milling is a vital process, where the material subtraction rate is one of the essential features to be established in addition to its final weight. However, factors such as shape precision and surface quality are constraining factors in the increase of material removal regarding robotic fabrication. Hence, in this work, machining strength and surface roughness are considered restricting to the optimization of machining parameters in order to obtain a maximum material removal rate.

Author(S) **El-Cheikh S., Felix M., Mohareb N., El-Bastawissi I.**

ARTICLE TITLE	**Investigating the Relationship Between User's Densities and Functions Distribution On Mediterranean Waterfronts: Statistical Analysis Approach**
JOURNAL	**APJ-Architecture and Planning Journal**
YEAR	2020
PUBLICATION INFO	26(1): 1-14
THEME / SUBTHEME	Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture
ABSTRACT	The type of buildings and activities along the waterfronts have to stimulate the interactivity between public spaces and their users to reach the desired comfort, enjoyment and appropriate densities. This study is part of a continuing research and it aims to highlight the spatial relationship between the type of buildings and the densities on cities waterfronts of the Mediterranean Sea. It undertakes three case studies with different economic and touristic levels. It is a top-bottom approach that analyzes the existing population densities on waterfronts and the surrounding building functions. This paper uses quantitative analysis based on spatial statistics along each of the three waterfronts. The data collection is made through documentation, direct observations, mapping, Global Positioning System, and Geographic Information System software. The outcome of this research evaluates the relationship between functions and population densities to record how locations of functions increase population on waterfronts by making them attractive and recommends how waterfront zoning laws will consider specific land uses and techniques.

Author(S) **El-Cheikh S., Felix M., Mohareb N., El-Bastawissi I.**

ARTICLE TITLE	**Monitoring Participatory Approaches in Mediterranean Waterfront Developments (El Mina, Lebanon; Alexandria, Egypt; and Antalya, Turkey)**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-18
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

ABSTRACT

Public participation is an important tool for communities to influence development decisions for public spaces in general and waterfronts in particular. In coastal cities, waterfronts are an important touristic attraction and are affected by social and economic issues. Users' activities and responsiveness to waterfront projects are affected by the development types and methods. This study is part of ongoing research aiming to evaluate the participatory approach methods in the waterfronts of Mediterranean cities. It examines three coastal cities that have developed differently based on sustainable development studies. This study is a top–down approach that investigates the applied phases and methods of participation and evaluates these involvements after comparison with the preferred phases and methods. This paper uses qualitative and quantitative methods, which are based on analysis of social studies about participation priorities. It uses methods such as documentation, lengthy interviews and questionnaires with visitors. The outcome of this research proves the need for application of participatory approaches in Mediterranean cities.

Author(S) **Omar O.**

ARTICLE TITLE	**Near Zero-Energy Buildings in Lebanon: The Use of Emerging Technologies and Passive Architecture**
JOURNAL	**Sustainability**
YEAR	2020
PUBLICATION INFO	DOI: 10.3390/su12062267
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	Architecture always aims to find solutions for problems around the world. One of the major trends at present relates to energy consumption and climate change. Construction is responsible for 18% of CO_2 emissions. However, continuing to use fuel as a main source of energy consumption for economic reasons, as it is the cheapest raw material and most easily available material for most of the Arab countries, results in a negative environmental impact on the quality of life in these countries. This paper investigates a new design concept and decision-supporting tools for zero-energy buildings. Based on critical thinking as a new mechanism to create a hierarchy of designing a building, the research presents the experience of the author in teaching architecture courses for postgraduates for five years (ARCH 662: Architecture Design and Decision-Supporting Tools and Arch 663: Advanced Sustainable Architecture). The result of this research could be new methodologies that help and guide the architect in creating more zero-energy buildings in their countries. In addition, the spread of knowledge in the future generation of architects in architecture schools will mean that new designers believe in protecting and taking care of their environment, which will increase awareness of environmental issues and improve the quality of life in these countries.

Author(S) **Merhy D., Mohareb N., Khalifa M.**

ARTICLE TITLE	**Optimum Windbreaker to Reduce Wind Tunnel Effect on Occupant Comfort at Pedestrian Level (A Case Study of BAU Building in Tripoli)**
JOURNAL	**APJ-Architecture and Planning Journal**
YEAR	2020
PUBLICATION INFO	26(1): 1-9
THEME / SUBTHEME	Health and Wellbeing/ Quality of Life in the Built Environment
ABSTRACT	Shape, size, building orientation and its interaction with the surrounding buildings can cause wind tunnel that affect the pedestrian comfort. This paper aims to select the optimum windbreaker height and thickness for reducing the effect of wind tunnels on pedestrian comfort, by selecting the building of Beirut Arab University (BAU)-Tripoli campus as a case study. Different alternative designs have been simulated and compared with the comfort criteria of pedestrians to conclude the optimum solution that can be adapted on the selected building and on any other cases that have similar characteristics.

Author(S) **Halabi M.**

ARTICLE TITLE	**Para(noia)metric: Architecture Beyond the Edge of Rationality**
JOURNAL	**APJ-Architecture and Planning Journal**
YEAR	2020
PUBLICATION INFO	26(1): 1-11
THEME / SUBTHEME	Science and Technology/ Digital Technology in Architecture
ABSTRACT	Nowadays, efforts are being tremendously put in order to facilitate opportunities for the fourth industrial revolution to play a real role in the destiny of architectural design and construction. Parametric design and digital fabrication are some of the tools that have been contributing in this uprising for the last two decades.

ABSTRACT

The amount of solutions developed so far has, sometimes out of curiosity, been used in alternative ways that occasionally lead to highly appreciated outcomes, and sometimes immersed us in worlds of rationally controlled complexities that might be not so useful. Some of the highly sophisticated computational design processes strengths are easily capable of hallucinating us with the ridiculously marvelous forms that make us see unimaginable things and which, by the help of digital fabrication, are sometimes attainable. However, and basing oneself on some rationality keys in architecture, the question of the real need for such complexities to be the predominant scheme of our thinking strategies arises. One specific issue that is tackled in this paper is the influence of technologies in architecture from a critical perspective. With great impact on all ages of architectural history, sooner or later, technology has influenced the way in which buildings were conceived, documented, and constructed. It is to say that a great deal of effort has been put throughout time in order to innovate, understand material behavior, and to find an aesthetical balance between science and art. In this sense, the argument of the digital technologies in architecture will be set up as a not too long time frame, only a few decades long, but due to the constant progress of technology, it seems that advancements in design and fabrication are either slow or not accepted yet. The speed is an issue not due to the fact that there are not clear innovative principles, but because of its wide variety of tools being developed constantly that opens the possibility for creative exploration, to the point that the simple can become complex, the material can become immaterial, and the rational can become humanly irrational. Not because it is not geometrically or parametrically descriptive, but due to other parameters that maybe are not in need for provision right now. The paranoia comes with the idea of delivering a concept in a way that requires efforts greater than building non-standard architecture, leading to the frustration of building a challenge that requires extra determination, manpower, advanced machines, or just more money for all of that. However, this is related to the customization design philosophy that architecture in many ways was imposed to follow for many reasons. It is therefore questionable what the role of sustainable development would be among all this mess.

Author(S) **Youssef M., Dikmak A.**

ARTICLE TITLE	**Re-interpretation of City's Radial Expansion in The Developing Countries through Green Affordable Housing Case Study: Greater Sour Southern Expansion Axis, Lebanon**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-10
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	The footprint of the city is at major risk. Cities are growing out in a fast and unplanned way thus increasing ground stress, both environmentally and economically. When the population increases, the suburbs are exposed to an amorphous expansion, which leads to a modification in the form and content of the city's periphery.

ABSTRACT

Greater Sour is one of the coastal cities in Lebanon that passed through major phases of expansion over time and has the potential for major future growth. This growth is resulting in a radial-shaped structure located along the major roads linking the city to the surrounding towns. It is also affecting the green natural environment surrounding the city. This paper aims to provide a vision for developing the city's expansion through the application of a sustainable urban model that ensures a healthy living environment and maintains the green natural environment in the city's periphery. The reinterpretation of the city's expansion will be through the examination of the reasons and shape of urban growth and the study of the efficiency of implementing a green affordable housing as a tool to enhance the urban expansion of the city. In addition to studying similar and distinctive examples of green housing neighborhood, the paper analyzes its relationship to the context (social and economic) and its future impact on the surrounding, spotting light on the finger plan in the Greater Copenhagen area. After analysis and study of the case, we could find that the focus now is to lead the built out and organize the expansion of the city by creating a flexible system to follow.

Author(s) **Youssef M., Abou Shahine S.**

ARTICLE TITLE	**Reinterpreting the Territory Fragmentation through Creating Cultural Promenade Case Study: Possibility to Reinterpret Zokak El-Blat District**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-11
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	This paper focuses on tools and actions of urban planning that help the creation, enhancement, transformation or revitalization of cultural identity and historical meaning of central public spaces that suffer from urban disruption or fragmentation. This work uses the case study of a well-known district, Zokak el Blat, in Beirut, Lebanon, which has undergone noticeable changes in terms of morphology of the urban fabric as well as disparities in functionality. According to these facts, this district has a high potential for defining a strong central dynamic zone, where local character is reinforced, which creates a sort of fragmentation and discontinuity in the territory. This fragmentation, mainly caused by the development of road network, will lead to a significant decreasing from the cultural dimension as well as the local meaning of the district. As the study focuses its main branches of urban planning and design, the methodology is supported by several tools (graphs, maps, questionnaire, and other empirical studies). First, in order to determine the evolution of current characteristics of the territory, a detailed study of the historical background should be analyzed. Later, a deeper study of urban cores and dynamics should take place in order to define what territories are most suitable for preserving cultural and historical value. These studies are completed with physical methodologies, like field study, where local agents are asked to give a detailed feedback about the development of urban dynamics that they noticed. Then, the use of empirical analysis will set up the main promoters of the fragmentation of the space. Finally, a developed proposal for the studied area will reinforce the ability of creation, enhancement and transformation or rescue of historical identity and cultural meaning of Zokak el Blat district.

Author(s) **Elsamahy E., Felix M.**

ARTICLE TITLE	**The Appropriate Building Materials for Energy Saving in Different Climate Zones in Egypt**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-10
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	Nowadays, reducing energy consumption is globally considered a matter of high priority on the different levels of community and economic interest, especially in the developing countries, due to the growing shortage of traditional energy resources with the rapidly increasing energy prices and its impact on the natural environment through the consumption of various energy resources such as fossil fuels. The residential building sector is responsible for consuming a large percentage of energy, especially that used in heating and cooling, which could be reduced through using different passive design strategies, such as designing the building shape, setting the optimum orientation and selecting the most appropriate building materials for the specific climate zones. Therefore, this paper focuses on reducing the energy consumption in the residential building sector in Egypt by evaluating four different non-structural filling wall materials, including red bricks, cement bricks, stone and curtain walls located in different climate zones. Simulation analysis techniques are used to measure the related energy consumption parameters for cooling and/or heating to achieve the thermal comfort zone for building users. These results will aid architects in the pre-design stage to choose the most appropriate material for their designs, depending on the location concerned.

Author(s) **Halabi M.**

ARTICLE TITLE	**The Digital Fabrication Lab Contribution to the Sustainable Development Goals: Exploring Waste Materials and Fabrication Techniques**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-10
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	The SDGs, commonly known as Sustainable Development Goals, unveil the shortcomings and deficiencies of the building sector facing of the challenges of the planet. Unfortunately, the news is not positive since the objectives established by the United Nations General Assembly should be reached by 2030. From the 17 goals and 169 targets, a case study was developed in order to test its effectiveness against SDG 9, which deals with Infrastructure, Innovation and Industry. In this sense, technology should play a significant role in the mapping criteria against the objective and its targets. Therefore, an overview of the potential digital tools will be exposed, and with a later test carried out using some of these tools with a balanced process among digital design, fabrication, and use of a material based on the waste produced at the Digital Fabrication Lab. From a variety of trends in technology such as the BIM or the virtual and augmented reality, a test was carried at the Digital Fabrication Lab, mixing different digital and material technologies, in order to assess its effectiveness and deficiencies related to the SDG9. A preliminary matrix of the case study would show the targets capable of being covered by taking advantage of such tools and systems to provide guidelines for further steps to tackle SDG 9. Conclusions were drawn both as scientific results and initiatives to take into consideration in order to contribute in the impact that recommendations should cause on such an ambitious goal.

Author(s) **Youssef M., Mefleh F.**

ARTICLE TITLE	**Towards a Creative Sustainable Promenade in Informal Souk Architecture Case Study: Mar Elias Camps in Beirut, Lebanon**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-15
THEME / SUBTHEME	Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture
ABSTRACT	Informal settlement and slums are from the past decades growing continuously with urbanization, where informal souk or small market propagate informally in slums. Mainly the informal settlement is defined as residential areas where a group of housing has been constructed on land to which the occupants have an illegal claim. These informal settlement maintain few shops in unorganized way which influence the economic conditions. There are also the lack of open spaces where small alleys are mainly allocated in these informal urban fabric. The main aim is to provide a new applicable and better living condition, by providing new retails and promenade path. For that reason, this paper focuses on the principles of how movement occurs within the slums, informal settlement and the built environment, and mainly presents a case study strategy which analyze in depth interviews, group discussion with residents, records, observations and measurements of informal settlement. Moreover the paper declares that the informally created open spaces and movement paths are formed on the basis of social relation, and economic practical problems. In conclusion, an analyzed new promenade path presented as an architectural souk in informal settlement based on theories and practices on movement architecture will be declared and analyzed.

CONFRENCE PROCEEDINGS

Author(S) **Farahat B., Alaeddine H.**

PROCEEDING TITLE	**Towards Improving the Quality of Workspaces for a Better Human Performance in Lebanon** ***(Joint Publication with the Faculty of Human Sciences)***
CONFERENCE TITLE	**The International Conference on Architecture and Civil Engineering**
DATE	12/3/2020
PLACE	Kuala Lumpur, Malaysia
THEME / SUBTHEME	Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture
ABSTRACT	The quality of built environment plays an essential role in defining human behavior. Nowadays, individuals spend most of their lifetime within all types of built environments, in particular, in work environment. Employees aspire for workspaces where they can fulfill their potential and satisfy their needs. Therefore, the design of workspaces is facing major challenges and requires several transformations in order to meet the various and diversifying demands and expectations of employees. The purpose of this research is to investigate the importance of improving the quality of workspaces. This research analyses the relationship between the quality of workspaces and the performance of employees. It explores the architectural design principles and environmental conditions leading to the quality of workspaces. Moreover, it sheds light on the existing of greenery within these workspaces. A qualitative research approach is used in this research. Two national case studies are taken into consideration; each case study is analyzed based on pre-determined parameters. The sample of research is selected randomly and an interview is separately conducted. The results confirmed that both two cases meet the requirements of quality, relevant to the workspaces' design; as well as it showed that the employees had reported an increase in their performance. These results emphasize the necessity to create more national workspaces, implementing the concepts of quality and adopting international criteria of design for a better human performance.

BOOK CHAPTERS

Author(S) **El-Daghar K.**

BOOK CHAPTER TITLE	**Conserving Symbolism in Architectural Heritage – Case Study Eloquence in Depicting Philosophical Ideas Inspired by the Principles of Islam on Islamic Architecture through Ages**
BOOK TITLE	**Advances in Science, Technology & Innovation-Conservation of Architectural Heritage**
YEAR	2019
PUBLISHER	Springer International Publishing
ISBN	9783030108717
THEME / SUBTHEME	Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture
ABSTRACT	Symbol includes a meaning not just a sign, and a meaning can be read whenever it is understood since the idea of communication is available in the significance of this meaning. This explains why human existence is closely related to symbol and symbolism. The architectural heritage attaches great importance to the idea of symbolism, and constantly uses different symbols and distinctive vocabulary. The general geometric shape of the building or outline, the formation of spaces, the degree of simplicity or complexity, the mass of the building, the quality of the materials used, and the colors are architectural elements rich in symbols. In addition to the architectural vocabulary, such as columns/pillars, arches and domes, ornaments, and circular openings borrowed by some architects from different periods of time to enrich the symbolic meaning of their design approaches. Though, this metaphor remains superficial if the vocabulary is not in harmony with the rest of the space and functional components of the building attached. The study aims to illustrate the meaning of symbol and symbolism in architecture. Then, to discuss the symbolic reflection on architectural heritage, where some architectural paradigms were taken expressing various historical periods. Finally, review and compare selected examples from different chronological periods of Islamic architecture. Moreover, the objective behind this is to highlight a set of ideas and architectural elements and vocabulary contained in these examples, which can be adapted nowadays in the design concepts to bear the same moral significance. This paper is clarifying an attempt to highlight the eloquence in depicting philosophical ideas that inspired by the principles of Islam and their relationship to Islamic architecture. The purpose of this study is to analyze and understand these ideas and display their importance to conserve symbolism in architectural heritage. In general, in order to reach a set of recommendations that can be used to enrich contemporary Islamic architecture in particular, hoping to raise the level of the spiritual environment and confirm a distinctive architectural identity.

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ACADEMIC JOURNAL ARTICLES

Author(s) **Issa H., Diab W., Wehbi M.**

ARTICLE TITLE	**A Compact X-Band Coplanar Waveguide Hybrid Lowpass Filter**
JOURNAL	**International Journal of Electrical and Electronic Engineering and Telecommunications**
YEAR	2019
PUBLICATION INFO	DOI: 10.18178/ijeetc.190702
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	The paper presents the design of a compact coplanar waveguide lowpass filter in the X band. The lowpass filter has a -3dB cutoff frequency of 10 GHz. The compact size is achieved due to the use of localized surface mount capacitive loading. For the first time, the employment of localized loading capacitors for miniaturization proves to be efficient at high frequencies. The designed hybrid filter proves to have smaller size and better performance than commercially available filter with which a comparison is made.

* Names in Bold Indicate BAU Authors

Author(S) **Damaj I.,** Mardini W., Mouftah H.

ARTICLE TITLE	**A Mathematical Framework for Effective Routing Over Low Power and Lossy Networks**
JOURNAL	**International Journal of Communication Systems**
YEAR	2020
PUBLICATION INFO	DOI: 10.1002/dac.4416
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	With the rapid advancement in the Internet of things, protocols are challenged to perform routing with low power over lossy networks (RPLs). Performance analysis of RPL attracted many researchers in the field. However, to the best of our knowledge, limited or no studies have been made to develop heterogeneous analytical models that aim at the classification and ranking of RPL deployments based on combinations of desired properties. In this paper, we develop an analytical framework that captures the effectiveness of RPL and enables its sound evaluation and classification. Performance metrics include power consumption, churn in, received packets, and duty cycle, to name but a few. The obtained results based on our analytical framework confirms its effectiveness compared to the simulation results obtained in the literature. The best performance is noted for the deployments with 50 m of range and for different number of nodes.

Author(S) **Damaj I., El Haj A.,** Mouftah H.

ARTICLE TITLE	**An Analytical Framework for Effective Joint Scheduling Over TDD-Based Mobile Networks**
JOURNAL	**IEEE Access**
YEAR	2019
PUBLICATION INFO	7: 144214-144229
THEME / SUBTHEME	Science and Technology/ Advances in Technology

ABSTRACT

The growing demand for data along with the emergence of new communication standards have reshaped wireless networks through a denser base station deployment, an increasing traffic heterogeneity, and an additional complexity in quality of service (QoS) assurance. Orthogonal Frequency Division Multiple Access (OFDMA) is considered as one technique to be used in next generation wireless networks. Utilizing time division duplexing (TDD) aids the management of resources and providing effective QoS. In the literature, common approaches in assessing effectiveness attempt to capture performance using single indicators that reflect one aspect of the network's operation. consequently, multi-objective evaluations are not easy and require intuitively considering isolated descriptions, plots, visualizations, and holistically performing multiple comparisons. In this paper, we propose an analytical framework that aims to classify the effectiveness of joint scheduling algorithms over TDD-OFDMA networks per combined heterogeneous properties. In the suggested framework, a designer benefits from a bouquet of carefully customized indicators that can lead to quality evaluations, performance classifications beyond traditional approaches, and accurate improvements. Validation includes exhaustive simulations and the assessment of different scheduling and performance classification schemes. The obtained results confirm the validity of the framework and confirms its effectiveness in application.

Author(S) **Damaj I.,** Elshafei M., El-Abd M., Aydin M.

ARTICLE TITLE	**An Analytical Framework for High-Speed Hardware Particle Swarm Optimization**
JOURNAL	**Microprocessors and Microsystems**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.micpro.2019.102949
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Engineering optimization techniques are computationally intensive and can challenge implementations on tightly-constrained embedded systems. Particle Swarm Optimization (PSO) is a well-known bio-inspired algorithm that is adopted in various applications, such as, transportation, robotics, energy, etc. In this paper, a high-speed PSO hardware processor is developed with focus on outperforming similar state-of-the-art implementations. In addition, the investigation comprises the development of an analytical framework that captures wide characteristics of optimization algorithm implementations, in hardware and software, using key simple and combined heterogeneous indicators. The framework proposes a combined Optimization Fitness Indicator that can classify the performance of PSO implementations when targeting different evaluation functions. The two targeted processing systems are Field Programmable Gate Arrays for hardware implementations and a high-end multi-core computer for software implementations. The investigation confirms the successful development of a PSO processor with appealing performance characteristics that outperforms recently presented implementations. The proposed hardware implementation attains 23,300 improvement ratio of execution times with an elliptic evaluation function. In addition, a speedup of 1777 times is achieved with a Shifted Schwefels function.

ABSTRACT

Indeed, the developed framework successfully classifies PSO implementations according to multiple and heterogeneous properties for a variety of benchmark functions.

Author(S) **Amine S.,** Mokhiamar O.

ARTICLE TITLE	**A Study of Stability and Power Consumption of Electric Vehicles Using Different Modern Control Strategies**
JOURNAL	**Alexandria Engineering Journal**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.aej.2019.10.010
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	This research paper aims at applying modern control techniques to study the stability and power consumption of electric vehicles. The main purpose is to propose an artificial neural network controller to estimate the direct yaw moment required for stabilizing the dynamics of electric vehicles with four in-wheel motors. Only one state variable, that can be measured using a cheap and standard sensor, is used to define the error signal for the controller. The algorithm of equality-constrained quadratic program is used to split the estimated yaw moment onto the four in-wheel motors. The neural network controller is trained using data obtained from fuzzy logic controller. In addition, the classical sliding mode control is applied for the sake of comparison. Simulation results prove that in comparison to classical controller, the mentioned modern controller provides better stability of the electric vehicle›s lateral dynamics and lower usage of electric power for the motors.

Author(S) El-Zahab S., Fares N., **Ghanem H.,** Dandashli T.

ARTICLE TITLE	**A Study of Truss Sub-structured Materials**
JOURNAL	**Multidiscipline Modeling in Materials and Structures**
YEAR	2020
PUBLICATION INFO	16(5): 50-66
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	**Purpose** The purpose of this study is to introduce a new concept in engineered materials and that is truss substructured materials (TSMs). These materials would be engineered to express mechanical abilities that are seldom found in nature. **Design/Methodology/Approach** This article starts with defining TSMs and how to classify and name TSMs. The article also introduces the theoretical modeling of TSMs, the software developed for analyzing TSMs and the parametric studies performed. **Findings** After these studies, new materials are introduced that have abilities such as negative Poisson ratio in X and Y direction, negative Poisson ratio in one direction (either x or y), self-remodeling under stress. **Research Limitations/Implications** The research is done in 2D, further studies in 3D using 3D printing are required to make the suggested materials a viable real-world solution. **Originality/Value** The main contribution of this research work is the proposed nomenclature that creates a system for researchers to experiment and create novel and unique versions of the proposed materials. Furthermore, some of the materials developed exhibit some unique properties that may create advances in engineering with further development.

Author(S) **Kanaan M.**

ARTICLE TITLE	**CFD Optimization of Return Air Ratio and Use of Upper Room UVGI in Combined HVAC and Heat Recovery System**
JOURNAL	**Case Studies in Thermal Engineering**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.csite.2019.100535
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Several strategies and techniques have been recently developed to decrease energy consumption in heating, ventilation, and air-conditioning (HVAC) systems. One method is to recirculate a fraction of return air and make use of the remaining part (exhaust) to preheat fresh air in order to reduce the heating load. However, limitations must be imposed to the return fraction to maintain acceptable indoor air quality (IAQ). The aim of this paper is to develop a computational fluid dynamics (CFD) model to predict the dispersion of CO2 and airborne bacteria in all-air HVAC systems with aforementioned heat recovery system for known return air ratios as well as the disinfection of indoor air by upper room Ultraviolet Germicidal Irradiation (UVGI). The developed model can be put to practical use for estimating the maximum allowable return that minimizes energy cost of the integrated system while maintaining acceptable IAQ. It can also be used to predict the minimum required UV output to eliminate any excess in bacteria count in the breathing zone without the need for additional fresh air intake at the supply.

Author(S) **Abou Moughlbay A., Kanaan M.**

ARTICLE TITLE	**Comparative Analysis of Kinematic Redundancy Resolution Techniques in Case of Hierarchical Tasks**
JOURNAL	**Journal of Mechanical Engineering Research and Developments**
YEAR	2020
PUBLICATION INFO	43(2): 361-370
THEME / SUBTHEME	Science and Technology/ Advances in Technology

ABSTRACT

Redundancy has been a matter of cynosure to researchers in the field of robotics. The aim of this paper is to explore by numerical simulation how to take advantage of kinematic redundancy in managing the priority and interactions between the robot's main task and any additional tasks/constraints. Doing so, better performance will be obtained in executing desired tasks in real-life applications. Different types of redundancy that may arise during task execution are identified and studied at three levels: the robotic system, the robotenvironment interaction and the sensory tools in use. The various kinematic redundancy resolution techniques are grouped into four control groups (partitioned, commutative, hybrid and hierarchical), and compared in controlling two different robots while executing several simultaneous tasks with specific hierarchy and priority. The behavior of two well-known serial manipulators of different types, namely the 4R planar robot and the LWR+4 robot, is investigated for hierarchical tasks with insufficient number of degrees of freedom for task execution. Several simulations of task execution are carried out to evaluate and compare the performances of the two robots under different redundancy resolution techniques. The objectives of this study to better interpret the cons and pros of each control method and then determine the most appropriate control technique. The obtained results can be used to provide important guidelines for the future development of more plausible redundancy resolution techniques.

Author(S) **Zein Z., Jaber L., Temsah Y.**

ARTICLE TITLE	**Dynamic Soil-Structure Interaction Analysis: Detecting the Reliability of Modelling the Piles as a Plate Element for a Multistory Building Resting on Deep Foundation**
JOURNAL	**International Journal of Engineering Research & Technology**
YEAR	2020
PUBLICATION INFO	9(7): 1673-1678
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Dynamic soil-structure interaction (SSI) is one of the main subjects that has attracted the attention of researchers in the recent decades. Numerous studies were interested in examining the seismic response of buildings supported on pile footings while including SSI. Most of these studies were simulating the problem by two dimensional models in the plane strain to overcome the usual difficulties encountered in 3D models. Commonly, piles were represented by plate elements of infinite length, disregarding the spacing between piles, and thus overestimating its stiffness. Recently, Plaxis – a finite element software- has implemented a new feature known as "the embedded pile row". Although this latter models the pile as a 2D structural element, it allows the definition of an out-of-plane spacing where the soil can flow around the piles upon keeping a continuous mesh. Many researchers have studied the reliability of the embedded row element and verified its validity. The objective of this paper is to define the limitations of employing the plate feature in soil- structure pile interaction analysis. This is achieved by comparing the behavior of the structure and the pile foundation using the plate feature to that of the embedded pile row.

ABSTRACT

In this scope, a series of 2D finite element models consisting of multistory buildings supported on pile footings are generated while varying the soil type, the earthquake frequency content, as well as the out-of-plane piles› spacing. This paper demonstrated that the building response with piles modeled as plate elements is just adequate when the surrounding soil is dense. Yet, regarding the pile response, the plate feature is unable to capture the real behavior for all soil types.

Author(s) Abu Salem F., **Damaj I.,** Hamandi L., Zantout R.

ARTICLE TITLE	**Effective Assessment of Computer Science Capstone Projects and Student Outcomes**
JOURNAL	**International Journal of Engineering Pedagogy**
YEAR	2020
PUBLICATION INFO	10(2): 72-93
THEME / SUBTHEME	Science and Technology/ Applied Mathematics and Computational Sciences
ABSTRACT	A capstone project is a culminating experience that entails creativity, critical thinking, and advanced problem-solving skills. To that end, capstone projects enable students to prove their abilities, demonstrate their attained skills, and carry out a significant project in their field. In Computer Science Bachelor programs, there is a strong mapping between learning outcomes of capstone projects and all student learning outcomes. This paper presents an assessment framework for capstone courses that allows for sound evaluations of the performance of students and project qualities; besides assessing the student outcomes of the program. The developed framework comprises criteria, indicators, extensive analytic rubrics, and a summative statistical formulation. The presented course and framework are supported by the results, analysis, and evaluation of a pilot study for a single institution to explore the effectiveness of the proposed tool.

Author(s) **Kassem H., Chehab G.,** Najjar S.

ARTICLE TITLE	**Effect of Asphalt Mixture Components on the Uncertainty in Dynamic Modulus Mastercurves**
JOURNAL	**Transportation Research Record**
YEAR	2020
PUBLICATION INFO	2674(5): 135-148
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	Practitioners and researchers in the paving industry have highlighted the importance of the adoption of reliability-based pavement design. The goal of developing reliable pavements with optimum performance over their design life has become a key factor to be considered during both pavement design and construction processes. This requires the adoption of statistical and probabilistic-based analyses for the formulation of the properties and behavior of pavement materials. Thus, many researchers worked on the quantification and modeling of the uncertainty caused by the inherent variability in pavement materials in general and that of asphalt concrete (AC) in particular. The dynamic modulus (|E*|), a fundamental property for mechanistic-empirical and purely mechanistic pavement designs, has been proven to have a significant level of uncertainty that is dependent on climatic and traffic loading conditions. The main objective of this study is to investigate the effect of the AC mixture properties and components on the uncertainty in the |E*| mastercurve. This objective is achieved by conducting an experimental program incorporating four different mixtures having the same material sources but different binder types and gradations. Monte Carlo simulations are used to model the uncertainty of |E*| for each of these mixtures. The paper shows that the uncertainty is dependent on mixture type, as the presence of larger nominal maximum aggregate size, modified binder, or additive can increase the uncertainty in the |E*| mastercurve, especially at high temperatures or slow loading rates. The uncertainty is proven to be material related and not imposed by the testing instrumentation

Author(S) **Ghanem H., Khatib J., Elkordi A.**

ARTICLE TITLE	**Effect of Partial Replacement of Sand by MWSI-BA on the Properties of Mortar**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2020
PUBLICATION INFO	1(2): 1-14
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	Disposal of municipal solid wastes (MSW) has recently become a major problem in Lebanon as finding appropriate landfill is becoming more challenging than ever. Incineration is a technique currently used to reduce the volume of MSW generated. The output of this treatment is a residue well known as Municipal Solid Waste Incineration bottom and fly ash. This study is focused on the mortar containing Municipal Solid Waste Incineration Bottom Ash (MSWI-BA) as partial replacement of sand. For this purpose, mortar specimens were prepared with 50 ,25 and 100% (by weight) MSWI-BA to replace the sand. Specimens were cured in water for 28 ,14 ,7 ,2 and 56 days. Testing included; compressive strength, ultrasonic pulse velocity (UPV), density, capillary water absorption (CWA) and total water absorption (TWA). Results indicate that 25% of sand can be replaced with MSWI-BA without significant alterations in mortar properties. Above 25% replacement levels, there is drastic decrease in compressive strength and UPV. The absorption by total immersion and capillary rise was found to increase as the replacement levels of sand by MSWIBA go up from 25% to 100% but significantly diminish as the curing duration increases beyond 7 days.

Author(S) **Assoum H.,** Hamdi J. El Hassan M., Mrach T., Abed Meriam K., Sakout A.

ARTICLE TITLE	**Energy Transfers Between Aerodynamic and Acoustic Fields in a Rectangular Impinging Jet**
JOURNAL	**Energy Reports**
YEAR	2020
PUBLICATION INFO	6(S2): 812-816
THEME / SUBTHEME	Science and Technology/ Energy and Environment

ABSTRACT

Ventilation systems in buildings are of vital importance for the provision of acceptable thermal conditions and air quality while meeting stringent energy requirements. When a rectangular jet hits a slotted plate, an acoustic disturbance can be generated and self-sustained tones produced. Self-sustaining tones appear when a feedback loop develops between the surface of impact and the jet instabilities near to the jet exit. In order to control this phenomenon, more attention should be given to the source of energy that amplifies the resulting noise. Few studies have considered the fluctuation of the aerodynamic field using High Speed 3D Tomographic-PIV in the presence of self-sustaining tones. In this work, we investigate energy transfer between the aerodynamic and acoustic fields for different Reynolds numbers (Re=5294 and Re=5956) to better understand the noise generated by a rectangular jet impinging on a slotted plate. High Speed 3D Tomographic-PIV was performed at a sampling rate of 2 KHz and main flow vortices frequencies below 0.4 KHz. It was found that in the case of an optimal configuration for self-sustaining tones, the fluctuation of the Z-component of velocity presented higher amplitudes near the jet exit region.

Author(S) **Hussein S., El Falou A., Sahyoun W., Ziade Y.,** Shubair R.

ARTICLE TITLE	**Evaluation of Nano-Antenna Directivity Contributions for EM Propagation in WBANs**
JOURNAL	**International Journal of Nanoparticles and Nanotechnology**
YEAR	2020
PUBLICATION INFO	DOI: 10.35840/2631-5084/5532
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	In-vivo sensing, diagnosis and treatment of diseases is having a great attention lately. With advanced computational systems, the processing of the biological data as well as the prediction of diagnosis is becoming more promising. However, the implementation of these systems inside the human body has a major challenge: Modeling the communication channel. To overcome this problem, researchers are investigating the main factors that define the characteristics of the communication channel between nano-devices. In this work, a study of the impact of nano-antenna directivity on the electromagnetic propagating wave in the communication channel inside the human body is conducted. Then, these results are compared to the other contributors in the path loss in-vivo that are discussed earlier in literature: Frequency and propagation distance. The simulation results show that the nano-antenna directivity seems to have minor contributions (5-7 dB) on the total path loss inside the human body compared to the communication distance (20-30 dB) and the operating frequency (10-15 dB).

Author(S) **Al Rawi Y., Temsah Y., Baalbaki O., Jahami A., Darwiche M**

ARTICLE TITLE	**Experimental Investigation on the Effect of Impact Loading on Behavior of Post-tensioned Concrete Slabs**
JOURNAL	**Journal of Building Engineering**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.jobe.2020.101207
THEME / SUBTHEME	Science and Technology/ Construction, Planning and Design
ABSTRACT	Impact resistance of structures has become an essential part of construction projects, especially in mountain zones due to the prominent hazard of falling rocks. Some environmental changes, such as deforestation and modifications in landslides, have increased the danger to civil structures and pose a serious threat to the infrastructure and human life. The effect of impact due to landslide falling rocks on reinforced concrete (RC) slabs has been investigated by many researchers, while very few studied the effect of impact loading on pre-stressed structures. Therefore, the aim of this study is to investigate the behavior of post-tensioned (PT) slabs under impact load. A comparison was made with a traditional (RC) slab having a similar moment capacity. The RC slab was a flat slab with a thickness of 320 mm, while the other two slabs were PT with a thickness of 250 mm. The slabs were subjected to an impact load of 605 Kg dropped freely from 20 m. The load was dropped at the center of gravity for the RC and PT1 slabs. On the other hand, the load was dropped at mid-span of the free edge of the second post-tensioned slab PT2. The tests showed the behavior of the PT slabs under dynamic impact load due to the free falling block, and their different behavior from the RC slab, by comparing displacements, impact force, cracks, and damage type. Also, the results displayed the effect of impact location on the response of PT slabs through analyzing PT1 and PT2 results.

Author(S) **Slika W., Masri A., Baalbaki O.**

ARTICLE TITLE	**Flexural testing of Various Composite-Beams Under Quasi-Static Loads**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-12
THEME / SUBTHEME	Science and Technology/ Construction, Planning and Design
ABSTRACT	The successful interaction between concrete and steel has inspired researchers to develop composite structural systems. Steel and concrete are utilized in various configurations to reduce construction costs and assure optimal load-response behavior. Since the response spectrum of the composite system varies from one system to another, adequate understanding of the composite system behavior is essential to guarantee a desired response. Several parameters affect the flexural capacity and failure mode of a composite section, such as geometry, material properties and bond. In practice, advanced material mechanics and numerical modeling can be utilized for simulating section response, however, variability in the material response hinders accurate prediction. To serve as a benchmark and facilitate optimal composite section design, this paper presents a thorough experimental investigation of four types of composite beams under flexural loading. The first type represents reinforced concrete T-shaped beams confined by structural steel members. The second system comprises steel tubes filled with concrete. The third type consists of an open web steel joist encased in reinforced concrete. The fourth system represents rectangular shaped RC beams strengthened by steel plates. The results confirm the diversity of behavior of composite sections and reveal significant enhancement in the failure mode and flexural behavior as compared to control non-composite sections.

Author(S) **Zein Y., Darwiche M.**

ARTICLE TITLE	**Fuzzy Logic Velocity Optimization of Autonomous Vehicles Based on Road Bump Geometry**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2020
PUBLICATION INFO	1(2): 1-12
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	In today's world of fast developing technologies, semi-autonomous vehicles are becoming a common sight and increasing in numbers. Some feature autopilot systems that drive the vehicle without any intervention from the driver in certain situations or warn the driver of dangers ahead. A fully autonomous vehicle is yet to come due to old fashioned road infrastructures that would convey challenging scenarios for it. From speed bumps and traffic lights to road lanes and warning signs, current autopilot systems will have to cope with all. A system that ensures safe crossing of speed bumps when in autopilot mode is discussed in this paper. Crossing a speed bump at high speeds may result in loss of control, suspension failure, onboard cargo damage, and/or compromised passenger comfort. The proposed system can detect a speed bump from a distance, calculate the suitable crossing speed by studying vertical acceleration disturbances, and apply the brakes automatically using a Fuzzy Logic Controller (FLC) to reduce the speed before the car reaches the speed bump.

Author(S) **Jahami A., Temsah Y.,** Khatib J., **Baalbaki O., Darwiche M., Chaaban S.**

ARTICLE TITLE	**Impact Behavior of Rehabilitated Post-tensioned Slabs Previously Damaged by Impact Loading**
JOURNAL	**Magazine of Civil Engineering**
YEAR	2020
PUBLICATION INFO	93(1): 134-146
THEME / SUBTHEME	Science and Technology/ Construction, Planning and Design

ABSTRACT

Accidental rockfalls are common hazards in many countries, where many structures and infrastructure are damaged by the impact of falling rocks. This research aims to study the efficiency of shear reinforcement as rehabilitation techniques for PT "post-tensioned" slabs damaged by falling rocks. Two simply supported PT slabs were considered in this study. Each has a dimension of (6.6 m×3 m×0.25 m) and was subjected to an impact from a 605 Kg reinforced concrete falling block at a height of 20 m. The first slab (PT1-) was hit at its center of gravity, while the second one (PT2-) was hit at the mid-span of its free edge. After impact, both slabs were repaired by replacing the damaged parts and adding shear ties in order to prevent any future collapse when new impact occurred. The impact test was repeated again after repairing, and both punching shear capacity and normal stresses were recorded. Results showed that the repaired slabs were able to resist the repeated impact successfully. Both punching shear and normal stress capacities were higher than the applied stresses. Moreover, using shear reinforcement helped in changing the crack pattern from shear to flexure. At the end of this study, some recommendations were suggested for further studies.

Author(S) Ward H., Adam I., **Salem A.,** Gamaleldin M.

ARTICLE TITLE	**Integral Pumping Rings for Dual Mechanical Seals: Hydraulic Performance Evaluation Using Numerical Simulations**
JOURNAL	**Engineering Applications of Computational Fluid Mechanics**
YEAR	2020
PUBLICATION INFO	14(1): 923-938
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	The flow of barrier fluid through an industrial pressurized dual mechanical seal cartridge is investigated and evaluated experimentally and numerically. The cartridge is of the bi-directional type wherein it is radial-flow designed and fitted with a bi-directional integral pumping ring. The standard k–ϵ turbulence model is applied and the multiple frame of reference method is utilized to simulate the motion of the pumping ring. The present study is a continuation of former experimental and numerical companion work conducted in the area of the design and evaluation of integral pumping rings for dual mechanical seals. In the present study, barrier fluid flow is visualized to provide internal insight of the flow behavior leading to a better understanding of the pumping mechanism on both quantitative and qualitative aspects. The flow field is evaluated and a number of design defects are revealed. The simulations show that barrier fluid is being trapped in closed circulation in the inboard-seal region, consequently implying weaker regeneration of barrier fluid in that region in comparison with the outboard-seal region. Moreover, the simulations also reveal the existence of a relatively large separation zone at the outlet port leading to increased losses and reduced flow rate capacity of the device.

Author(s) El Hassan M., **Assoum H.,** Bukharin N., Abed-Meraim K., Sakout A.

ARTICLE TITLE	**Investigation of Thermo-physical Fluid Properties Effect on Binary Fluid Ejector Performance**
JOURNAL	**Energy Reports**
YEAR	2020
PUBLICATION INFO	6(S2): 287-292
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	Supersonic Ejector (SE) is a thermally-driven fluidic compressor that replaces the electro-mechanical compressor in Reverse-Rankine refrigeration/heat pump cycles. These widely used thermal cycles account for billions of kWh of electric energy and produce hundreds of millions of metric tons of atmospheric carbon yearly in North America. As compared to mechanical compressors, ejectors are simple mechanical devices with no moving parts. It can be configured to provide residential and commercial space heating/ cooling and water heating, industrial process heating/cooling, industrial distillation/ desalination and drying. Rather than electricity, SE-based systems can make direct use of many forms of thermal energy including solar thermal, waste heat, biogas, or natural gas, depending on emission targets, price, or availability. It is known that the SE systems have a lower thermal efficiency as compared to mechanical compressor because of its lower performance at high compression ratios. Highly efficient ejector would thus play a critical role in unlocking the wide spread use of renewable energy such as waste heat, solar thermal, and geothermal. Even in the absence of renewable energy, such a device would enable fuel switching from electricity to natural gas, which would save 65 to 75% on energy costs, and relieve the power grid during peak times. In the present study, Computational Fluid Dynamics (CFD) is used to study the effect of fluids thermo-physical properties including molecular mass, viscosity and specific heat ratio on the performance of an ejector for distillation applications. It is found that molecular mass and specific heat ratio can significantly affect the entrainment ratio of the ejector and consequently the COP of the refrigeration system.

Author(s) **Amine S., Gazo Hanna E.**

ARTICLE TITLE	**Kinematic Analysis of HALF Parallel Robot**
JOURNAL	**Journal of Engineering Science and Technology Review**
YEAR	2019
PUBLICATION INFO	12(5): 207-213
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	In the present study, the kinematics of a class of parallel manipulators with two translational and one rotational degrees-offreedom are addressed through the analysis of HALF robot. A detailed kinematic and constraint analysis of the robot is conducted. In addition, an exhaustive singularity characterization is presented with interpretation of the robot's behavior in singular poses. The implications of this study will initiate further investigations on the design of parallel manipulators belonging to the class of manipulators under consideration.

Author(s) **Ellakany A., Ali M., El-Gohary M., Elkholy M.**

ARTICLE TITLE	**Lumped System Model for Elastic Steel-Concrete Beams with Partial Interaction**
JOURNAL	**Multidiscipline Modeling in Materials and Structures**
YEAR	2019
PUBLICATION INFO	DOI: 10.1108/MMMS-01-2019-0007
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	**Purpose** The purpose of this paper is to introduce a numerical model to investigate static response of elastic steel-concrete beams. The numerical model is based on the lumped system with the combination of the transfer matrix and the analog beam methods (ABM).

ABSTRACT

The beams are composed of an upper concrete slab and a lower steel beam, connected at the interface by shear transmitting studs. This type of beam is widely used in constructions especially for highway bridges. The static field and point transfer matrices for the element of the elastic composite beam are derived. The present model is verified and is applied to study the static response of elastic composite beams with intermediate conditions. The intermediate condition is considered as an elastic support with various values of stiffness. The elastic support can be considered rigid when the stiffness has very high values. The influence effect of shear stiffness between the upper slab and lower beam, and the end shear restraint on the static behavior of the composite beams is studied. In addition, the change in the stiffness of the elastic support is also highlighted.

Design/Methodology/Approach

The objective of this study is to introduce a numerical model based on lumped system to calculate the static performance of elastic composite bridge beams having intermediate elastic support by combining the ABM with the transfer matrix method (TMM). The developed model is applicable for studying static and dynamic responses of steel-concrete elastic composite beams with different end conditions taking into account the effect of partial shear interactions. The validity of the lumped mass model is checked by comparing its results with a distributed model and good agreements are achieved (Ellakany and Tablia, 2010).

Findings

A model based on the lumped system of the elastic composite steel-concrete bridge beam with intermediate elastic support under static load is presented. The model takes into consideration the effect of the end shear restraint together with the interaction between the upper slab and the lower beam. Combining the analogical beam method with the TMM and analyzing the behavior of the elastic composite beam in terms of shear studs and stiffness, the following outcomes can be drawn: end shear restraint and stiffness of the shear layer are the two main factors affecting the response of elastic composite beams in terms of both the deflection and the moments. Using end shear restraint reduces the deflection extensively by about 40 percent compared to if it is not used assuming that: there is no interaction between the upper slab and the lower beam and the beam is acting as simply supported. As long as the shear layer stiffness increases or interaction exists, the deflection decreases. This reduced rate in deflection is smaller in case of existence of end shear restraint. The effect of the end shear restraint is more prevailing on reducing the deflections in case of partial interactions. However, its effect completely diminishes in case of complete interaction. Presence of the end shear restraint and shear layer stiffness produces almost the same variations in the components of the bending moments of the composite beam. Finally, for a complete interaction, comparing the case of using end shear restraint or the case without it, the differences in the values of the deflections and moments are almost negligible.

Research Limitations/Implications

The following assumptions related to the theory of ABM: shear studs connecting both sub-beams are modeled as a thin shear layer, each sub-beam has the same vertical displacement and the shear deformation in the sub-beams is neglected.

Practical Implications

The developed model can be effectively used for a quick estimation of the dynamic responses of elastic composite beams in real life rather than utilizing complicated numerical models.

ABSTRACT

Social Implications

The applications of this model can be further extended for studying the behavior of complex bridge beams that will guarantee the safety of the public in a quick view.

Originality/Value

Previous models combined the TMM with the ABM for studying the static and free-vibration behaviors of elastic composite beams assuming that the field element is subjected to a distributed load. To study the dynamic response of elastic composite beams subjected to different moving loads using transfer matrix ABM, it was essential to use a massless field element and concentrate the own weight of the beam at the point element. This model is considered a first step for studying the impact factors of elastic composite beams subjected to moving loads.

Author(S) Faraj A., Jaber H., **Chahine K.,** Faraj J., Ramadan M., El Hage H., Khaled M.

ARTICLE TITLE	**New Concept of Power Generation Using TEGs: Thermal Modeling, Parametric Analysis, and Case Study**
JOURNAL	**Entropy**
YEAR	2020
PUBLICATION INFO	22(5): 503-518
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	In this manuscript, an innovative concept of producing power from a thermoelectric generator (TEG) is evaluated. This concept takes advantage of using the exhaust airflow of all-air heating, ventilating, and air-conditioning (HVAC) systems, and sun irradiation. For the first step, a parametric analysis of power generation from TEGs for different practical configurations is performed. Based on the results of the parametric analysis, recommendations associated with practical applications are presented. Therefore, a one-dimensional steady-state solution for the heat diffusion equation is considered with various boundary conditions (representing applied configurations). It is revealed that the most promising configuration corresponds to the TEG module exposed to a hot fluid at one face and a cold fluid at the other face. Then, based on the parametric analysis, the innovative concept is recognized and analyzed using appropriate thermal modeling. It is shown that for solar radiation of 2000 W/m^2 and a space cooling load of 20 kW, a × 40 40 cm^2 flat plate is capable of generating 3.8 W of electrical power. Finally, an economic study shows that this system saves about 6$ monthly with a 3-year payback period at 2000 W/m2 solar radiation. Environmentally, the system is also capable of reducing about 1 ton of CO_2 emissions yearly.

Author(s) **El-Tannir A.**

ARTICLE TITLE	**Optimal Project Deadlines for Mean-Variance Incentive Contract Designs**
JOURNAL	**Computers and Industrial Engineering**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.cie.2019.106018
THEME / SUBTHEME	Science and Technology/ Construction, Planning and Design
ABSTRACT	This paper studies contracts that incorporate incentives in the form of bonuses and penalties on top of the contract's fixed payment and investigates their impact on the project completion time. Its aim is to derive an optimal deadline that maximizes the mean-variance utility function for a risk-averse contractor. By maximizing his payoff utility function, the contractor becomes more motivated to bid for the project, as well as to meet its deadline. It is shown in this paper that under appropriate risk-aversion levels for the contractor, and when the bonus rate in the contract is bigger than that of the penalty, then an optimal deadline that maximizes the risk-averse mean-variance utility function of the contractor exists and is less than the expected mean of the project random duration. This result is in line with many empirical studies and research reports found in the literature which concluded that the bonus in the contract works better than the penalty to incite the contractor to complete the project earlier than planned. In the other case where the bonus rate is less than or equal to the penalty rate, the utility payoff function for the risk-averse contractor is shown to be strictly increasing in terms of the deadline, and therefore, there exists no limit for it. The latter fact cannot therefore work in favor to the contractor. Special cases of famous probability distributions for the project duration were also investigated and their optimal deadlines were derived either in a closed form formula or computed numerically.

Author(s) Hassanein A., El-Abd M., **Damaj I.,** Rehman H.

ARTICLE TITLE	**Parallel Hardware Implementation of the Brain Storm Optimization Algorithm Using FPGAs**
JOURNAL	**Microprocessors and Microsystems**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.micpro.2020.103005
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Brain Storm Optimization (BSO) is a metaheuristic algorithm that has been gaining attention in solving engineering problems. The algorithm emulates the human brainstorming procedure by initializing a population and optimizing it over several generations. The algorithm enjoys intrinsic parallelism that enables the development of high-speed hardware implementations. However, investigations on accelerating the BSO are yet limited in the literature. In this paper, we present a parallel BSO processor under Field Programmable Gate Arrays (FPGAs). The development includes sequentially modeling the algorithm, deriving parallel versions, targeting a rich set of benchmark evaluation functions, and performing thorough validations. The results confirm the achievement of appealing performance characteristics that significantly outperform software implementations in terms of execution speed. The paper includes thorough analysis, evaluation, and sets the ground for future works.

Author(s) **Itani Y., Soliman M.,** Kahil M.

ARTICLE TITLE	**Recovering Energy by Hydro-turbines Application in Water Transmission Pipelines: A Case Study West of Saudi Arabia**
JOURNAL	**Energy**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.energy.2020.118613
THEME / SUBTHEME	Science and Technology/ Energy and Environment

ABSTRACT

Pressurized water transmission lines reserve amounts of energy that are dissipated by pressure control devices. The dissipated energy may be recovered by installing hydro-turbines at high pressure points and benefit from power production and decreasing CO_2 emissions. In this work, an existing transmission water pipe was simulated under several velocity scenarios, and results indicated that an extensive amount of energy can be recovered by installing Pelton turbines. The approach began by identifying the location of the residual pressure in the system and quantifying the amount of power to be harvested. Afterwards, the pipeline was redesigned by changing the allowed velocity from 1 to 2.5 m/s consecutively. Moreover, the best fitting turbine was selected at each of the residual pressure locations and outputted the potential amount of power to be produced. Finally, a financial and environmental evaluation of the presented solution was conducted. Based on this methodology, the total system cost was reduced by 2.74% because of adopting the maximum allowable velocity of 2 m/s. System optimization allowed for the installation of hydro-power plants with total capacity of 5,751 kW and energy payback period of 9.46 years. Moreover, a reduction in carbon footprint was estimated by 35,295t of CO_2 per year.

Author(s) **Trad A.**

ARTICLE TITLE	**Seismic Assessment and Rehabilitation of Typical Stone Masonry Historical Mosque in Lebanon**
JOURNAL	**Masonry International**
YEAR	2019
PUBLICATION INFO	32(3): 104-109
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	In order to assess the structural behaviour and to evaluate the seismic vulnerability of old masonry structures located in Lebanon, a historical masonry mosque was analysed under earthquake loading. A numerical model using the finite element method associated with Abaqus software was developed on the basis of previously published experimental studies. It was concluded that the numerical model can predict maximum stresses with reasonable accuracy, when compared to test results from a full-scale wall model. This analysis shows that the stresses generated in the joints between the blocks exceed the ultimate shear stress of the mortar, resulting in cracks in the joints. The choice of an adequate structural rehabilitation method was limited because the mosque is of archaeological importance and its original appearance could not be modified. Therefore, a seismic retrofit solution using internal or external post tensioned tendons was recommended.

Author(s) **Abou Alfa K., Harkouss R., Khatib J.**

ARTICLE TITLE	**Siderite as a Weighting Material in Drilling Mud**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-10
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	Successful petroleum drilling largely depends on the type and quality of mud used in the process. There exist many types of muds, which differ in use and composition. Certain muds are composed of materials that can cause damage to the formation and the bottom-hole. This has resulted in the search for alternatives mud additives or addition of new materials to minimize the damage of the formation and enhance the stability of the wellbore. Several bodies of literature exist that research different sources of mud functions and additives, also their effect on the drilling process, the production zone and the environment. Density is one of the main properties of drilling mud because it is the responsible in controlling the formations pressure. So, many weighting agents exist to increase the density of drilling mud. Barite ($BaSO_4$) has a specific gravity of 4.2–4.5 and hardness 2.5-3.5. It has been the most common weight material used in drilling fluids, it is preferred to other weighting materials because of its low cost and high purity but its main disadvantage that its composed of large amount of insoluble acid which damage the formation due to the invasion of the solids into the production zone. A new weighting agent that can be used instead of barite would be a new innovation in the oil field. Siderite ($FeCO_3$) is a weighting material which has a specific gravity of 3.9 and a hardness of 3.5 and makes the mud weighted up to 20 lb/ gal. It is specified by a high acid solubility which didn't cause damage to the formation compared to barite. So, it can be used as an alternative weighting material in both oil and water muds due to its high specific gravity and high acid solubility

Author(S) **Assoum H.,** Hamdi J., Abed-Meraïm K., Al Kheir M., Mrach T., El Soufi L., Sakout A.

ARTICLE TITLE	**Spatio-Temporal Changes in the Turbulent Kinetic Energy of a Rectangular Jet Impinging on a Slotted Plate Analyzed with High Speed 3D Tomographic-Particle Image Velocimetry**
JOURNAL	**International Journal of Heat and Technology**
YEAR	2020
PUBLICATION INFO	37(4): 1071-1079
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	The purpose of this study is to investigate the temporal changes of the Turbulent Kinetic Energy (TKE) of an impinging rectangular self-excited jet in order to identify a reduced zone that is active in producing TKE. An experimental set up consisting of a rectangular jet impinging on a slotted plate was considered for a Reynolds Number Re=5435. This configuration is accompanied by a high level of noise due to the appearance of self-sustained tones that occur in optimal conditions for energy transfer between fluctuating velocity and acoustic field. High Speed Tomographic Particle Image Velocimetry (PIV) technic was used to evaluate the Turbulent Kinetic Energy (TKE) field derived from the aerodynamic one. Through this study, it was found that a reduced volume of height of 0.5*H and a length of 2*H (where H is the height of the nozzle exit) was satisfactory to represent the three-dimensional TKE activity between the jet exit and the plate. The findings of this research lies in investigating the evolution of the TKE that could feed the acoustic generation in order to develop new techniques of noise control. Such sub-volume of the flow would also save a considerable time of calculation.

Author(S) **Darwiche M., El-Hajj-Chehadeh W.**

ARTICLE TITLE	**Speed Bump Detection for Autonomous Vehicles Using Signal-Processin Techniques** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-9

THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Autonomous vehicle (AV) is one of the emerging technologies that have far-reaching applications and implications in smart cities. Among the current challenges of the Smart City, Traffic management is of utmost importance. AV technologies can decrease transportation cost and can be used for efficient management and control of traffic flows. Traffic management strongly depends on the road surface condition. Abnormalities in the road, such as manholes and potholes, can cause accidents when not identified by the drivers. Furthermore, human-induced abnormalities, such as speed bumps, could also cause accidents. Detecting road abnormalities provide safety to human and vehicles. Current researches on speed bump detection are based on using sensors, accelerometer and GPS. This makes them vulnerable to GPS error, network overload, delay and battery draining. To overcome these problems, we propose a novel method for speed bump detection that combines both image and signal processing techniques. The advantage of the proposed approach consists in detecting speed bumps accurately without using any special sensors, hardware, Smartphone and GPS.

Author(S) **Abou Chakra H.**

ARTICLE TITLE	**The Impact of Design Changes in Construction Projects on the Cost Charged by Consultant Offices**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-7
THEME / SUBTHEME	Science and Technology/ Construction, Planning and Design
ABSTRACT	In any construction project, a large number of modifications occur. The consequences of those modifications may result in additional costs due to the re-design of the project on each member of the project's stakeholders. The financial impact of modifications during the construction phase of a project on consultant offices will be explored in this study. The aim of this study is to investigate the cost of the modifications and to examine the type of relationship between the time spent on the design to accomplish the modifications and the amount of money earned in the return of the extra work done. As a wrong estimation of the additional cost may lead to an atrocious financial impact on the office and dramatic consequences. Professional interview method was used to collect data from four different Lebanese consultant offices. Eleven projects were selected in this study. These projects were categorized into three different groups based on the initial cost of the structural design. A regression model that can be used to forecast the cost of extra work for modifications based on the initial design cost was derived in this study. The outcome of this study will simplify the forecasting of cost of any modification in construction projects.

Author(s) **Assoum H.,** Hamdi J., El Hassan M., Abed-Meraim K., El Kheir M., Mrach T., El Asmar S., Sakout A.

ARTICLE TITLE	**Turbulent Kinetic Energy and Self-Sustaining Tones: Experimental Study of a Rectangular Impinging Jet Using High Speed 3D Tomographic Particle Image Velocimetry**
JOURNAL	**Journal of Mechanical Engineering and Sciences**
YEAR	2020
PUBLICATION INFO	14(1): 6322-6333
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	Impinging jets are widely used in ventilation systems to improve the mixing and diffusion of airflows. When a rectangular jet hits a slotted plate, an acoustic disturbance can be generated and self-sustained tones produced. Few studies have looked at the Turbulent Kinetic Energy (TKE) produced by the aerodynamic field in such configurations and in the presence of self-sustaining tones. The aim of this work is to investigate the energy transfer between the aerodynamic and acoustic fields generated in a rectangular jet impinging on a slotted plate. The present paper methodology is based on experimental data measurements using 3D tomographic Particle Image Velocimetry (PIV) technique and microphones. It was found that the spectrum of the TKE for Re=5294 (configuration of self-sustained tones) is which is smaller than that of the acoustic signal . A negative peak of correlation is obtained between the acoustic signal and TKE for These results may lead to conclude that the acoustic cycle should be covered by the TKE period and the two signals of both fields are in opposition of phase in order to obtain an optimal configuration for energy transfer.

Author(s) **Assoum H.,** El Hassan M., **Hamdi J.,** Alkheir M., Abed Meraim K., Sakout A.

ARTICLE TITLE	**Turbulent Kinetic Energy and Self-Sustaining Tones in an Impinging Jet Using High Speed 3D Tomographic-PIV** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Energy Reports**
YEAR	2020
PUBLICATION INFO	6(S2): 802-806
THEME / SUBTHEME	Science and Technology/ Energy and Environment
ABSTRACT	Impinging jets are encountered in many ventilation systems, and these can have a major impact on the acoustic environment and energy performance. Self-sustaining tones produced by aero-acoustic coupling can occur in impinging jets when a feedback loop develops between the jet exit and the surface of impact. (Powell, 1964) developed an analogy that takes into account the sound sources created by vortices, and (Howe, 1975) was the first to use this analogy in the case of a near-wall flow. Howe's energy corollary makes it possible to calculate acoustic power using three quantities: vorticity, flow velocity and acoustic velocity, using experimental or numerical data and taking the aerodynamic field to be the main source of energy. In this study, the velocity and the acoustic fields in a rectangular jet impinging on a slotted plate were measured simultaneously using High Speed 3D Tomographic time-resolved particle image velocimetry (Tomographic-PIV) and a microphone. The 3D Tomographic time-resolved has the advantage of providing three components of velocity in a volume. Thus, we inspect the interaction between turbulent energy produced by the flow and the acoustic field in the presence of self-sustaining tones in order to have a better comprehension of the aero-acoustic coupling. Results were obtained for a Reynolds numbers Re = 5294 and Re = 5956 which are configurations that induces acoustic tones. The spectrum of the Turbulent Kinetic Energy (TKE) had peaks of frequencies such that the period of the acoustic signal was smaller than that of the TKE in presence of self-sustaining tones. The findings of this work may serve to develop new techniques of control to reduce the acoustic generation.

Author(s) Khilqa S., **Elkholy M.,** Al-Tofan M., Caicedo J., Chaudhry H.

ARTICLE TITLE	**Uncertainty Quantification for Damping in Transient Pressure Oscillations**
JOURNAL	**Journal of Water Resources Planning and Management**
YEAR	2019
PUBLICATION INFO	DOI: 10.1061/(ASCE)WR.1943-5452.0001089
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	The uncertainty of a model to determine the damping of pressure head oscillations following a sudden valve closure in a simple piping system in a pressurized closed conduit is quantified using Bayesian inference. The joint probability density of the model parameter is estimated based on experimental results published in the literature as well as experiments performed at the University of South Carolina. A Markov chain of the posterior joint distribution of the model parameters is calculated and used to predict the pressure head oscillations. The prediction is performed in a probabilistic fashion, estimating an interval of pressures as a function of time rather than estimating a single point by a traditional regression analysis. The 95% high posterior density of the damping ratio ranges from 1% to 6%. The probabilistic model also correctly predicts the experimental damping ratios when compared with experimental data.

CONFERENCE PROCEEDINGS

Author(s) Awad A., Soliman A., **Soliman M.**

PROCEEDING TITLE	**An Application of Artificial Submerged Reef Breakwater**
CONFERENCE TITLE	**The 14th International MEDCOAST Congress on Coastal and Marine Sciences, Engineering, Management & Conservation (MEDCOAST 2019)**
DATE	22/10/2019
PLACE	Marmaris, Turkey
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	Many conventional systems of shore protection such as seawalls, rubble mound breakwater, groins and detached breakwaters may be used to attenuate the wave energy which cause coastal erosion. Although, these methods are effective, they are expensive and are not ecofriendly. Recently, synthetic geotextile tubes may be used as a barrier used along shorelines and beaches to help control erosion. In the present study, 2D numerical modelling studies using MIKE21 were conducted to study the efficiency of geotextile breakwaters for the case study of the beach of Miamy - Asafra - Mandara - Montaza which lies on Alexandria coastline, Egypt. The submerged breakwater system consists of one main parallel part and two overlapping parts 150 to 300 meters offshore. The total length of the breakwaters is 2520 m with water depth ranging from 2.5 to 8.5 m at the location of the structure. A bathymetry survey was carried out on the year of 2004 and several beach profiles were also conducted on year 2005. The numerical model successfully predicted the cross-shore profiles for the year 2005. Moreover, different scenarios were implemented to investigate the optimum submergence ratio of the geotextile breakwater. Results reveal that a submergence depth of 0.5m is enough to provide the breakwater shadow area with circulation and could provide safer areas for swimmers.

Author(S) **Sahyoun Kouzeiha W., El Falou A., Ziade Y.**

PROCEEDING TITLE	**A New Waveform for Multi-target Detection in FMCW Radar**
CONFERENCE TITLE	**19th International Conference on Electronics, Information, and Communication (ICEIC 2020)**
DATE	19/1/2020
PLACE	Barcelona, Spain
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	A novel Frequency Modulated Continuous Wave (FMCW) is proposed in this paper. This waveform is composed of four continuous segments: one fast up-ramp followed by one slow down-ramp, a flat frequency and then a fast down-ramp. Two different slopes are used. For a single target, enhancement of range and velocity resolutions have been observed with respect to triangular waveform. Furthermore, challenges in multi-target detection caused by ghost and missing targets have been addressed in this paper using new algorithm. Depending on the ratio of the ramp-down slopes, the algorithm can separate the targets, identify the missing targets and remove the ghost targets.

Author(S) **Bou-Hamdan K.**

PROCEEDING TITLE	**An Experimental Approach that Scans the Surface Area Using Ultrasonic Waves to Generate a Two-Dimensional Image**
CONFERENCE TITLE	**7th International Conference on Electrical and Electronics Engineering (ICEEE 2020)**
DATE	14/4/2020
PLACE	Antalya, Turkey
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	This paper presents an experimental scanning measurement system. The system uses ultrasonic waves in a water-coupled medium to scan an immersed object.

ABSTRACT

Pulse-echo mode is enabled, and data are measured at different locations using an automated table (scanner). A microcontroller is used to control the movement of the scanner, whereas a MATLAB code is used to control the operation of the ultrasonic pulser receiver. MATLAB is also used to control the movement of the automated table. Reflected ultrasonic waves are recorded, and an A-scan image of the surface is generated. The experimental results of a one-pound coin show that the proposed measurement method can be used with high accuracy and can be utilized in further applications with minimal errors.

Author(S) **Kassem R., El Hajj Chehade W., El-Zaart A.**

PROCEEDING TITLE	**Bimodal Skin Cancer Image Segmentation Based on Different Parameter Shapes of Gamma Distribution** ***(Joint Publication with the Faculty of Science)***
CONFERENCE TITLE	**Third International Conference on Intelligent Computing in Data Sciences (ICDS 2019)**
DATE	28/10/2019
PLACE	Marrakech, Morocco
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	Cancer describes a type of malady distinguished by uncontrolled growth and division of abnormal cells. Skin cancer is one the most commonly diagnosed cancer. Image-based computer aided diagnosis (CAD) systems have significant potential for screening and can help discover cancer in its earlier stages. The bottleneck of the CAD system is the skin image segmentation. Image thresholding techniques are the most used for image segmentation. Statistical approaches are widely used in image thresholding. Due to the simplicity of its mathematical formula, different skin image thresholding techniques used Gaussian distribution as a model of data image. However, that distribution has a limitation when the histogram modes of the image has non-symmetric shapes. Gamma distribution has symmetric and non-symmetric shapes and has been used to improve the skin image thresholding. That technique assumed that the shape of each mode in the histogram is constant. However, the shape of each mode in the skin image histogram can be vary inside the image itself. In this paper, our contribution is to use different parameter shape for each mode in order to improve the quality of skin cancer image segmentation. Experimental results showed that the improved technique has better results than existing techniques using performance measures.

Author(S) **Issa H., El-Halabi H.,** Awde D., Ezzeddine L., **El-Hawary A., El-Ibrahim B.**

PROCEEDING TITLE	**Compact Dual Band LowPass-BandPass Filter**
CONFERENCE TITLE	**7th International Conference on Electrical and Electronics Engineering (ICEEE 2020)**
DATE	14/4/2020
PLACE	Antalya, Turkey
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	This paper presents the design of a compact dual band lowpass-bandpass filter (LPF-BPF) for GSM applications. The idea behind this design is to apply multiple miniaturization techniques on the dual band to achieve compact dimensions with optimal performance. Miniaturization is achieved by using lumped capacitors along with DGS and meandering techniques. The designed filter shows dual behavior: lowpass behavior with cutoff frequency at 0.9 GHz and bandpass behavior with center frequency at 2.4 GHz. The achieved size reduction when applying the three miniaturization techniques is 70%. Measurement results validate the proposed design. Moreover, the design is also compatible with integrated circuit process.

Author(S) **Hussein S., El Falou A., Sahyoun W., Ziade Y.,** Shubair R.

PROCEEDING TITLE	**Effect of Water Molecules on the Channel Modeling in THz Band for WBANs**
CONFERENCE TITLE	**International Conference on Electrical and Computing Technologies an Applications (ICECTA 2019)**
DATE	19/11/2019
PLACE	Ras Al Khaimah, United Arab Emirates
THEME / SUBTHEME	Science and Technology/ Advances in Technology

ABSTRACT

The work in this paper presents an analytical study of nanoscale communication networks operating in-vivo at the Terahertz frequency. The paper discusses the path loss of a proposed simplified human tissue model within a wireless body area network (WBAN). The human model is simplified to include water, whole blood and skin. The main objective is to assess the losses induced by water molecules. The simulation is done using the numerical values of the loss parameters measured in literature. The simulation results indicate that the path loss at 1 THz for a distance of 1 mm depth is 32 dB for water, 33 dB for whole blood and 34 dB for skin. The results for whole blood and skin are in line with the results encountered in literature. On the other hand, the results of water molecules are similar to that of whole blood. This finding verifies that the electromagnetic communication inside the human body is a valid analytical assumption for the in-vivo modeling of nano-communications in the THz band taking into consideration that the human body is mainly build of water.

Author(S) **Abo Sakr S., Abdel Razzac A., Ziade Y.**

PROCEEDING TITLE	**Evaluation of the Capacity Usage Efficiency of LTE Networks with Impatient Video Streaming Users**
CONFERENCE TITLE	**International Wireless Communications and Mobile Computing (IWCMC 2020)**
DATE	15/6/2020
PLACE	Limassol, Cyprus
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	We study in this work the performance of an LTE network offering video streaming services in the presence of impatient users. We consider a realistic modeling of the user›s impatience behavior in a cellular network where video services, with different session durations, follow a Poisson process arrival, an exponential service time and an exponentially distributed patience duration whose rate depends on both the perceived bitrate and the video session length. We model our system using continuous-time Markov chain and we study the transient system to evaluate the transmission efficiency. We compute namely the efficiently carried traffic generated by fully watched video clips and the wasted traffic which is the traffic being uselessly carried when the user drops his connection before the end of the session.

Author(S) **Chahal S., Baalbaki O., Timsah Y., Ghanem H.,** Abu Saleh Z.

PROCEEDING TITLE	**Experimental Investigation of Two-Way Hinges in Reinforced Concrete Members**
CONFERENCE TITLE	**International Congress and Exhibition "Sustainable Civil Infrastructures" (GeoMEast 2019)**
DATE	10/11/2019
PLACE	Cairo, Egypt
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	Concrete foundations in seismic regions are usually designed to withstand plastic hinge moments that can be developed at the bases of the columns. These hinges are used to eliminate the moments transferred to the foundations. The ratio adopted by the American Concrete Institute (ACI) to determine the amplification of the strength of the hinge due to confinement effects, is limited to two. This paper presents the experimental analysis conducted on several two-way hinges to assess their behavior on concrete structures with specific focus on the amplification factor. The main parameters used in this investigation are the square root of the column area over the hinge area, and the overall hinge strength due to vertical throat concrete crushing failure mode. It is expected that the results of this study will lead to the development of guidelines for the behavior of two-way hinges in reinforced concrete structures.

Author(S) **Hussein S., Ziade Y.,** Shubair R.

PROCEEDING TITLE	**On Propagation Losses due to In-Vivo Electromagnetic Nanoscale Communication**
CONFERENCE TITLE	**2019 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting**
DATE	31/10/2019
PLACE	Atlanta, United States
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	In-vivo nano-biosensing has been attracting a lot of interest within the academic research community recently since it plays a major role in the development of personalized nano-medicine technologies and solutions. The implementation of new nano-biosensing systems inside the human body faces the major challenge of modeling the in-vivo communication channel. Several efforts have been reported recently to investigate the main factors that define the characteristics of the in-vivo communication channel. This paper outlines and discusses the factors that contribute to the path loss encountered by an EM wave in-vivo. These include spreading loss of the propagating wave, the loss due to molecular absorption by biological tissue, and the scattering from the body particles.

Author(S) **Hussein S., El Falou A., Ziade Y.,** Shubair R.

PROCEEDING TITLE	**On the Use of Optogenetics Wireless Systems in Modern Pathology: Opportunities and Challenges**
CONFERENCE TITLE	**International Conference on Electrical and Computing Technologies and Applications (ICECTA 2019)**
DATE	19/11/2019
PLACE	Ras Al Khaimah, United Arab Emirates
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	Optogenetics tools and techniques are having a great attention lately. Thanks to these techniques, the understanding as well as the treatment of neurodegenerative diseases become more promising. In this work, we present an overview of the optogenetics approach as a tool used in the modern pathology to treat the neurodegenerative diseases. Moreover, the recent applications in modern pathology are presented as well as the wireless optogenetics techniques that ranges from infrared, high frequency, ultra high frequency and ultrasonic technologies. Finally, the challenges of the minimization of the systems as well as the issues related to patient risk are highlighted.

Author(S) **El-Tannir A.**

PROCEEDING TITLE	**Optimal Order Quantity for the Mean-Variance Newsvendor Problem with Stockout**
CONFERENCE TITLE	**Global Joint Conference on Industrial Engineering and Its Application Areas (GJCIE 2019)**
DATE	2/9/2019
PLACE	Gazimagusa, Turkish Republic of Northern Cyprus
THEME / SUBTHEME	Science and Technology/ Applied Mathematics and Computational Sciences
ABSTRACT	This paper extends the formula that derives the optimal order quantity for the risk-neutral newsvendor under stockout. Its objective is to maximize the mean-variance risk-averse profit utility function under the general demand probability distribution. The obtained formula is applied for the cases of the Uniform, Normal, and Exponential distributions. The obtained results confirmed earlier findings that the optimal order quantity for the risk-averse newsvendor problem with stockout using the mean-variance utility can either be less than or greater than the optimal quantity of the risk-neutral case.

Author(S) **Moussilli M., El Falou A.,** Shubair R.

PROCEEDING TITLE	**Performance Parameter Optimization of Graphene Enhanced Surface Plasmon Resonance Biosensors**
CONFERENCE TITLE	**2019 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting**
DATE	7/7/2019
PLACE	Atlanta, Georgia, United States
THEME / SUBTHEME	Science and Technology/ Advances in Technology

ABSTRACT

In this paper, we perform a theoretical study in order to optimize the sensitivity Sn and detection accuracy DA performance parameters of a proposed Silver-based and Graphene enhanced Fiber Optic Surface Plasmon Resonance (FO-SPR) biosensor. Upon simulation utilizing the 4-layer model, it was found that the physical and geometrical parameters of this biosensor such as the metal layer type, addition of a Graphene coating, sensing region length L, core diameter D and thickness of the metal layer d_2 have an effect on the sensor performance parameters and thus need to be optimized. The optimal design was found to be a Silver-based and Graphene enhanced FO-SPR biosensor with L = 10 mm, D = 100 mm and d_2 = 40 nm.

Author(S) **Ghanem H., Chahal S., Ajam W., Kurdi A.**

PROCEEDING TITLE	**Post Buckling Behavior of Steel Plate Girder Panels Under Shear Loading**
CONFERENCE TITLE	**International Congress and Exhibition "Sustainable Civil Infrastructures" (GeoMEast 2019)**
DATE	10/11/2019
PLACE	Cairo, Egypt
THEME / SUBTHEME	Science and Technology/ Materials Engineering
ABSTRACT	Previously, the shear design of web and transverse stiffeners was based on the initial shear buckling in the web without the tension field action. The American Institute of Steel Construction (AISC) adopted post-buckling tension field strength into its specifications for stiffened interior web panels but exclude the post-buckling tension field action for the end web panel. In this study, a finite element method (FEM) analysis on an isolated panel confirms the view that post-buckling strength of steel plate girders is attributed to a non-uniform shear stress distribution along the boundary of the plates, varying from the critical stress in one corner up to the shear-yield stress in the tension corner with no need for any diagonal tension. It was also shown that the presence of flanges with bending strength does rise the shear capacity in the panel. However; light flanges give a slight increase in shear resistance without diagonal tension, but heavy flanges are shown to be capable of developing true diagonal tension, leading to a significant gain in total shear capacity.

Author(S) Abo Halima M., Soliman A., **Soliman M.**

PROCEEDING TITLE	**Sedimentary Dynamics of a Tidal Inlet**
CONFERENCE TITLE	**The 14th International MEDCOAST Congress on Coastal and Marine Sciences, Engineering, Management & Conservation (MEDCOAST 2019)**
DATE	22/10/2019
PLACE	Marmaris, Turkey
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design
ABSTRACT	During the last three decades, many coastal projects were built along the Nile delta coast as a result of the increasing development of this valuable region. Unfortunately, most of these projects are experiencing frequent sedimentation and siltation in their access inlet channels due to the higher littoral drift rate and sedimentation imbalance. In order to investigate the complicated behavior of such natural and manmade influences on coastal areas, a two-dimensional model based on a finite volume method with structured Cartesian grid is developed. The model is used to simulate unsteady waves and currents motion in coastal areas as well as sediments transport. The model was validated against several experimental cases to test its reliability and robustness. The predictions showed generally good agreement against the measured data. Numerical simulation to study Ghilion tidal Inlet, which is located in the north western part of Nile Delta, is under progress now.

Author(S) **Sahyoun Kouzeiha W., El Falou A.**

PROCEEDING TITLE	**Single and Double Staircase FMCW Waveforms for Enhanced Range and Velocity Resolutions**
CONFERENCE TITLE	**International Symposium on Advanced Electrical and Communication Technologies (ISAECT 2019)**
DATE	27/11/2019
PLACE	Rome, Italy
THEME / SUBTHEME	Science and Technology/ Simulation, Modeling and Design

ABSTRACT

This paper is an investigation of new Frequency-Modulated waveform used in short range radars at 77 GHz in order to detect target with enhanced range and velocity. Two waveforms are proposed: the single and double staircase with equal and different slopes separated by an interval of flat frequency. The single staircase waveform shows an increasing of the range resolution by a factor of 4 compared to a triangular FMCW radar. The velocity resolution is enhanced also by a factor of 2 compared to classic FMCW waveforms. The double staircase waveform with unequal slopes shows better results in terms of range and velocity resolutions compared to single staircase waveform. MATLAB simulation are done for a radar at 77 GHz and a bandwidth of 2 GHz.

BOOK CHAPTERS

Author(S) Hussain F., **Damaj I.,** Abu Doush I.

BOOK CHAPTER TITLE	**ChildPOPS: A Smart Child Pocket Monitoring and Protection System**
BOOK TITLE	**Smart Technologies for Smart Cities**
YEAR	2020
PUBLISHER	Springer, Cham
ISBN	9783030399863
THEME / SUBTHEME	Science and Technology/ Advances in Technology
ABSTRACT	The advancements in Internet of things (IoT) technology is quickly transforming the world into a smart network of interoperable devices. Traditional devices are becoming ubiquitous, pervasive, connected, and wearable IoT gadgets. The purpose of this investigation is to develop a smart Child Pocket Monitoring and Protection System (ChildPOPS). ChildPOPS provides a touch of advanced lifestyle by automatically monitoring infant's health conditions, promoting safe living, and providing an easy-to-deploy system and a user-friendly interface. An IoT Development Model is used to design, represent, and analyze the system through a set of submodels. The main challenges that the proposed system addresses include supporting accurate physiological parameter measurements, remote sensing, and correct detection. This chapter includes studying challenges, such as accurately using the device and the training needed by the users—as related to the adoption of such a modern tool by the target human subjects.

ABSTRACT

The proposed system is supported by two mobile monitoring devices at the child and parent, or caregiver, sides, sensors, wireless communication nodes, control processors, Internet access, and a supporting server. ChildPOPS enables a ubiquitous access using tablets and smartphones through a mobile application or a web browser. This chapter includes studying the effectiveness of adding smart bands, at the child and parents' sides, to enable accurate monitoring. In addition, the system supports the interaction with a software system that provides assisted communication and intervention when needed. System testing includes multiple detection scenarios and the reliability of interactions. System testing, analysis, and evaluation confirms ChildPOPS effectiveness in application.

Faculty of Science

ACADEMIC JOURNAL ARTICLES

Author(s) **Zeid I., Al Abdallah R.,** El-Kork N., **Korek M.**

ARTICLE TITLE	**Ab-initio Calculations of the Electronic Structure of the Alkaline Earth Hydrid Anions XH^- (X = Mg, Ca, Sr and Ba) Toward Laser Cooling Experiment**
JOURNAL	**Spectrochimica Acta-Part A: Molecular and Biomolecular Spectroscopy**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.saa.2019.117461
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	By the use of the ab initio CASSCF/(MRCI+Q) calculations in the representation $^{2s+1}\Lambda^{(+/-)}$, the adiabatic potential energy curves and the dipole moment curves of the low lying states of the alkaline earth hydride anions (MgH^-, CaH^-, SrH^- and BaH^-) have been investigated in their singlet and triplet multiplicities. The spectroscopic parameters Te, Re, ωe, Be, αe, the dipole moment μe, and the dissociation energy De have been also calculated for the bound states of the considered molecules. In addition, a systematic investigation of the transition dipole moment curves for the lowest $1\Sigma^+$-1Π transitions has been done along with the Franck-Condon factor (FCF) corresponding to the $X^1\Sigma^+$-$(1)^1\Pi$ transition. Using the canonical function approach, a rovibrational study has been performed for finding the rovibrational constants Ev, Bv, Dv and the turning points Rmin and Rmax for the ground and different excited bound state. Efficient routes may be achieved via the diagonal FCF for the formation of cold and ultracold alkaline earth hydride anions.

* Names in Bold Indicate BAU Authors

Author(s) **Zeid I., Al Abdallah R.,** El-Kork N., **Korek M.**

ARTICLE TITLE	**Ab Initio Calculations of the XI Molecules (X = Li, Na, K, Rb) with the Ionicity and Laser Cooling Analysis**
JOURNAL	**Canadian Journal of Physics**
YEAR	2020
PUBLICATION INFO	98(1): 45-56
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	For the alkali iodide molecules LiI, NaI, KI, and RbI, ab initio CASSCF/(MRCI+Q) calculations have been employed to investigate the adiabatic potential energy curves and the static dipole moment curves of the low-lying singlet and triplet electronic states in the representation $^{2S+1}\Lambda^{(+/-)}$. The spectroscopic constants Te, Re, ωe, Be, αe, the dipole moment μe, and the dissociation energies De have been computed for the bound states. Additionally, the percentage ionic character f_{ionic} around the equilibrium position of the ground state and the $(2)^1\Sigma^+$ state has been estimated. Using the canonical function approach, these calculations have been followed by a rovibrational calculation from which the rovibrational constants Ev, Bv, Dv, and the abscissas of the turning points Rmin and Rmax for the investigated bound states are calculated.

Author(s) Devi D., Namasudra S., **Kadry S.**

ARTICLE TITLE	**A Boosting-Aided Adaptive Cluster-Based Undersampling Approach for Treatment of Class Imbalance Problem**
JOURNAL	**International Journal of Data Warehousing and Mining**
YEAR	2020
PUBLICATION INFO	16(3): 60-86
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

The subject of a class imbalance is a well-investigated topic which addresses performance degradation of standard learning models due to uneven distribution of classes in a dataspace. Cluster-based undersampling is a popular solution in the domain which offers to eliminate majority class instances from a definite number of clusters to balance the training data. However, distance-based elimination of instances often got affected by the underlying data distribution. Recently, ensemble learning techniques have emerged as effective solution due to its weighted learning principle of rare instances. In this article, a boosting aided adaptive cluster-based undersampling technique is proposed to facilitate elimination of learning- insignificant majority class instances from the clusters, detected through AdaBoost ensemble learning model. The proposed work is validated with seven existing cluster based undersampling techniques for six binary datasets and three classification models. The experimental results have established the effectives of the proposed technique than the existing methods.

Author(s) Khan F., Ncube C., Ramasamy L., **Kadry S.,** Nam Y.

ARTICLE TITLE	**A Digital DNA Sequencing Engine for Ransomware Detection Using Machine Learning**
JOURNAL	**IEEE Access**
YEAR	2020
PUBLICATION INFO	8: 119710-119719
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Malware is 'malicious software' programs that carry out many of the cyberattacks on the Internet, including cybercrime, fraud, scams and nation-state cyberwar. These malicious software programs come in a wide range of different classifications such as viruses, Trojans, worms, spyware, botnet malware, ransomware, Rootkit, etc. Ransomware is class of malware that holds the victim's data hostage by encrypting the data on a user's computer to make it unavailable to the user and only decrypt it after the user pays a ransom in the form of a sum of money. To avoid detection, different variants of ransomware utilise one or more techniques in their attack flow including Machine Learning (ML) algorithms. There is, therefore, a need to understand the techniques used ransomware development and their deployment strategy in order to understand their attack flow better to develop appropriate countermeasures. In this paper, we propose DNAact-Ran, A Digital DNA Sequencing Engine for Ransomware Detection Using Machine Learning. DNAact-Ran utilises Digital DNA sequencing design constraints and k-mer frequency vector. To measure the efficacy of the proposed approach, we evaluated DNAact-Run on 582 ransomware and 942 goodware instances to measure the performance of precision, recall, f-measure and accuracy. Compared to other methods, the evaluation results show that DNAact-Run can predict and detect ransomware accurately and effectively.

Author(s) Abou Najem S., **Khawaja G.,** Hodroj M., Babikian P., Rizk S.

ARTICLE TITLE	**Adjuvant Epigenetic Therapy of Decitabine and Suberoylanilide Hydroxamic Acid Exerts Anti-Neoplastic Effects in Acute Myeloid Leukemia Cells**
JOURNAL	**Cells**
YEAR	2019
PUBLICATION INFO	8(12): 1-23
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Atypical epigenetic processes including histone acetylation and DNA methylation have been identified as a fundamental theme in hematologic malignancies. Such mechanisms modify gene expression and prompt, in part at least, the initiation and progression of several malignancies including acute myeloid leukemia. In the current study we determined the effects of treating KG-1 and U937 acute myeloid leukemia (AML) cells, in vitro, with the HDAC inhibitor, suberoylanilide hydroxamic acid (SAHA), or with a DNMT inhibitor, decitabine (DAC), or their combination, on cell proliferation, cell cycle progression, apoptosis, and expression of apoptosis-related proteins. Each of SAHA and DAC attenuated cell proliferation and induced cell cycle arrest and apoptotic cell death of KG-1 and U937 cell lines. Besides, their sequential combination improved the obtained anti-neoplastic effect: significant augmentation of growth inhibition and apoptosis induction as compared to cells treated with either drug alone. This effect was featured by the upregulated expression of Bax, cytochrome c1, p21, and cleaved caspases 8, 9, and 3, signifying the activation of both the intrinsic and extrinsic pathways of apoptosis. The sequential combination of SAHA and DAC causes a profound antitumorigenic effect in AML cell lines by inducing the expression of tumor suppressor genes.

Author(s) Khan Z., Rasheed H., Noor S., Khan W., Shah Q., Khan I., **Kadry S.,** Nam Y., Nisar K.

ARTICLE TITLE	**Analytical Solution of UCM Viscoelastic Liquid with Slip Condition and Heat Flux over Stretching Sheet: The Galerkin Approach**
JOURNAL	**Mathematical Problems in Engineering**
YEAR	2020
PUBLICATION INFO	DOI: 10.1155/2020/7563693
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This paper provides a substantial amount of study related to coupled fluid flow and heat conduction of an upper-convected-Maxwell viscoelastic liquid over a stretching plane with slip velocity. A new model, presented by Christov, for thermal convection is employed. The partial differential equations are converted to ordinary differential equations by using appropriate transformation variables. The transformed equations are solved analytically by using the Galerkin method. For the sake of soundness, a comparison is done with a numerical method, and good agreement is found. The impacts of various parameters like slip coefficient, elasticity number, the thermal relaxation time of heat flow, and the Prandtl number over the temperature and velocity fields are studied. Furthermore, the Cattaneo–Christov heat flux model is compared with Fourier's law. Additionally, the present results are also verified by associating with the published work as a limiting case.

Author(s) Dogra A., **Kadry S.,** Goyal B., Agrawal S.

ARTICLE TITLE	**An Efficient Image Integration Algorithm for Night Mode Vision Applications**
JOURNAL	**Multimedia Tools and Applications**
YEAR	2020
PUBLICATION INFO	79: 10995-11012
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

The night mode visible images are often fused with infrared images for increased visual perception and contextual enhancement as the later is equipped with the complimentary information which is otherwise missing due to night mode image acquisition. This technology finds extensive application in the field of armed forces and surveillance. The night mode visible images, due to under-exposure and poor atmospheric conditions are prone to noise and artefacts which leads deterred level of information analysis and extraction. This article not only provides higher visual perception of the individual source images but also proposes an efficient fusion algorithm for visible and infrared images in night mode which is able to generate high quality results with increased focus on the objects of interest competitive with the state-of-the-art methods.

Author(s) Khan Z., Gulistan M., Chammam W., **Kadry S.,** Nam Y.

ARTICLE TITLE	**A New Dispersion Control Chart for Handling the Neutrosophic Data**
JOURNAL	**IEEE Access**
YEAR	2020
PUBLICATION INFO	8: 96006-96015
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The control chart based on mean deviation (MD) is customary used as a robust alternative to the existing Shewhart control charts for observing changes in dispersion parameter of the process. The existing model of MD control chart is rooted under the assumption that indeterminate observations are not included in measured quality characteristic. If, inspected quality data entail some indeterminate and vague information, typical design of the MD control chart could not be effectively employed. This study originally presents an appropriate generalized design namely neutrosophic mean deviation (gMD) control chart that could accommodate imprecise observations in collected quality characteristic variables. Under the neutrosophic situation, the related properties of this newly gMD design have been derived. Using simulated data, performance of the gMD control chart in terms of neutrosophic average run length (gARL) is investigated. The performance of proposed gMD control chart relative to existing competitor designs has been evaluated. The study reveals that proposed design of gMD chart outperforms as to existing counterparts in terms of statistical power. To illustrate the efficacy of this new design, real data from a manufacturing company has been used to describe the control procedure of the proposed gMD control chart.

Author(s) **El Chakik A.,** El Sayed A., Alabboud H., Bakkach A.

ARTICLE TITLE	**An Invariant Descriptor Map for 3D Objects Matching**
JOURNAL	**International Journal of Engineering and Technology**
YEAR	2020
PUBLICATION INFO	9(1): 59-68
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Meshes and point clouds are traditionally used to represent and match 3D shapes. The matching prob-lem can be formulated as finding the best one-to-one correspondence between featured regions of two shapes. This paper presents an efficient and robust 3D matching method using vertices descriptors de-tection to define feature regions and an optimization approach for regions matching. To do so, we compute an invariant shape descriptor map based on 3D surface patches calculated using Zernike coef-ficients. Then, we propose a multi-scale descriptor map to improve the measured descriptor map quali-ty and to deal with noise. In addition, we introduce a linear algorithm for feature regions segmentation according to the descriptor map. Finally, the matching problem is modelled as sub-graph isomorphism problem, which is a combinatorial optimization problem to match feature regions while preserving the geometric. Finally, we show the robustness and stability of our method through many experimental re-sults with respect to scaling, noise, rotation, and translation.

Author(s) El-Khatib A., Doma A., Abo-Zaid G., **Badawi M.,** Mohamed M., Mohamed A.

ARTICLE TITLE	**Antibacterial Activity of Some Nanoparticles Prepared by Double Arc Discharge Method**
JOURNAL	**Nano-Structures and Nano-Objects**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.nanoso.2020.100473
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

Nanoparticles (NPs) have been considered as an active research area because of its excellent physical and chemical properties. These properties based on the size, shape and composition of NPs. In this work, Ag NPs and Cu NPs are prepared by double arc discharge method applying stabilized ac current between three rods. The synthesized NPs were applied using discharge currents (15 and 30A) which submerged in deionized water at room temperature without any heat exchanger, vacuum or gas handling equipment. The morphology and crystal structure were studied. X-ray diffraction (XRD) showed that Ag NPs and Cu NPs are crystalline in nature with a face-centered cubic (fcc) structure while the sizes are 19.60 nm 32.97 nm respectively.TEM image of the Ag NPs shows narrow size distribution with 8–12 nm mean particle size. While for Cu NPs is spherical shape and in the range from 23 nm to 43 nm. EDX analysis is in good agreement with TEM and XRD results and insured that all the obtained materials are 100% Ag NPs and Cu NPs. Antibacterial activities of Ag NPs and Cu NPs were investigated using Escherichia coli bacteria. The results showed that these NPs act as antimicrobial agents in order to enhance antimicrobial activity of them.

Author(S) **Salim G., El-Dakdouki M., Abdallah H.,** Nasser H., Arnold-Apostolides N.

ARTICLE TITLE	**Antioxidative and Hepatoprotective Effects of Rubus Canescens DC. Growing Wild in Lebanon**
JOURNAL	**The Natural Products Journal**
YEAR	2020
PUBLICATION INFO	DOI: 10.2174/2210315509666191111103820
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

ABSTRACT

Background

Plants of the genus Rubus (family Rosaceae) have been used for diverse medicinal purposes for centuries. We hypothesized that the scarcely investigated R. canescens DC. should, like other species of the genus Rubus, exhibit prominent antioxidant activity.

Objective

The present study investigates the in vitro and in vivo antioxidant activity of fruit juice as well as aqueous and methanolic extracts of the areal parts of Rubus canescens DC., and decipher the phytochemical profile of the methanolic extracts by GC-MS.

Methods

The in vitro antioxidant activity was assessed by DPPH radical scavenging assay and β-carotene bleaching assays. The in vivo antioxidant activity of the extracts was assessed by measuring ALT, AST, CAT, and SOD levels in CCl4-challenged mice in two experimental models (chronic exposure and preventive).

ABSTRACT

Histological analysis was conducted on H&E stained liver sections, and the phytochemical profile of methanolic extracts was investigated by GC-MS.

Results

DPPH radical scavenging assay revealed that the methanolic leaves extract exhibited the highest activity, while the juice was the most active in the β-carotene bleaching assay. The in vivo experiments suggested that the extracts have promising antioxidant potential and hepatoprotective effect capable of promoting liver functions. Histological analysis of liver sections revealed that administrating juice extract regenerated hepatocytes while reducing inflammation. GC-MS analysis indicated the presence of squalene, β-amyrin, and γ-sitosterol that may have contributed to the observed activity.

Conclusion

The current study provided the first in vivo evidence supporting the antioxidative and hepatoprotective effects of R. canescens DC. growing wild in Lebanon.

Author(S) **Houssein M., Khalil M.,** Fatfat M., Gali Muhatsib H.

ARTICLE TITLE	**Apoptosis as a Mechanism for the Treatment of Adult T Cell Leukemia: Promising Drugs from Benchside to Bedside**
JOURNAL	**Drug Discovery Today**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.drudis.2020.04.023
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

Human T cell lymphotropic virus-1 (HTLV-1) is the causative agent of adult T cell leukemia (ATL), an aggressive malignancy of mature activated T cells. Although many therapeutic strategies are available, none are effective and most patients experience recurrence of the disease. Over the past decade, many drugs have been discovered that showed promising therapeutic potential against ATL but which remain in the preclinical testing phase. Mechanistically, these drugs either induce apoptosis or regulate cellular proliferation in ATL cells. Here, we provide a summary of these promising drugs that target ATL, with a focus on their mechanism of anticancer activity, to offer insights into the use of multiple drugs with different targets for enhancing ATL eradication.

Author(s) **Khaled R.,** Abdel-Gaber A., **Rahal H., Awad R.**

ARTICLE TITLE	**A Potential Green Anti-scaling and Corrosion Inhibitor for Mild Steel in Brine Solution**
JOURNAL	**International Journal of Electrochemical Science**
YEAR	2020
PUBLICATION INFO	15: 6790-6801
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Mineral calcareous deposits are a current challenge in industrial water systems. The antiscalant properties of Prunus dulcis (Almond) leaf extract were tested using different chemical and electrochemical techniques. Fourier transform infrared spectroscopy (FTIR) was used to identify the functional groups of almond leaf extract. Static anti-scaling, conductivity, chronoamperometry, as well as optical photographic studies showed that almond leaf extract acts as a safe, ecofriendly antiscalant for steel in brine solution. Electrochemical impedance spectroscopy (EIS) technique and Potentiodynamic polarization curves measurements were used to test the inhibitive effect of Almond leaf extract on the corrosion of mild steel in brine solution. The results obtained showed that almond leaf extract acts as mixed type inhibitor. The corrosion inhibition increases by increasing the concentration of the extract up to a critical concentration. It is recommended to use 400 ppm of almond leaf extract to impede the formation of scale deposits and provide an acceptable level of corrosion inhibition.

Author(s) Yassine S., **Kadry S.,** Sicilia M.

ARTICLE TITLE	**Application of Community Detection Algorithms on Learning Networks. The Case of Khan Academy Repository**
JOURNAL	**Computer Applications in Engineering Education**
YEAR	2020
PUBLICATION INFO	DOI: 10.1002/cae.22212
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

The rapid development of online learning networks has resulted in the widespread use of recorded educational contents. While the community structure of those networks may have an influence on the use of contents, research on detecting online learning communities and investigating their structures using social network analysis (SNA) methods is scarce. The purpose of the research presented here is to investigate the structure of online learning networks and their users' engagement patterns. In this study, Khan Academy, a widely used video learning repository, will be used as a case. Community detection algorithms are used to detect the development of online learning communities and network performance and effectiveness measures are applied to assess the network structure, effectiveness, and efficiency of a large dataset consisting of 359,163 users that interacted with Khan Academy's videos with over 3M questions and answers. The results demonstrate that different community detection algorithms can be implemented on learning networks and produce good learning communities which are not necessarily related to a domain or a topic. Measures such as density can be used to measure social presence while centrality measures are used to define central users and hubs in the communities. This study complements previous research that shed the light on the power and potential of SNA measures to structurally evaluate and detect online learning communities.

Author(s) **El Arwadi T.,** Sayah T.

ARTICLE TITLE	**A Regularization Scheme for 2D Conductivity Imaging by the D-Bar Method**
JOURNAL	**Numerical Functional Analysis and Optimization**
YEAR	2019
PUBLICATION INFO	40(12): 1410-1425
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This article deals with the D-bar method in order to determine the conductivity distribution inside a body from the electrical measurements at the boundary. We introduce a new algorithm called tBm regularization which allows us to get a high order error estimates. Then we prove the stability of the corresponding method and we treat the case of nonsmooth conductivities.

Author(s) **Karaali H., Borjac J.**

ARTICLE TITLE	**Association Between Kidney Injury Molecule-1 Gene Polymorphism and Acute Kidney Injury in Lebanese Population**
JOURNAL	**Genetics and Applications**
YEAR	2019
PUBLICATION INFO	3(3): 9-16
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Acute kidney injury is a common condition associated with longer hospital stay and increased mortality. Kidney injury molecule-1 (KIM-1) is one of the early and sensitive biomarkers for acute kidney injury diagnosis. Therefore we examined the relationship between kidney injury molecule-1 gene polymorphism and acute kidney injury in Lebanese hospitalized patients. Genomic DNA was isolated from blood samples collected from 50 patients and 40 controls. Kidney injury molecule-1 exon 4 was amplified by polymerase chain reaction and the amplified products were sequenced at Macrogen. Serum creatinine and urea levels were measured and compared between controls and patients. Three out of the five known single nucleotide polymorphisms showed significant association with susceptibility to the disease ($P \leq 0.05$). Data analysis implied that carriers of the risk allele of these 3 single nucleotide polymorphisms were more predisposed to acute kidney injury. No association was found between the studied nucleotides variations and creatinine/urea levels. Haplotype analysis showed high association of the block CTA with acute kidney injury incidence and high creatinine and urea levels. Our results suggest that polymorphisms in exon 4 of kidney injury molecule-1 in the Lebanese population may be associated with acute kidney injury.

Author(s) **Matar A., Jennani S.,** Abdallah H., **Borjac J.**

ARTICLE TITLE	**Association of Various Genes with Susceptibility to Multiple Sclerosis in Lebanese Population of Bekaa Region: A Preliminary Study**
JOURNAL	**Kragujevac Journal of Science**
YEAR	2020
PUBLICATION INFO	42: 97-112
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Multiple sclerosis (MS) is a multifactorial, polygenic, neurodegenerative autoimmune disease. Interleukin 7–receptor alpha (IL7-Rα), Human Leukocyte Antigen - DRB1*1501 (HLA-DRB1*1501), Tumor protein p53 (Tp53) and Synapsin III (SynIII) genes play a crucial role in this disease. This study aims at investigating specific genetic variants with MS occurrence in the Lebanese population of Bekaa province. MS patients (n=28) and controls (n=28) living in the Bekaa region in Lebanon participated in the study. DNA was purified from the collected blood samples. PCR-RFLP and sequencing of amplified PCR products from the targeted genes were performed along with convenient statistical tests. Genotype and allele frequencies of the studied genes were not statistically significant between MS patients and controls. No significance was noticed in rs1494558 and rs1494555 of IL7-Rα where T/T genotype was lower in patients (P=0.106) and A allele was higher in patients (P=0.108), respectively. Haplotypes stratification for rs1494555 and rs6897932 of IL7-Rα shows an increase in AT haplotype (P=0.248) and a decrease in GC haplotype (P=0.251) in MS patients and this was independent with HLA - DRB1*1501. Also, no association was shown neither with smoking (P=0.105) nor with gender (P=0.788). Although no association was shown between the studied SNPs and MS in the Lebanese population living in the Bekaa region, this research is considered of high interest since it is one of the first studies done in Lebanon that permits a better comprehension of the genetic implication in the disease.

Author(S) **Tafran C.,** El-Abed M., **Osman Z., Elkabani I.**

ARTICLE TITLE	**Blind Image Quality Assessment for Face Pose Problem** ***(Joint Publication with the Faculty of Engineering)***
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2020
PUBLICATION INFO	1(2): 1-16
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	No-Reference image quality assessment for face images is of high interest since it can be required for biometric systems such as biometric passport applications to increase system performance. This can be achieved by controlling the quality of biometric sample images during enrollment. This paper proposes a novel no-reference image quality assessment method that extracts several image features and uses data mining techniques for detecting the pose variation problem in facial images. Using subsets from three public 2D face databases PUT, ENSIB, and AR, the experimental results recorded a promising accuracy of 97.06% when using the RandomForest Classifier, which outperforms other classifiers.

Author(S) **Al Youssif R.**, Sahab A., Zissis G., **Malaeb W.,** Hamady M.

ARTICLE TITLE	**Calculation of Net Emission Coefficient for High Intensity Discharge Lamps**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2020
PUBLICATION INFO	28(3): 80-86
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	There is still great interest in studying high intensity discharge (HID) lamps despite the great development of other light sources like light emitting diodes (LEDs).

ABSTRACT

Basic equations and numerical formulations allow calculating important terms such as the net emission coefficient (NEC) that plays an important role in understanding the radiation behaviour of these lamps. These lamps are considered to be at high pressure and the produced plasma was found to be at local thermodynamic equilibrium (LTE). The volume of the lamp is meshed into small cells and the total number of cells represents a compromise between correct results and calculation time. Each cell has its own local absorption and emission coefficient that applies to its position in the discharge. Line profile is calculated by two profiles convolution: one is Lorentz's and the second one is a quasi-static profile. Ray tracing technique is used to resolve the radiation transport for the visible and ultra violet (UV) spectrum. The NEC is thus calculated and compared with other models for a pure mercury discharge. In addition, additional photometric properties of the lamp are obtained.

Author(S) **Badawi M.,** Noureddine S., Kopatch Y., Abbas M., Ruskovc I., Grozdanov D., Thabet A., Fedorov N., Gouda M., Hramco C., Abd-Elzaher M., Hamzawy A., Elsafi M., El-Khatib A.

ARTICLE TITLE	**Characterization of the Efficiency of a Cubic NaI Detector with Rectangular Cavity for Axially Positioned Sources**
JOURNAL	**Journal of Instrumentation**
YEAR	2020
PUBLICATION INFO	DOI: 10.1088/1748-0221/15/02/P02013
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Scintillation NaI(Tl) crystals are typically utilized at room temperature for detection of energetic photons in high energy and nuclear physics research, non-destructive analysis of materials testing, safeguards, verification of nuclear treaty, geological exploration and therapeutic imaging. The present work provides a new geometry for the source-to-detector combination. A special order cubic detector with rectangular cavity was used. The mathematical expressions of the path-lengths traveled by the incident photon as well as the geometrical solid angle were derived. The detector efficiency was determined for an axially positioned standard point-like gamma-ray source using the analytical efficiency transfer technique. Geant4 Monte Carlo simulation code was also used to predict the detector response under the calibration geometry. The analytical efficiency transfer and Geant4 simulation results were compared with those obtained experimentally and a good agreement between them was shown.

Author(S) Huifeng W., **Kadry S.,** Deni Raj E.

ARTICLE TITLE	**Continuous Health Monitoring of Sportsperson Using IoT Devices Based Wearable Technology**
JOURNAL	**Computer Communications**
YEAR	2020
PUBLICATION INFO	160: 588-595
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Nowadays, wearable techniques are widely used in the Internet of Things (IoT). The discussed IoT devices are used in various applications such as smart home, security management, education institutions and so on. Among the various application, IoT devices are used widely in health care application for reducing the risk factors. So, in this paper, introduces the wearable sensors based on the Internet of Things (WS-IoT) for sports person continuous health monitoring system. The goal of this paper is to define the health clinics for sports medicine and performance services of the sports team to further the use of the technology to help athletes return to play in different fields of sport. With the help of wearable tracking devices to collect the health details and track the exercise records. To analyze and monitoring sports person health effective optimization machine learning techniques are introduced. The created system efficiency is evaluated using experimental results and discussion.

Author(S) **Hallal N., Khalil M.,** Moustafa M., Ramadan W., Joumaa W.

ARTICLE TITLE	**Data on Dysfunctional Muscle Contraction and Genes Contractile Expression Associated With Chlorpyrifos Exposure in Slow Twitch Skeletal Muscle**
JOURNAL	**Data in Brief**
YEAR	2019
PUBLICATION INFO	27: 1-6
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

ABSTRACT

Chlorpyrifos (CPF) is a toxic organophosphate commonly used worldwide. Its residues are being detected in different environmental matrixes and hence in the food chain. Repeated CPF exposure might pose health risk for the general population on long term. This data article contains the data of contractility impairment further to dietary exposure to CPF on a hind limb skeletal muscle; soleus, a typical slow twitch skeletal muscle. Thirty adult male rats Sprague Dawley are divided into three groups receiving the following daily diet for 6 weeks: Group 1 (vehicle), Group 2: CPF1 (CPF 1mg/kg/day) and Group 3: CPF5 (CPF 5 mg/kg/day). Soleus twitch tension and fatigability index are determined at the end of the treatment. The activity of acteylcholinesterase enzyme is assessed in the tissues homogenate. Additionally, we examined the expression levels of ryanodine type 1 receptor (RyR1), ATPase Sarcoplasmic/Endoplasmic Reticulum Ca^{2+} Transporting 1 (Atp2a1), ATPase Sarcoplasmic/Endoplasmic Reticulum Ca^{2+} Transporting 2 (Atp2a2) and nicotinic acetylcholine receptor (nAChR) in CPF-exposed skeletal muscle tissue using quantitative real time polymerase chain reaction. CPF exposure at two different doses induced an increase in twitch contraction in soleus muscle along with an increase in fatigability index. These increases are accompanied by low level of acetylcholinesterase enzyme activity as well as modification in genes level expression of nAChR, RyR1, Atp2a1 and Atp2a2 involved in contractility.

Author(S) Sekaran K., Chandana P., Jeny J., Meqdad M., **Kadry S.**

ARTICLE TITLE	**Design of Optimal Search Engine Using Text Summarization Through Artificial Intelligence Techniques**
JOURNAL	**Telkomnika**
YEAR	2020
PUBLICATION INFO	18(3): 1268-1274
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Natural language processing is the trending topic in the latest research areas, which allows the developers to create the human-computer interactions to come into existence. The natural language processing is an integration of artificial intelligence, computer science and computer linguistics. The research towards natural Language Processing is focused on creating innovations towards creating the devices or machines which operates basing on the single command of a human. It allows various Bot creations to innovate the instructions from the mobile devices to control the physical devices by allowing the speech-tagging. In our paper, we design a search engine which not only displays the data according to user query but also performs the detailed display of the content or topic user is interested for using the summarization concept. We find the designed search engine is having optimal response time for the user queries by analyzing with number of transactions as inputs. Also, the result findings in the performance analysis show that the text summarization method has been an efficient way for improving the response time in the search engine optimizations.

Author(S) Khan F., Ahamed J., **Kadry S.,** Ramasamy L.

ARTICLE TITLE	**Detecting Malicious URLs Using Binary Classification Through Adaboost Algorithm**
JOURNAL	**International Journal of Electrical and Computer Engineering**
YEAR	2020
PUBLICATION INFO	10(1): 997-1005
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Malicious Uniform Resource Locator (URL) is a frequent and severe menace to cybersecurity. Malicious URLs are used to extract unsolicited information and trick inexperienced end users as a sufferer of scams and create losses of billions of money each year. It is crucial to identify and appropriately respond to such URLs. Usually, this discovery is made by the practice and use of blacklists in the cyber world. However, blacklists cannot be exhaustive, and cannot recognize zero-day malicious URLs. So to increase the observation of malicious URL indicators, machine learning procedures should be incorporated. This study aims to discuss the exposure of malicious URLs as a binary classification problem using machine learning through an AdaBoost algorithm.

Author(S) Anbarasan M., Muthu B., Sivaparthipan C., Sundarasekar R., **Kadry S.,** Krishnamoorthy S., Samuel D., Dasel A.

ARTICLE TITLE	**Detection of Flood Disaster System Based on IoT, Big Data and Convolutional Deep Neural Network**
JOURNAL	**Computer Communications**
YEAR	2020
PUBLICATION INFO	150: 150-157
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Natural disasters could be defined as a blend of natural risks and vulnerabilities. Each year, natural as well as human-instigated disasters, bring about infrastructural damages, distresses, revenue losses, injuries in addition to huge death roll.

ABSTRACT

Researchers around the globe are trying to find a unique solution to gather, store and analyse Big Data (BD) in order to predict results related to flood based prediction system. This paper has proposed the ideas and methods for the detection of flood disaster based on IoT, BD, and convolutional deep neural network (CDNN) to overcome such difficulties. First, the input data is taken from the flood BD. Next, the repeated data are reduced by using HDFS map-reduce . After removal of repeated data, the data are pre-processed using missing value imputation and normalization function. Then, centred on the pre-processed data, the rule is generated by using a combination of attributes method. At the last stage, the generated rules are provided as the input to the CDNN classifier which classifies them as a) chances for the occurrence of flood and b) no chances for the occurrence of a flood. The outcomes obtained from the proposed CDNN method is compared parameters like Sensitivity, Specificity, Accuracy, Precision, Recall and F-score. Moreover, when the outcomes is compared other existing algorithms like Artificial Neural Network (ANN) & Deep Learning Neural Network (DNN), the proposed system gives is very accurate result than other methods.

Author(S) Mann A., Ramzan M., Nizami I., **Kadry S.,** Nam Y., Babazadeh H.

ARTICLE TITLE	**Diffraction of Transient Cylindrical Waves by a Rigid Oscillating Strip**
JOURNAL	**Applied Sciences**
YEAR	2020
PUBLICATION INFO	10(10): 3568-3580
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This investigation portrays the transient cylindrical wave diffraction by an oscillating strip. Mathematical analysis of the problem is carried out with the help of an integral transforms and the Wiener–Hopf technique. Using far zone approximation, the scattered field is evaluated by the method of steepest descent. This study takes into consideration the transient cylindrical source and an oscillating strip such that both the source and a scatterer have different oscillating frequencies ω′1 and ω′0 , respectively. The situation under consideration is well supported by graphical results showing the effects of emerging parameters.

Author(S) Abbas M., **Badawi M.**, Thabet A., Kopatch Y., Ruskov I., Grozdanov D., Noureddine S., Fedorov N., Gouda M., Hramco C. Abd-Elzaher M., Hamzawy A., Elsafi M., El-Khatib A.

ARTICLE TITLE	**Efficiency of a Cubic NaI(Tl) Detector with Rectangular Cavity Using Standard Radioactive Point Sources Placed at Non-axial Position**
JOURNAL	**Applied Radiation and Isotopes**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.apradiso.2020.109139
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Low cost scintillation detectors as compared with HPGe detectors are considered to be one of most important radiation detection tools. Therefore, these detectors can be manufactured in different shapes and work at room temperature without any cooling systems, which added an extra advantage to it. This work presents a study of a cubic detector with a rectangular cavity in different experimental setup geometries, using standard point-like gamma-ray sources, where the efficiency of the detector in these geometries was the target to be studied. According to this aim, the data from the experimental measurements was used to determine the detector efficiency. An analytical calculation of the detector efficiency was done by using a new mathematical expression, this mathematical expression depends on the efficiency transfer technique and effective solid angle calculations. To support the mathematical model, the source-to-detector arrangement was simulated by Geant4 Monte Carlo code. All the compared efficiency results were found to be promising and trusted based on the calculated deviation percentages.

Author(S) **El Ghouch N., Al-Oweini R., Awad R.**

ARTICLE TITLE	**Effects of Adding Transition Metal Substituted Polyoxotungstates on the Frequency and Temperature Dependent Dielectric Properties of $(Bi_{1.8}Pb_{0.4})Sr_2Ca_2Cu_3O_{10+\delta}$ Superconducting Phase**
JOURNAL	**Journal of Low Temperature Physics**
YEAR	2020
PUBLICATION INFO	200: 62-75
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

In the search for highly responsive dielectric materials, superconducting samples of type (Bi,Pb)-2223 were prepared using the standard solid-state reaction technique, with the addition of three different concentrations of ferrato and mangano-undecatungstosilicate (0.04, 0.12, and 0.20 wt%). The dielectric studies were performed by measuring the parallel capacitance CpCp as well as the dielectric loss factor using LCR HiTESTER. The studies were performed at temperature and frequency ranges starting from room temperature down to 98 K and from 50 kHz up to 5 MHz, respectively. The dielectric behavior was investigated by calculating both dielectric constants (ε′ε′ and ε″ε″), loss tangent (Tanδ) and ac conductivity (σac) as a function of frequency, temperature and addition concentrations of the $\{FeSiW_{11}\}$ and $\{MnSiW_{11}\}$ polyoxometalates. The results revealed that the dielectric parameters decrease with increasing frequency at each temperature for all the $\{FeSiW_{11}\}$x(Bi,Pb)-2223 and $\{MnSiW_{11}\}$x(Bi,Pb)-2223 prepared samples. Moreover, ε′ε′ and σac showed a decreasing trend with an increase in temperature in contrast to the increasing trend shown by ε″ε″ and Tanδ. Additionally, ε″ε″ has decreased upon increasing temperature at low frequencies. Accordingly, low $\{MnSiW_{11}\}$ addition at 0.12 wt% exhibited the highest dielectric constant $(1.99\times10^7)(1.99\times10^7)$ and ac conductivity 61.44961.449 $(\Omega.m)^{-1}$ with minimum dissipation (1.078). Furthermore, the ac conductivity was studied according to the power law, and the frequency exponent was found greater than one $(1.654\leq S\leq1.759)(1.654\leq S\leq1.759)$ for all the prepared samples.

Author(S) **Habanjar K., Shehabi H., Abdallah A., Awad R.**

ARTICLE TITLE	**Effect of Calcination Temperature and CobaltA on Structural, Optical and Magnetic Properties of Barium Hexaferrite $BaFe_{12}O_{19}$ Nanoparticles**
JOURNAL	**Applied Physics A: Materials Science and Processing**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s00339-020-03497-3
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	(xCo)-$BaFe_{12}O_{19}$ nanoparticles, with 0 ≤x≤x≤ 0.1 wt%, have been prepared using a chemical co-precipitation method and different calcination temperatures (850 °C, 900 °C and 950 °C). The samples were subjected to structural, optical and magnetic studies. X-ray powder diffraction showed the hexagonal crystal structure of (xCo)-$BaFe_{12}O_{19}$, and the more convenient temperature for the formation of this phase was 950 °C. Transmission electron microscope was used for investigating the morphology as well as the average particle size of the samples. It was found that the average size of all samples ranges between 65 and 90 nm. The energy band gap Eg was determined using UV–Vis spectroscopy. It was noticed that the values of Eg decreased with the addition of cobalt and the increase in the calcination temperature. The M–H curve obtained from vibrating sample magnetometer has been used to study the magnetic behavior.

ABSTRACT

The anisotropy field (Ha), the saturation magnetization (σs), the effective crystalline anisotropy constant (Keff), the remanent magnetization (σr) and squareness ratio (S) for each sample were calculated. The maximum value of coercivity (5087Oe) was found for x = 0 wt% at T = 950 °C which is suitable for magnetic applications, such as the recording equipment and permanent magnets.

Author(s) **Al-Mokdad F., Bitar Z.,** Sayed Hassan R., Yaacoub N., **Awad R.**.

ARTICLE TITLE	**Effect of Molybdenum Doping on the Structural and Magnetic Properties of $MnFe_2O_4$ Magnetic Nanoparticles**
JOURNAL	**Applied Physics A: Materials Science and Processing**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s00339-020-03687-z
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Magnetic nanoparticles $MnFe_{2-x}Mo_xO_4$ (x = 0.00, 0.04, 0.08 and 0.10) have been prepared by wet coprecipitation method at calcination temperature 673 K. X-ray powder diffraction (XRD) was used to study the structural properties of the prepared samples, whereas the vibrating sample magnetometer (VSM) and Mössbauer spectrometry measurements (at T = 300 K and T = 77 K) were used to investigate the magnetic properties. The single-phase cubic spinel structure of the ferrites samples was confirmed by the XRD patterns, and a nonlinear variation in the crystalline size was revealed. VSM hysteresis loops confirmed the ferromagnetic behavior in all the samples with an increase in saturation magnetization with the molybdenum doping. Mössbauer spectra at 300 K showed a mixture of the magnetic sextet and central quadrupole doublet with enhancement in the magnetic sextet in the Mo-doped samples. Moreover, Mössbauer spectra at 77 K revealed the disappearance of the quadrupole doublet in all samples, indicating the enhancement of magnetic properties of manganese ferrites nanoparticles due to Mo-doping.

Author(s) **Habanjar K., Najem A.,** Abdel-Gaber A., **Awad R.**

ARTICLE TITLE	**Effect of Pelletization Pressure on the Physical and Mechanical Properties of (Bi, Pb)-2223 Superconductors**
JOURNAL	**Physica Scripta**
YEAR	2020
PUBLICATION INFO	DOI: 10.1088/1402-4896/ab7f46
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Conventional solid-state reaction technique was used to prepare bulk samples with nominal composition of $(Bi, Pb)_2Sr_2Ca_2Cu_3O_{10+\delta}$ superconductors. The prepared powder was pelletized at different pressure (P = 0.3, 0.7, 1.0, 1.4 and 1.9 GPa) before the calcination process. Structural parameters and phase purity were evaluated using x-ray diffraction (XRD). The formation of the tetragonal major phase is improved with increasing the pelletization pressure up to 1.4 GPa. The morphology and elemental compositions were performed by using scanning electron microscope (SEM) and energy dispersive x-ray spectroscopy (EDX), respectively. The results showed the enhancement of the grain alignment at an optimum pelletization pressure of 1.4 GPa with a decrease in the porosity percentages. Superconducting transition temperature (Tc) and the critical current density (Jc) were obtained by means of DC electrical resistivity and the voltage-current characteristic, respectively. Both Tc and Jc are improved with increase the pelletization pressure up to 1.4 GPa. Room temperature Vickers microhardness Hv measurement was performed at different applied loads (0.245–9.8 N) and times (10–60 s). As a result of the Hv measurements, all the prepared samples have a normal indentation size effect behaviour. It was found that P = 1.4 GPa was the optimal pressure to improve the microhardness in the (Bi, Pb)-2223 phase. The measured Hv data were theoretically analysed using Meyer's law, the Hays-Kendall approach, the elastic plastic deformation model and the proportional sample resistance. The last model was recognized to be the best theoretical one describing the true Hv values for the considered phase. Room temperature indentation creep analysis was also performed using time-dependent microhardness to identify the operative creep mechanisms in the measured samples.

Author(s) **Najjar R., Awad R.**, Abdel-Gaber A.

ARTICLE TITLE	**Electrical and Mechanical Properties of Mn_2O_3 Nanoparticles / $SmBa_2Cu_3O_{7-\delta}$ Composite**
JOURNAL	**Materials Research Innovations**
YEAR	2019
PUBLICATION INFO	DOI: 10.1080/14328917.2019.1686306
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

$(Mn_2O_3)x\ SmBa_2Cu_3O_{7-\delta}$ composite samples (0.00 ≤ x ≤ 0.08 wt.%) were prepared using solid state reaction technique, and investigated using resistivity measurements and the Vickers microhardness. The characterisation of the prepared samples was accomplished using X-ray powder diffraction (XRD), Scanning Electron Microscopy (SEM), Energy-Dispersive X-ray Spectroscopy (EDS), and Brunauer-Emmett-Teller (BET). The Mn_2O_3 nanoparticles do not influence the orthorhombic structure of $SmBa_2Cu_3O_{7-\delta}$ and stay as adhering material producing a filling up of the voids and reducing the cracks. BET measurements show a decrease in the specific surface area as well as in the total pore volume for x = 0.02 wt.%, confirming the SEM results. The superconducting transition temperature Tc of the prepared samples was investigated using electrical resistivity measurements. Results showed that Tc increases from 91.68 K to 94.43 K as x increases from 0.00 to 0.02 wt.%, then it decreases as nano-Mn2O3 wt.% concentration increases. The mechanical properties of $(Mn_2O_3)xSmBa_2Cu_3O_{7-\delta}$ samples were measured using Vickers microhardness in order to investigate the effect of Mn_2O_3 nanoparticles on Vickers microhardness number Hv. The Vickers microhardness data were analysed using Meyer's law, Hays and Kendall (HK), and Modified Proportional Specimen Resistance (MPSR) models. The analysis showed that the HK is the best model to describe the load dependence of Hv for all samples.

Author(s) **Abu El Kher N.,** El-Kork N., **Korek M.**

ARTICLE TITLE	**Electronic Structure With Rovibrational Calculations of the Magnesium Monohalides MgX and Their Cations MgX^+ (X = Cl, Br, and I)**
JOURNAL	**ACS Omega**
YEAR	2019
PUBLICATION INFO	4(26): 21741-21760
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Alkaline-earth monohalides are popular compounds that are used in various applications. Little is known, however, in terms of electronic structure, about their cations and their low-lying electronic states. We present in this work electronic structure ab-initio calculations based on multireference configuration interaction plus Davidson correction of three magnesium monohalides and their cations (MgCl, MgBr, MgI, $MgCl^+$, $MgBr^+$, and MgI^+). We determine the spectroscopic constants T e, R e, ωe, B e, and αe and the dissociation energies D e for their bound states. Additionally, we investigate their vibrational properties by calculating the vibrational eigenvalue E v, the rotational constant B v, and the centrifugal distortion constant D v. We additionally study the electric charge distribution of several states by determining their permanent dipole moment and transition dipole moment curves. Finally, we calculate the Franck-Condon factors and the radiative lifetimes as precursors for laser cooling experiments.

Author(s) Abbas S., Khan W., **Kadry S.,** Ijaz Khan M., Waqas M., Imran Khan M.

ARTICLE TITLE	**Entropy Optimized Darcy-Forchheimer Nanofluid (Silicon dioxide, Molybdenum disulfide) Subject to Temperature Dependent Viscosity**
JOURNAL	**Computer Methods and Programs in Biomedicine**
YEAR	2020
PUBLICATION INFO	190: 363-384
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Background

In this research communication, entropy optimized Darcy-Forchheimer flow with magnetohydrodynamic over a stretched surface is considered. Here Molybdenum disulfide (MOS_2) and Silicon dioxide (SiO_2) are taken as a nanoparticles and Propylene glycol as a continuous phase liquid. Electrically conducting fluid is considered and flow is generated via stretched surface of sheet. The total entropy rate which is depends on four types of irreversibilities i.e., heat transfer, porosity, fluid friction and dissipation) is calculated via second law of thermodynamics. The energy expression is mathematically modeled and discussed subject to heat generation/absorption, dissipation, thermal radiation and Joule heating. Furthermore, temperature dependent viscosity is accounted.

Method

The nonlinear PDE's (partial differential equations) are first changed to ODE's (ordinary differential equations) through implementation of appropriate similarity variables (transformations). The numerical results of ordinary ones are computed via Built-In-Shooting method. The results for the flow field, temperature, skin friction, Nusselt number and entropy generation are discussed against various sundry flow parameters graphically.

Results

Salient characteristics of sundry flow parameters on the entropy generation rate, velocity, Bejan number, gradients of velocity, gradient of temperature and temperature are examined and display graphically. The results are computed for both nanoparticles. From obtained results it is observed that temperature field increases versus higher thermal Biot number for both nanoparticles. It is also observed that the thermal field is more in presence of Molybdenum disulfide as compared to Silicon dioxide, because the thermal conductivity of Molybdenum disulfide is higher than Silicon dioxide. Entropy generation and Bejan number show contrast impact versus higher estimations of Brinkman number versus both nanoparticles.

Author(s) **Abdel-Gaber A., Rahal H., Beqai F.**

ARTICLE TITLE	***Eucalyptus* Leaf Extract as a Eco-friendly Corrosion Inhibitor for Mild Steel in Sulfuric and Phosphoric Acid Solutions**
JOURNAL	**International Journal of Industrial Chemistry**
YEAR	2020
PUBLICATION INFO	11: 123-132
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

The adsorption mechanism and inhibitive action of the Eucalyptus plant leaf extract (Eu) on the corrosion of mild steel in 0.5 M H_2SO_4 and 0.5 M H_3PO_4 solutions were investigated by potentiodynamic polarization curves measurements and electrochemical impedance spectroscopy technique. Potentiodynamic polarization curves revealed that the Eucalyptus leaf extract acts as a mixed type inhibitor in both acidic solutions. The impedance responses indicated that the corrosion process occurs under activation control. Fourier transform infrared spectroscopy has been used to predict the possible major chemical constituent of the leaf extract. Four adsorption isotherms including Langmuir, kinetic–thermodynamic, Flory–Huggins and Temkin model were used to investigate the mode of inhibition of Eucalyptus leaf extract. The free energy of adsorption showed that the corrosion inhibition takes place by spontaneous physical adsorption of Eucalyptus leaf extract molecules on the mild steel surface. The obtained data indicated that Eucalyptus leaf extract is a more efficient inhibitor of mild steel corrosion in 0.5 M H_2SO_4 than in 0.5 M H_3PO_4 solutions. Thermodynamics activation parameters were also calculated and discussed.

Author(s) **Jamal A., Awad R.,** Yusef H.

ARTICLE TITLE	**Evaluation of Antimicrobial Activity of ZnO Nanoparticles against Foodborne Pathogens**
JOURNAL	**International Journal of Current Microbiology and Applied Sciences**
YEAR	2019
PUBLICATION INFO	8(11): 2000-2025
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology
ABSTRACT	Nanostructures have a great potential in the area of food packaging. This study aims to determine the antimicrobial efficacy for zinc oxide (ZnO) nanoparticles (Nps), compared to bulk ZnO powder. ZnO Nps were synthesized using; co-precipitation and high-speed ball milling method. The synthesized powders were characterized by X-ray diffraction (XRD), Transmission Electron Microscope (TEM), Fourier Transform Infrared Spectroscopy (FTIR) and Ultraviolet-Visible Absorption Spectroscopy (UV). All data revealed the formation of pure nano-sized ZnO. ZnO Nps showed notable size and concentration-dependent antimicrobial effects. In comparison to nanosuspension, the antimicrobial activity of bulk ZnO was almost negligible, a strong significant difference was noticed between the antimicrobial activity of the bulk and that of prepared Nps ($p<0.05$). ZnO Nps exhibited a privileged ability to suppress the growth of foodborne pathogens in culture media and milk samples. Among the bacterial strains tested, Gram-positive bacteria were more sensitive to ZnO nano-treatments. The examination of DNA of Bacillus subtilis treated with ZnO Nps using gel electrophoresis, displayed a reduction in band size but the absence of DNA fragmentation. Transmission Electron Microscope illustrated remarkable damages in the cell wall and cytoplasmic membrane of Bacillus subtilis cell structure upon exposure to ZnO Nps.

Author(s) **Said-Salman I.,** Jebaii F., **Yusef H.,** Moustafa M.

ARTICLE TITLE	**Evaluation of Wi-Fi Radiation Effects on Antibiotic Susceptibility, Metabolic Activity and Biofilm Formation by Escherichia *Coli* $0_{157}H_7$, *Staphylococcus Aureus and Staphylococcus Epidermis***
JOURNAL	**Journal of Biomedical Physics and Engineering**
YEAR	2019
PUBLICATION INFO	9(5): 579-586
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	**Background** The radiation emitted from electromagnetic fields (EMF) can cause biological effects on prokaryotic and eukaryotic cells, including non-thermal effects. **Objective** The present study evaluated the non-thermal effects of wireless fidelity (Wi-Fi) operating at 2.4 GHz part of non-ionizing EMF on different pathogenic bacterial strains (Escherichia coli $0_{157}H_7$, Staphylococcus aureus, and Staphylococcus epidermis). Antibiotic resistance, motility, metabolic activity and biofilm formation were examined. **Material and Methods** In this case-control study, a Wi-Fi router was used as a source of microwaves and also bacterial cells were exposed to Wi-Fi radiation continuously for 24 and 48 hours. The antibiotic susceptibility was carried out using a disc diffusion method on Müller Hinton agar plates. Motility of Escherichia coli $0_{157}H_7$ was conducted on motility agar plates. Cell metabolic activity and biofilm formation were performed using 3-(4, 5-Dimethylthiazol-2yl)-2, 5-diphenyltetrazolium bromide (MTT) assay and crystal violet quantification, respectively. **Results** The exposure to Wi-Fi radiation altered motility and antibiotic susceptibility of Escherichia coli $0_{157}H_7$. However, there was no effect Wi-Fi radiation on antibiotic susceptibility of Staphylococcus aureus and Staphylococcus epidermis. On the other hand, the exposed cells, as compared to the unexposed control, showed an increased metabolic activity and biofilm formation ability in Escherichia coli $0_{157}H_7$, Staphylococcus aureus and Staphylococcus epidermis.

ABSTRACT

Conclusion

These results proposed that Wi-Fi exposure acted on bacteria in stressful manner by increasing antibiotic resistance and motility of Escherichia coli $0_{157}H_7$, as well as enhancing biofilm formation by Escherichia coli $0_{157}H_7$, Staphylococcus aureus and Staphylococcus epidermis. The findings may have implications for the management of serious diseases caused by these infectious bacteria.

Author(S) **Skafi M.,** Yunis M., **Zekri A.**

ARTICLE TITLE	**Factors Influencing SMEs' Adoption of Cloud Computing Services in Lebanon: An Empirical Analysis Using TOE and Contextual Theory**
JOURNAL	**IEEE Access**
YEAR	2020
PUBLICATION INFO	8: 79169-79181
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	An increasingly important advancement in information and communication technologies is cloud computing, and a remarkably increasing trend is its adoption by various organizations. The trend is attributed to the potential of this growing computing paradigm to improve the scalability, efficiency, and reliability of IT systems. Diffusion of cloud computing innovation is changing the way business information systems are developed, paid for, and maintained Alshamaila et al. 2013, Low et al. 2011, thus contributing to efficiency and better value for enterprises. This not only applies to large organizations, but also progressively more to small and medium-sized enterprises (SMEs). However, little is known about the factors most likely to be associated to the adoption behavior of cloud computing services among small and medium enterprises operating in Lebanon. This study deploys the technology–organization–environment (TOE) framework and the Contextual Theory to empirically examine the determinants of cloud computing service adoption in a developing country, namely Lebanon. A model is proposed, and data collected from 139 respondents working in SMEs in Lebanon and analyzed using confirmatory factor analysis and logistic regression in SPSS provide strong support for the model. Results indicate that technological (i.e., complexity and security) and organizational (i.e., top management support and prior IT experience) factors are positively related to the decision to adopt cloud computing services. Moreover, one of the areas of potential interest is the effect of country-specific, or contextual factors, among those who intend to adopt cloud computing. The analysis shows that context-specific factors (i.e. poor infrastructure and lack of government initiatives) are negatively related to the adoption decision. Implications and limitations are discussed, and recommendations for future research are proposed.

Author(S) **Houri T., Osta B.,** Khoder Agha M.

ARTICLE TITLE	**Familial Mediterranean Fever: A General Review**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	1(2):1-10
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Familial Mediterranean Fever (FMF) is an autosomal recessive inherited disease, which is accompanied by recurrent attacks of fever and serositis. It can be distinguished into two types. Type 1, is associated with recurrent short episodes of inflammation and polyserositis; type 2, is characterized by the accumulation of serum amyloid A mainly in the kidney leading to amyloidosis. The etiology of this disease is due to mutations in the MEFV gene, which encodes the protein "pyrin". These mutations cause the uncontrolled production of proinflammatory cytokines including interleukin 1. Genetic analysis is important to confirm the diagnosis in the patients. Colchicine is the drug of choice. However, some people are resistant to this drug. In such cases, newer biologic agents have used in the treatment of the disease. This review aims to discuss the most recent advances about FMF including the major symptoms, the diagnosis, the genetics and the management.

Author(S) **Halawi M.,** Nasser R., Yassine W., **Yusef H., Borjac J.,** Zeaiter Z.

ARTICLE TITLE	**First Case of Identification of Candida kefyr and Pichia kluyveri in Lebanese Water**
JOURNAL	**Water, Air, and Soil Pollution**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s11270-020-4460-y
THEME / SUBTHEME	Science and Technology/ Environmental Studies

ABSTRACT

Candida kefyr (Kluyveromyces marxianus) is a clinically important infectious yeast. It is found in nature, and is known to cause diseases in humans. No previous studies known have shown the detection of Candida kefyr in water sources of any country, and no studies have detected it anywhere in Lebanon. This present study is carried out to assess the quality of Lebanese water in terms of yeast pollution. The occurrence of Candida spp. (species) was inspected in 84 water samples that tested positive for containing Candida. Out of all isolates, 12 isolates were of C. kefyr and two were of P. kluyveri. The identification of Candida sp. was carried out by using HiCrome™ M1297A and M1297AR chromogenic media. Isolates identified were confirmed by MALDI-TOF MS and 26S rRNA sequencing. The isolates varied from sensitive to resistant to common antifungal agents, including Itraconazole, clotrimazole, fluconazole, miconazole, and nystatin, via disk diffusion assay. These results are the first to confirm the presence of C. kefyr in Lebanese water supplies and suggest that water consumed in Lebanon may be a potential transmission route for serious Candida-based infections.

Author(S) **El Kojok H., El Darra N., Khalil M.,** Capo A., Pennacchio A., Staiano M., Camarca A., D'Auria S., Varriale A.

ARTICLE TITLE	**Fluorescence Polarization Assay to Detect the Presence of Traces of Ciprofloxacin** ***(Joint Publication with the Faculty of Health Sciences)***
JOURNAL	**Scientific Reports**
YEAR	2020
PUBLICATION INFO	DOI: 10.1038/s41598-020-61395-3
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology
ABSTRACT	Detection of ciprofloxacin residues in milk by sensitive and rapid methods is of great interest due to its use in the treatment of dairy livestock health. Current analytical approaches to antibiotics detection, are laboratory-based methods and they are time-consuming and require trained personnel. To cope this problem, we propose an assay, based on fluorescence polarization principle, able to detect the presence of ciprofloxacin in diluted milk sample without any pre-treatment. The proposed method is based on the use of ciprofloxacin-protein conjugate labeled with near infrared fluorescence dye, which upon binding to specific antibody causes an increase of the fluorescence polarization emission signal. The developed assay allows for the detection of ciprofloxacin at a concentration of 1ppb, which represents an amount lower than the maximum residual limit (MRL) of ciprofloxacin in milk, as set by the European Union regulation (100 ppb).

Author(S) Abbas S., Ijaz Khan M., **Kadry S.,** Khan W., Israr-Ur-Rehman M., Waqas M.

ARTICLE TITLE	**Fully Developed Entropy Optimized Second Order Velocity Slip MHD Nanofluid Flow with Activation Energy**
JOURNAL	**Computer Methods and Programs in Biomedicine**
YEAR	2020
PUBLICATION INFO	190: 450-468
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Hydromagnetic second order velocity slip flow of viscous material with nonlinear mixed convection towards a stretched rotating disk is numerically examined here. Important slip mechanism of Buongiorno's nanofluid model i.e., Brownian motion and thermophoretic diffusion is incorporated in the mathematical modeling. Heat transport aspects are examined via Joule heating, thermal radiation and dissipation. Convective conditions at the stretchable surface of disk is implemented for the heat transport analysis. Chemical reaction subject to activation energy is also considered. Through appropriate transformations and shooting method the outcomes are computed and demonstrated graphically. The flow field, temperature, surface drag force, concentration and Nusselt number are deliberated subject to pertinent parameters. Total entropy rate is obtained. The outcomes show that magnetic field significantly affects the flow field as well as entropy rate.

Author(S) El-Khatib A., Abbas M., Abd Elzaher M., **Badawi M.,** Alabsy M., Alharshan G., Aloraini D.

ARTICLE TITLE	**Gamma Attenuation Coefficients of Nano Cadmium Oxide/High Density Polyethylene Composites**
JOURNAL	**Scientific Reports**
YEAR	2019
PUBLICATION INFO	DOI: 10.1038/s41598-019-52220-7
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

In the present work, high density polyethylene (HDPE) matrix mixed with micro-sized and nano-sized Cadmium oxide (CdO) particles of different concentrations were prepared by compression molding technique. The aim of the study is to investigate the effect of particle size and weight percentage of CdO particles on the gamma radiation shielding ability of CdO/HDPE composites. The mass attenuation coefficients of pure HDPE, micro-CdO/HDPE and nano-CdO/HDPE composites were evaluated at photon energies ranging from 59.53 keV to 1408.01 keV using standard radioactive point sources [^{241}Am, ^{133}Ba, ^{137}Cs, ^{60}Co and ^{152}Eu]. Adding micro and nano CdO particles to the HDPE matrix clearly increases the mass attenuation coefficients of the composites and the improvement is more significant at low γ-ray energies. The effect of particle size of CdO filler has an important role on the shielding ability of the composite. The experimental results reveal that, the composites filled with nano-CdO have better γ-radiation shielding ability compared to that filled with micro-CdO at the same weight fraction. A relative increase rate of about 16% is obtained with nano-CdO content of 40 wt% at 59.53 keV, which attributed to the higher probability of interaction between γ-rays and nanoparticles. From this study, it can be concluded that nano-CdO has a good performance shielding characteristic than micro-CdO in HDPE based radiation shielding material.

Author(s) **Said-Salman I.,** Jebaii F., **Yusef H.,** Moustafa M.

ARTICLE TITLE	**Global Gene Expression Analysis of Escherichia coli K-12 DH5α After Exposure to 2.4 GHz Wireless Fidelity Radiation**
JOURNAL	**Scientific Reports**
YEAR	2019
PUBLICATION INFO	DOI: 10.1038/s41598-019-51046-7
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology
ABSTRACT	This study investigated the non-thermal effects of Wi-Fi radiofrequency radiation of 2.4 GHz on global gene expression in Escherichia coli K-12 DH5α. High-throughput RNA-sequencing of 2.4 GHz exposed and non-exposed bacteria revealed that 101 genes were differentially expressed (DEGs) at $P \leq 0.05$. The up-regulated genes were 52 while the down-regulated ones were 49. QRT-PCR analysis of pgaD, fliC, cheY, malP, malZ, motB, alsC, alsK, appB and appX confirmed the RNA-seq results. About 7% of DEGs are involved in cellular component organization, 6% in response to stress stimulus, 6% in biological regulation, 6% in localization, 5% in locomotion and 3% in cell adhesion. Database for annotation, visualization and integrated discovery (DAVID) functional clustering revealed that DEGs with high enrichment score included genes for localization of cell, locomotion, chemotaxis, response to external stimulus and cell adhesion. Kyoto encyclopedia of genes and genomes (KEGG) pathways analysis showed that the pathways for flagellar assembly, chemotaxis and two-component system were affected. Go enrichment analysis indicated that the up-regulated DEGs are involved in metabolic pathways, transposition, response to stimuli, motility, chemotaxis and cell adhesion.

ABSTRACT

The down-regulated DEGs are associated with metabolic pathways and localization of ions and organic molecules. Therefore, the exposure of E. coli DH5α to Wi-Fi radiofrequency radiation for 5 hours influenced several bacterial cellular and metabolic processes.

Author(s) Ramasamy L., **Kadry S.,** Jayanthi M., Wei W., Rho S.

ARTICLE TITLE	**Handling Failures in Semantic Web Service Composition Through Replacement Policy in Healthcare Domain**
JOURNAL	**Journal of Internet Technology**
YEAR	2020
PUBLICATION INFO	21(3): 733-741
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Consistency of web service composition is a challenge for developing business applications. As web services are naturally changeable, the way to deliver consistent web services composition over unreliable web services could pose a significant problem. We propose a framework for semantic web services in healthcare domain that automatically performs web service discovery, composition and quality of service assurance, and, performs error handling through the replacement policy and fault-tolerant composition of web services that mixes both exception managing and transaction approaches. The framework enables the development of personalized healthcare systems.

Author(s) **Shebbo S., El Joumaa M., Kawach R., Borjac J.**

ARTICLE TITLE	**Hepatoprotective Effect of *Matricaria* chamomilla Aqueous Extract Against 1,2-Dimethylhydrazine-Induced Carcinogenic Hepatic Damage in Mice**
JOURNAL	**Heliyon**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.heliyon.2020.e04082
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Dimethylhydrazine (DMH) is a potent colonic and hepatic carcinogen that is metabolized into oxyradicals causing liver injury and DNA mutations. Matricaria chamomilla is a well-documented medicinal herb that possesses antiinflammatory, antioxidant and antitumor activities and is commonly used to treat diverse ailments. The present study aimed to reveal the hepatoprotective effects of Matricaria chamomilla aqueous extract during an intermediate stage of colorectal cancer (CRC) in mice. Male Balb/c mice were divided into six groups: group A served as control, group B received chamomile extract (150 mg/Kg b.w.) orally for 12 weeks, and groups C-F received weekly intraperitoneal injections of DMH (20 mg/Kg b.w.) once a week for 12 weeks. In addition to DMH, groups D and F received chamomile during the initiation and post-initiation stages, respectively. Blood and liver samples were collected for biochemical and molecular analyses. The results showed that DMH induced hepatic injury in mice as shown by significant increase in serum aspartate aminotransferase and alanine aminotransferase. The changes in biochemical parameters were accompanied by activation of the Wnt signaling pathway leading to increased hepatocytes proliferation as well as inflammation evidenced by high levels of pro-inflammatory enzymes cyclooxygenase 2 (COX-2) and inducible nitric oxide synthase (iNOS). The results also showed potential hepatoprotective effects of chamomile extract against DMH-induced liver injury, proliferation and inflammation. Chamomile restored the biochemical and molecular parameters and this improvement was more pronounced in mice pretreated with the extract. In conclusion, chamomile extract may exert its hepatoprotective activities against DMH probably due to the antioxidant, antiproliferative and anti-inflammatory properties of its flavonoids.

Author(s) Sornalakshmi M., Balamurali S., Venkatesulu M., Krishnan M., Ramasamy L., **Kadry S.,** Manogaran G., Hsu C., Muthu B.

ARTICLE TITLE	**Hybrid Method for Mining Rules Based on Enhanced Apriori Algorithm with Sequential Minimal Optimization in Healthcare Industry**
JOURNAL	**Neural Computing and Application**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s00521-020-04862-2
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Data mining may enable healthcare organizations, with analysis of the different prospects and connection between seemingly unrelated information, to anticipate trends in the patient's medical condition and behavior. Raw data are large and heterogeneous from healthcare organizations. It needs to be collected and arranged, and its integration enables medical information systems to be integrated in a united way. Health data mining offers unlimited possibilities to evaluate numerous less obvious or secret data models utilizing common techniques for study. Association rule mining (ARM) is an effective technique for detecting the connection of the data which are the most commonly used and influential algorithms in ARM for an Apriori algorithm. However, it generates a large amount of rules and does not guarantee the efficiency and value of the knowledge created. In order to overcome this issue, an enhanced Apriori algorithm (EAA) based on the knowledge of a context ontology (EAA-SMO) methodology for sequential minimal optimization (SMO) is suggested. The simple knowledge is to establish the ideas of ontology as a hierarchical structure of the conceptual clusters of specific subjects, which comprises "similar" concepts that mean an exact category of the knowledge within the domain. There is an interesting rule for each cluster based on the correlation between the items. In addition, the rule developed is classified as a prediction model for anomaly detection based on SMO regression. The experimental analysis demonstrates the proposed method improved 2% of accuracy and minimizes the execution time by 25% when compared to semantic ontology.

Author(S) Vijayalaxmi B., Anuradha C., Sekaran K., Meqdad M., **Kadry S.**

ARTICLE TITLE	**Image Processing Based Eye Detection Methods a Theoretical Review**
JOURNAL	**Bulletin of Electrical Engineering and Informatics**
YEAR	2020
PUBLICATION INFO	9(3): 1189-1197
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Lately, many of the road accidents have been attributed to the driver stupor. Statistics revealed that about 32% of the drivers who met with such accidents demonstrated the symptoms of tiredness before the mishap though at varying levels. The purpose of this research paper is to revisit the various interventions that have been devised to provide for assistance to the vehicle users to avert unwarranted contingencies on the roads. The paper tries to make a sincere attempt to encapsulate the body of work that has been initiated so far in this direction. As is evident, there are numerous ways in which one can identify the fatigue of the driver, namely biotic or physiological gauges, vehicle type and more importantly the analysis of the face in terms of its alignment and other attributes.

Author(S) Khan Z., Rasheed H., Islam S., Noor S., Khan W., Abbas T., Khan I., **Kadry S.,** Nam Y., Nisar K.

ARTICLE TITLE	**Impact of Magnetohydrodynamics on Stagnation Point Slip Flow due to Nonlinearly Propagating Sheet with Nonuniform Thermal Reservoir**
JOURNAL	**Mathematical Problems in Engineering**
YEAR	2020
PUBLICATION INFO	DOI: 10.1155/2020/1794213
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this analysis, we introduced heat convective aspects of stagnation point movement of a magnetohydrodynamic (MHD) stream on a nonlinear oscillating plane with the impacts of velocity and heat slips with variable heat reservoir.

ABSTRACT

By using some appropriate transformations, the governing differential equations are switched into an ordinary differential equation. The semianalytics technique called Homotpy Analysis Method (HAM) has been applied to evaluate the ordinary differential equations. For convergence achievement, a numerical method BVPh2-midpoint method is also applied and an outstanding agreement is found. The impacts of the governing constraints on flow, motion, and temperature distributions are investigated in detail. We observed that the temperature distribution increases with nonlinear heat reservoir parameter. Our results, in some limiting situations, matched well with previously published results, which approve that our obtained results are correct.

Author(S) Vijayalaxmi B., Sekaran K., Neelima N., Chandana P., Meqdad M., **Kadry S.**

ARTICLE TITLE	**Implementation of Face and Eye Detection on DM6437 Board using Simulink Model**
JOURNAL	**Bulletin of Electrical Engineering and Informatics**
YEAR	2020
PUBLICATION INFO	9(2): 785-791
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Driver Assistance system is significant in drriver drowsiness to avoid on road accidents. The aim of this research work is to detect the position of driver's eye for fatigue estimation. It is not unusual to see vehicles moving around even during the nights. In such circumstances there will be very high probability that a driver gets drowsy which may lead to fatal accidents. Providing a solution to this problem has become a motivating factor for this research, which aims at detecting driver fatigue. This research concentrates on locating the eye region failing which a warning signal is generated so as to alert the driver. In this paper, an efficient algorithm is proposed for detecting the location of an eye, which forms an invaluable insight for driver fatigue detection after the face detection stage. After detecting the eyes, eye tracking for input videos has to be achieved so that the blink rate of eyes can be determined.

Author(s) **Al Boukhari J.,** Sayed Hassan R., **Awad R.**

ARTICLE TITLE	**Improving the Dielectric Behavior of NiO Nanoparticles by Samarium Doping for Electromagnetic Applications**
JOURNAL	**Materials Research Express**
YEAR	2019
PUBLICATION INFO	DOI: 10.1088/2053-1591/ab4ad2
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	In an attempt to improve the dielectric behavior of NiO nanoparticles, pure and 2% Sm doped NiO nanoparticles were prepared via co-precipitation method. The prepared samples were characterized by x-ray Powder Diffraction XRD and Transmission Electron Microscopy TEM. The XRD results confirm the formation of the NiO cubic structure for both samples and they indicate that the crystallite size of the Sm doped NiO nanoparticles is smaller than that of the pure NiO nanoparticles with comparable lattice parameters. TEM images reveal the formation of weakly agglomerated nanoparticles with size distribution agreeable with the size obtained from XRD results. DC electrical conductivity measurements, recorded in the temperature range 323–573 K, revealed an increase in the dc conductivity with the increase in temperature for both samples. Dielectric measurements were done in the frequency range 50 Hz–5 MHz at different temperatures. The plots of the dielectric constant ε', dielectric loss ε'', loss tangent tanδ and ac conductivity σ ac as a function of both frequency and temperature were discussed. The Nyquist plots, between real and imaginary parts of impedance, were studied at different temperatures. Moreover, the Correlated Barrier Hopping CBH model can describe the conduction mechanism of the prepared samples, and the binding energy Wm and minimum hopping distance Rmin were calculated.

Author(s) Rekaby M., **Shehabi H., Awad R.**

ARTICLE TITLE	**Influence of Cobalt Addition and Calcination Temperature on the Physical Properties of $BaFe_{12}O_{19}$ Hexaferrites Nanoparticles**
JOURNAL	**Materials Research Express**
YEAR	2020
PUBLICATION INFO	7(1): 1-15
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Nano-scale particles of pure Barium hexaferrite 'BaFe$_{12}$O$_{19}$' and Cobalt added Barium hexaferrite 'CoxBaFe12O19', with x = 0.04, 0.06 and 0.1 wt%, were successfully synthesized by the chemical co-precipitation method. The synthesized powder was subjected to different calcination temperatures (T = 850 °C, 900 °C, 950 °C and 1050 °C). X-ray powder diffraction (XRD) clarified that nearly single phase of $BaFe_{12}O_{19}$ with tiny traces of Fe_2O_3 phase were obtained when the precursor was calcined at 1050 °C for 2 h. The lattice parameters and unit cell volume were almost unchanged with either Cobalt addition or calcination temperatures. From Debye–Scherrer equation, the crystallite size (D) was found to gradually increase with increasing calcination temperature to reach its maximum values for samples calcined at 1050 °C. The formation of Barium hexaferrite phase was also confirmed from Fourier transform infrared (FTIR) spectra through the existence of strong absorption peaks that appeared between 581 cm^{-1} and 435 cm^{-1}. The morphology and grain size of the samples were examined using transmission electron microscopy (TEM) technique. Optical properties of the samples were studied through ultraviolet 'UV' visible spectroscopy. The optical band gap (Eg) of the samples was obtained from Tauc relation as function of Cobalt addition (x) and calcination temperature (T). Finally, the mechanical properties were examined using Vickers microhardness. The microhardness data revealed that the samples exhibited reverse indentation size effect (RISE). The Elastic modulus (E) and yield strength (Y) for the prepared samples were calculated, in accordance with Vickers microhardness, as function of Cobalt addition. Furthermore, the indentation size effect ISE was analyzed using indentation induced cracked model (IIC). The IIC model was found to be a suitable model for describing the microhardness results of the prepared samples. Time dependent Vickers microhardness was done through indentation creep test at different dwell time (t = 10, 20, 30, 40 and 50 s) and constant applied loads (F = 0.98, 4.90 and 9.80 N). Results clarified that the specimens revealed grain boundary sliding together with dislocation climbs at small loads and a dislocation creep in the operating creep process for greater loads.

Author(s) **Abu Hlaiwa H., Basma H.,** Rekaby M., Roumie M., **Awad R.**

ARTICLE TITLE	**Influence of Lead Fluoride Substitution on the Physical Properties of $(Cu_{0.5}\pi_{0.5})$-1223 Phase**
JOURNAL	**Journal of Low Temperature Physics**
YEAR	2020
PUBLICATION INFO	198: 26-40
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	This work reveals the influence of lead fluoride on the physical properties of high-temperature superconductor samples $(Cu0_{.5-x}Tl_{0.5}Pb_x)Ba_2Ca_2Cu_3O_{10-\delta-y}F_y$, with $(0.00 \leq x \leq 0.10)$. The samples under investigation were synthesized by solid-state reaction method at normal pressure. Ion beam analysis techniques were employed to determine the elemental content of the starting materials. The fluorine content "y" was estimated using the proton-induced gamma-ray emission technique by the aid of a 3 MeV proton beam. It was correlated to the oxygen content which was obtained using the Rutherford backscattering technique. Moreover, the samples were characterized using X-ray powder diffraction (XRD), scanning electron microscope (SEM) and Fourier transform infrared (FTIR). The XRD data have indicated that the partial replacement of Cu^{2+} ions by Pb^{2+} ions and oxygen by fluorine in the reservoir layer do not alter the tetragonal structure of the samples. On the other hand, the values of the lattice parameters a and c were found to be varied with x according to the difference in the ionic radii of Pb^{2+}andCu^{2+} as well as to the oxygen content. SEM analysis has revealed that lead fluoride substitutions improve the inter-grains connectivity of the prepared samples. FTIR analysis has shown that the apical oxygen, planar and the oxygen in reservoirs layers, modes are observed around 415–524 cm^{-1}, 564–579 cm^{-1} and 680 cm^{-1}, respectively. Moreover, a shift in all absorption peaks was observed in the pure sample of (CuTl-1223) phase, and new peaks were appeared according to the values of x. The physical properties of the samples were investigated using electrical resistivity and ac magnetic susceptibility measurements at different values of the applied ac magnetic field. The granular response shows both inter-granular and intra-granular contributions. The values of the superconducting transition temperature (Tc) have shown an increase with x up to 0.06 wt% followed by a decrease with further increase in elements substitution.

Author(s) **Shehadeh T., Ashmawy E.**

ARTICLE TITLE	**Interaction of Two Rigid Spheres Translating Collinearly in a Couple Stress Fluid**
JOURNAL	**European Journal of Mechanics, B/Fluids**
YEAR	2019
PUBLICATION INFO	78(6): 284-290
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This paper considers the steady translational motion of two collinear rigid spheres in an incompressible couple stress fluid. The two spheres are assumed to be of different sizes and are moving with two different speeds along a line axis connecting their centers. First, the general solution for the steady motion of an incompressible couple stress fluid past an axially symmetric particle is obtained analytically in the form of an infinite series. Second, the obtained solution is employed to construct the general solution for the steady motion of a couple stress fluid flow past two translating spheres using the principle of superposition. The boundary collocation technique is then used to satisfy the imposed boundary conditions on the surfaces of the two spheres. The normalized drag force acting on each of the two spherical particles is evaluated and presented numerically through tables and graphs. The tabulated results show that the convergence of the numerical results is achieved rapidly. In addition, it is observed that the increase in the couple stress viscosity parameter increases the values of the normalized drag force on each of the spherical particles.

Author(s) **Alsayed Z., Badawi M., Awad R.,** El-Khatib A., Thabet A.

ARTICLE TITLE	**Investigation of γ-ray Attenuation Coefficients, Effective Atomic Number and Electron Density for ZnO/HDPE Composite**
JOURNAL	**Physica Scripta**
YEAR	2020
PUBLICATION INFO	95(8): 1-10
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

Bulk and nano ZnO/HDPE composite with different weight fractions (10, 20, 30 and 40%) of ZnO as a filler were prepared and studied for radiation shielding properties against γ-ray. The structural, morphological and functional properties of the composites were identified using x-ray diffraction (XRD), scanning electron microscope (SEM) and Fourier transform infrared specrtroscopy (FTIR). The results confirmed the formation of ZnO nanoparticles with crystallite size of 27 nm and revealed their good dispersion within the polymer matrix compared to bulk ZnO as well as interaction mechanism between the filler and the polymer matrix. The mass attenuation coefficient (μ m) for the composite was measured experimentally using a well calibrated high purity germanium cylindrical detector (HPGe) at energies (59.54, 356.01, 661.66, 1173.33 and 1332.50 keV) for different radioactive point sources (^{241}Am, ^{133}Ba, ^{137}Cs and ^{60}Co). The obtained attenuation coefficients were used to determine the values of total molecular cross section σ mol , the total atomic cross section σ atm (cm2/atom), total electronic cross-section σ el (cm2/electron) effective atomic number Z eff , and effective electron number N eff . Using NIST XCOM photon cross section database, the theoretical radiation parameters were calculated for bulk ZnO/HDPE composite and compared with the experimental results of both bulk and nano ZnO/HDPE composite. The obtained results revealed good agreement compared to theoretical values. μ m , σ mol , and σ atm values decreased with incident photon energy and increased with weight percentage of both bulk and nano ZnO filler. However, these values were greater for nano ZnO/HDPE composite compared to bulk ZnO/HDPE composite with the same weight percentage. Whereas, σ el , Z eff and N eff values decreased with weight percentage and revealed a plateau region which appeared with further increase in energy.

Author(S) Muthu B., Sivaparthipan C., Manogaran G., Sundarasekar R., **Kadry S.,** Shanthini A., Dasel A;.

ARTICLE TITLE	**IOT Based Wearable Sensor for Diseases Prediction and Symptom Analysis in Healthcare Sector**
JOURNAL	**Peer-to-Peer Networking and Applications**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s12083-019-00823-2
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Humans with good health condition is some more difficult in today's life, because of changing food habit and environment. So we need awareness about the health condition to the survival. The health-support systems faces significant challenges like lack of adequate medical information, preventable errors, data threat, misdiagnosis, and delayed transmission. To overcome this problem, here we proposed wearable sensor which is connected to Internet of things (IoT) based big data i.e. data mining analysis in healthcare. Moreover, here we design Generalize approximate Reasoning base Intelligence Control (GARIC) with regression rules to gather the information about the patient from the IoT. Finally, Train the data to the Artificial intelligence (AI) with the use of deep learning mechanism Boltzmann belief network.

ABSTRACT

Subsequently Regularization _ Genome wide association study (GWAS) is used to predict the diseases. Thus, if the people has affected by some diseases they will get warning by SMS, emails. Etc., after that they got some treatments and advisory from the doctors.

Author(S) **Haidar H., Abdulrahim M.**

ARTICLE TITLE	**Irreducibility of a Specialization of the Three Dimensional Albeverio–Rabanovich Representation of the Pure Braid Group *P3***
JOURNAL	**Rendiconti di Matematica e delle Sue Applicazioni**
YEAR	2020
PUBLICATION INFO	7: 1-8
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	We consider the Albeverio-Rabanovich linear representation π of the braid group B3. After specializing the indeterminates used in defining the representation to non-zero complex numbers, we prove that its restriction to the pure braid group P3 of dimension three is irreducible.

Author(S) Ijaz Khan M., Qayyum S., **Kadry S.,** Khan W., Abbas S.

ARTICLE TITLE	**Irreversibility Analysis and Heat Transport in Squeezing Nanoliquid Flow of Non-Newtonian (Second-Grade) Fluid Between Infinite Plates with Activation Energy**
JOURNAL	**Arabian Journal for Science and Engineering**
YEAR	2020
PUBLICATION INFO	45: 4939-4947
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

The main theme of this communication is to scrutinize the chemically reactive flow of second-grade nanoliquid between two infinite plates. The MHD fluid is considered. Both plates approach symmetrically to each other, generating squeezing flow. The Buongiorno model is utilized for the modeling. Viscous dissipation and Ohmic heating effects are further considered. The total irreversibility rate is achieved via thermodynamics second law. To transform the reactants into products, a concept of activation energy is used. The nonlinear PDEs are altered into ordinary ones through similarity transformations and solved through homotopy analysis method. The impact of sundry parameters on flow, temperature and concentration fields is studied with the help of graphic illustrations. Velocity and temperature gradients are discussed numerically through Tables 2 and 3. The velocity of fluid particles increases versus squeezing parameter, while temperature field decreases. The entropy rate and Bejan number demonstrate the contrast influence against Brinkman number.

Author(s) Khalaf A., **Al Boukhari J., Zeidan L.**

ARTICLE TITLE	**Mechanical Properties of Transition Metals Mn, Fe and Zn Doped NiO Nanoparticles**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-8
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	This work is a continuation of the characterization study of nickel oxide (NiO) nanoparticles (NPs) doped with transition metals (TM) like Mn, Fe and Zn, synthesized by the co-precipitation method. In this part, the effect of TM doping on the physical and mechanical properties of the NiO NPs is examined using a digital Vickers microhardness tester. The microhardness measurement results enable us to evaluate the important mechanical parameters including Vickers microhardness (HV), Young's modulus (E), yield strength (Y) and fracture toughness (KIC), responsible for practical industrial applications. It was found that all the properties given above strongly depend on the type of TM doping element. Specifically, Vickers microhardness Hv values of the samples studied in this work were found to decrease by doping with Mn, Fe, and Zn. Moreover, the normal Indentation Size Effect (ISE) behavior was observed. The experimental results were analyzed according to Meyer's Law, Proportional Sample Resistance (PSR), Elastic/Plastic Deformation (EPD) models, and Hays–Kendall (HK) approach. As a result, the Hays–Kendall (HK) approach is found to be the best model for the load-independent microhardness determination of the studied samples.

Author(s) Hodroj M., Al Bast N., Taleb R., **Borjac J.,** Rizk S.

ARTICLE TITLE	**Nettle Tea Inhibits Growth of Acute Myeloid Leukemia Cells In Vitro by Promoting Apoptosis**
JOURNAL	**Nutrients**
YEAR	2020
PUBLICATION INFO	12(9): 1-18
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	*Urtica dioica (UD)*, commonly known as "stinging nettle", is a herbaceous flowering plant that is a widely used agent in traditional medicine worldwide. Several formulations of UD leaf extract have been reported to exhibit anti-inflammatory and antioxidant properties, with anticancer potential. The current study investigated the possible anticancer properties of nettle tea, prepared from Urtica dioica leaves, on acute myeloid leukemia (AML) cell lines, and deciphered the underlying molecular mechanisms. Treatment of AML cell lines (U-937 and KG-1) with UD aqueous leaf extract resulted in a dose- and time-dependent inhibition of proliferation, an increase in apoptotic hallmarks such as phosphatidylserine flipping to the outer membrane leaflet, and DNA fragmentation as revealed by cell-death ELISA and cell-cycle analysis assays. Apoptosis induction in U937 cells involves alterations in the expression of Bax and Bcl-2 upon exposure to nettle tea. Furthermore, the chemical composition of UD aqueous extract indicated the presence of multiple chemical agents, such as flavonoids and phenolics, mainly patuletin, m/p-hydroxybenzoic acid, and caffeic acid, among others, to which the pro-apoptotic and anti-tumor effects may be attributed.

Author(s) Thabet A., Hamzawy A., **Badawi M.**

ARTICLE TITLE	**New Mathematical Approach to Calculate the Geometrical Efficiency Using Different Radioactive Sources with Gamma-Ray Cylindrical Shape Detectors**
JOURNAL	**Nuclear Engineering and Technology**
YEAR	2020
PUBLICATION INFO	52(6): 1271-1276
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

The geometrical efficiency of a source-to-detector configuration is considered to be necessary in the calculation of the full energy peak efficiency, especially for NaI(Tl) and HPGe gamma-ray spectroscopy detectors. The geometrical efficiency depends on the solid angle subtended by the radioactive sources and the detector surfaces. The present work is basically concerned to establish a new mathematical approach for calculating the solid angle and geometrical efficiency, based on conversion of the geometrical solid angle of a non-axial radioactive point source with respect to a circular surface of the detector to a new equivalent geometry. The equivalent geometry consists of an axial radioactive point source with respect to an arbitrary elliptical surface that lies between the radioactive point source and the circular surface of the detector. This expression was extended to include coaxial radioactive circular disk source. The results were compared with a number of published data to explain how significant this work is in the efficiency calibration procedure for the γ-ray detection systems, especially in case of using isotropic radiating γ-ray sources in the form of point and disk shapes.

Author(S) Ramzan M., Riasat S., **Kadry S.,** Kuntha P., Nam Y., Howari F.

ARTICLE TITLE	**Numerical Analysis of Carbon Nanotube-Based Nanofluid Unsteady Flow Amid Two Rotating Disks with Hall Current Coatings and Homogeneous–Heterogeneous Reactions**
JOURNAL	**Coatings**
YEAR	2020
PUBLICATION INFO	10(1): 48-68
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In the present exploration, our objective is to investigate the importance of Hall current coatings in the establishment of Cattaneo–Christov (CC) heat flux model in an unsteady aqueous-based nanofluid flow comprising single (SWCNTs) and multi-walled (MWCNTs) carbon nanotubes (CNTs) amid two parallel rotating stretchable disks. The novelty of the presented model is strengthened with the presence of homogeneous-heterogeneous (HH) reactions and thermal stratification effects. The numerical solution of the system of coupled differential equations with high nonlinearity is obtained by applying the bvp4c function of MATLAB software. To corroborate the authenticity of the present envisioned mathematical model, a comparison table is added to this study in limiting case. An excellent harmony between the two results is obtained. Effects of numerous parameters on involved distributions are displayed graphically and are argued logically in the light of physical laws. Numerical values of coefficient of drag force and Nusselt number are also tabulated for different parameters. It is observed that tangential velocity (function of rotation parameter) is increasing for both CNTs. Further, the incremental values of thermal stratification parameter cause the decrease in fluid temperature parameter.

Author(S) Ramzan M., Riasat S., **Kadry S.,** Long C., Nam Y., Lu D.

ARTICLE TITLE	**Numerical Simulation of 3D Condensation Nanofluid Film Flow with Carbon Nanotubes on an Inclined Rotating Disk**
JOURNAL	**Applied Sciences**
YEAR	2020
PUBLICATION INFO	10(1): 168-180
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Here, we discuss three-dimensional dusty nanofluid thin film flow with nonlinear thermal radiation, where carbon nanotubes flow past an inclined rotating disk with a constant angular velocity of Ω. This novel mathematical model is unique and is discussed here for the first time. Downward draining flow and lateral flow arise due to inclination. The demonstrated geometry is characterized in terms of time-independent continuity, momentum, and energy balance. Similarity transformations convert the partial differential equation into a system of ordinary differential equations. The obtained equations are analyzed numerically using the bvp4c MATLAB function. The thermal field of the dust phase was smaller than that of the nanofluid phase, and this difference was exacerbated by increasing the thermal radiation. To validate the model presented here, it is compared to a previous model; the models showed high concordance.

Author(S) Abdul Wahab H., Zeb H., Bhatti S., Gulistan M., **Kadry S.,** Nam Y.

ARTICLE TITLE	**Numerical Study for the Effects of Temperature Dependent Viscosity Flow of Non-Newtonian Fluid with Double Stratification**
JOURNAL	**Applied Sciences**
YEAR	2020
PUBLICATION INFO	10(2): 708-728
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The main aim of the current study is to determine the effects of the temperature dependent viscosity and thermal conductivity on magnetohydrodynamics (MHD) flow of a non-Newtonian fluid over a nonlinear stretching sheet.

ABSTRACT

The viscosity of the fluid depends on stratifications. Moreover, Powell–Eyring fluid is electrically conducted subject to a non-uniform applied magnetic field. Assume a small magnetic reynolds number and boundary layer approximation are applied in the mathematical formulation. Zero nano-particles mass flux condition to the sheet is considered. The governing model is transformed into the system of nonlinear Ordinary Differential Equation (ODE) system by using suitable transformations so-called similarity transformation. In order to calculate the solution of the problem, we use the higher order convergence method, so-called shooting method followed by Runge-Kutta Fehlberg (RK45) method. The impacts of different physical parameters on velocity, temperature and concentration profiles are analyzed and discussed. The parameters of engineering interest, i.e., skin fraction, Nusselt and Sherwood numbers are studied numerically as well. We concluded that the velocity profile decreases by increasing the values of St,H and M. Also, we have analyzed the variation of temperature and concentration profiles for different physical parameters.

Author(S) **Jneid M.,** Awadalla M.

ARTICLE TITLE	**On the Controllability of Conformable Fractional Deterministic Control Systems in Finite Dimensional Spaces**
JOURNAL	**International Journal of Mathematics and Mathematical Sciences**
YEAR	2020
PUBLICATION INFO	DOI: 10.1155/2020/9026973
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this paper, we establish a set of convenient conditions of controllability for semilinear fractional finite dimensional control systems involving conformable fractional derivative. Indeed, sufficient conditions of controllability for a semilinear conformable fractional system are presented, assuming that the corresponding linear systems are controllable. The present method is based on conformable fractional exponential matrix, Gramian matrix, and the iterative technique. Two illustrated examples are carried out to establish the facility and efficiency of this technique.

Author(S) **Haidar H., Abdulrahim M.**

ARTICLE TITLE	**On the Faithfulness of the Representations of the Extraspecial 2-Groups E m $^{-1}$**
JOURNAL	**International Journal of Mathematics and Computer Science**
YEAR	2020
PUBLICATION INFO	15(3): 787-798
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	We consider a family of representations of the braid groups Bn corresponding to a specific solution to the Yang-Baxter equation. The images of the pure braid group Pn, a normal subgroup of Bn, under these representations are extraspecial 2-groups and the images of the braid group Bn are extensions of extraspecial 2-groups. We determine conditions under which any representation of the extraspecial 2-group, E m $^{-1}$, is faithful.We then show that the irreducible representations of E m $^{-1}$, constructed by Franko, Rowell and Wang, are faithful if and only if m = 2k or m = 2k – 1 (k odd); where as it is not faithful if m = 2k – 1 (k even).

Author(S) **El Arwadi T.,** Youssef W.

ARTICLE TITLE	**On the Stabilization of the Bresse Beam with Kelvin–Voigt Damping**
JOURNAL	**Applied Mathematics and Optimization**
YEAR	2019
PUBLICATION INFO	DOI: 10.1007/s00245-019-09611-z
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The aim of this paper is to study the theoretical and numerical stability of the Bresse system in one-dimensional bounded domain with viscoelastic Kelvin–Voigt damping. We first showed the well posedness of the system. Then stability is obtained by applying the multiplicative techniques. Later a numerical scheme is proposed and analyzed. Finally a priori error estimate is established.

Author(s) **El Arwadi T.,** Copetti M., Youssef W.

ARTICLE TITLE	**On the Theoretical and Numerical Stability of the Thermoviscoelastic Bresse System**
JOURNAL	**Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM Journal)**
YEAR	2019
PUBLICATION INFO	99(10): 1-20
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this paper, we shall study the stability of the Bresse system where the equations are damped by the dissipation from the viscoelasticity and the thermoelasticity. The thermoviscoelastic Bresse beam is a generalization of the thermoviscoelastic Timoshenko beam. Theoretically, we prove the exponential decay of the energy. Later, we introduce and study an implicit Euler type scheme based on finite differences in time and finite elements in space. We show that the discrete energy decreases in time and obtain error estimates. At the end, numerical simulations are presented.

Author(s) **Dally M., Abdulrahim M.**

ARTICLE TITLE	**On the Unitary Representations of the Braid Group B_6**
JOURNAL	**Mathematics**
YEAR	2019
PUBLICATION INFO	7(11): 1-7
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	We consider a non-abelian leakage-free qudit system that consists of two qubits each composed of three anyons. For this system, we need to have a non-abelian four dimensional unitary representation of the braid group B6 to obtain a totally leakage-free braiding. The obtained representation is denoted by ρ. We first prove that ρ is irreducible. Next, we find the points y ∈ C∗ at which the representation ρ is equivalent to the tensor product of a one dimensional representation χ(y) and μˆ 6(±i), an irreducible four dimensional representation of the braid group B6. The representation μˆ 6(±i) was constructed by E. Formanek to classify the irreducible representations of the braid group Bn of low degree. Finally, we prove that the representation χ(y) ⊗ μˆ 6(±i) is a unitary relative to a hermitian positive definite matrix.

Author(s) Khan A., Cao X., Katsikis V., Stanimirović P., Brajević I., Li S. **Kadry S.,** Nam Y.

ARTICLE TITLE	**Optimal Portfolio Management for Engineering Problems Using Nonconve Cardinality Constraint: A Computing Perspective**
JOURNAL	**IEEE Access**
YEAR	2020
PUBLICATION INFO	8: 57437-57450
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

The problem of portfolio management relates to the selection of optimal stocks, which results in a maximum return to the investor while minimizing the loss. Traditional approaches usually model the portfolio selection as a convex optimization problem and require the calculation of gradient. Note that gradient-based methods can stuck at local optimum for complex problems and the simplification of portfolio optimization to convex, and further solved using gradient-based methods, is at a high cost of solution accuracy. In this paper, we formulate a nonconvex model for the portfolio selection problem, which considers the transaction cost and cardinality constraint, thus better reflecting the decisive factor affecting the selection of portfolio in the real-world. Additionally, constraints are put into the objective function as penalty terms to enforce the restriction. Note that this reformulated problem cannot be readily solved by traditional methods based on gradient search due to its nonconvexity. Then, we apply the Beetle Antennae Search (BAS), a nature-inspired metaheuristic optimization algorithm capable of efficient global optimization, to solve the problem. We used a large real-world dataset containing historical stock prices to demonstrate the efficiency of the proposed algorithm in practical scenarios. Extensive experimental results are presented to further demonstrate the efficacy and scalability of the BAS algorithm. The comparative results are also performed using Particle Swarm Optimizer (PSO), Genetic Algorithm (GA), Pattern Search (PS), and gradient-based fmincon (interior-point search) as benchmarks. The comparison results show that the BAS algorithm is six times faster in the worst case (25 times in the best case) as compared to the rival algorithms while achieving the same level of performance.

Author(S) Vijayalakshmi R., Vasudevan V., **Kadry S.,** Kumar R.

ARTICLE TITLE	**Optimization of Makespan and Resource Utilization in the Fog Computing Environment through Task Scheduling Algorithm**
JOURNAL	**International Journal of Wavelets, Multiresolution and Information Processing**
YEAR	2020
PUBLICATION INFO	18(1): 1025-1045
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The Fog computing is rising as a dominant and modern computing model to deliver Internet of Things (IoT) computations, which is an addition to the cloud computing standard to get it probable to perform the IoT requests in the network of edge. In those above independent and dispersed environment, resource allocation is vital. Therefore, scheduling will be a test to enhance potency and allot resources properly to the tasks. This paper offers a distinct task scheduling algorithm in the fog computing environment that tries to depreciate the makespan and maximize resource utilization. This algorithm catalogues the task based on the mean Suffrage value. The suggested algorithm gives much resource utilization and diminishes makespan. Our offered algorithm is compared with different alive scheduling for performance investigation, and test results confirm that our algorithm has a more significant resource utilization rate and low makespan than other familiar algorithms.

Author(S) **Ghaddar N.,** Anastasiadis E., Halimeh R., Ghaddar A., Matar G., Abou Fayad A., Sherri N. Dhar R. AlFouzan W., **Yusef H.,** El Chaar M.

ARTICLE TITLE	**Phenotypic and Genotypic Characterization of Extended-Spectrum Beta-Lactamases Produced by *Escherichia coli* Colonizing Pregnant Women**
JOURNAL	**Infectious Diseases in Obstetrics and Gynecology**
YEAR	2020
PUBLICATION INFO	DOI: 10.1155/2020/4190306
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

ABSTRACT

Introduction

Infections caused by extended spectrum beta lactamase (ESBL) producing bacteria continue to be a challenge for choosing the appropriate therapy since they may exhibit coresistance to many other classes of antibiotics. The aim of the study was to screen pregnant women for ESBL producing bacteria in Beirut, Lebanon, to examine their phenotypic and genotypic characterization and to study the association between ESBL colonization with adverse neonatal outcomes.

Method

In this cross-sectional study, vaginal samples from 308 pregnant women at 35-37 weeks of gestation were studied during a one-year period. The samples were plated on MacConkey agar and selective MacConkey agar supplemented with ceftazidime. Phenotypic confirmation of ESBL production was performed by double-disc synergy test and all isolates were screened by PCR for the resistance genes bla_{SHV}, bla_{TEM}, and $bla_{CTX\text{-}M}$. Clonal relatedness of Escherichia coli isolates was investigated by pulsed-field gel electrophoresis.

Results

In total, 59 women out of 308 (19.1%) were colonized by ESBL producing gram negative bacteria. Two babies born to mothers colonized with ESBL were diagnosed with sepsis. The susceptibility rates of isolates to other antibiotics were 39% to co-trimoxazole, 49.2% to ciprofloxacin, 91.5% to gentamicin, 18.6% to aztreonam and 35.6% to cefepime. Most of isolates were highly sensitive to meropenem and imipenem, with a susceptibility of 93.2%. PCR was performed on all E. coli isolates to detect the most common ESBL producing genes; blaCTX-M was the predominant gene (90.7%), followed by blaTEM (88.4%) and finally blaSHV (44.2%). PFGE analysis of 34 E. coli isolates revealed 22 distinct clusters showing more than 85% similarity.

ABSTRACT

Conclusion

In conclusion, this study showed that Lebanon has a high prevalence of ESBL carriage in pregnant women. Further studies that include a continuous screening of pregnant women and follow up of their newborn clinical status should be conducted to foresee the risk of transmission.

Author(S) **Youssef L.,** El-Rassy H., **Younes G., Al-Oweini R.**

ARTICLE TITLE	**Photocatalytic and Kinetic Study on the Degradation of Three Food Pesticides Using Vanadium-Substituted Polyoxotungstates**
JOURNAL	**International Journal of Environmental Research**
YEAR	2019
PUBLICATION INFO	13: 899-907
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Mono-, di-, and tri-vanadium-substituted Keggin-type heteropolyoxoanions $[SiW_{12}O_{40}]^{4-}$ and $[PW_{12}O_{40}]^{4-}$ were evaluated as photocatalysts for the photodegradation of three hazardous food pesticides: atrazine, chlorpyrifos, and dieldrin. Kinetic experiments were performed under UV irradiation at 254 nm. The degradation of each pesticide was assessed by investigating its disappearance with time using high-performance liquid chromatography equipped with an ultra-violet spectrophotometer detector. The photocatalytic degradation of the three pesticides exhibited first-order kinetics. It was found that the introduction of vanadium addenda atoms into the Keggin-type polyoxometalates decrease the degradation rate for the photocatalytic transformation of each pesticide as well as the degradation percentage. This effect was significantly related to the number of vanadium metal ions substituting the tungsten addenda atoms. As a general trend, the photocatalytic efficiency of $\{XVW_{11}\}$ was better than that of $\{XV_3W_9\}$. Accordingly, a marked drop was noticed in the photocatalytic degradation of atrazine, where 90% was decomposed in the presence of $[\alpha\text{-}SiW_{12}O_{40}]^{4-}$ at a rate of 1 mg/L min, whereas the degradation percentage decreased to 55% in the presence of $[\alpha\text{-}SiVW_{11}O_{40}]^{5-}$ at a decreased rate of 0.7 mg/L min. Hence, the negative effect on the degradation percentage was evident for the Si-based POMs, which drops from 90 to 38%, 83 to 32%, and 60 to 23% for atrazine, chlorpyrifos, and dieldrin, respectively. Similar effect was observed for the P-based POMs under the studied conditions.

Author(S) **Marhaba S., El Samad S.**

ARTICLE TITLE	**Plasmonic Coupling of One-Dimensional Palladium Nanoparticle Chains**
JOURNAL	**Nano**
YEAR	2020
PUBLICATION INFO	15(5): 1-9
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	In this paper, we investigate the plasmonic coupling effects on the localized surface plasmon resonances (LSPRs) of palladium nanoparticle chains. We show the transmission electron microscopy (TEM) images and the extinction cross-section spectra of near-contact palladium nanoparticle chains from monomer to pentamer. The extinction spectra of chains nanoparticles were measured by far-field polarization spectroscopy over a large spectral range (ultraviolet, visible and near-infrared) and compared with numerical calculations based on finite element method (FEM). For single palladium nanoparticle, the LSPR phenomenon appears in ultraviolet region. By addition of palladium nanoparticles to the chain, we observe a tunable red-shifting on the spectral position due to plasmonic coupling between palladium nanoparticles and a systematic spectral amplitude enhancement with the appearance of new modes of resonance.

Author(S) **El Ghouch N., Al-Oweini R., Awad R.**

ARTICLE TITLE	**Preparation and Physical Properties of $(Bi_{1.8}Pb_{0.4})Sr_2Ca_2Cu_3O_{10+\delta}$ Superconductors Impregnated with Mangano(II)undecatungstosilicate Nanomaterials**
JOURNAL	**Applied Physics A: Materials Science and Processing**
YEAR	2019
PUBLICATION INFO	DOI: 10.1007/s00339-019-3076-9
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

In this study, the effects of ($K_6[(H2O)MnSiW_{11}O_{39}]\cdot 21H_2O$, $\{MnSiW_{11}\}$) polyoxometalate, with an average particle size of 48.46 nm, on $(Bi_{1.8}Pb_{0.4})Ca_2Sr_2Cu_3O_{10+\delta}$ (Bi,Pb)-2223, superconducting samples, were investigated. Samples of type $\{MnSiW_{11}\}x(Bi_{1.8}Pb_{0.4})Ca_2Sr_2Cu_3O_{10+\delta}$, $0.00 \leq x \leq 0.20$ (wt%) were prepared using the conventional solid-state reaction technique. Manganese-containing polyoxometalates are considered as an attractive class of inorganic nanomaterials, because they have multiple oxidation states and many unpaired electrons. Consequently, the microstructure, morphology, optical and magnetic properties of the prepared $\{MnSiW_{11}\}$ nanoparticles were determined by powder X-ray diffraction (XRD), transmission electron microscopy, Fourier transform infrared spectroscopy and magnetic hysteresis loop measurements, respectively. The bulk of superconducting samples was characterised by XRD, scanning electron microscopy and energy dispersive X-ray spectroscopy. The XRD analysis showed that the addition of small amounts of $\{MnSiW_{11}\}$ nanoparticles improves (Bi,Pb)-2223 phase formation significantly. The lattice parameters (a and c) of (Bi,Pb)-2223 phase did not change with the addition of nanoparticles. Furthermore, the superconducting transition temperature (Tc) was determined from dc electrical resistivity ($\rho - T$) as a function of temperature measurements. Tc was enhanced as x increased up to x = 0.12 wt%, then decreased gradually with a further increase in the concentration of nanoparticles. The (EE – JJ) measurements were conducted at 77 K with 1 μV/cm. It showed that the critical current density (Jc) of the samples increased from about 301.9 to 728.4 A/cm2 as x increased from 0.00 to 0.12 wt%. The suppression in Tc and Jc for $x > 0.12$ wt% samples may be due to the decrease in the volume fraction of a high-Tc (Bi,Pb)-2223 phase and the increase of weak links connectivity among the grain boundaries.

Author(s) Slika L., **Moubarak A., Borjac J.,** Baydoun E., Patra D.

ARTICLE TITLE	**Preparation of Curcumin-poly (allyl amine) Hydrochloride Based Nanocapsules: Piperine in Nanocapsules Accelerates Encapsulation and Release of Curcumin and Effectiveness Against Colon Cancer Cells**
JOURNAL	**Materials Science and Engineering C**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.msec.2019.110550
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	Curcumin (CUR) is a natural polyphenol present in the rhizomes of Curcuma longa and possesses diverse pharmacological effects, especially anti-carcinogenic effects against several types of cancers. Unfortunately, this novel compound has poor aqueous solubility and bioavailability that limit its pharmaceutical effects. The use of polymeric nanocapsules has been applied in order to overcome such problems. Thus, our present study aimed at developing two novel polymeric nanoparticles (NPs) systems that encapsulate either curcumin alone (CURN) or with piperine (CURPN), which acts as a glucuronidation inhibitor and increases the bioavailability of CUR.

ABSTRACT

The NPs were successfully designed by self-assembled nanoprecipitation method and their characteristics were identified by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Dynamic Light Scattering (DLS), and Zeta potential analysis. The drug release profiles of NPs were monitored under different pH, and their cytotoxic effects were assessed in vitro against Caco-2 cells and in vivo against dimethylhydrazine-induced colon cancer in mice. The FTIR and XRD analyses and SEM images showed amorphous and spherical shaped CURN and CURPN of 80–100 nm sized diameter. In vitro drug release study showed that pH triggered the maximum release of CUR in basic medium compared to acidic and neutral media, and following Higuchi model. CUR nanoencapsulation enhanced its physiochemical properties and drug loading and release. In vitro and in vivo studies showed that CUR NPs exerted selective and potential cytotoxic effects against colon cancer cells. The addition of piperine facilitated the encapsulation and drug loading of CUR. Thus, CUR nanoencapsulation enhanced the solubility and bioavailability of curcumin rendering it more effective against colon cancer.

Author(s) **Ghaddar N.,** Anastasiadis E., Halimeh R., Ghaddar A., Dhar R., AlFouzan W., **Yusef H.,** El Chaar M.

ARTICLE TITLE	**Prevalence and Antifungal Susceptibility of Candida Albicans Causing Vaginal Discharge Among Pregnant Women in Lebanon**
JOURNAL	**BMC Infectious Diseases**
YEAR	2019
PUBLICATION INFO	DOI: 10.1186/s12879-019-4736-2
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology
ABSTRACT	**Background** Vaginal candidiasis is frequent in pregnant women and is associated with sepsis and adverse neonatal outcomes. This study determined the prevalence of candida species in symptomatic pregnant women and evaluated the antifungal susceptibility profile of the isolated Candida strains. It also aimed to explore whether Candida species predicts gestational complications and adverse neonatal outcomes. **Methods** A total of 258 pregnant women with vaginal discharge at 35 to 37 week of gestation participated in this study. Vaginal swabs from these patients were collected at various obstetrics and gynecology clinics in Lebanon for a period of 14 months. Candida isolates were identified at species level and antifungal susceptibility of Candida albicans to fluconazole (FCZ), amphotericin B (AMB), itraconazole (ICZ) and voriconazole (VCZ) was determined by the agar-based E-test method.

ABSTRACT

Results

Among 258 women tested, 100 (39%) were positive for Candida species. C. albicans, C. glabrata and C. krusei were isolated from 42, 41 and 17% of the women, respectively. C. albicans was significantly associated only with gestational diabetes while C. krusei or C. glabrata had significant positive associations with other gestational complications. The antifungal susceptibility tests of C. albicans isolates revealed 97.5, 90, 87.5 and 97.5% susceptibility to AMB, FCZ, ICZ and VCZ, respectively.

Conclusion

The current study revealed high incidence of both C. albicans and non-C. albicans Candida strains causing vulvovaginitis among pregnant women in Beirut, Lebanon. Candida screening as antenatal follow up is advised to minimize the risk of adverse neonatal outcome or gestational complications.

Author(S) **Halawi M., Yusef H., Borjac J.,** Zeaiter Z.

ARTICLE TITLE	**Prevalence of Candida Species in Lebanese Waters**
JOURNAL	**Asian Journal of Microbiology, Biotechnology and Environmental Sciences**
YEAR	2019
PUBLICATION INFO	21(3): 619-623
THEME / SUBTHEME	Science and Technology/ Environmental Studies
ABSTRACT	The prevalence of Candida spp. (species) was inspected in 105 water samples (45 potable water, 50 community tap water, and 10 spring water samples), in parallel with the concentration of four different metals (Fe, Cu, Mn, Zn) that are part of Candida quorum sensing mechanism. Candida spp. were isolated from 84 of 105 (80%) samples. Prevailing species were Candida Krusei, isolated from 67 samples, Candida parapsilosis, from 38, and Candida glabrata, from 34, Candida tropicalis from 25, Candida albicans from 12, and 5 other species of Candida. There was a significant correlation between the concentration of zinc in water and the presence of Candida ($P<0.001$). These results are the first to confirm the presence of Candida in Lebanese water supplies, and suggest that potable, tap and natural water in Lebanon may be a potential transmission route for Candida both in hospitals and community water supplies.

Author(S) **El Joumaa M.,** Taleb R., Rizk S., **Borjac J.**

ARTICLE TITLE	**Protective Effect of Matricaria Chamomilla Extract Against 1,2-dimethylhydrazine-induced Colorectal Cancer in Mice**
JOURNAL	**Journal of Complementary and Integrative Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1515/jcim-2019-0143
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	**Background** Colorectal cancer (CRC) is a major public health problem, with almost 1.8 million newly diagnosed cases and about 881,000 deaths annually. Chamomile (Matricaria chamomilla) is a well-documented medicinal herb that possesses anti-inflammatory and anti-carcinogenic properties. This study aimed to unravel the effect of aqueous chamomile extract against 1,2-dimethylhydrazine(DMH)-induced CRC in mice. **Method** Male Balb/c mice received a weekly intraperitoneal injection of DMH (20 mg/kg body weight) for 12 weeks. Chamomile extract (150 mg/kg body weight/5 days/week p.o.) was administered at the initiation and post-initiation stages of carcinogenesis. Polyps count, histopathological analysis, real-time polymerase chain reaction (RT-PCR) analysis of Wnt signaling genes, ELISA of cyclooxygenase-2 (COX-2), and enzyme assay for inducible nitric oxide synthase (iNOS) were performed. **Results** Chamomile extract modulated the Wnt pathway in colonic tissues, where it significantly downregulated Wnt5a, β-catenin, T cell factor (Tcf4), lymphoid enhancer factor 1 (Lef1), c-Myc and Cyclin D1 expression levels, while it upregulated adenomatous polyposis coli (APC) and glycogen synthase kinase (GSK3β) expression levels. This extract significantly reduced COX-2 levels and iNOS activities. Polyps count and histopathological analysis provided supportive evidence for the biochemical and molecular analyses **Conclusions** Chamomile can act as a potent dietary chemopreventive agent against DMH-induced CRC.

Author(s) **Borjac J., El Joumaa M., Youssef L., Kawach R.,** Blake D.

ARTICLE TITLE	**Quantitative Analysis of Heavy Metals and Organic Compounds in Soil from Deir Kanoun Ras El Ain Dump, Lebanon**
JOURNAL	**The Scientific World Journal**
YEAR	2020
PUBLICATION INFO	DOI: 10.1155/2020/8151676
THEME / SUBTHEME	Science and Technology/ Environmental Studies
ABSTRACT	Recently, there has been a worldwide concern regarding soil contamination by heavy metals and organic compounds, especially in the developing countries including Lebanon that has suffered from solid waste mismanagement for decades. Deir Kanoun Ras El Ain is a village in southern Lebanon that possesses one of the country's worst dumps, and its leachates influx into a running canal that irrigates surrounding agricultural lands. +e aim of this study was to determine the levels of some toxic heavy metals and organic compounds in different soil samples collected from the dump and along the canal during winter and summer seasons. Six research sites (four from the dump and two along the canal) were selected, and the soil samples for analysis were collected from a depth of around 10 cm. Heavy metals (lead, cadmium, arsenic, and mercury) and organic compounds (phthalates, bisphenol A, and polyaromatic hydrocarbons) content were determined using atomic absorption and high pressure liquid chromatography, respectively. +e conducted research confirmed high levels of contamination in the collected soil samples by both heavy metals and organic compounds. +e present study provided evidence that different sampling sites accumulated heavy metals at concentrations that exceeded the average maximum permissible levels for sewage sludge and agricultural land. +ese findings suggest the need for mitigation measures by the Lebanese authorities and new waste management programs to resolve the problems associated with uncontrolled dumping of solid wastes in Lebanon.

Author(s) Tlili I., Ramzan M., **Kadry S.,** Kim H., Nam Y.

ARTICLE TITLE	**Radiative MHD Nanofluid Flow over a Moving Thin Needle with Entropy Generation in a Porous Medium with Dust Particles and Hall Current**
JOURNAL	**Entropy**
YEAR	2020
PUBLICATION INFO	22(3): 354-370
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This paper investigated the behavior of the two-dimensional magnetohydrodynamics (MHD) nanofluid flow of water-based suspended carbon nanotubes (CNTs) with entropy generation and nonlinear thermal radiation in a Darcy–Forchheimer porous medium over a moving horizontal thin needle. The study also incorporated the effects of Hall current, magnetohydrodynamics, and viscous dissipation on dust particles. The said flow model was described using high order partial differential equations. An appropriate set of transformations was used to reduce the order of these equations. The reduced system was then solved by using a MATLAB tool bvp4c. The results obtained were compared with the existing literature, and excellent harmony was achieved in this regard. The results were presented using graphs and tables with coherent discussion. It was comprehended that Hall current parameter intensified the velocity profiles for both CNTs. Furthermore, it was perceived that the Bejan number boosted for higher values of Darcy–Forchheimer number.

Author(s) **Shehadeh T., Ashmawy E.**

ARTICLE TITLE	**Rotary Oscillation of a Rigid Sphere in a Couple Stress Fluid**
JOURNAL	**BAU Journal-Science and Technology**
YEAR	2019
PUBLICATION INFO	1(1): 1-12
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

In this paper, the rotary oscillation of a rigid sphere in an incompressible couple stress fluid is studied. The classical no slip boundary conditions are imposed on spherical boundary. Moreover, it is assumed that the couple stresses on the boundary of the sphere vanish. In the present study, the motion is generated by a sudden rotary oscillation of the rigid sphere about an axe passing through its center with a time-dependent angular velocity. Stokasian assumption is taken into consideration so that the non-linear terms are neglected in the equation of motion. The torque experienced by the couple stress fluid on the spherical body is obtained using an integral formula. Exact solutions are obtained and results are illustrated through graphs.

Author(s) **El Sayed M.,** Abdel-Gaber A., **Rahal H.**

ARTICLE TITLE	**Safranin—A Potential Corrosion Inhibitor for Mild Steel in Acidic Media: A Combined Experimental and Theoretical Approach**
JOURNAL	**Journal of Failure Analysis and Prevention**
YEAR	2019
PUBLICATION INFO	19: 1174-1180
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	The adsorption behavior and the inhibition performance of safranin, an azo dye, for mild steel corrosion in 0.5 M hydrochloric acid and citric acid solutions have been carried using potentiodynamic polarization and electrochemical impedance spectroscopy techniques as well quantum chemical calculations. Safranin has shown good inhibition efficiency in both acidic solutions. The impedance responses in both acids indicated that the corrosion process takes place under activation control. Langmuir and kinetic–thermodynamic adsorption isotherms were applied to clarify the mode of safranin inhibition. The obtained results revealed that the corrosion inhibition of mild steel in both acid solutions occurs through a physicochemical adsorption mechanism of safranin. The dissolution mechanism of mild steel in both acids was clarified and discussed.

Author(s) **Matar A., Jennani S.,** Abdallah H., Mohsen N., **Borjac J.**

ARTICLE TITLE	**Serum Iron and Zinc Levels in Lebanese Multiple Sclerosis Patients**
JOURNAL	**Acta Neurologica Taiwanica**
YEAR	2020
PUBLICATION INFO	29(1): 5-11
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level
ABSTRACT	**Purpose** Multiple sclerosis (MS) is an autoimmune disease of the central nervous system that attacks mainly the myelin sheath covering the axons of neurons. Various studies have reported a potential role of zinc and iron in MS disease. The aim of this study is to estimate the serum level of iron and zinc in Lebanese MS patients. **Methods** Sixty-nine participants were enrolled in this study, 27 were diagnosed with MS according to McDonald's criteria and 42 were normal control. Subjects were matched in age. Serum iron and zinc levels were measured using colorimetric methods. Descriptive methods and Mann-Whitney U test were used in the statistical analysis. **Results** The mean age of MS patients and healthy subjects was 42.8 and 38.3 years respectively. The mean serum iron level in patient and control groups was 84.7 and 83.3 µg/dl respectively. The mean serum zinc level in patient and control groups was 80.6 and 82.0 µg/dl respectively. No significant association was observed between serum iron and zinc levels in both groups. No association was also observed between serum iron and zinc levels in terms of gender. **Conclusion** Our results showed no significant difference in serum iron and zinc levels between MS patients and healthy controls.

Author(S) Sekaran K., Meqdad M., Kumar P.,Rajan S., **Kadry S.**

ARTICLE TITLE	**Smart Agriculture Management System Using Internet of Things**
JOURNAL	**Telkomnika**
YEAR	2020
PUBLICATION INFO	18(3): 1275-1284
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In the world of digital era, an advance development with internet of things (IoT) were initiated, where devices communicate with each other and the process are automated and controlled with the help of internet. An IoT in an agriculture framework includes various benefits in managing and monitoring the crops. In this paper, an architectural framework is developed which integrates the internet of things (IoT) with the production of crops, different measures and methods are used to monitor crops using cloud computing. The approach provides real-time analysis of data collected from sensors placed in crops and produces result to farmer which is necessary for the monitoring the crop growth which reduces the time, energy of the farmer. The data collected from the fields are stored in the cloud and processed in order to facilitate automation by integrating IoT devices. The concept presented in the paper could increase the productivity of the crops by reducing wastage of resources utilized in the agriculture fields. The results of the experimentation carried out presents the details of temperature, soil moisture, humidity and water usage for the field and performs decision making analysis with the interaction of the farmer.

Author(S) **Khaled R.**, Abdel-Gaber A., **Rahal H., Awad R.**

ARTICLE TITLE	**Static and Electrochemical Performance of Ecofriendly Extract as Antiscalant and Corrosion Inhibitor in Desalination Plants**
JOURNAL	**Desalination and Water Treatment**
YEAR	2020
PUBLICATION INFO	180: 117-125
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

The impact of Ceratonia silique L. (carob) leaf extract as an antiscalant in an alkaline $CaCl_2$ brine solution was examined using the static anti-scaling technique, conductivity, and chronoamperometry measurements as well as optical photographic study. Mineral scales were deposited from the brine solution by cathodic polarization of the mild steel surface to –0.8 V. The electrochemical behavior of the formed film was tested in simulating seawater solutions (0.5 M NaCl) using electrochemical impedance spectroscopy (EIS) technique. Functional groups and organic compounds of carob leaf extract were identified by Fourier transform infrared spectroscopy and gas chromatography-mass spectroscopy. The obtained results showed that carob leaf extract can be used safely as an antiscalant and corrosion inhibitor for cooling systems. Moreover, the used techniques showed that scale deposits and the surface area occupied decreased with increasing carob leaf extracts concentrations. EIS measurements revealed that carob leaf extract retards the corrosion rate of steel in simulating seawater solutions.

Author(S) Yassine S., **Kadry S.,** Sicilia M.

ARTICLE TITLE	**Statistical Profiles of Users' Interactions with Videos in Large Repositories: Mining of Khan Academy Repository**
JOURNAL	**KSII Transactions on Internet and Information Systems**
YEAR	2020
PUBLICATION INFO	14(5): 2101-2121
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The rapid growth of instructional videos repositories and their widespread use as a tool to support education have raised the need of studies to assess the quality of those educational resources and their impact on the quality of learning process that depends on them. Khan Academy (KA) repository is one of the prominent educational videos' repositories. It is famous and widely used by different types of learners, students and teachers. To better understand its characteristics and the impact of such repositories on education, we gathered a huge amount of KA data using its API and different web scraping techniques, then we analyzed them. This paper reports the first quantitative and descriptive analysis of Khan Academy repository (KA repository) of open video lessons. First, we described the structure of repository. Then, we demonstrated some analyses highlighting content-based growth and evolution. Those descriptive analyses spotted the main important findings in KA repository. Finally, we focused on users' interactions with video lessons. Those interactions consisted of questions and answers posted on videos. We developed interaction profiles for those videos based on the number of users' interactions. We conducted regression analysis and statistical tests to mine the relation between those profiles and some quality related proposed metrics. The results of analysis showed that all interaction profiles are highly affected by video length and reuse rate in different subjects. We believe that our study demonstrated in this paper provides valuable information in understanding the logic and the learning mechanism inside learning repositories, which can have major impacts on the education field in general, and particularly on the informal learning process and the instructional design process.

ABSTRACT

This study can be considered as one of the first quantitative studies to shed the light on Khan Academy as an open educational resources (OER) repository. The results presented in this paper are crucial in understanding KA videos repository, its characteristics and its impact on education.

Author(s) **Slayi S., Ashmawy E.**

ARTICLE TITLE	**Steady Motion of an Incompressible Microstretch Fluid between Two Rotating Spheres with Slip Conditions**
JOURNAL	**International Journal of Advanced and Applied Sciences**
YEAR	2019
PUBLICATION INFO	6(12): 105-111
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this paper, the steady rotational motion of an incompressible microstretch fluid between two rotating spheres is investigated. The slip boundary conditions are proposed on the spherical boundaries. The two spheres are assumed to be rotating with different angular speeds. Closed form solutions for the velocity, microrotation, and microstretch are obtained. Numerical results are presented and the effects of slip and spin parameters on the velocity, microrotation, and microstretch are discussed through graphs.

Author(s) **Al Boukhari J.,** Khalaf A., **Awad R.**

ARTICLE TITLE	**Structural Analysis and Dielectric Investigations of Pure and Rare Earth Elements (Y and Gd) Doped NiO Nanoparticles**
JOURNAL	**Journal of Alloys and Compounds**
YEAR	2020
PUBLICATION INFO	820: 1-12
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

In this work, pure and 2% rare earth elements RE (RE = Y and Gd) doped NiO nanoparticles, capped with polyvinyl alcohol PVA, were prepared by coprecipitation technique. X-ray powder diffraction XRD was performed to investigate the structural properties of the prepared samples. X-ray peak profile analysis was carried out using the Debye Scherrer model DSM, the Williamson Hall WH approach by its three models: Uniform Deformation model UDM, Uniform Deformation Stress model UDSM and Uniform Deformation Energy Density model UDEDM, and using the size-strain plot SSP. It was found that doping NiO with both Y and Gd causes a decrease in the lattice parameter, lattice strain and crystallite size. Transmission Electron Microscopy TEM was done to study the particles size and morphology. The particle size trend obtained from the TEM images were agreeable with the crystallite size obtained from the XRD results. The TEM images showed homogeneous, nearly spherical and slightly agglomerated NiO nanoparticles, that can be good candidates for rechargeable Lithium ion batteries. Dielectric measurements were done by measuring the parallel-equivalent circuit mode capacitance Cp, the dielectric loss tangent D (tanδ), the impedance Z and the impedance phase angle θ. Then, the frequency and temperature dependence of the dielectric constant ε', dielectric loss ε", loss tangent, ac conductivity σac and the imaginary part of both impedance Z″ and modulus M" were calculated and studied. Furthermore, the Nyquist plot was studied to correlate the electrical behavior by the microstructural contributions. The ionic radius and the valency of the dopant elements were found to be the factors that affect the dielectric behavior of the prepared samples. The dopant having larger ionic radius and higher valency was found to result in a higher dielectric constant and ac conductivity and a lower dielectric loss and electrical impedance, enhancing the role of NiO nanoparticles in electrical technologies, such as solar cells.

Author(s) **Al Boukhari J.,** Khalaf A., Sayed Hassan R., **Awad R.**

ARTICLE TITLE	**Structural, Optical and Magnetic Properties of Pure and Rare Earth-Doped NiO Nanoparticles**
JOURNAL	**Applied Physics A: Materials Science and Processing**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s00339-020-03508-3
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Pure and a series of rare earth element (RE) (Er, Sm, Gd, Pr and Y)-doped NiO nanoparticles (NPs) were fabricated by co-precipitation method in the presence of polyvinyl alcohol as a capping agent. X-ray diffraction (XRD) and transmission electron microscope (TEM) techniques were used to investigate the crystal structure and morphology of the prepared samples, respectively. The XRD patterns indicated that all the samples exhibited a single phase of face-centered cubic crystalline structure. TEM images displayed a spherical morphology of weakly agglomerated NPs. Furthermore, the chemical compositions were identified by proton-induced X-ray emission and Rutherford backscattering analysis. The metal oxide (Ni–O) functional group was confirmed by Fourier transform infrared spectroscopy with its observed band varying from 419.3 to 433.3 cm^{-1}, depending on the RE doping element.

ABSTRACT

The optical properties of the RE-doped NiO NPs were studied using UV–Vis absorption and photoluminescence (PL) spectroscopy. A small blueshift was obtained in the optical spectra of the RE-doped samples as compared to the undoped samples, implying an increase in the optical band gap. The study of the room temperature magnetic properties was done using the vibrating sample magnetometer, which revealed the coexistence of antiferromagnetic and weak ferromagnetic ordering in pure and RE^{3+}-doped NiO NPs. The magnetization increased depending on the magnetic moments of RE dopant ions. Also, the origin of the anomalous ferromagnetism in the prepared samples may be mainly related to Ni vacancy defects, which were evinced from the results of PL.

Author(S) **Alsayed Z., Badawi M., Awad R.,** Thabet A., El-Khatib A.

ARTICLE TITLE	**Study of Some γ-ray Attenuation Parameters for New Shielding Materials Composed of Nano ZnO Blended with High Density Polyethylene**
JOURNAL	**Nuclear Technology and Radiation Protection**
YEAR	2019
PUBLICATION INFO	34(4): 342-352
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	The extensive utilization of radiation is rapidly developing worldwide involving abundant fields like medical, industrial, research, and nuclear facilities. This makes the need for studying radiation shielding materials and their properties more urgent than ever. In the present study, bulk and nano ZnO were mixed by the same ratio each time (10, 20, 30, and 40 wt.%), with high-density polyethylene as a polymer matrix and characterized by X-ray diffraction. The results confirmed the good dispersion of bulk and nano ZnO particles within the polymer matrix. The prepared composite samples were used in different thicknesses as gamma ray shielding materials, and the heaviness was calculated and compared to lead. Using HPGe detector at specific energies (59.53, 356.01, 661.66, 1173.33, and 1332.50 keV) for different radioactive point sources (^{241}Am, ^{133}Ba, ^{137}Cs, and ^{60}Co), the mass attenuation coefficient for the samples was measured experimentally. Depending upon the obtained values, the linear attenuation coefficient, half-value layer, tenth value layer, heaviness and relaxation length were estimated. Using the XCOM database, the values of linear attenuation coefficient, mass attenuation coefficient, and other parameters were calculated theoretically for the bulk ZnO blended with high-density polyethylene. The obtained results were compared to the experimental values for nano and bulk ZnO blended with high density polyethylene. The radiation shielding behavior of nano ZnO blended with high density polyethylene was found to be more promising and efficient for radiation protection against gamma ray.

Author(S) **Abdallah A., Awad R.**

ARTICLE TITLE	**Study of the Structural and Physical Properties of Co_3O_4 Nanoparticles Synthesized by Co-Precipitation Method**
JOURNAL	**Journal of Superconductivity and Novel Magnetism**
YEAR	2020
PUBLICATION INFO	33: 1395-1404
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	Tricobalt tetroxide (Co_3O_4) nanoparticles were synthesized by co-precipitation method. The structure, morphology, purity, real compositions, and functional groups of the prepared nanoparticles were determined by X-ray diffraction (XRD), transmission electron microscope (TEM), energy-dispersive X-ray (EDX) analysis, and Fourier transform infrared (FTIR) spectroscopy, respectively. The results confirm the formation of pure spinel structure of the Co_3O_4 nanoparticles with space group Fd3m and average spherical particle size of 58 nm. The optical properties were explored by ultraviolet–visible spectroscopy (UV–vis) and photoluminescence spectroscopy (PL). Two absorption peaks were aroused in ultraviolet and visible ranges accompanied by two band gap energies and an Urbach energy. Moreover, two emission peaks in agreement with the calculated band gap energies were observed in the PL spectrum. A weak ferromagnetic behavior was investigated by magnetic hysteresis (M-H) loop at room temperature. The electrical conductivity was measured in the temperature range 313–573 K. A normal semiconductor behavior was detected. The dielectric properties were studied under the variation of temperature and frequency. Then, the dielectric constant, dielectric loss, ac conductivity, relaxation process, and Nyquist plots were discussed.

Author(s) **Yassine N.,** Kumar Singh S.

ARTICLE TITLE	**Sustainable Supply Chains Based on Supplier Selection and HRM Practices**
JOURNAL	**Journal of Enterprise Information Management**
YEAR	2020
PUBLICATION INFO	DOI: 10.1108/JEIM-12-2019-0421
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Purpose

The purpose of this paper is to investigate a supply chain consisting of a producer and multiple suppliers of a type of component needed for the production of a certain product. The effects of carbon emission taxes, quality of components and human inspection errors as well as the collaboration among the supply chain members are considered.

Design/Methodology/Approach

A mathematical model is formulated for a non-collaborative supply chain, and the optimal policy is shown to be the solution of a constraint optimization problem. The mathematical model is modified to the case of a collaborative supply chain and to account for inspection errors. Algorithms are provided, and a numerical example is given to illustrate the determination of the optimal policy.

Findings

This study offers a new conceptual and analytical model that analyzes the production problem from a supply chain perspective. Human resource management practices and environmental aspects were incorporated into the model to reduce risk, optimally select the suppliers and properly maximize profit by accounting for human inspection error as well carbon emission taxes. Algorithms describing the determination of the optimal policy are provided.

Practical Implications

This study provides practical results that can be useful to researchers and managers aiming at designing sustainable supply chains that incorporate economic, environmental and human factors.

Originality/Value

This study can be useful to researchers and managers aiming for designing sustainable supply chains that incorporate economic and human factors.

Author(s) Abou Najem S., **Khawaja G.,** Hodroj M., Rizk S.

ARTICLE TITLE	**Synergistic Effect of Epigenetic Inhibitors Decitabine and Suberoylanilide Hydroxamic Acid on Colorectal Cancer In vitro**
JOURNAL	**Current Molecular Pharmacology**
YEAR	2019
PUBLICATION INFO	12(4): 281-300
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

ABSTRACT

Background

Colorectal Cancer (CRC) is a common cause of oncological deaths worldwide. Alterations of the epigenetic landscape constitute a well-documented hallmark of CRC phenotype. The accumulation of aberrant DNA methylation and histone acetylation plays a major role in altering gene activity and driving tumor onset, progression and metastasis.

Objective

In this study, we evaluated the effect of Suberoylanilide Hydroxamic Acid (SAHA), a panhistone deacetylase inhibitor, and Decitabine (DAC), a DNA methyltransferase inhibitor, either alone or in combination, on Caco-2 human colon cancer cell line in vitro.

Results

Our results showed that SAHA and DAC, separately, significantly decreased cell proliferation, induced apoptosis and cell cycle arrest of Caco-2 cell line. On the other hand, the sequential treatment of Caco-2 cells, first with DAC and then with SAHA, induced a synergistic anti-tumor effect with a significant enhancement of growth inhibition and apoptosis induction in Caco-2 cell line as compared to cells treated with either drug alone. Furthermore, the combination therapy upregulates protein expression levels of pro-apoptotic proteins Bax, p53 and cytochrome c, downregulates the expression of antiapoptotic Bcl-2 protein and increases the cleavage of procaspases 8 and 9; this suggests that the combination activates apoptosis via both the intrinsic and extrinsic pathways. Mechanistically, we demonstrated that the synergistic anti-neoplastic activity of combined SAHA and DAC involves an effect on PI3K/AKT and Wnt/β-catenin signaling.

Conclusion

In conclusion, our results provide evidence for the profound anti-tumorigenic effect of sequentially combined SAHA and DAC in the CRC cell line and offer new insights into the corresponding underlined molecular mechanism.

Author(s) **El Ghouch N., Al-Oweini R., Awad R.**

ARTICLE TITLE	**Synthesis, Characterization and Electrical Properties of Hybrid Mono-iron-substituted Undecatungstosilicate/(Bi,Pb)-2223 Phase Superconductors**
JOURNAL	**Materials Research Express**
YEAR	2019
PUBLICATION INFO	DOI: 10.1088/2053-1591/ab46e2
THEME / SUBTHEME	Science and Technology/ Advanced Materials

ABSTRACT

A conventional solid-state reaction technique was used to synthesize superconducting samples of $(Bi_{1.8}Pb_{0.4})Ca_2Sr_2Cu_3O_{10+\delta}$, (Bi,Pb)-2223, phase. The electrical properties of (Bi,Pb)-2223 samples were investigated upon the addition of different amounts of ferratoundecatungstosilicate $(K_5[SiFe(OH_2)W_{11}O_{39}]\ 14H_2O,\ \{FeSiW_{11}\})$ nanoparticles, x, ranging from 0.00 to 0.20 wt%. The optimum preparation conditions to obtain high quality superconducting bulk samples were considered. The average particle size of these antiferromagnetic nanoparticles was approximately 19.56 nm. Such Fe-containing polyoxometalates are a highly interesting class of inorganic nanomaterials, possessing outstanding properties of high oxidation states as well as thermal and oxidative stability. Consequently, the superconducting samples were characterized by powder x-ray diffraction (XRD), scanning electron microscopy (SEM) and energy dispersive x-ray spectroscopy (EDX) to study the structure, morphology and elemental composition of the prepared samples, respectively. The volume fraction of the (Bi,Pb)-2223 phase was improved by the nano-addition, while the lattice parameters showed unchangeable values. On the other hand, the superconducting electrical parameters were assessed via dc electrical resistivity and critical current density measurements. The obtained results indicated that the addition of nano $\{FeSiW_{11}\}$ enhanced the superconducting transition temperature (Tc) and the transport critical current density (Jc) up to x = 0.16 and 0.12 wt%, respectively. Conversely, Tc and Jc were suppressed with further increases of nanoparticle addition.

Author(s) Hamida R., Abdelmeguid N., Abdelaal Ali M., Bin-Meferij M., **Khalil M.**

ARTICLE TITLE	**Synthesis of Silver Nanoparticles Using a Novel Cyanobacteria Desertifilum sp. Extract: Their Antibacterial and Cytotoxicity Effects**
JOURNAL	**International Journal of Nanomedicine**
YEAR	2020
PUBLICATION INFO	15: 49-63
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology

ABSTRACT

Background

The emergence of multi drug-resistant (MDR) bacterial infections and cancer has necessitated the development and discovery of alternative eco-safe antibacterial and anticancer agents. Biogenic fabrication of metallic nanoparticles is an emerging discipline for production of nanoproducts that exert potent anticancer and antibacterial activity, and do not suffer from the limitations inherent in physiochemical synthesis methods.

Methodology

In this study, we isolated, purified, and characterized a novel cyanobacteria extract (Desertifilum IPPAS B-1220) to utilize in biofabrication of silver nanoparticles (D-SNPs). D-SNPs were produced by adding Desertifilum extract to silver nitrate solution under controlled conditions. Biofabrication of D-SNPs was confirmed using a UV-Vis spectrophotometer. The resultant D-SNPs were characterized using XRD, FTIR, SEM, and TEM. The toxicity of D-SNPs against five pathogenic bacteria and three cancer cell lines (MCF-7, HepG2, and Caco-2) was evaluated.

Results

Formation of D-SNPs was indicated by a color change from pale yellow to dark brown. The peak of the surface plasmon resonance of the D-SNPs was at 421 nm. The XRD detected the crystallinity of D-SNPs. FTIR showed that polysaccharides and proteins may have contributed to the biofabrication of D-SNPs. Under SEM and TEM, the D-SNPs were spherical with diameter ranges from 4.5 to 26 nm. The D-SNPs significantly suppressed the growth of five pathogenic bacteria, and exerted cytotoxic effects against MCF-7, HepG2, and Caco-2 cancer cells with IC50 values of 58, 32, and 90 µg/mL, respectively.

ABSTRACT

Conclusion

These findings showed for the first time the potentiality of novel cyanobacteria strain Desertifilum IPPAS B-1220 to fabricate small SNPs that acted as potent anticancer and antibacterial material against different cancer cell lines and pathogenic bacterial strains. These findings encourage the researchers to focus on cyanobacteria in general and especially Desertifilum sp. IPPAS B-1220 for synthesizing different NPs that opening the window for new applications.

Author(S) **Jneid M., Chaouk A.**

ARTICLE TITLE	**The Conformable Reduced Differential Transform Method for Solving Newell-Whitehead-Segel Equation with Non-integer Order**
JOURNAL	**Journal of Analysis and Applications**
YEAR	2020
PUBLICATION INFO	18(1): 35-51
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this study, we aim at solving analytically and approximately the conformable fractional Newell-Whitehead-Segel equation (CFNWSE) via conformable reduced differential transform method (CRDTM). Through utilizing the proposed procedure, CFNWSE is converted to an iterative expression which can be easily solved using the initial condition. Four numerical examples, which we already knew their exact solution using other numerical methods, were solved by CRDTM to examine the competence of this method in solving the CFNWSEs. It is observed that CRDTM gives solutions that coincide with the exact solutions, and it saves a lot of computational work in solving FNWSEs. Moreover, the CRDTM is an efficient and simple tool for dealing with the CFNWSEs.

Author(S) **Badreddine K., Srour A., Awad R.,** Abou-Aly A.

ARTICLE TITLE	**The Investigation of Mechanical and Dielectric Properties of Samarium Doped ZnO Nanoparticles**
JOURNAL	**Materials Research Express**
YEAR	2020
PUBLICATION INFO	7(2): 1-12
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	$Zn_{1-x}Sm_xO$ nanoparticles, with $0.00 \leq x \leq 0.10$, were prepared using chemical co-precipitation method. The structure and morphology of the obtained samples were characterized using x-ray powder diffraction (XRD), transmission electron microscopy (TEM) and scanning electron microscopy (SEM), respectively. However, the mechanical properties were investigated via digital Vickers microhardness tester. Vickers microhardness measurements were carried out at different applied loads, varying between 0.5 and 10 N at dwell time 60 s on pressed discs of average thickness 3 mm. Hv decreased as the Sm-content increased up to 0.02 and then it increased for higher concentrations. Whereas, it increased as the applied load increased, revealing that the samples exhibited a reverse indentation size effect (ISE). The microhardness measurements were interpreted using various models such as Meyer's law, Hays and Kendall (HK) approach, elastic/plastic deformation (EPD), proportional specimen resistance (PSR) and the indentation-induced cracking (IIC). Mechanical parameters such as Young's modulus (E), yield strength (Y), fracture toughness (K) and brittleness index (B) were calculated as a function of x. The most adequate model for the true microhardness of these samples is IIC. It was found that the addition of Sm content enhanced the mechanical properties of the prepared samples after x = 0.02. Dielectric measurements were used to compute different parameters such as real and imaginary parts of the complex permittivity, dielectric loss (tan δ) and ac conductivity (σ_{ac}).

Author(s) **El Kasty H., Zeid I.,** El-Kork N., **Korek M.**

ARTICLE TITLE	**Theoretical Electronic Structure with Rovibrational and Dipole Moment Calculation of the SiS Molecule**
JOURNAL	**Journal of Physics: Conference Series**
YEAR	2019
PUBLICATION INFO	DOI: 10.1088/1742-6596/1258/1/012033
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The quantitative distribution of the molecular abundances in the universe is a classical problem in astronomy, astrophysics and cosmo-chemistry. Astrophysicists are interested in determining the abundances of molecular species in order to: (1) Know the primordial composition of the solar system, and its relation to the past and present composition of the earth. (2) Have a complete understanding of physical and chemical processes taking place in the stellar atmospheres and the interstellar medium (3) Test the hypotheses that have been proposed for element formation. To investigate the presence of astronomical sources, experimental astrophysicists usually study the wavelength and intensity of light that they emit. Many diatomic molecular species are present in various astrophysical sources, however, the theoretical studies on such species are not enough and information is missing in that area. Knowledge of the electronic structure, Franck-Condon factors (FCFs), and other related quantities for a band system of a diatomic molecule is essential to arrive at its astrophysically significant parameters such as kinetics of the energy transfer, radiative lifetimes, band intensity, vibrational temperature, etc. In this view, the spectroscopic and ro-vibrational constants, FCFs of several electronic states of the diatomic molecule SiS electronic have been evaluated in this work. We performed theoretical calculation of the low-lying electronic state, of the molecule SiS by using the Complete Active Space Self Consistent Field (CASSCF) method followed by the Multi Reference Configuration Interaction with Davidson correction MRCI+Q. The potential energy along with the dipole moment curves of these states have been calculated along with the spectroscopic constants Re, ωe, Be, and Te. Additionally, the Rotation-vibration lines for the considered electronic states were obtained by direct solution of the nuclear motion Schrödinger equation using the canonical approach with program Rovib-1.

Author(s) **Zeid I.,** El-Kork N., **Halat N., Jaber H., Korek M.**

ARTICLE TITLE	**Theoretical Electronic Structure with Rovibrational Calculations of the Alkali Chloride Molecules XCl (X = Li, Na, K, Rb, Cs)**
JOURNAL	**Physica Scripta**
YEAR	2019
PUBLICATION INFO	94(12): 1-18
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	The adiabatic potential energy curves and the static dipole moment curves of the low-lying singlet and triplet electronic states in the representation $2^{s+1}\Lambda^{(+/-)}$ of the five alkali chloride molecules (LiCl, NaCl, KCl, RbCl and CsCl) have been investigated via ab initio calculations using the state averaged complete active space self consistent field followed by the Multi-reference single and double configuration interaction method with Davidson correction CASSCF/(MRCI + Q). For the molecules under consideration, the spectroscopic constants T e, R e, ω e and B e, the dipole moment μ e, and the dissociation energy D e have been calculated for the bound states along with the percentage ionic character f ionic around the equilibrium position of the ground state. Moreover, the transition dipole moment curves of the $X^1\sum^+$–$(2)^1\sum^+$ and $X^1\sum+^-(1)^1\Pi$ transitions have been investigated for the five alkali chloride molecules. A rovibrational calculation was carried out using the canonical functions approach in order to determine the rovibrational constants E v, B v and D v and the abscissas of the turning points Rmin and Rmax for the investigated bound states.

Author(s) Ijaz Khan M., Qayyum S., **Kadry S.,** Khan W., Abbas S.

ARTICLE TITLE	**Theoretical Investigations of Entropy Optimization in Electro-Magneto Nonlinear Mixed Convective Second Order Slip Flow**
JOURNAL	**Journal of Magnetics**
YEAR	2020
PUBLICATION INFO	25(1): 8-14
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Here nonlinear mixed convective entropy based nanofluid second order slip flow of magnetic and electric field is addressed. Both electric and magnetic field is considered for the problem formulation and the flow is generated by a stretched surface. Important slip factors, i.e., Brownian and thermophoresis diffusions are accounted. Total entropy rate subject to four types of irreversibilities (i) heat transfer (ii) chemical reaction (iii) fluid friction (iv) Joule or Ohmic heating is obtained through second law of thermodynamics. Thermal radiation, heat generation/absorption, dissipation, Brownian motion, Joule or Ohmic heating and thermophoresis effects are considered in the development of the energy equation. Activation energy to undergo the physical transportation or chemical transformation of atoms or molecules is further considered in the analysis of concentration. Firstly ordinary differential system is found, then numerically solved for flow field, entropy generation, concentration, temperature, skin friction, Nusselt number, Bejan number and Sherwood number through built-in- Shooting method.

Author(S) Ramzan M., Shaheen N., **Kadry S.,** Ratha Y., Nam Y.

ARTICLE TITLE	**Thermally Stratified Darcy Forchheimer Flow on a Moving Thin Needle with Homogeneous Heterogeneous Reactions and Non-Uniform Heat Source/Sink**
JOURNAL	**Applied Sciences**
YEAR	2020
PUBLICATION INFO	10(2): 432-450
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	This study discusses the flow of viscous fluid past a moving thin needle in a Darcy–Forchheimer permeable media. The novelty of the envisioned mathematical model is enhanced by adding the effects of a non-uniform source/sink amalgamated with homogeneous–heterogeneous (hh) reactions. The MATLAB bvp4c function is employed to solve the non-linear ordinary differential equations (ODEs), which are obtained via similarity transformations. The outcomes of numerous parameters are explicitly discussed graphically. The drag force coefficient and heat transfer rate are considered and discussed accordingly. It is comprehended that higher estimates of variable source/sink boost the temperature profile.

Author(S) **Alsayed Z., Awad R., Badawi M.**

ARTICLE TITLE	**Thermo-mechanical Properties of High Density Polyethylene with Zinc Oxide as a Filler**
JOURNAL	**Iranian Polymer Journal**
YEAR	2020
PUBLICATION INFO	29: 309-320
THEME / SUBTHEME	Science and Technology/ Advanced Materials
ABSTRACT	This study investigates the microstructural, thermal, and mechanical behavior of high density polyethylene (HDPE)-based composites prepared using compression molding technique. HDPE was mixed with either micro-size zinc oxide (bulk ZnO) or zinc oxide nanoparticles (nano-ZnO) as fillers' contents at 0, 10, 20, 30, and 40 wt%. The structural, morphological, and thermal properties of the composites were identified using X-ray diffraction (XRD), scanning electron microscope (SEM), Fourier transform infrared spectrophotometer (FTIR), and thermal gravimetric analysis (TGA). The results showed good dispersion and interaction mechanisms between HDPE and the fillers at low weight percentage. The thermal stability of HDPE was enhanced by adding both bulk and nano-ZnO, especially for higher filler loading. Tensile tests at different speeds and Vickers microhardness tests conducted at different indentation loads (0.25–5 N) at t = 60 s were performed to realize how the mechanical properties of the composites were influenced. The values of stiffness, ultimate tensile strength, and yield stress increased by increasing the filler loading to 20 wt% of either bulk ZnO or nano-ZnO. The values of ultimate tensile strain and ductility were deteriorated by increasing the filler loading. Nano-ZnO, at 20 wt% content in composite, showed higher mechanical properties than bulk composite, so it has been recommended for a better tensile performance at higher strain rates. Vickers microhardness measurements showed that the tested samples exhibited reverse indentation size effect (RISE) behavior. The obtained results were analyzed using Meyer's law which was a preferred approach for analysis of HDPE/ZnO composite.

Author(s) **Houssein M.,** Fatfat M., Habli Z., Ghazal N., Moodad S., Khalife H., **Khalil M.,** Gali-Muhtasib H.

ARTICLE TITLE	**Thymoquinone Synergizes With Arsenic and Interferon Alpha to Target Human T-cell Leukemia/Lymphoma**
JOURNAL	**Life Sciences**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.lfs.2020.117639
THEME / SUBTHEME	Health and Wellbeing/ Human Disorders at the Molecular Level

ABSTRACT

Aims

To reduce the dose of arsenic used against human T-cell leukemia/lymphoma and to sensitize cells to drug treatment, we combined arsenic/interferon-alpha (As/IFN-α) with thymoquinone (TQ) in HTLV-I positive (HuT-102 and C91) and HTLV-1 negative (CEM and Jurkat) cell lines.

Main Methods

Cells were treated with TQ, As/IFN-α and combinations. Trypan blue and flow cytometry were used to investigate viability and cell cycle effects. Annexin-V staining, rhodamine assay and western blotting were used to determine apoptosis induction and changes in protein expression. Efficacy of single drugs and combinations were tested in adult T-cell leukemia (HuT-102) mouse xenograft model.

Key Findings

TQ/As/IFN-α led to a more pronounced and synergistic time-dependent inhibitory effect on HTLV-I positive cells in comparison to As/IFN-α. While As/IFN-α combination was not effective against CEM or Jurkat cells, the triple combination TQ/As/IFN-α sensitized these two cell lines and led to a pronounced time-dependent inhibition of cell viability. TQ/As/IFN-α significantly induced apoptosis in all four cell lines and disrupted the mitochondrial membrane potential. Apoptosis was confirmed by the cleavage of caspase 3 and poly (ADP-ribose) polymerase (PARP), downregulation of Bcl-2 and XIAP and upregulation of Bax. TQ alone or in combination activated p53 in HTLV-1 positive cell lines. Strikingly, TQ/As/IFN-α resulted in a pronounced significant decrease in tumor volume in HuT-102 xenograft mouse model, as compared to separate treatments or double combination therapy.

Significance

Our results suggest a strong potential for TQ to enhance the drug targeting effects of the standard clinical drugs As and IFN-α against CD^{4+} malignant T-cells.

Author(s) Namasudra S., Devi D., **Kadry S.,** Sundarasekar R., Shanthini A.

ARTICLE TITLE	**Towards DNA Based Data Security in the Cloud Computing Environment**
JOURNAL	**Computer Communications**
YEAR	2020
PUBLICATION INFO	151: 539-547
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Nowadays, data size is increasing day by day from gigabytes to terabytes or even petabytes, mainly because of the evolution of a large amount of real-time data. Most of the big data is transmitted through the internet and they are stored on the cloud computing environment. As cloud computing provides internet-based services, there are many attackers and malicious users. They always try to access user's confidential big data without having the access right. Sometimes, they replace the original data by any fake data. Therefore, big data security has become a significant concern recently. Deoxyribonucleic Acid (DNA) computing is an advanced emerged field for improving data security, which is based on the biological concept of DNA. A novel DNA based data encryption scheme has been proposed in this paper for the cloud computing environment. Here, a 1024-bit secret key is generated based on DNA computing, user's attributes and Media Access Control (MAC) address of the user, and decimal encoding rule, American Standard Code for Information Interchange (ASCII) value, DNA bases and complementary rule are used to generate the secret key that enables the system to protect against many security attacks. Experimental results, as well as theoretical analyses, show the efficiency and effectivity of the proposed scheme over some well-known existing schemes.

Author(s) Khan W., Ijaz Khan M., **Kadry S.,** Farooq S., Imran Khan M., Abbas S.

ARTICLE TITLE	**Transportation of Water-Based Trapped Bolus of SWCNTs and MWCNTs with Entropy Optimization in a Non-uniform Channel**
JOURNAL	**Neural Computing and Applications**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s00521-020-04766-1
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Here, we communicate the peristalsis of single- and multi-walled CNTs through nonlinear porous, non-uniform propagating channel boundaries. Non-uniform channel boundaries are of asymmetric characteristics. Flow equations are modeled by taking variable viscosity, linear and nonlinear porous medium (i.e., Darcy and Darcy–Forchheimer), nonlinear thermal radiation, mixed convection, heat generation and absorption aspects. Convective heat transfer aspects are at the convectively heated surface. The entropy generation rate is modeled via the second law of thermodynamics. Modeled equations are simplified with the help of long wavelength assumption. Dimensionless system of equations with respective boundary conditions is solved numerically via built-in shooting algorithm in Mathematica 8 software. Further, these numerical results are directly received in the form of curves. Such curves are made for velocity, temperature, pressure gradient, trapping, entropy rate and Bejan number. Heat transfer rate at lower and upper walls is achieved through bar charts.

Author(s) **Halawi M.,** Yassine W., Nasser R., Y**usef H., Borjac J.,** Al Sagheer T., Zeaiter Z.

ARTICLE TITLE	**Two Weeks of Chronic Unpredictable Stress are Sufficient to Produce Oral Candidiasis in BALB/C Mice**
JOURNAL	**Asian Journal of Microbiology, Biotechnology and Environmental Sciences**
YEAR	2020
PUBLICATION INFO	22(2): 254-264
THEME / SUBTHEME	Health and Wellbeing/ Industrial and Medical Microbiology

ABSTRACT

The incidence of oral infections caused by Candida species with diverse virulence and susceptibility profiles has increased in recent years. Due to scarce clinical and experimental data on the ability of stress to induce oral candidiasis, the aim of this study was to assess the impact of stress on oral candidiasis in healthy BALB/c mice and compare its effect to other predisposing factors of oral candidiasis. Immunocompetent and immunocompromised BALB/c female mice were orally infected with C. albicans. A total of four groups of mice each receiving a different treatment were screened. Treatments included antibiotics, corticosteroids and chronic unpredictable stress. Oral tissue colonization and infection was inspected and evaluated comparatively in each group. Tissue burden on day 14 post challenge was measured and mice tongues were inspected for white patches and studied histo-pathologically for evidence of colonization or infection. The induced stress model was able to result in oral colonization and infection without the use of antibiotics or immuno-suppressants. Moreover, the fungal burden was significantly greater in stressed group than that in groups receiving antibiotics treatment or control group. Histopathological examination revealed the abundant presence of C. albicans cells with pseudo-hyphae and in the yeast form, in all tongue tissue samples of treated mice. Tissues were intact in the control group and Candida cells count was significantly lower in the treated unstressed group. White patches were significantly more dominant in stressed group than non-stressed and control group. In conclusion, stress maybe a more potent predisposing factor than the use of antibiotics in inducing oral candidiasis, although being a weaker factor than the combined use of antibiotics and corticosteroids together.

Author(s) Khan W., Farooq S., **Kadry S.,** Hanif M., Iftikhar F., Abbas S.

ARTICLE TITLE	**Variable Characteristics of Viscosity and Thermal Conductivity in Peristalsis of Magneto-Carreau Nanoliquid with Heat Transfer Irreversibilities**
JOURNAL	**Computer Methods and Programs in Biomedicine**
YEAR	2020
PUBLICATION INFO	190: 105-134
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	**Background** Peristaltic is a basic way of fluid transportation in physiology, engineering and nuclear industry. Importance of peristalsis is due to its contraction and compulsion property of symmetric and asymmetric type channel walls. Another beauty of this mechanism is that the channel walls propagates and push the material along the tube/conduit channel walls. This mechanism shows its presence in physiology while food particles are transferred through esophagus and stomach, urine through intestines, spermatoza transportation in reproductive tract. In industry it is found in roller and finger pumps, drug delivery and various nuclear materials e.g. toxic, corrosive, noxious etc. Magnetic field in peristalsis is found helpful in treatment of various treatments using magnets. Actually earth and human body as a whole comprises of magnetic and electric fields.

ABSTRACT

The medical specialists found that unbalances of electromagnetic field in human body is the reason for emotional and physical disturbance. In addition it has significant and potential utilizations in modification of medical, industrial and chemical, procedures for example MRI, evaporation, convection, thermoregulation, MHD throttles, and in various types of tumor treatments. Entropy production work out irreversibility in complex systems which are frequently encountered in industrial mechanisms. In view of that, this methodology is effectually implemented in distinct technological applications covering porous media, propulsion ducts, electronic cooling, turbo-machinery and combustion.

Method

Modelled flow mechanism is nonlinear and coupled due to considered assumptions (i.e. nanofluid, nonlinear porous channel, mixed convection, variable viscosity and thermal conductivity, activation energy and chemical reaction). Such nonlinear and coupled system is difficult to tackle analytically. Thus to obtain the solution we employed RK algorithm for numerical simulations.

Results

Stronger magnetic parameter shows resistive characteristics to the flow field. Nonlinear Darcy medium assists the fluid motion at channel center and resits at walls vicinity. Variable characteristics of thermal conductivity moderate the soak or disperse up heat ability which corresponds to temperature reduction. Thermal slip quantity increase the temperature whereas concentration slip deduct the concentration of Carreau nanomaterial. Entropy and Bejan number shows maximum response for higher dissipation estimations. Brownian and thermopherotic motions aspects has reverse impact on nanomaterial concentration.

Conclusion

Entropy and Bejan number deduces for higher variable thermal conductivity values. Carreau material variable enhance the entropy of the system as a whole.

CONFERENCE PROCEEDINGS

Author(s) **Yassine N.,** Markarian C., El-Khalil R.

PROCEEDING TITLE	**An Economic Production Quantity Model with Imperfect Quality Raw Material and Backorders**
CONFERENCE TITLE	**9th International Conference on Operations Research and Enterprise Systems (ICORES 2020)**
DATE	22/2/2020
PLACE	Valletta, Malta
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this paper the classical EPQ model is extended to account for the cost and quality of the raw material used in the production process and to incorporate the effects of shortages into the model. A production process that uses n different types of raw material is considered. The various types of raw material acquired in batches from the suppliers are assumed to contain a percentage of imperfect quality items of raw material. The proportion of imperfect quality raw material found in a batch is a random variable having a known probability distribution. A mathematical model describing the inventory/ production situation is formulated and used to derive a system of equations whose solution is the optimal production and shortage quantities that minimizes the total cost. It is shown that the total cost function depends on the determination of the maximum of a set of n independent random variables obtained from the proportions of imperfect quality raw material. A process for obtaining the probability function of the maximum along with its expected value is described. Expressions for the probability density function and the expected value of the maximum are developed for the case when the random variables are uniformly distributed. A numerical example illustrating the determination of the optimal policy is presented.

Author(s) **Rawas S., Zekri A., El Zaart A.**

PROCEEDING TITLE	**CELA: Cost-Efficient, Location-Aware VM and Data Placement in Geo-Distributed DCs**
CONFERENCE TITLE	**The 8th International Conference on Cloud Computing and Services Science (CLOSER 2018)**
DATE	19/3/2018
PLACE	Madeira, Portugal
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	Geo-distributed data centres (DCs) that recently established due to the increasing use of on-demand cloud services have increasingly attracted cloud providers as well as researchers attention. Energy and data transmission cost are two significant problems that degrades the cloud provider net profit. However, increasing awareness about CO_2 emissions leads to a greater demand for cleaner products and services. Most of the proposed approaches tackle these problems separately. This paper proposes green approach for joint management of virtual machine (VM) and data placement that results in less energy consumption, less CO_2 emission, and less access latency towards large-scale cloud providers operational cost minimization. To advance the performance of the proposed model, a novel machine-learning model was constructed. Extensive simulation using synthetic and real data are conducted using the CloudSim simulator to validate the effectiveness of the proposed model. The promising results approve the efficacy of the CELA model compared to other competing models in reducing network latency, energy consumption, CO_2 emission and total cloud provider operational cost.

Author(s) **Elkabani I.,** Hamandi L., Zantout R., **Ghali S.**

PROCEEDING TITLE	**Evaluation of a Multilingual Workspace to Practice Math for Visually Impaired Students**
CONFERENCE TITLE	**10th International Conference on Applied Human Factors and Ergonomics (AHFE 2019)**
DATE	24/7/2019
PLACE	Washington D.C., United States
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	An interactive workspace that enables learning and practicing Algebra for visually impaired students using Arabic or English was built. In this paper, the experiments conducted to evaluate the efficiency, effectiveness and user satisfaction of the proposed system are described. Visually impaired students from upper elementary and middle school in Lebanon participated in testing the implementation of the workspace. The effectiveness of the system is much better than that of other existing systems. All students were able to solve all exercises correctly using the hints suggested by the system in learning mode. In addition, a 40% reduction in learning time was recorded compared to using already existing systems with a sighted person giving the student hints. Moreover, using the system, students were able to learn and practice operations they were incapable of performing using traditional tools.

Author(s) **Jneid M.**

PROCEEDING TITLE	**Exact Controllability of Semilinear Control Systems Involving Conformable Fractional Derivatives**
CONFERENCE TITLE	**Sixth International Conference New Trends in the Applications of Differential Equations in Sciences (NTADES 2019)**
DATE	1/7/2019
PLACE	Saints Constantine and Helena, Bulgaria
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

In this paper, we discuss the exact controllability of conformable fractional semilinear control systems. First, the existence and uniqueness of the solution for such control systems are proved. Second, we establish the exact controllability results for the conformable fractional semilinear control system using fixed point theorem, assuming that the associated linear system is exactly controllable. Finally, a typical example is provided to show the effectiveness of the obtained results.

Author(S) RZantout R., **Elkabani I.,** Hamandi L., **Al Masri B.**

PROCEEDING TITLE	**Experimental Evaluation of an Interactive Workspace for Helping the Visuall Impaired in Learning Linear Algebra**
CONFERENCE TITLE	**11th International Conference on Applied Human Factors and Ergonomics (AHFE 2020)**
DATE	16/7/2020
PLACE	Virtual Conference, United States
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	A framework and a workspace were designed to allow visually impaired students to practice linear algebra in an independent, convenient, interactive and accessible way. This improved the students' self-assurance and motivated them to learn more linear algebra topics compared to traditional methods. In this paper, the workspace is evaluated experimentally. Experiments with increasing level of complexity were performed by six visually impaired participants to evaluate the effectiveness, efficiency and satisfiability of the workspace. The time taken by the student to complete the exercise was used to evaluate the effectiveness of the workspace, the number of errors of the participant was used to evaluate the efficiency, whereas a level from 1 to 5 was used to evaluate satisfiability. The results, analyzed using T-test, showed that the proposed system is more effective, efficient and satisfactory than conventional systems especially when it comes to more complex experiments.

Author(S) **Abdel Kader R.**

PROCEEDING TITLE	**Finding the Spreaders in a Graph Database**
CONFERENCE TITLE	**IEEE 15th International Conference on Intelligent Computer Communication and Processing (ICCP 2019)**
DATE	5/9/2019
PLACE	Cluj-Napoca, Romania
THEME / SUBTHEME	Science and Technology/ Software and Computing
ABSTRACT	The use of graph databases has increased significantly in the last decades, especially for storing data in social networks (e.g. Facebook, Linkedin, etc.). An important question that has received considerable research is finding the group of spreaders or the influential nodes in a social network. These nodes are defined to be the set of nodes who collectively can reach all other nodes in the network diffusing and spreading information. These nodes can be used to drive the whole network to a certain opinion or idea, therefore finding these nodes can be of high interest to politicians and opinion makers and drivers. In this paper, we provide an algorithm that can identify the minimal set of spreaders in a database graph. The algorithm is based on first extracting the strongly connected components of the graph, and then using these to identify the set of bases of the directed graph. Each base can be used as the set of spreaders that will allow a piece of information to flow and reach all other users in the database.

Author(S) **Rawas S., El-Zaart A.**

PROCEEDING TITLE	**HCET-G2: Dermoscopic Skin Lesion Segmentation via Hybrid Cross Entropy Thresholding using Gaussian and Gamma Distributions**
CONFERENCE TITLE	**Third International Conference on Intelligent Computing in Data Sciences (ICDS 2019)**
DATE	28/10/2019
PLACE	Marrakech, Morocco
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science

ABSTRACT

Malignant melanoma has been seen as one of the most precarious form of human cancer. The detection of skin cancer in early stage can be helpful to save human life. Computer vision plays an important role in skin cancer detection. It has been proved its importance in detecting the cancer in its early stage which can be helpful to cure it. Accurate segmentation is one of the key steps in medical image diagnosis. Moreover, developing a precise segmentation of skin cancer images leads to better feature diagnosis, extractions, and classification. This paper develops a novel segmentation method for skin cancer images based on hybrid cross entropy thresholding techniques to find an optimum extraction of region that reflect the presence of skin cancer. The proposed methodology tackles the problem of finding the optimal thresholding using hybrid combination of both Gaussian and Gamma distributions. To evaluate the effectiveness of the proposed method, two benchmark skin lesion dermoscopic images datasets are: PH2 and ISIC 2017. The obtained results indicate that the proposed hybrid combination methodology gave better result and achieves 75% accuracy in skin cancer detection compared to other benchmark segmentation techniques.

Author(S) **Jumiawi W., El-Zaart A.**

PROCEEDING TITLE	**Image Spectrum Segmentation for Lowpass and Highpass Filters**
CONFERENCE TITLE	**4th International Conference on Applied and Theoretical Computing and Communication Technology (iCATccT 2018)**
DATE	6/9/2018
PLACE	Mangalore, India
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Digital image processing includes an important approach related to image filtering that leads to image enhancement. In general, Images may get noisy according to various reasons, in such situations; the filtering approach of images is the key for smoothing and sharpening process. In this paper, we proposed a filtering technique related to the frequency domain for both lowpass and highpass filters. The idea of the proposed filter can be described in two cases, in case of lowpass filter, we set the values of the bright objects in the spectrum to ones, and the rest of them to zeros, in case of highpass filter, we set the values of the bright object in the spectrum to zeros, and the rest of them to ones. The proposed technique can estimates the perfect match on the image spectrum resulting from Fourier Transform. This technique is to cover the intensity levels starting from the initial coordinates at the center toward the various directions of the spectrum. The Intensity levels appear in various distributions and it depend on the transformed image spectrum. We can see the image spectrum as an intensity image in a spatial domain, we want to segment it in order to detect the bright objects or the low frequency in the spectrum. We have segmented the image using Otsu method, which used to define the location of low frequencies. The segmented image will be used as a lowpass and highpass filters.

Author(S) **Zreika N., El Zaart A., El Chakik A., El Arwadi T.**

PROCEEDING TITLE	**Skin Cancer Segmentation with Entropy PAL MCET Using Gaussian Distribution**
CONFERENCE TITLE	**4th International Conference on Applied and Theoretical Computing and Communication Technology (iCATccT 2018)**
DATE	6/9/2018
PLACE	Mangalore, India
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	Skin cancer is the most common cancer diagnosis and it is the most preventable cancer. Diagnosis of skin cancer would be improved if an accurate skin image segmentation is available. The process of image segmentation is a fundamental step in many applications of image processing, yet current methods and techniques for image segmentation necessitate particular domain knowledge to define well the region of the cancer. To estimate an optimal threshold for skin cancer images, thresholding is used as the principal approach of segmentation. We propose a new method for skin cancer segmentation using a Minimum Cross Entropy Thresholding (MCET) method. We applied this method on bimodal skin cancer images and obtained promising experimental results. The resulting segmented skin cancer images yielded better estimation of the optimal threshold than does the same MCET method with Poisson distribution.

Author(S) **Elkabani I., Abu Daher L.,** Zantout R.

PROCEEDING TITLE	**Use of FP-Growth Algorithm in Identifying Influential Users on Twitter Hashtags**
CONFERENCE TITLE	**4th International Conference on Compute and Data Analysis (ICCDA 2020)**
DATE	9/3/2020
PLACE	California, United States
THEME / SUBTHEME	Science and Technology/ Software and Computing

ABSTRACT

Due to the spread of technology and World Wide Web, Online Social media invaded every home in the world; hence, the analysis of such networks became an important, yet challenging, case of study for researchers. One of the most interesting fields of study in social network analysis is to identify influential users who are important actors in online social networks. In this paper, identification of influential users on some trendy hashtags has been done. The data of these trendy hashtags has been collected between December 2015 and March 2016. For the identification of influential users from the trendy hashtags collected, Association Rule Learning has been employed. In order to investigate why users were detected as influential, different Influence Measures have been identified. The results of this study indicate the effectiveness of using Association Rule Learning for identifying influential users, moreover, detecting the most effective Influence Measures for these users.

BOOKS

Author(S) Sud K., Erdogmus P., **Kadry S.**

BOOK TITLE	**Introduction to Data Science and Machine Learning**
YEAR	2020
PUBLISHER	IntechOpen
ISBN	9781838803346
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	"Introduction to Data Science and Machine Learning" has been created with the goal to provide beginners seeking to learn about data science, data enthusiasts, and experienced data professionals with a deep understanding of data science application development using open-source programming from start to finish. This book is divided into four sections: the first section contains an introduction to the book, the second covers the field of data science, software development, and open-source based embedded hardware; the third section covers algorithms that are the decision engines for data science applications; and the final section brings together the concepts shared in the first three sections and provides several examples of data science applications.

BOOK CHAPTERS

Author(S) Oueida S., **Kadry S.,** Ionescu S.

BOOK CHAPTER TITLE	**Estimating Key Performance Indicators of a New Emergency Department Model**
BOOK TITLE	**Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice**
YEAR	2020
PUBLISHER	IGI Global
ISBN	9781799824510
THEME / SUBTHEME	Science and Technology/ Mathematical and Computational Science
ABSTRACT	In this article, a real-life Emergency Department (ED) is studied and analyzed in order to propose areas for improvement in its operations and patient flow. EDs are in native very busy and complex systems where medical facility treatments are provided to arriving patients without any prior appointment. ED, a 24/7 open facility, interacts with the majority of other departments of the healthcare system. Due to this complexity and unplanned nature of patient surge, simulation modeling is proven to be very effective in order to study the necessary changes needed for better performance. As a consequence of these challenges, the patient LoS (Length of Stay) and the human-resource utilization rates are increased and thus leading to staff and customer dissatisfaction which need to be addressed for better performance. An emergency department of a hospital in Lebanon is chosen for simulation using Arena software where a model is designed to match the real system. This model is then verified, validated and enhanced by proposing some modifications in the resource allocation levels. These improvements are achieved by running different scenarios using Arena Process Analyzer and suggesting an optimal solution using Arena OptQuest tool without the need of interrupting the real system.

Faculty of Pharmacy

Research Report 2019 - 2020

ACADEMIC JOURNAL ARTICLES

Author(s) **Nasser S., El-Lakany A.**

ARTICLE TITLE	**An Integrated Approach to Teaching Laboratory Data and Pharmacology of Respiratory Diseases to Pharmacy Students**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-9
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	Laboratory data course has been designed in the Faculty of Pharmacy at Beirut Arab University to build and develop the basic skills needed in the analysis and interpretation of laboratory test results to ultimately ensure safety and effectiveness of the patient's treatment regimen. The aim of this study is to describe and evaluate the impact of a multidisciplinary module integration, customized by pharmacology, laboratory data and pharmacotherapeutics disciplines, in teaching asthma and COPD pharmacotherapy on the third level Beirut Arab University pharmacy students' knowledge acquisition and satisfaction. Following the completion of an integrated approach, third year pharmacy students (N= 92) were recruited to participate in filling close-ended questionnaire based on 5-point Likert scale. One-sample t-test was conducted in the statistical results of Likert scale. The strength of the relationship between the students' performance (represented by grade point average, GPA) in laboratory data, pharmacology and pharmacotherapeutics was determined using Spearman's Rho Correlation. Statistical analysis of students' evaluation identified a positive feedback on the integrated module, which significantly contributed to their enhanced performance in the subsequent pharmacotherapeutics course. Spearman's Rho coefficient analysis revealed a moderate positive and statistically significant correlation between laboratory data and pharmacotherapeutics GPAs (rs(86)=.38, pp←.05). The integrated module was well-appreciated as an effective way of asthma and COPD pharmacotherapy learning by third year pharmacy students. Nevertheless, findings of the present study identified the insufficient allotted time for pharmacology I as a shortcoming of the multidisciplinary integrated module, underscoring an urgent need of fine-tuning of the curriculum.The integrated module was well-appreciated as an effective way of asthma and COPD pharmacotherapy learning by third year pharmacy students.The introduction of laboratory data as an integrative discipline greatly helped the students apply the integrated knowledge in the pharmacotherapeutics course.

Author(s) Yaacoub S., Koyess V., Lahoud N., **Rahme D.,** Francis N., Saleh N., Maison P.

ARTICLE TITLE	**Antibiotic Prescribing for Acute Uncomplicated Cystitis in Lebanese Community Pharmacies Using a Simulated Patient**
JOURNAL	**Pharmacy Practice**
YEAR	2020
PUBLICATION INFO	4(17): 1-8
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Background

Urinary tract infections are considered as one of the most frequent bacterial infections in the community and hospital settings. In this era of increasing antimicrobial resistance, antimicrobial stewardship has become highly important in the struggle to preserve the effectiveness of available drugs. One the main causes of antibiotic resistance is the inappropriate prescribing of antibiotics; which evidence show that community pharmacists contribute to.

Objective

This study aims to evaluate antibiotic prescribing rate and responses of the contact persons in community pharmacies and to assess the conformity of the prescribed antibiotics with international guidelines. It also aims to evaluate the responses with sociodemographic characteristics.

Methods

A cross-sectional, nationwide study conducted between February and May 2017 using a simulated patient case of acute uncomplicated cystitis. Two hundred fifty pharmacies were included. Descriptive data was reported for the medications prescribed, conformity, questions asked and counseling. Bivariate analysis using the Pearson chi-squared, Fisher's exact and Student's t-tests were used to identify possible factors affecting the prescribing rates and responses in community pharmacies.

Results

The prescribing rate of antibiotics was 83.6% (n=209) with ciprofloxacin being the most prescribed (50.2%, n=105). The global conformity to international guidelines was 3.8% (n=8) with the highest conformity rate for the antibiotic choice (91.4%, n=191). Counseling about what to do in case symptoms persist was 12.8% (n=32) and that of non-pharmacological management was 53.6% (n=134). Male participants (88.1%) had a higher prescribing rate than female participants (77.6%) ($p<0.05$). The number of questions asked was higher in pharmacists and in female participants ($p<0.05$). Other results showed non-significant differences in diagnosis, antibiotic prescribing, conformity rates, referral rates and counseling points between the pharmacists and assistants.

ABSTRACT

Conclusions

The high antibiotic prescribing rate in Lebanese community pharmacies is alarming and calls for action. This should be tackled by legislative bodies, which should enforce laws that restrict such practices.

Author(s) Rajha H., El Khoury G., **El Darra N., Raafat K.,** Debs E., Maroun R., Louka N.

ARTICLE TITLE	**Biological Activities of Saussurea lappa Antioxidants Recovered by Solid–liquid, Ultrasound and Ired-Irrad®** ***(Joint Publication with the Faculty of Health Sciences)***
JOURNAL	**Current Bioactive Compounds**
YEAR	2020
PUBLICATION INFO	DOI: 10.2174/1573407216666200227094059
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Background

Saussurea lappa is a traditionally well-known plant appreciated for its biological activities and medicinal uses.

Objective

In the present study, the recovery of antioxidants from Saussurea lappa was optimized using Response Surface Methodology (RSM). The efficiency of a newly-patented infrared (IR) technology, Ired-Irrad®, was compared to that of the emerging ultrasound method (US) and the conventional solid liquid water bath (WB) extraction.

Methods

The effects of time (t) and temperature (T), mostly known to affect the extraction process, were tested on maximizing the total phenolic compounds concentration (TPC) and the radical scavenging activity (AA). Response surface methodology was used for the optimization process.

ABSTRACT

Results

A multiple response optimization of both time (t) and temperature (T) was conducted, showing the best extraction conditions to be for WB: t= 43.86 min, T=33.79°C, for US: t= 65.47 min, T= 57.97°C and for IR: t= 42.5 min, T=34.19°C. The quantity of the optimally extracted polyphenols by WB, US and IR; as well as many of their bioactivities were compared. IR extraction gave the highest yield of TPC (15.3 mg GAE/g DM) followed by US (14.8 mg GAE/g DM) and lastly WB (13.9 mg GAE/g DM). The highest antioxidant and antiradical activities were also obtained by the IR treatment. The optimal IR extract inhibited the growth of Staphylococcus aureus and Escherichia coli up to 65 and 35%, respectively. Moreover, all Saussurea lappa extracts (WB, US and IR) inhibited up to 96% the production of Aflatoxin B1 (AFB1) by Aspergillus flavus.

Conclusion

Our findings on the extraction of antioxidants from Saussurea lappa demonstrated that IR technology is an efficient novel method that can be used to extract the maximum yield of polyphenols, with the highest antioxidant, antiradical and antibacterial activities.

Author(S) **Amin M.,** Abdelmageed A.

ARTICLE TITLE	**Clinicians' Perspectives on Caring for Muslim Patients Considering Fasting During Ramadan**
JOURNAL	**Journal of Religion and Health**
YEAR	2020
PUBLICATION INFO	59(3): 1370-1387
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	This study explores clinicians' perspectives on factors affecting care provided to Muslim patients who decide to fast during Ramadan. Semi-structured interviews were conducted with a purposeful sample of clinicians in Egypt (11) and the USA (10). Framework analysis was conducted through mapping data to constructs within social cognitive theory. Data were mapped into clinician's belief in ability to care for those patients, belief in group's ability to provide care, anticipated consequences of providing such care, knowledge, learning by observing other clinicians, cultural norms and perceived acceptability and prevalence of care provision, environmental barriers and opportunities, and communication approach.

Author(S) **Al Jamal M., Ghazy A.**

ARTICLE TITLE	**Development and Validation of Analytical Spectrophotometric and RP-HPLC Methods for the Simultaneous Estimation of Hydroquinone, Hydrocortisone and Tretinoin Ternary Mixture in Topical Formulation**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2019
PUBLICATION INFO	11(11): 10-16
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Objective** Development and validation of spectrophotometric and RP-HPLC methods for the simultaneous determination of Hydroquinone (HQ), Hydrocortisone (HC) and Tretinoin (TRT) ternary combination in pharmaceutical preparation. **Methods** The proposed spectrophotometric method was able to determine TRT directly from its absorption spectrum at 362 nm, however, HQ and HC from their first derivative spectra at 284 nm and 252 nm, respectively, without any separation step. The RP-HPLC method was developed using a C18 Sunfire© waters column with a mobile phase composed of acetonitrile: phosphate buffer (adjusted to pH 6.1 using ortho-phosphoric acid) in the ratio of 30:70 %, v/v, respectively at a flow rate of 0.8 ml/min. Quantification was based on measuring peak areas at 260 nm. **Results** The spectrophotometric method was able to selectively quantify each of HQ, HC and TRT in the ranges of 10-50 µg/ml, 2-10 µg/ml and 0.5-5 µg/ml, respectively. The RP-HPLC method was able to produce well-resolved peaks after 3.0, 8.2 and 20.2 min, in the ranges of 2-10 µg/ml, 0.1-1 µg/ml and 0.05-2 µg/ml, for HQ, HC and TRT, respectively. The obtained A, D1 or peak areas values plotted against the concentration of each of the three components showed linear response in the stated ranges. Both methods were validated in terms of linearity, LOD, LOQ, precision, accuracy and selectivity. **Conclusion** Both developed proposed methods were applied for the determination of the active ingredients in the pharmaceutical formulation and the common excipients did not interfere in the analysis. The RP-HPLC method proved to be more sensitive when compared to the applied spectrophotometric method. However, the applied spectrophotometric methods, considered as green analytical chemistry, is a simple, time-saving method that requires minimal use of a hazardous solvent.

Author(s) **Mehanna M., Alwattar J.,** Habchi R.

ARTICLE TITLE	**Electrohydrodynamic Atomization, a Promising Avenue for Fast-Dissolving Drug Delivery System: Lessons from Tadalafil-Loaded Composite Nanofibers**
JOURNAL	**Journal of Applied Pharmaceutical Science**
YEAR	2020
PUBLICATION INFO	10(1): 33-45
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	The utilization of electrospinning in drug delivery has thrived in recent years, with the ability to incorporate drugs and enhance dissolution, this technique is employed to improve the dissolution of poorly water soluble selective phosphodiesterase-5 inhibitor, tadalafil. The strategy involved direct electrospinning of tadalafil/polyvinylpyrrolidone (PVP) and polyethylene oxide (PEO) solution. The optimization process included a 32 full factorial design based on the influence of polymers concentration as independent variables on the electrospun yield, loading efficiency, nanofibers diameter, number of beads and in vitro release. Optimization studies revealed negative influence of both polymers on the electrospun yield, whilst the loading efficiency and in vitro dissolution rate were reduced by the PEO concentration solely. The higher polymer concentrations were favorable for declination of beads number, and a driving factor for fiber diameter reduction. Further physicochemical characterization of the optimized formulation revealed the presence of drug in amorphous state or molecular dispersion within the polymer matrix. In vitro dissolution studies revealed about 81.5 ±8.34 % release in less than two minutes compared to a negligible dissolution of free drug. From the derived outcomes the electrohydrodynamic spun tadalafil-loaded nano fibers pave the way for dissolution enhancement for insoluble low bioavailability class II drugs.

Author(s) **Mehanna M.**

ARTICLE TITLE	**Electrospun Fibrous Mat of Cellulose Acetate: Influence of Solvent System (Acetic Acid/Acetone) on Fibers Morphology**
JOURNAL	**International Journal of Pharmaceutical Investigation**
YEAR	2020
PUBLICATION INFO	10(1): 82-85
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Objectives** Electrospun Cellulose Acetate (CA) fibers system are of high demand due to its desired properties associated with the final fiber features. This polymer inability to dissolve may hinder its electrospinning processing. The goal of the current study is to explore the fiber forming ability of solvent mixture of varying ratios of acetone and acetic acid and to derive the optimized formulation that facilitate the continuous and uniform CA fiber formation. **Methods** In this study, a new solvent system for electrospinning of cellulose acetate is developed for the preparation of continuous uniform CA fibers. Different concentrations of cellulose acetate are dissolved in solvent system consisting of acetic acid/acetone mixture. The polymer solution prepared was hosted in a mechanical syringe pump, with a stainless-steel blunt end needle fixated to the tip acting as the spraying nozzle. The polymeric cellulose acetate in acetone/acetic acid mixture was examined for its viscosity and electrical conductance. Moreover, the formed cellulose acetate-based fibers were morphologically examined. **Results** The solvent system composition as well as the cellulose acetate concentration affected the final CA fiber morphology, where the 10% cellulose acetate solution in acetone: acetic acid at 9:1 ratio presented uniform fiber morphology with a diameter of 549±45 nm. The solvent system optimized preserved continuous and uniform, beads-free CA fibers. **Conclusion** In the current study, the different solvent systems studied presented different fiber morphologies and diameter sizes thus preserving the importance of the solvent system for the cellulose acetate fine fiber production.

Author(s) Wehbe N., **Nasser S.,** Al-Dhaheri Y., Iratni R., Bitto A., El-Yazbi A., Badran A., Kobeissy F., Baydoun E., Eid A.

ARTICLE TITLE	**EPAC in Vascular Smooth Muscle Cells**
JOURNAL	**International Journal of Molecular Sciences**
YEAR	2020
PUBLICATION INFO	21(14): 1-14
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	Vascular smooth muscle cells (VSMCs) are major components of blood vessels. They regulate physiological functions, such as vascular tone and blood flow. Under pathological conditions, VSMCs undergo a remodeling process known as phenotypic switching. During this process, VSMCs lose their contractility and acquire a synthetic phenotype, where they over-proliferate and migrate from the tunica media to the tunica interna, contributing to the occlusion of blood vessels. Since their discovery as effector proteins of cyclic adenosine 3′,5′-monophosphate (cAMP), exchange proteins activated by cAMP (EPACs) have been shown to play vital roles in a plethora of pathways in different cell systems. While extensive research to identify the role of EPAC in the vasculature has been conducted, much remains to be explored to resolve the reported discordance in EPAC's effects. In this paper, we review the role of EPAC in VSMCs, namely its regulation of the vascular tone and phenotypic switching, with the likely involvement of reactive oxygen species (ROS) in the interplay between EPAC and its targets/effectors.

Author(s) Wehbe Z., **Nasser S.,** El-Yazbi A., Nasreddine S., Eid A.

ARTICLE TITLE	**Estrogen and Bisphenol A in Hypertension**
JOURNAL	**Current Hypertension Reports**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s11906-020-1022-z
THEME / SUBTHEME	Health and Wellbeing/ Therapies

ABSTRACT

Purpose of Review

Cardiovascular disease (CVD) is a non-subsiding disease that remains a leading cause of morbidity and mortality. CVD has been associated with endocrine disruptors, such as bisphenol A (BPA). This review critically summarizes existing findings on BPA and hypertension, with particular attention to genomic, non-genomic, molecular, and cellular mechanisms of action that render BPA as a cardiovascular estrogenic disruptor.

Recent Findings

Owing to its similar estrogenic structure, BPA has been shown to affect various phenotypes that are regulated by the natural hormone, estrogen. Indeed, BPA has been shown to interact with estrogen receptors, located both in the cell membrane and in the cytoplasm/nucleus. Given that estrogen plays an important role in cardiovascular physiology, a contributing role for BPA in CVD would not be unexpected. Existing literature, though limited, established BPA as a source of disruption in cardiovascular health, particularly hypertension. However, effects of BPA are largely dependent on the dose, patient gender, tissue, and developmental stage of the exposed tissue/organ.

Summary

Accumulating evidence argues for an adverse effect of BPA on blood pressure, with this effect being gender, dose, and time specific. Thus, comprehensive studies which take these factors and other parameters, like epigenetic factors, into account are warranted before a thorough understanding is at hand.

Author(s) Fardoun M., Issa K., Maaliki D., **Nasser S.,** Baydoun E., Eid A.

ARTICLE TITLE	**Estrogen Increases Expression of Vascular Alpha 2C Adrenoceptor Through the cAMP/Epac/JNK/AP-1 Pathway and Potentiates Cold-Induced Vasoconstriction**
JOURNAL	**Vascular Pharmacology**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.vph.2020.106690
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	Cutaneous cold-induced vasoconstriction is a normal physiological reaction mediated by alpha 2C-adrenergic receptors (α_{2C}-ARs) expressed in vascular smooth muscle cells (VSMCs). When this reaction is exaggerated, Raynaud's phenomenon (RP) ensues. RP is more prevalent in females compared to age-matched men. We previously established that 17-β estradiol (estrogen) upregulates α_{2C}-ARs in human VSMCs via a cAMP/Epac/Rap pathway. We also showed that cAMP acts through JNK to increase α_{2C}-AR expression. However, whether estrogen employs JNK to regulate α_{2C}-AR is not investigated.

ABSTRACT

Knowing that the α_{2C}-AR promoter harbors an activator protein-1 (AP-1) binding site that can be potentially activated by JNK, we hypothesized that estrogen regulates α_{2C}-AR expression through an Epac/JNK/AP-1 pathway. Our results show that estrogen (10^{-10} M) activated JNK in human VSMCs extracted from cutaneous arterioles. Pretreatment with ESI09 (10 μM; an Epac inhibitor), abolished estrogen-induced JNK activation. In addition, pre-treatment with SP600125 (3 μM; a JNK specific inhibitor) abolished estrogen-induced expression of α_{2C}-AR. Importantly, estrogen-induced activation of α_{2C}-AR promoter was attenuated with SP600125. Moreover, transient transfection of VSMCs with an Epac dominant negative mutant (Epac-DN) abolished estrogen-induced activation of α_{2C}-AR promoter. However, co-transfection of constitutively active JNK mutant overrode the inhibitory effect of Epac-DN on α_{2C}-AR promoter. Moreover, estrogen caused a concentration-dependent increase in the activity of AP-1-driven reporter construct. Mutation of AP-1 site in the α_{2C}-AR promoter abolished its activation by estrogen. This in vitro estrogen-increased α_{2C}-AR expression was mirrored by an increase in the ex vivo functional responsiveness of arterioles. Indeed, estrogen potentiated α_{2C}-AR-mediated cold-induced vasoconstriction, which was abolished by SP600125. Collectively, these results indicate that estrogen upregulates α_{2C}-AR expression via an EPAC-mediated JNK/AP-1- dependent mechanism. These results provide an insight into the mechanism by which exaggerated cold-induced vasoconstriction occurs in estrogen-replete females and identify Epac and JNK as potential targets for the treatment of RP.

Author(S) Desselle S., Chen A., **Amin M.,** Aslani P., Dawoud D., Miller M., Norgaard L.

ARTICLE TITLE	**Generosity, Collegiality, and Scientific Accuracy when Writing and Reviewing Original Research**
JOURNAL	**Research in Social and Administrative Pharmacy**
YEAR	2020
PUBLICATION INFO	16(2): 261-265
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	In spite of concerns about the lack of recognition for its conduct, peer review remains the backbone of scientific evaluation and advancement of scientific knowledge. Given the challenges and evolution in the peer review system, collegiality among authors, reviewers, editors, and even consumers of content is more important than ever. While general guidance has been provided recently in the pharmacy literature, this commentary provides both philosophical underpinnings and specific mechanics for enhancing effectiveness of reviews and improving the quality of writing for authors concurrently, thus examining each major section in an original research contribution. Generosity, courtesy, diligence, thoroughness, and empathy are required of us all to advance the scientific paradigm of our discipline and profession.

Author(S) **Soubra R., Gazy A., Saab M., Al Jamal M.**

ARTICLE TITLE	**Identification and Quantification of Phosphodiesterase-5 Inhibitors as Adulterants in Dietary Supplements Marked for Sexual Enhancement in the Lebanese Market**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2020
PUBLICATION INFO	12(3): 57-62
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Objective** Ultraviolet Visible spectrophotometric was adopted to identify and quantify any adulteration with PDE-5 inhibitors (Sildenafil and Tadalafil) in selected dietary supplements used for sexual enhancement in the Lebanese market **Methods** Nine dietary supplements, randomly collected from Lebanese pharmacies, were screened for Sildenafil and Tadalafil using UV-spectrophotometry for both qualitative and quantitative detection. **Results** Tadalafil was detected in one sample at a dose of 59 mg/dosage unit, with the maximal recommended dose being 20 mg. Sildenafil was detected in five samples at doses ranging from 11.7 to 188.2 mg/dosage unit, with the maximal recommended dose being 100 mg. **Conclusion** This study demonstrates that regular analysis of supposed dietary supplements is needed for more effective quality control and health promotion. The method described for the extraction, identification and quantification of Tadalafil and Sildenafil would be useful for regulatory detection of adulterations.

Author(S) **Raafat K.**

ARTICLE TITLE	**Identification of Phytochemicals from North African Plants for Treating Alzheimer's Diseases and of their Molecular Targets by in Silico Network Pharmacology Approach**
JOURNAL	**Journal of Traditional and Complementary Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.jtcme.2020.08.002
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Background

The global social expenses of Alzheimer's disease (AD) have been increased to US$1 trillion due to high cost, side-effects, and low efficiency of the current AD-therapies. Another reason is the lack of preventive drugs and the low-income situation of Asian and African countries. Accordingly, patients rather prefer traditional herbal remedies. Network-pharmacology has been a well-established method for the visualization and the construction of disorder target protein-drug framework. This could aid in the identification of drugs molecular-mechanisms.

Aim

The aim of this study is to investigate the phytochemical constituents that could target Alzheimer's disease from the North African plants. This could be done by exploring their possible mechanisms of action through molecular network pharmacology-based approach.

Experimental procedure

The Phytochemical-compounds of North-African plants (NAP) have been accessed from open-databank. ADME-screening has been conducted for filtering of the NAP phytochemical-constituents utilizing Qikprop-software. The open STITCH databank has been utilized for the prediction of the phytochemical-constituents target-proteins; UniProt and TDD-DB databanks have been utilized for distinguishing AD-related proteins. Phytochemical constituent-target protein (C-T) and plant-phytochemical constituent-target protein (P-C-T) frameworks have been assembled utilizing Cytoscape to interpret the anti-Alzheimer's disease mechanism of action of the targeted phytochemical constituents.

ABSTRACT

Results

The NAP 6842 phytochemical-constituents (from more than 1000 plants) have been exposed to ADME and CNS modulating filtration, generating 94 phytochemical-constituents which have been subjected to target-prediction investigation. The 94 phytochemical-constituents and the 4 AD-identified targets have been associated through 155 edges which formed the main pathways related to AD. Cuparene, alpha-selinene, beta-sesquiphellandrene, calamenene, 2-4-dimethylheptane, undecane, n-tetradecane, hexadecane, nonadecane, n-eicosane, and heneicosane have had C-T network highest combined-score, whilst the proteins MAO-B, HMG-CoA, BACE1, and GCR have been the most enriched ones by comprising the uppermost combined-scores of C-T. Hypericum perforatum, Piper nigrum, Juniperus communis, Levisticum officinale, Origanum vulgare acquired the uppermost number of P-C-Target interactions.

Conclusion

The phytochemical-targets prediction of NAP utilizing molecular-network pharmacology-based investigation has paved the way for networking multi-target, multi-constituent, and multi-pathway mechanisms. This may introduce potential future targets for the regulation and the management of Alzheimer's disease.

Author(S) **Al Arwadi R., Gazy A., Soubra L., Ajami R.**

ARTICLE TITLE	**In Vitro Equivalence Study of Generic Metformin Hydrochloride Tablets Under Biowaiver Conditions**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-12
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Background

Generic drugs are smarter alternative to expensive brands, it is bio- equivalent formula of any branded drug. FDA approved that generic drugs are the safest to consume, the medicines meet the similar manufacturing standards followed while producing an innovator drug, however, the color, shape, taste and packaging of generics is different from the innovator product. In short, a generic drug should be bioequivalent to its brand counterpart. Metformin was initially marketed under the name of Glucophage®, and now the market is loaded by generics of different origin, and price variability.

Method

Our study was conducted to determine whether metformin generics are bioequivalent to the innovator drug Glucophage®.

ABSTRACT

In-vitro bioequivalence testing under Biowaiver conditions can predict bioequivalence in a safe, fast, and less expensive method. Thus, study was performed on Metformin tablets to assess whether generics are bioequivalent to the innovator and hence be interchangeable.

Results

The quality control results of the thickness, hardness, friability, disintegration, weight uniformity, content uniformity, and assay showed that most metformin tablets complied with the USP 34 NF29 2011 specifications. Dissolution testing under biowaiver conditions showed different results. All tablets of the generics and innovator Glucophage® were able to dissolve by more than 85% within 15 min. Two generics were bioequivalent to the innovator Glucophage® having f2≥ 50 in the three dissolution media. The rest of generics showed variable results.

Conclusion

Generics of metformin varied in their bioequivalency to the innovator Gluocophage®. This variation could be explained by different excipients, and manufacturing conditions. In-vivo bioequivalence testing should be conducted to confirm that the innovator could be safely interchangeable with the brand and this variation won't affect the safety and efficacy of the drug.

Author(S) **Domiati S. Itani M., Itani G.**

ARTICLE TITLE	**Knowledge, Attitude, and Practice of the Lebanese Community Toward COVID-19**
JOURNAL	**Frontiers in Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.3389/fmed.2020.00542
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Objectives

Distinct measures were adopted in Lebanon to prohibit the spreading of SARS-CoV-2. These actions provide positive results only if the population chooses to be compliant.

Aim

Accordingly, this study aimed to reflect the Lebanese population adherence by determining their level of knowledge and practice during this pandemic.

ABSTRACT

Method

A cross-sectional online survey was performed in April 2020. It involved 410 volunteers from the main 5 Lebanese districts. The questionnaire was divided into 3 parts; sociodemographic, knowledge, and practice. A score was calculated out of 18 points to evaluate the knowledge of the respondents. The last 8 questions reflected the participants' precautionary methods during the pandemic. Descriptive statistics and one-way analysis of variance tests were conducted using SPSS version 20.

Results

The overall correct rate of the knowledge questionnaire was 75%. Survey completers of extreme age groups (under 18 and >44), elementary education level, and medical occupation displayed the least level of knowledge compared to other groups ($p < 0.05$). Most of the participants showed proactive practices to protect themselves against COVID-19. They covered their mouths (81.2%), threw the used tissues (93.7%), and washed their hands (66.6%) after sneezing or coughing. Moreover, they wore face masks if they were sick (59%) or in a crowded place (79.3%). Concerning Hydroxychloroquine, 10% claimed that they would take it if they have COVID-19 symptoms.

Conclusion

This survey sheds the light on the fact that one mandatory measure does not fit all the population; there must be a specialized method of prevention for each profession, age group, and area of the country to prevent the outbreak of COVID-19.

Author(S) **Mehanna M.**

ARTICLE TITLE	**Limonene-based Self-nanoemulsifying System: Formulation, Physicochemical Characterization and Stability**
JOURNAL	**International Journal of Pharmaceutical Investigation**
YEAR	2020
PUBLICATION INFO	10(1): 64-69
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development

ABSTRACT

Objectives

The aim of current research was to formulate limonene selfnanoemulsified delivery system (SNEDS) by spontaneous emulsification method.

Methods

The optimization was carried out through the construction of a pseudo-ternary phase diagram. Limonene-based self- nanoemulsifying system was optimized by evaluating its droplet characteristic; namely; size, polydispersity, zeta potential, in addition, its morphology was assessed through the use of transmission electron microscopy. Moreover, the formulation stability under different storage conditions for three months was examined.

Results

The obtained results showed that the optimized limonene-based self-nanoemulsifying system was characterized by a small droplet size, low polydispersity index, high percentage transmittance and optimal zeta potential with uniform spherical droplets. The selected formulation with 50% w/w limonene, 40% w/w Tween 80 and 10% w/w propylene glycol had a droplet size of 113.3±1.18nm with bluish transparent appearance and a zeta potential value of -19.13±0.38 mV. The developed formula was stable against pH change. The stored limonenebased SNEDS showed acceptable stability at 4°C and 0°C compared to 25°C.

Conclusion

The formulated self-nanoemulsifying system showed an improved aqueous dispersibility, patient acceptability and stability of limonene, representing a promising carrier for lipophilic drugs.

Author(s) Wehbe N., **Nasser S.,** Pintus G., Badran A., Eid A., Baydoun E.

ARTICLE TITLE	**MicroRNAs in Cardiac Hypertrophy**
JOURNAL	**International Journal of Molecular Sciences**
YEAR	2019
PUBLICATION INFO	20(19): 1-17
THEME / SUBTHEME	Health and Wellbeing/ Therapies

ABSTRACT

Like other organs, the heart undergoes normal adaptive remodeling, such as cardiac hypertrophy, with age. This remodeling, however, is intensified under stress and pathological conditions. Cardiac remodeling could be beneficial for a short period of time, to maintain a normal cardiac output in times of need; however, chronic cardiac hypertrophy may lead to heart failure and death. MicroRNAs (miRNAs) are known to have a role in the regulation of cardiac hypertrophy. This paper reviews recent advances in the field of miRNAs and cardiac hypertrophy, highlighting the latest findings for targeted genes and involved signaling pathways. By targeting pro-hypertrophic genes and signaling pathways, some of these miRNAs alleviate cardiac hypertrophy, while others enhance it. Therefore, miRNAs represent very promising potential pharmacotherapeutic targets for the management and treatment of cardiac hypertrophy.

Author(s) Wehbe Z., **Hammoud S.,** Soudani N., Zaraket H., El-Yazbi A., Eid A.

ARTICLE TITLE	**Molecular Insights Into SARS COV-2 Interaction With Cardiovascular Disease: Role of RAAS and MAPK Signaling**
JOURNAL	**Frontiers in Pharmacology**
YEAR	2020
PUBLICATION INFO	DOI: 10.3389/fphar.2020.00836
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	In December 2019, reports of viral pneumonia came out of Wuhan city in Hubei province in China. In early 2020, the causative agent was identified as a novel coronavirus (CoV) sharing some sequence similarity with SARS-CoV that caused the severe acute respiratory syndrome outbreak in 2002. The new virus, named SARS-CoV-2, is highly contagious and spread rapidly across the globe causing a pandemic of what became known as coronavirus infectious disease 2019 (COVID-19). Early observations indicated that cardiovascular disease (CVD) patients are at higher risk of progression to severe respiratory manifestations of COVID-19 including acute respiratory distress syndrome. Moreover, further observations demonstrated that SARS-CoV-2 infection can induce de novo cardiac and vascular damage in previously healthy individuals. Here, we offer an overview of the proposed molecular pathways shared by the pathogenesis of CVD and SARS-CoV infections in order to provide a mechanistic framework for the observed interrelation. We examine the crosstalk between the renin-angiotensin-aldosterone system and mitogen activated kinase pathways that potentially links cardiovascular predisposition and/or outcome to SARS-CoV-2 infection. Finally, we summarize the possible effect of currently available drugs with known cardiovascular benefit on these pathways and speculate on their potential utility in mitigating cardiovascular risk and morbidity in COVID-19 patients.

Author(s) **Mehanna M., Alwattar J.**

ARTICLE TITLE	**Nanosphere-Loaded Tadalafil with Enhanced Oral Bioavailability: Innovative Application of Electrohydrodynamic Technique**
JOURNAL	**International Journal of Current Pharmaceutical Research**
YEAR	2019
PUBLICATION INFO	12(1): 28-34
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development

ABSTRACT

Objective

Electrohydrodynamic atomization is a technique that utilizes electrical potential differences for the fabrication of particles ranging from nano to micrometer size, where the ultra-charged droplets of drug-loaded mist deposit as nanospheres after solvent evaporation. The drug-loaded polymeric spherical nanocomposites have a small volume with large surface area, which is a beneficial characteristic for dissolution and bioavailability enhancement of class II drugs.

Methods

This facile approach is employed for the preparation of tadalafil-loaded nanosystems, a class II drug used for erectile dysfunction treatment. Tadalafil-loaded nanoparticles prepared with different polymer concentrations were evaluated through process yield, drug loading, morphology and functional performance. Further, drug solid-state and compatibility of formulation components were assessed.

Results

The results obtained pointed out that nanoparticles were of uniform spherical morphologies with a size range between 1279±141 and 374±13 nm. The system maintained a high loading efficacy of 88%, with most of the loaded drug released within 2 min during the in vitro dissolution studies. The differential scanning calorimetry, X-ray diffraction and Fourier-transform infrared spectroscopy demonstrated the presence of tadalafil in an amorphous form or as a molecular dispersion within the polymer matrix.

Conclusion

Tadalafil-loaded nanoparticles manufactured through this methodology is qualified as a strategy to ameliorate its solubility and bioavailability.

Author(s) **Raafat K.,** El-Zahaby S.

ARTICLE TITLE	**Niosomes of *Active Fumaria officinalis* Phytochemicals: Antidiabetic, Antineuropathic, Anti-inflammatory, and Possible Mechanisms of Action**
JOURNAL	**Chinese Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1186/s13020-020-00321-1
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Background

Fumaria officinalis (F. officinalis, FO) has been used in many inflammatory and painful-ailments. The main aim of this work is to perform an in-depth bio-guided phytochemical investigation of F. officinalis by identifying its main-active ingredients. Optimizing pharmacokinetics via niosomal-preparation will also be done to enhance their in vivo antineuropathic and anti-inflammatory potentials, and to explore their possiblemechanism of actions.

Methods

Bio-guided phytochemical-investigations including fractionation, isolation, chromatographic-standardization, and identification of the most active compound(s) were done. Optimized niosomal formulations of F. officinalis most active compound(s) were prepared and characterized. An in vivo biological-evaluation was done exploring acute, subchronic, and chronic alloxan-induced diabetes and diabetic-neuropathy, and carrageenan-induced acute inflammatory-pain and chronic-inflammatory edema.

Results

In-vivo bio-guided fractionation and chromatographic phytochemical-analysis showed that the alkaloid-rich fraction (ARF) is the most-active fraction. ARF contained two major alkaloids; Stylopine 48.3%, and Sanguinarine 51.6%. In-vitro optimization, analytical, and in vivo biological-investigations showed that the optimized-niosome, Nio-2, was the most optimized niosomal formulation. Nio-2 had particle size 96.56 ± 1.87 nm and worked by improving the pharmacokinetic-properties of ARF developing adequate entrapment-efficiency, rapid-degradation, and acceptable stability in simulated GI conditions. FO, ARF, and Nio 2 were the most potent antidiabetic and anti-inflammatory compounds. The reduction of the pro-inflammatory tumor necrosis factor-alpha (TNF-alpha) and Interleukin 6 (IL-6), and elevation the anti-inflammatory factor IL-10 levels and amelioration of the in vivo oxidative-stress might be the main-mechanism responsible for their antinociceptive and anti-inflammatory activities.

ABSTRACT

Conclusions

Fumaria officinalis most-active fraction was identified as ARF. This study offers an efficient and novel practical oral formulation ameliorating various inflammatory conditions and diabetic complications especially neuropathic-pain.

Author(s) **Bathish M., Gazy A., El Jamal M.**

ARTICLE TITLE	**Novel Selective Spectrophotometric Methods for the Determination of Methimazole in Pure Form and in Pharmaceutical Formulation**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2020
PUBLICATION INFO	12(2): 62-69
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Objective** To develop and validate new, selective spectrophotometric colorimetric analytical methods for the quantification of methimazole in its pure form and in its pharmaceutical preparations. **Methods** Method A is based on the oxidation of methimazole with potassium permanganate in alkaline medium, the manganate ion produced was measured at λmax= 610 nm. Method B is a kinetic determination of methimazole using fixed-time method based on the oxidation of methimazole using known excess of cerium (IV) nitrate in acidic medium and assessing the unreacted Ce (IV) by adding a fixed amount of methyl orange and measuring the absorbance of the resultant solution at λmax=507 nm which is equivalent to the unreacted methyl orange. The reaction conditions and analytical parameters are investigated and optimized. Method validation was carried out according to ICH guidelines in terms of linearity, LOD, LOQ, precision, and accuracy. **Results** Beer's law is obeyed in the range of 1.50–15.00 µg/ml for method A and 0.25–3.00 µg/ml for method B. The developed methods were subjected to the detailed validation procedure. The proposed spectrophotometric methods were applied for the determination of the methimazole in its pure form and in its pharmaceutical formulation. The percentage recoveries were found to be 100.82 % and 99.85 % in the pharmaceutical formulation for the two proposed methods, respectively.

ABSTRACT

Conclusion

Both developed spectrophotometric methods, considered as green analytical chemistry, were found to be novel, highly selective and can be applied for the quality control of methimazole in its pure form and in its pharmaceutical formulation based on the simplicity, applicability of the parameters, accessibility of the reagents employed and reasonably low time of analysis.

Author(s) **Raafat K., Aboul-Ela M., El-Lakany A.**

ARTICLE TITLE	**Phytochemical and Anti-neuropathic Investigations of Crocus sativus via Alleviating Inflammation, Oxidative Stress and Pancreatic Beta-Cells Regeneration**
JOURNAL	**Chinese Herbal Medicines**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.chmed.2019.07.004
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery
ABSTRACT	**Objectives** The aim of this study is to investigate the phytochemical and the long-term anti-neuropathic potentials of Crocus sativus cultivated in the University botanical garden, and explore its most bioactive compounds and their underlying mechanisms of action. **Methods** Phytochemical analysis and bio-guided isolation-procedures including RP-HPLC and ^{1}H and ^{13}C NMR utilizing biological models of diabetes, inflammation, and diabetic-neuropathy were used. Cultivated saffron (S-RCED) and Spanish-saffron stigma (S-SP) alone or in combination with Camellia sinus (CS) were investigated. **Results** The RP-HPLC analyses showed the presence of picrocrocin, crocin I, crocin II, crocin I', crocin II', and safranal (SAF) in both S-SP and S-RCED extracts with higher-concentrations. It had been shown that SAF was the most bioactive-compound in Crocus sativus. Both S-SP and S-RCED possessed significant ($P < 0.05$) anti-diabetic activities in acute (6 h), subchronic (8 d) and chronic (8 weeks) models. S-RCED had been proven with more hypoglycemic potentials when compared to S-SP and SAF. S-SP, S-RCED, and SAF produced significant anti-inflammatory and anti-nociceptive activities against carrageenan-induced inflammatory, hyperalgesic and tactile diabetic-neuropathy models, respectively. S-SP, S-RCED, and SAF elevated serum catalase, reduced glutathione, and insulin serum levels, ameliorated lipid peroxidation and HbA1c levels, and histopathologically regenerated the pancreatic beta-cells. Combinations with CS showed more significant efficacy than the single component.

ABSTRACT

Conclusion

The oxidative stress reduction, insulin secretagogue, and pancreatic beta-cells regeneration potentials might be responsible for the mechanism underlying the anti-diabetic, anti-inflammatory and anti-diabetic neuropathy activities. Thus, the cultivated Crocus sativus might be clinically useful for protecting against many serious-disorders.

Author(S) **Raafat K.**

ARTICLE TITLE	**Phytochemical and Neuroprotective Investigation on *Ferula hermonis***
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	1(2): 1-6
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery
ABSTRACT	Ferula hermonis (F. hermonis, Fh) is one of the important medicinal-plants cultivated in Lebanon. The aim of this study is to phytochemically-investigate F. hermonis and its most active compound(s) and to explore their neuroprotective potentials utilizing an in vivo model of glycine receptor. HPLC-DAD investigation was done to identify F. hermonis phytochemical constituents. Combined chromatographic, bio-guided fractionation, and in vivo model of glycine receptor were utilized to identify its most active constituent(s). HPLC has shown that F. hermonis has shown 11 major peaks identified as: (1) Jaeskenin (2.47%), (2) Acetoxy-Ferutinin (3.71%), (3) Lapiferin (4.95%), (4) Siol anisate (6.16%), (5) Fertidin (7.38%), (6) Ferutinin (24.60%), (7) p-Coumariloxy jaekeanadiol (7.29%), (8) Akiferin (5.98%), (9) Ferulenol (23.7%), (10) Ferutidin (4.68%), and (11) Jaekeanadiol benzoate (6.03%). Ferutinin (Ft) was identified as the most active constituent in F. hermonis. The novelty in this work that F. hermonis has shown neuroprotective potentials utilizing an ICV, for the first time, in the in-vivo model of glycine receptor. Ft has shown more significant ($p < 0.05$) neuroprotective potentials than F. hermonis. It could be concluded that F. hermonis has significant neuroprotective potentials and that Ft might be responsible for this activity.

Author(S) **Amin M.,** Abdelmageed A.

ARTICLE TITLE	**RAMCOM: A Qualitative Study of Clinicians' Viewpoints on a Tool for Communication with Muslim Patients Considering Fasting During Ramadan**
JOURNAL	**PLoS ONE**
YEAR	2020
PUBLICATION INFO	DOI: 10.1371/journal.pone.0228888
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	**Objectives** Fasting during the month of Ramadan is a basic pillar of Islam. While patients may be religiously exempted from fasting, literature indicates that the majority decide to fast. Caring for millions of Muslim patients who decide to fast during Ramadan can be challenging for clinicians around the globe. This study proposes a communication tool, RAMCOM, which aims to assist clinicians in communicating with Muslim patients considering fasting during Ramadan. It addresses the following questions: What are the clinicians' preferences for the tool in terms of Content, Format, Style, Length and language? How do clinicians perceive factors that would impact their intentions to sue the tool? What would facilitate the implementation and dissemination of the proposed tool? **Methods** Semi-structured interviews were conducted with a purposeful sample of clinicians in Egypt (11) and the US (10). Clinicians were purposefully sampled to assure variance in age, gender, time in practice, specialty, and religious background. Directed content analysis was conducted and emerging data were mapped to constructs within the theory of planned behavior. Iterative sampling and analysis continued until saturation was reached. **Results** In total, 21 clinicians were interviewed. The tool was iteratively revised according to clinicians' comments on format, content, language and usability. Factors contributing to using RAMCOM included perception of tool (need for use, perceived burden of use), perceived norm (perceived patient expectations), and ability to use tool (time, frequency of seeing patients, knowledge of Ramadan and Islam). Practice environment factors that impact the use of RAMCOM include education, early reminders, colored laminated copies, communication training, involvement of support staff, and patient education.

ABSTRACT

Conclusion

Clinicians provided valuable perceptions on the implementability and use of RAMCOM, a new communication tool designed to assist in caring for Muslim patients during Ramadan. These perceptions should be considered by different stakeholders to facilitate goal-concordant care for Muslim patients considering fasting.

Author(S) **Boukhary R., Aboul-Ela M., El-Lakany A.**

ARTICLE TITLE	**Review on Chemical Constituents and Biological Activities of Genus Anthemis**
JOURNAL	**Pharmacognosy Journal**
YEAR	2019
PUBLICATION INFO	11(5): 1155-1166
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery
ABSTRACT	Genus Anthemis of Family Asteraceae contains mainly flavonoids, sesquiterpene lactones belonging to germacranolides, eudesmanolides, guaianolides, sterols and essential oils. The Plants of genus Anthemis have been known to have anti-inflammatory, hepatoprotective and antioxidant activities due to their rich contents of important physiological and biological compounds. They are referred to as nature's biological response modifier's and are involved in energy transfer, photosensitization and morphogenesis. Several clinical studies have shown that people who take diets rich in flavonoids and sesquiterpenes have reduced risk of developing cancer and cardiovascular diseases. This article covers most of constituents of plants of genus Anthemis reported from 2002 up to 2018. Furthermore, the biological activities of plants of genus Anthemis will be presented.

Author(S) **Mehanna M.,** Mohyeldin S., Elgindy N.

ARTICLE TITLE	**Rifampicin-Carbohydrate Spray-Dried Nanocomposite: A Futuristic Multiparticulate Platform For Pulmonary Delivery**
JOURNAL	**International Journal of Nanomedicine**
YEAR	2019
PUBLICATION INFO	14: 9089-9112
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Purpose** Rifampicin, a first-line anti-tuberculosis drug, was loaded into a carbohydrate-based spray-dried nanocomposite with the aim to design a dry powder inhalation formulation. This strategy can enable efficient distribution of rifampicin within the lungs, localizing its action, enhancing its bioavailability and reducing its systemic exposure consequently side effects. **Methods** The respirable nanocomposite was developed utilizing spray drying of rifampicin nanosuspension employing a combination of mannitol, maltodextrin and leucine as microparticles matrix formers. Detailed physicochemical characterization and in-vitro inhalation properties of the nanocomposite particles were investigated. Compatibility studies were carried out using differential scanning calorimetry and Infrared spectroscopy techniques. Moreover, pulmonary in-vitro cytotoxicity on alveolar basal epithelial cells was performed and evaluated. **Results** Nanocomposite-based rifampicin-loaded dry inhalable powder containing maltodextrin, mannitol and leucine at a ratio of 2:1:1 was successfully formulated. Rifampicin loading efficiency into the carbohydrate nanocomposite was in the range of 89.3% to 99.2% w/w with a suitable particle size (3.47–6.80 µm) and unimodal size distribution. Inhalation efficiency of the spray-dried nanosuspension was significantly improved after transforming into an inhalable carbohydrate composite. Specifically, mannitol-based powder had higher respirable fraction (49.91%) relative to the corresponding formulation of maltodextrin. Additionally, IC50 value of rifampicin nanocomposite was statistically significantly higher than that of free drug thus providing superior safety profile on lung tissues.

ABSTRACT

Conclusion

The obtained results suggested that spray drying of rifampicin nanosuspension utilizing carbohydrates as matrix formers can enhance drug inhalation performance and reduce cellular toxicity. Thus, representing an effective safer pulmonary delivery of anti-tuberculosis drugs.

Author(S) **Hijazi M.,** Shatila H., **El-Lakany A.,** Al Rifai H., **Aboul-Ela M.,** Naja F.

ARTICLE TITLE	**Role of Community Pharmacists in Weight Management: Results of a National Study in Lebanon**
JOURNAL	**BMC Health Services Research**
YEAR	2020
PUBLICATION INFO	DOI: 10.1186/s12913-020-05258-7
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice
ABSTRACT	**Background** Ideally situated within the community, pharmacists can be involved in a broad range of health promotion campaigns including prevention of obesity. Limited evidence is available regarding their involvement in weight management in Lebanon, a country with escalating prevalence rate of obesity. **Objective** To examine the role of community pharmacists in weight management in Lebanon, specifically studying their beliefs, current practices, services, and knowledge. **Methods** Using a stratified random sampling approach, a cross sectional national survey of community pharmacists was conducted (n=341, response rate 89%). At the pharmacy, and through a face-to-face interview, pharmacists completed a multi-component questionnaire that addressed, in addition to socio-demographic and work characteristics, their beliefs, practices, knowledge in relation to weight management. Frequencies and proportions were used to describe the data. Simple and multiple linear regression analyses were used to examine the determinants of knowledge in the study population.

ABSTRACT

Results

Over 80% of study participants agreed that they have an important role to play in weight management. However, 50% of pharmacists did not agree that weight loss products are well regulated and 81.1% thought that companies marketing weight loss products are making false promises. The majority of pharmacists always/often sold weight loss products (84.7%) and counseled their patients for diet (86.3%) and physical activity (91.7%). Despite taking weight and height measurements, 50% of pharmacists rarely/never calculated BMI. Among the pharmacists who reported side effects of weight loss products (46.5%), the majority (91.3%) did so to the pharmaceutical company. The knowledge of pharmacists was better for the use of weight loss products as opposed to their side effects and interactions. Significant predictors of knowledge were holding a Masters/ PhD degree in Pharmacy, graduating from a university inside Lebanon, obtaining weight management training within the academic degree, and receiving inquiries about weight management in the pharmacy more than once daily.

Conclusions

The results of the study provided important insights on the beliefs, practices and knowledge of community pharmacists in weight management in Lebanon. These findings could be used to inform the development of future evidence-based community pharmacists led weight management service provision nationally and internationally.

Author(S) **Bathish M., Gazy A., El Jamal M.**

ARTICLE TITLE	**RP-HPLC and Chemometric Methods for the Determination of Two Anti-diabetic Mixtures; Metformin Hydrochloride-Canagliflozin and Metformin Hydrochloride-Gliclazide in their Pharmaceutical Formulation**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2020
PUBLICATION INFO	12(2): 83-94
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development
ABSTRACT	**Objective** To develop and validate novel more sensitive analytical methods for the concurrent quantification of metformin-canagliflozin and metformin-gliclazide in their bulk forms and in their pharmaceutical preparations. **Methods** Two methods were developed based on several chemometric assisted spectrophotometric methods and a Reversed-Phase High-Performance Liquid Chromatography (RP-HPLC).

ABSTRACT

The first method applies different spectrophotometric chemometric assisted methods, including ratio difference, derivative ratio and extended ratio subtraction method, while the second method describes a RP-HPLC separation of metformin hydrochloride-canagliflozin and metformin hydrochloride-gliclazide binary mixtures using a C18 column with a mobile phase consisting of acetonitrile: potassium dihydrogen phosphate (adjusted to pH 3) with sodium lauryl sulphate as additive in the ratio of 30:70 (%v/v) in isocratic elution mode at 1 ml/min.

Results

The proposed methods were able to quantify each of the studied drugs in their binary mixtures with high percentage recoveries in both methods. The spectrophotometric methods were able to quantify each of metformin, canagliflozin and gliclazide in the ranges of 2.0-20.0 µg/ml, 1.5-40.0 µg/ml and 2.0-30.0 µg/ml, respectively. The RP-HPLC method produced well-resolved peaks at a retention time of 3.92, 6.92 and 9.10 min in the concentration ranges of 50.0-300.0 µg/ml, 5.0-50.0 µg/ml and 10.0-100.0 µg/ml for metformin, canagliflozin and gliclazide, respectively. The proposed methods were optimized and validated in accordance to the International Conference of Harmonisation (ICH) guidelines in terms of linearity, LOD, LOQ, precision and accuracy.

Conclusion

The developed methods were found to be sensitive and reproducible methods for the simultaneous determination of anti-diabetic binary mixtures; metformin hydrochloride-canagliflozin and metformin hydrochloride-gliclazide. And thus were successfully employed for the quality control analysis of the pharmaceutical formulations of the studied binary mixtures.

Author(S) **El Jamal M., Gazy A.**

ARTICLE TITLE	**Selective H-Point Standard Addition and Double Divisor Ratio Derivative Chemometric Methods for Determination of Ternary Mixture of Cardiovascular Drugs**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(1): 1-13
THEME / SUBTHEME	Health and Wellbeing/ Drug Discovery

ABSTRACT

Green analytical chemistry is concerned with the development of analytical procedures that minimize consumption of hazardous reagents and solvents, and maximize safety for operators and environment. Chemometrics, considered as green analytical chemistry, have become one of the important mathematical and statistical techniques for the resolution of overlapping spectra of multi component mixtures. This work relates simple, accurate and specific analytical chemometric techniques for the simultaneous determination of a ternary mixture of co-administered cardiovascular drugs (Ticagrelor (TICA), Irbesartan (IRB) and Hydrochlorothazide (HCT)). The different applied Chemometric methods are based on H-point standard addition method (HPSAM) and Double divisor ratio spectra Derivative method (DDRD). The applied methods were compared to Derivative spectrophotometry (First derivative (D1) and second derivative (D2)), and shows their superiority in resolving the ternary mixture. TICA, IRB and HCT were determined simultaneously at concentration ratios varying from 0.5: 4: 12.5 µg.mL-1 to 1: 8: 25 or from 10:1:10 to 20:3:8 µg.mL-1, by applying HPSAM or DDRD respectively in a mixed sample. The methods were validated in terms of linearity, LOD, LOQ, precision and accuracy and the results were statistically compared to an established RP-HPLC method.

Author(S) **Nasser S.,** Afify E.

ARTICLE TITLE	**Sex Differences in Pain and Opioid Mediated Antinociception: Modulatory Role of Gonadal Hormones**
JOURNAL	**Life Sciences**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.lfs.2019.116926
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	Sex-related differences in pain and opioids has been the focus of many researches. It is demonstrated that women experience greater clinical pain, lower pain threshold and tolerance, more sensitivity and distress to experimentally induced pain compared to men. Sex differences in response to opioid treatment revealed inconsistent results. However, the etiology of these disparities is not fully elucidated. It is, therefore, conceivable now that this literature merits to be revisited comprehensively. Possible multifaceted factors seem to be associated. These include neuroanatomical, hormonal, neuroimmunological, psychological, social and cultural aspects and comorbidities. This review aims at providing an overview of the substantial literature documenting the sex differences in pain and analgesic response to opioids from animal and human studies within the context of the modulatory effects of the aforementioned factors. A detailed and critical discussion of the cellular and molecular signaling pathways underlying the modulatory actions of gonadal hormones in the sexual dimorphism in pain processing and opioid analgesia is extensively presented. It is indicated that sexual dimorphic activation of certain brain regions contributes to differential pain sensitivity between females and males.

ABSTRACT

Plausible crosstalk between sex hormones and neuroimmunological signaling pertinent to toll-like and purinergic receptors is uncovered as causal cues underlying sexually dimorphic pain and opioid analgesia. Conceivably, a thorough understanding of these factors may aid in sex-related advancement in pain therapeutic management.

Author(S) Bhagani H., **Nasser S.,** Dakroub A., El-Yazbi A., Eid A., Kobeissy F., Pintus G., Eid A.

ARTICLE TITLE	**The Mitochondria: A Target of Polyphenols in the Treatment of Diabetic Cardiomyopathy**
JOURNAL	**International Journal of Molecular Sciences**
YEAR	2020
PUBLICATION INFO	21(14): 1-12
THEME / SUBTHEME	Health and Wellbeing/ Therapies
ABSTRACT	Diabetic cardiomyopathy (DCM) is a constellation of symptoms consisting of ventricular dysfunction and cardiomyocyte disarray in the presence of diabetes. The exact cause of this type of cardiomyopathy is still unknown; however, several processes involving the mitochondria, such as lipid and glucose metabolism, reactive oxygen species (ROS) production, apoptosis, autophagy and mitochondrial biogenesis have been implicated. In addition, polyphenols have been shown to improve the progression of diabetes. In this review, we discuss some of the mechanisms by which polyphenols, particularly resveratrol, play a role in slowing the progression of DCM. The most important intermediates by which polyphenols exert their protective effect include Bcl-2, UCP2, SIRT-1, AMPK and JNK1. Bcl-2 acts to attenuate apoptosis, UCP2 decreases oxidative stress, SIRT-1 increases mitochondrial biogenesis and decreases oxidative stress, AMPK increases autophagy, and JNK1 decreases apoptosis and increases autophagy. Our dissection of these molecular players aims to provide potential therapeutic targets for the treatment of DCM.

Author(S) **Al Jamal M.**

ARTICLE TITLE	**Validated Kinetic Spectrophotometric Determination of Pitavastatin Calcium Using Acidic Permanganate Oxidation**
JOURNAL	**International Journal of Pharmacy and Pharmaceutical Sciences**
YEAR	2020
PUBLICATION INFO	12(3): 28-33
THEME / SUBTHEME	Science and Technology/ Drug Delivery and Development

ABSTRACT

Objective

Development and validation of a sensitive, indirect spectrophotometric kinetic method, based on oxidation-reduction reaction, using potassium permanganate, for the quantitative assay of pitavastatin calcium, a cardiovascular drug used for the treatment of hyperlipidemia.

Methods

The developed spectrophotometric kinetic method is based on the ability of potassium permanganate to oxidize Pitavastatin, where, the drug solution is treated with a fixed concentration of permanganate in acidic medium, and after a specified time, the unreacted permanganate is measured at 525 nm. All variables affecting the color development have been investigated and the conditions were optimized. Different kinetic methods, including initial rate, rate constant, fixed time and fixed concentration, were applied for the determination Pitavastatin.

Results

During the course of the reaction, the absorbance values, at 525 nm, related to $KMnO_4$, decreased linearly with increasing the concentration of the drug. The reaction rate obeyed was found to be pseudo-first-order and the kinetic method used was the fixed-time method. The assay of PITA in the concentration range of 16-80 µg/ml, using the fixed time method was successfully determined with a correlation coefficient value of 0.9999. The applicability of the developed method was also demonstrated by the determination of pitavastatin in its pure form and in its pharmaceutical formulation, where, the effect of excipients has also been studied and found to have no effect.

Conclusion

The developed indirect spectrophotometric kinetic method, using the fixed time method, was used for the determination of Pitavastatin in pharmaceutical tablets. This method was simple, accurate and easy to apply for routine assay and in quality control laboratories.

Author(s) **Rahme D.,** Lahoud N., Sacre H., Akel M., Hallit S., Salameh P.

ARTICLE TITLE	**Work Fatigue Among Lebanese Community Pharmacists: Prevalence and Correlates**
JOURNAL	**Pharmacy Practice**
YEAR	2020
PUBLICATION INFO	18(2): 1-7
THEME / SUBTHEME	Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT

Objective

To assess work fatigue and its associated factors among community pharmacists in Lebanon.

Methods

This cross-sectional study was conducted between March and July 2018. A proportionate sample of 435 community pharmacists was selected from all regions of Lebanon. A standardized self-administered questionnaire, distributed by trained interviewers, was used to assess the studied variables.

Results

The results showed that 50.12% of the pharmacists had emotional work fatigue [95%CI 0.454-0.549], 55.01% had mental work fatigue [95%CI 0.503-0.597], and 54.78% had physical work fatigue [95%CI 0.501-0.595]. Higher mental work fatigue was significantly associated with higher stress (Beta=0.185) and having a master's degree compared to a bachelor's degree (Beta=2.23). Higher emotional work fatigue was significantly associated with higher stress (Beta=0.219), working more than 40 hours compared to ≤ 16 hours (Beta=2.742), and having 6 months to less than 1 year of practice compared to less than 6 months (Beta=-5.238). Higher physical work fatigue was significantly associated with higher stress (Beta=0.169) and having better soft skills (Beta=-0.163).

Conclusions

Work-related fatigue is high among community pharmacists and touches all aspects: physical, mental, and emotional. In our study, community pharmacists' fatigue levels were associated with educational level, years of experience, working hours, stress, depression, and soft skills, while no relation was found with gender, age, position in the pharmacy, and economic status. Interventions are recommended to tackle this public health problem that affects pharmacists, and eventually, patients.

Faculty of Medicine

ACADEMIC JOURNAL ARTICLES

Author(s) **Bahmad H.,** Saleh E., **Abou El Naga A., Azakir B.**

ARTICLE TITLE	**Estimation of Stature from Hand Anthropometric Measurements in the Adult Lebanese Population**
JOURNAL	**Journal of Forensic Identification**
YEAR	2020
PUBLICATION INFO	70(1): 125-144
THEME / SUBTHEME	Health and Wellbeing/ Epidemiology of Communicable and Non-communicable Disease
ABSTRACT	Inherent characteristics, such as height, are essential parameters for the identification of an unknown individual from dismembered remains by forensic anthropometrics. Clinically, in certain situations that impede a person from standing or in diseases that affect vertebral column length, stature estimation using hand anthropometric measures might confer a simpler, easier, more reliable, and less time-consuming alternative method to directly measure the standing height. The objective of this study is to correlate between hand anthropometric measures and measured heights of adult Lebanese individuals and to formulate regression equations to predict the height from these anthropometric measures. We conducted an age-proportionate randomized cross-sectional study using a consecutive sample of 394 participants from central Beirut and its suburbs. Participants were randomly divided into a development sample and a cross-validation sample. Linear regression models were used to formulate the different equations specific for height estimation. Regression equations of predicted heights from right- and left-hand measurements were obtained. Body mass index (BMIs) calculated from the measured heights and BMIs predicted by the regression equations showed no significant difference between the development and the cross-validation samples. Similarly, the measured and predicted heights showed no difference between the two samples. On the other side, a very strong correlation was demonstrated between the measured and predicted heights and BMIs in males and females and in both the development and the cross-validation samples. In conclusion, the formulated regression equations using hand anthropometric measures, age, and sex provide a statistically valid estimation of height and might indeed be useful in the clinical context.

* Names in Bold Indicate BAU Authors

Author(s) **Alwan I., Annous N., Diab T., Barake M., Bizri R., Houri M., Azakir B.**

ARTICLE TITLE	**Factors Affecting Patient Compliance to Physician Advice among Lebanese Internet Users**
JOURNAL	**Journal of Clinical and Diagnostic Research**
YEAR	2020
PUBLICATION INFO	14(6): 1-5
THEME / SUBTHEME	Society, Culture and Human Behavior/ Healthcare Jurisdictions and Policies

ABSTRACT

Introduction

Patient compliance to physicians' advice is pivotal for successful management of disease and in improving health care outcome. Aim: To identify the factors that affect medical compliance to physicians' advice among Lebanese internet users.

Materials and Methods

This descriptive cross-sectional study was conducted by interviewing randomly-selected adults Lebanese internet users who visited a physician at least once in the past three months. A pre-tested, pre-structured questionnaire was applied comprising of six parts: (1) personal information; (2) patient's compliance; (3) perceived information asymmetry; (4) patient-physician concordance; (5) internet health information quality; and (6) physician quality. Descriptive statistics were computed as means/standard deviations (±SD) for continuous variables and as frequencies for categorical variables. The independent sample t-test or ANOVA was used to compare means of scales between groups and Pearson's correlation was used to determine the degree of correlation between continuous variables.

Results

The mean age of the participants was 28.54±12 and the majority had secondary school education (53%), unmarried (64.5%), had a non-medical educational background (64.6%).Results showed that the level of education, patient-physician concordance and communication, and physicians' empathy and competence were significantly associated with patient compliance with medical advice. Primary educated Lebanese patients exhibited the highest compliance score (29.80±3.53). Interestingly, perceived information asymmetry and internet health information quality had no significant impact on patients' compliance.

Conclusion

This study demonstrated that patients' compliance is affected by the level of education, patientphysician concordance, physician's competence and empathy, and communication between the patients and the physicians themselves. Henceforth, it is recommended that physicians should focus on improving their communication and professional skills rather than worrying about patients acquiring health information through the internet.

Author(s) **Ahmadieh H.,** Majzoub G., Abou Radi F., Abou Baraki A.

ARTICLE TITLE	**Inter-professional Physician-Nurse Collaboration in Lebanon**
JOURNAL	**International Journal of Health Governance**
YEAR	2020
PUBLICATION INFO	25(1): 34-35
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Medicine

ABSTRACT

Purpose

A physician–nurse relationship is a complex, professional and shared-decision-making process, which is an important predictor of high-quality patient care. The purpose of this paper is to explore the attitude of the physician–nurse relationship in Southern Lebanon hospitals.

Design/Methodology/Approach

A descriptive institutional cross-sectional study was conducted among different departments of three hospitals in Southern Lebanon using a validated Jefferson Scale of Attitude.

Findings

In sum, 89 physicians and 245 nurses accepted to participate. The nurses' mean age was 32 and the physicians' was 44. The mean score was found to be 46 for all participants, with significantly higher scores noted among nurses compared to physicians (48 vs 43, respectively) and higher scores among females compared to males (48 vs 46, respectively). However, the study scored no significant difference in relation to the degrees attained by nurses and the participants' years of experience. The majority had agreed that the shortage in the nurses' staff affects proper patient care delivery. One fourth of the physicians disagreed that nurses should be considered as a collaborator and colleague. Therefore, more work is required to improve this collaboration.

Research Limitations/Implications

There is a complex relationship normally displayed by physicians and nurses, which cannot be easily interpreted and analyzed. Physicians and nurses may have given socially desirable responses while filling the questionnaire. Even more, this study was conducted in Hospitals in Southern Lebanon, and it would be nice to extend this study to include further hospitals in other regions in Lebanon as well.

ABSTRACT

Practical Implications

Nurses had higher scores toward collaboration, with females scoring higher than males. However, overall scores are considered to be lower compared to other countries. Thus, more efforts should be done on improving this communication among nurses and physicians, through promoting inter-professional undergraduate and postgraduate education training toward more effective communication.

Social implications

Quality of patient care would be improved if more work is done on improving the collaboration between physicians and nurses, and this was shown to be required as per study results.

Originality/Value

There is a gap in literature assessing this important topic which is the collaboration and attitude of nurses and physicians toward their relationship in Lebanon. It is extremely important that efforts should be taken in order to determine the type of nurse–physician relationship in every local context as this relationship affects quality of patients' care.

Author(S) **Malas S., Al Madani A., Abbas R., Al Kadri M., Salloum Z., Abdo R., AbouMerhi A.**

ARTICLE TITLE	**Knowledge and Attitude Regarding Vaginal Ring as a Form of Contraception Among Lebanese Women**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	1(2): 1-7
THEME / SUBTHEME	Health and Wellbeing/ Women and Health
ABSTRACT	This study aimed to evaluate the knowledge of Lebanese women concerning the vaginal ring as a contraceptive means, and to assess their attitude regarding the usage of this form of contraception.502 participants of ages 20-49 were recruited to complete a 10-minute questionnaire to assess their contraceptive knowledge, awareness, and attitude towards the vaginal ring. Knowledge was evaluated among those who had heard about the ring by completing 16 questions. While those of no previous knowledge of the ring were directed towards a brief description about it. All participants completed 7 questions to assess their attitude towards the vaginal ring, and whether or not they might consider using it. Of all the participants 79.8 % recorded having knowledge about different forms of contraceptives, but only 29.1% knew about the ring. Of the latter, 105 had a score less than 50, and were thus considered to have poor knowledge.

ABSTRACT

Whereas, 34 participants had a score of 50 and above, and were considered to have sufficient knowledge. Of the participants, 66.5% would not consider using the ring in the future. Age, level of education and enrollment in the medical field among other factors had a significant impact on the attitude of women towards the vaginal ring. Lack of advertisement, poor counselling from medical professionals, and unavailability of the product had a significant role in the inadequate awareness towards it. The ring did not seem appealing for most of the participants.

Author(S) **Hammoud R., Saleh S., Halawani D., Mezher H., Abou El Naga A., Azakir B.**

ARTICLE TITLE	**Knowledge and Attitudes of Lebanese Women of Childbearing Age Towards Emergency Contraception**
JOURNAL	**European Journal of Contraception and Reproductive Health Care**
YEAR	2020
PUBLICATION INFO	25(1): 28-32
THEME / SUBTHEME	Health and Wellbeing/ Women and Health
ABSTRACT	**Objectives** Unwanted pregnancy is sometimes associated with unsafe abortion, which may lead to maternal death. Pregnancy after unprotected sexual intercourse can be avoided by using emergency contraception (EC). Our study aimed to assess the knowledge and attitudes of reproductive-aged Lebanese women towards EC use. **Methods** A descriptive cross-sectional study was conducted by interviewing randomly selected women aged between 15 and 49 years from the five major Lebanese governates. A pre-tested, pre-structured questionnaire was applied composed of three parts: (1) personal information, (2) knowledge about EC methods and (3) attitude towards EC. **Results** We found that 78% of participants had never heard of EC. Among those who had heard of EC, only 29.3% had good knowledge about it. Knowledge about EC was not, however, associated with participants' sociodemographic characteristics (i.e., age, marital status, educational level and background, occupation and occupational field and area of residence). There was a positive attitude towards EC among 57.3% of participants. Attitudes were statistically associated with level of education, area of residence and whether the respondent had ever heard of EC.

ABSTRACT

Conclusion

Most Lebanese women of childbearing age lack knowledge about EC. There is a need to raise public awareness of EC.

Author(s) **Azakir B., Mobarak H., Al Najjar S., Abou El Naga A., Mashaal N.**

ARTICLE TITLE	**Knowledge and Attitudes of Physicians Toward Research Ethics and Scientific Misconduct in Lebanon**
JOURNAL	**BMC Medical Ethics**
YEAR	2020
PUBLICATION INFO	DOI: 10.1186/s12910-020-00475-5
THEME / SUBTHEME	Society, Culture and Human Behavior/ Healthcare Jurisdictions and Policies

ABSTRACT

Background

Despite the implementation of codes and declarations of medical research ethics, unethical behavior is still reported among researchers. Most of the medical faculties have included topics related to medical research ethics and developed ethical committees; yet, in some cases, unethical behaviors are still observed, and many obstacles are still conferring to applying these guidelines.

Methods

This cross-sectional questionnaire-based study was conducted by interviewing randomly selected 331 Lebanese physicians across Lebanon, to assess their awareness, knowledge and attitudes on practice regarding international and national research ethics guidelines (Lebanese decrees/Laws and CNRS chart of ethics) and scientific misconduct and misbehaviors.

Results

Our results revealed that although majority of participants declared familiar with ethical principles governing research that involves human subjects (79.5%), the overall mean score achieved on their knowledge questions was 46%. Only 27.4% are aware of the presence of the Lebanese National Consultative Committee on Ethics (LNCCE), with only half of them aware of its functions and only 25.7% know about the charter of ethics and guiding principles of scientific research in Lebanon. Significant higher levels of research ethics knowledge were recorded among Ph.D. degree-holding subjects, higher university positions as in professors, research ethics trainings-attendees, and physicians with prior research experience. A significant correlation was observed between knowledge of research ethics principles and positive attitudes toward research ethics principles. Noteworthy, we found that more than one third of participants have reported witnessing scientific misconduct and misbehaviors at some period of their careers.

ABSTRACT

Conclusions

The presence of low mean awareness levels regarding research ethical principles among the study population of physicians and high levels of perception of scientific misconduct raises concern on the importance of implementing proper training for physicians on research ethics.

Author(s) **Salem N., Abou Merhi L., Adra G., Ayoub R., El Akash N., Chaar S., Awad A., Dasuki O.**

ARTICLE TITLE	**Lymphoma: Exploring Awareness in Lebanon**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	1(2): 1-11
THEME / SUBTHEME	Health and Wellbeing/ Epidemiology of Communicable and Non-communicable Disease

ABSTRACT

In 2012, there were 14.1 million cancer cases around the world of which 385,700 estimated new cases were attributed to non-Hodgkin lymphoma (NHL). However, 81,080 new cases of lymphoma were reported in United States (US) among both sexes in 2016. In Lebanon, Lymphoma represents the fifth most frequent cancer, nonetheless, little is known regarding its epidemiological attributes. This study aims to determine the current knowledge of the Lebanese people living in Lebanon about Lymphoma. About 400 participants were approached in public places, universities, entrances of the hospitals or places of work in different regions in Lebanon. A survey including questions about lymph nodes, cancer and lymphoma as well as demographic characteristics was given to all eligible participants. The data was collected and analyzed using SPSS system. A p-value of 0.05 was considered significant. The majority of participants (93.5%) were able to identify breast cancer when asked about types of cancer they knew while less than half of (30.67%) identified lymphoma. Enlargement of lymph nodes was the most common recognized symptom (93.4%) whereas family history of lymphoma was the most frequently identified risk factor (76.42%). Among those who claim to know about lymphoma (30%), true in-depth knowledge about lymphoma was still lacking. The results of this independently conducted survey reveal the lack of awareness of lymphoma among the Lebanese population and highlight the need for campaigns for raising awareness.

Author(s) **Salem N., Deif M., Hatem Y.**

ARTICLE TITLE	**Pulmonary Function Tests in Shisha-Only Smokers and its Correlation with Insomnia in Lebanon**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	1(2): 1-12
THEME / SUBTHEME	Health and Wellbeing/ Epidemiology of Communicable and Non-communicable Disease
ABSTRACT	Shisha smoking is continuing to be a socially acceptable method of tobacco smoking especially in the young population worldwide. The objective of this study was to determine the effect of shisha smoking on pulmonary function tests (PFT) and its correlation with insomnia in Lebanon. 382 shisha-only smokers who are less than 50 years old were recruited. A questionnaire form including inquiry about some demographic data, shisha smoking history, level of physical activity and Pittsburgh sleep quality index (PSQI) was administered to the participants after signing an informed consent. Forced expiratory volume at one second (FEV1), forced vital capacity (FVC), and FEV1/FVC ratio were recorded using a portable spirometer. More than half of the participants showed an abnormal pattern on spirometry. Two thirds of the participants showed a global PSQI score higher than 5 indicating poor sleep quality. Yet, no statistically significant values could be detected in relating longevity of shisha smoking, last time shisha has been smoked or duration of shisha smoking session and the presence of either abnormal patterns of PFT or poor sleep quality. A statistically significant correlation showed only between the level of physical activity and normal PFT. Shisha-only smokers with frequent physical activity had significantly better PFT pattern than those with no physical activity (P<0.011). In conclusion, this study suggests that in population younger than 50 years old, shisha smoking seems not as harmful as widely believed especially in regards to lung functions and insomnia. Physical activity is a positive predictor of normal PFT.

Author(s) Alameddine R., **Taleb R.,** Al-Habbal K., Patel K.

ARTICLE TITLE	**Systems Thinking: Advancing Health Advocacy Training; a Perspective from Junior Family Physicians in the Middle East**
JOURNAL	**Education for Primary Care**
YEAR	2020
PUBLICATION INFO	DOI: 10.1080/14739879.2019.1711201
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Medicine
ABSTRACT	Healthcare systems are becoming increasingly complex. Physicians are expected to be agents of change to meet the growing health needs. In the Middle East, young family doctors are subtly creating a space for advocacy. Recognising the need for compulsory advocacy training in undergraduate medical curricula, allows health workers and students a concrete exposure to social determinants of health by carrying out clinical encounters from the hospital setting to outpatient dispensaries in underprivileged areas. At the community level, they organise mobile clinics and engage in collaborative initiatives to provide primary healthcare services to vulnerable populations. To be successful, advocacy practice and training should move towards systems thinking. Family doctors need to engage and collaborate with other stakeholders within the healthcare system and understand the dynamics of the relationships between them. This empowers their role in national health agendas, especially those related to universal health coverage (UHC). Future physicians and all members of primary care teams need to partner with people outside their discipline; the idea of interdisciplinary and interprofessional collaboration should be integrated into their schooling and all forms of vocational training.

Author(s) **Salem N., Kayssi A., Fayad K., Ghanem A., Hatoum Z., Younes L., El Haddad S., Jbahi B.**

ARTICLE TITLE	**The Correlation Between Specialty Choice and the Quality of Life of Lebanese Physicians**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(1): 1-11

THEME / SUBTHEME	Health and Wellbeing/ Epidemiology of Communicable and Non-communicable Disease
ABSTRACT	Doctors suffer a stressful life and are less satisfied than individuals in other careers. A trend has been observed among medical students in USA showing a change of specialty choice to alleviate their quality of life. Even though most medical students choose their career path based on the field they are most pleased with, it sounds reasonable to get an idea about the quality of life in the specialty they will elect to do. The objective of this study is to evaluate the correlation between specialty choice and the quality of life of Lebanese physicians, to see which specialties have the most favorable quality of life and present their personal level of satisfaction regarding their lifestyle. This study conducted an anonymous modified short form survey (SF-36) questionnaire and some demographic data among Lebanese physicians practicing in Lebanon. Data was collected via emails using Lime Survey then entered and analyzed on SPSS software version 23.1. P value less than 0.05 was considered significant. 470 complete responses were retrieved in this research by email via Lime Survey. Specialty choice had a significant effect only on three scales; physical functioning ($p < .001$), social functioning ($p < .001$) and role limitations due to emotional problems ($p = .25$), with no significant effect on energy and fatigue, emotional well-being, role limitations due to physical health, general health and pain. It was also found that specialty had significant effect on personal satisfaction ($p = .016$). The study concluded that Lebanese physicians who practice laboratory medicine, family medicine, and pathology specialties having the most favorable quality of life based on the scales assessed in the SF-36 and that those practicing pediatrics had lower levels of personal satisfaction compared to those with pathology specialty.

Faculty of Dentistry

ACADEMIC JOURNAL ARTICLES

Author(s) **Aly M., Farghali E., Badih R.**

ARTICLE TITLE	**A Comparison of Color Stability Between Hybrid Ceramic and Glass Ceramic Veneers: An in vitro Study**
JOURNAL	**International Arab Journal of Dentistry**
YEAR	2019
PUBLICATION INFO	10(1): 25-30
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry
ABSTRACT	The aim of the present study is to compare the color stability between hybrid ceramics (Vita Enamic®) and oxide ceramic (Zirconia).Twenty-four square-shaped specimens were cut using a precision saw machine. 0.8mm thick specimens of 10mm diameter were prepared with high-translucent CAD / CAM blocks by slicing them with a water-cooled diamond disk at low speed (150 rpm). The 0M1 color for Enamic® and zirconia specimens was chosen according to the Vita Easy shade guide (Vita Zahnfabrik, Germany). Each group of Zirconia and Enamic® was subdivided into three subgroups, four samples each, immersed in coffee, Pepsi®, and Perio Lacer mouthwash. Then, underwent shade measurement specimens using Vita Easy Shade. Data was collected and statistically analyzed using SPSS version 18.0 (SPSS Inc., Chicago IL, USA). Zirconia showed no difference in color in a specimen immersed in both coffee and Pepsi®. A slight difference in color after immersion in Perio Lacer mouthwash was observed. Regarding Enamic®, there was a change in the color of the specimens when placed in coffee, Pepsi®, and Perio Lacer mouthwash with the highest color change seen in the Perio Lacer mouthwash group. Color changes were mainly found in the Enamic® subgroups. Regarding the Zirconia specimen, changes were found only in the Perio Lacer mouthwash subgroup.

* Names in Bold Indicate BAU Authors

Author(S) **Jaafar N., Ragab H.,** Abedrahman A., **Osman E.**

ARTICLE TITLE	**An In Vivo Investigation of Diagnostic Performance of DIAGNOdent Pen and the Canary System for Assessment and Monitoring Enamel Caries under Fissure Sealants**
JOURNAL	**Journal of International Society of Preventive and Community Dentistry**
YEAR	2020
PUBLICATION INFO	10(3): 246-254
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Aim and Objectives

The aim of this study was to evaluate and compare the diagnostic performance of a quantitative light-induced fluorescence (DIAGNOdent pen [DP]) and a photothermal radiometry (Canary System [CS]) for assessment and monitoring occlusal enamel caries under fissure sealants placed on young permanent teeth.

Materials and Methods

Forty-five patients of mean age 9.96 (1.4) years, having at least two occlusal surface sites of non-cavitated lesions (International Caries Detection and Assessment System [ICDAS], 1–3 at baseline), were assigned for this clinical study as per specific inclusion/exclusion criteria. A total of 90 permanent teeth were examined using a visual examination method (ICDAS), a quantitative light-induced fluorescence (DP), and a photothermal radiometry (CS). Teeth were randomly divided into two groups based on the type of fissure sealants: a resin sealant and a glass-ionomer sealant. Sealants were placed over the study sites, and caries assessment was performed with each caries detection method at 3- and 6-month recall appointments. Numerical data were presented as mean, standard deviation, median, and interquartile range values. Qualitative data were presented as frequencies and percentages. Receiver operating characteristic (ROC) curve was constructed to determine the diagnostic accuracy measures of the two modalities and compared using z-statistic. ROC curve analysis was performed with MedCalc software, Ostend, Belgium, version 11.3 for Windows (MedCalc Software). Changes by time in caries progression were analyzed using McNemar test and Cochran Q test. The significance level was set at P ↖ 0.05. Statistical analysis was performed with the IBM Statistical Package for the Social Sciences (SPSS) software for Windows, version 23.0 (IBM, Armonk, New York).

Results

The CS and DP were able to distinguish between sound and carious tissue beneath fully and partially retained sealants at 6-month follow-up with an accuracy of 46.7% and 33.4%, respectively.

ABSTRACT

Conclusion

The diagnostic performance of the CS and DP are acceptable and can be considered as useful adjunct tools in the clinical evaluation and monitoring the changes in enamel due to lesion progression under fissure sealants. However, in the clinical setting, sensitivity and specificity of these devices may be influenced by the sealant type, thickness, retention, and the differences in the lesion characteristics over time.

Author(S) **Badr S., Yahfoufi S.**

ARTICLE TITLE	**Assessment of the Occlusal Characteristics of the Primary Dentition Among Lebanese Pre-School Children: A Base Line Study Cross-Sectional Study**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-5
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

One of the most important goals in pediatric dentistry is to achieve and maintain a normal occlusion throughout the development of the child. Any deviation from the normal dentofacial growth pattern might lead to esthetic and functional problems in the future. These changes can be noticed during regular dental checkups, and actions can be taken to reduce their effect on the developing dentition. The aim of this study is to assess the occlusal characteristics of primary dentition in children under 6 years of age, attending the BAU output dental clinics and a number of private schools. This cross-sectional study was conducted among 377 Lebanese children with their ages ranging between 3 to 6 years. Each child possessing a complete set of primary teeth, with no severe caries, and without the eruption of any of his permanent teeth, had his occlusal parameters evaluated separately such as: primary molar relationship (flushed terminal plane, mesial step, distal step), canine relationship (class I, class II, class III), overjet, overbite, presence or absence of spaces, crowding, crossbite (anterior and posterior) in each jaw. Then the percentage of each characteristic was calculated. The results showed the following percentages; flushed terminal plane molar relationship (62%), class 1 canine relationship (84%), spaced upper and lower arches (98%), over jet 2mm (49.1%), and overbite 50% (53%).. It was found that the flushed terminal plane molar relationship, Class I canine relationship, spacing in both arches, increased overbite and overbite predominated.

Author(S) **Aboelsaad N., Abiad R.**

ARTICLE TITLE	**Clinical and Radiographic Evaluation of Periodontal Infrabony Defects Treated With Chitosan in Periodontitis Patients**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2020
PUBLICATION INFO	1(2): 1-9
THEME / SUBTHEME	Creative Sustainable Development/ Sustainable Development Dentistry

ABSTRACT

Chitosan is a naturally derived polymer that has been investigated for its uses as a biomaterial for drug delivery and anti-inflammatory. Recently, chitosan applications in bone regeneration has gained distinct interest. The aim of this study was to. evaluate clinically and radiographically the healing of the periodontal infra-bony defects using chitosan gel in periodontitis patients .

Material & Methods

Twenty periodontitis patients with bilateral infrabony defects having stage II and Stage III periodontitis were selected according to the criteria of AAP (2017) classification system of periodontal diseases and conditions. Using split mouth design, 20 defects were treated using chitosan gel; while contra-lateral defects were treated by flap only. A total of 40 periodontal infra-bony defects. were randomly assigned for treatment. The clinical parameters included clinical probing pocket depths and clinical attachment levels. Standardized periapical radiographs were recorded at baseline and 6 months after surgery.

Results

The results were statistically analyzed and clinical and radiographic data. revealed a statistically significant difference between Chitosan and control sites in the parameters investigated with a significant bone fills versus baseline measurements ($P < 0.05$).

Conclusion

Chitosan gel showed promising benefit in the periodontal regeneration context among periodontitis patients.

Author(S) **Al Shammaa M., Abiad R., Abo Elsaad N.**

ARTICLE TITLE	**Clinical Evaluation of Soft Tissue Healing Using Diode Laser Versus Conventional Scalpel After Micro-Endodontic Surgery**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	2(1): 1-8
THEME / SUBTHEME	Health and Wellbeing/ Esthetics and Oral Rehabilitation

ABSTRACT

Micro-endodontic surgery attempt to minimize trauma and enhance esthetics soft tissue surgical results. Wound healing monitoring is performed for early identification of signs and symptoms related to surgical complications. The aim of this study was to compare surgical wound healing of soft tissue flap after using conventional scalpel and diode laser in micro-endodontic surgery

Methodology

This study was carried out as a randomized controlled clinical trial after taking approval of BAU institutional review board. Fourteen healthy patients were indicated for root end surgery; full mucoperiosteal tissue flap incision was done by using Bard-Parker Blades (Group I) and(Group II) Diode Laser with a wavelength of 940 nm set at a power of 1.5 W. Follow-up assessment scale was used at the day of surgery (baseline) and days1, 3, 7 and 30. After surgery to monitor the following clinical parameters including pain, swelling, bleeding and wound healing.

Result

The clinical parameters investigated were statically analyzed and showed that there was no statistically significant difference between the laser and scalpel groups during all follow-up days ($P > 0.05$).

Conclusion

Both Diode Laser and Conventional Scalpel yield same effect on wound healing. Moreover, careful training in oral hygiene, combined with a valid surgical technique is essential to obtain the best result of soft tissue healing after micro-endodontic surgery.

Author(s) **Farghaly E., Rayyan M.,** Aboushelib M.

ARTICLE TITLE	**Color Match of Modified High Translucency Zirconia Frameworks**
JOURNAL	**Egyptian Dental Journal**
YEAR	2020
PUBLICATION INFO	66(2): 1311-1315
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Purpose

Improve color match of full anatomical high translucency zirconia restorations using framework modifications.

Materials and Methods

Full anatomical high translucency zirconia frameworks (Cercon HT) received three modifications in framework design to allow room for layering conventional porcelain material: buccal window, extended buccal window, and occlusal clearance. Conventional porcelain was manually built according to manufacturer instructions. Color match of each framework design was compared to target color (A2, Vita classic shade guide) using a dental spectrophotometer (Vita Easy shade Advance). Delta E equation was used to measure color match of each framework design. Amount of transmitted light passing through each design was used to calculate translucency coefficient.

Results

All framework modifications improved color match (ΔE<3.2) compared to unmodified full anatomical design (ΔE=5.7), however this improvement in color match was only limited to the area of framework modifications. Translucency of modified frameworks improved by addition of veneering porcelain (67%) compared to translucency of full anatomical framework (58%).

Conclusion

Color match and translucency of full anatomical high translucency zirconia restorations improved using framework modifications.

Author(s) **Rayyan M.,** Aboushelib M., Bdeir M.

ARTICLE TITLE	**Effect Of 5 Different CAD CAM Core Designs On Fracture Resistance And Color Of Zirconia Bilayered Crowns: An In-Vitro Study**
JOURNAL	**Egyptian Dental Journal**
YEAR	2020
PUBLICATION INFO	65(2): 1825-1831
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Objectives

To study influence of different designs of zirconia substructures on color and fracture resistance in bilayered zirconia CAD CAM restorations.

Materials and Methods

Fifty identical PMMA dies were 3D printed using stereolithography, to mimic a prepared maxillary first molar with chamfer finish line of 1 mm, axial reduction of 1.5 mm and occlusal preparation of 2 mm. CAD CAM (Wieland dental) was used to digitally scan the fifty dies in order to fabricate 50 zirconia copings. They were assigned to 5 groups according to coping design (n=10): Gp FV (control): full-veneer coping covering to finish line, Gp CS: 1mm cervical-shoulder, GP BW: monolithic zirconia with window cut-back on the buccal surface, GP 3W: monolithic zirconia with window cut-back on buccal, lingual and mesial surfaces and Gp MM: circular projections of 1 mm on palatal cusps and mid-palatal surface. All copings were then veneered, air-abraded using 50µm- Al2O3, primed and cemented to their matching dies using resin cement (Rely X U200, 3M-ESPE). Specimens were tagged and thermo-cycled for 10000 cycles. Spectrophotometer (Easy Shade V, VITA Zahnfabrik) was used to digitally analyze the color for all groups. Delta E was calculated in-comparison to the control group. Compressive load was applied to all specimens in the central fossa, parallel to long axis of each die at a crosshead speed of 0.5 mm/min till failure. Level of significance between groups was calculated using One Way ANOVA (P<0.05).

Results

Regarding the fracture resistance, a significant difference among groups was revealed by ANOVA(P=0.000). Gp MM recorded the highest mean fracture resistance (2102.3) whereas Gp 3W recorded the least (1363.2). Delta E showed no significant difference in color among all tested groups (P=.219).

Conclusions

Fracture resistance is significantly affected by the core design. MM design increased the mean fracture of Bilayered zirconia without affecting negatively its color, therefore it can be considered as a replacement of the traditional coping design.

Author(s) **Rayyan M.,** Hussein A., Naguib H., **Makarem H.**

ARTICLE TITLE	**Evaluation of an Experimental Screw-Retained Retrievable Crown Versus Conventional Crown Design**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-11
THEME / SUBTHEME	Science and Technology/ Laser Application in Dentistry

ABSTRACT

Statement of Problem

Removing cemented crowns is usually a complicated procedure that may lead to irreversible damage to the tooth/crown and mostly necessitate remake of crown with added effort for both patient and clinician.

Purpose

This in-vitro study evaluated an experimental two-component, screw-retained retrievable crown design in comparison to the conventional design.

Materials and methods

A total of 120 extracted maxillary 2nd premolars received root canal treatment and were divided into two groups (n=60 each) according to the crown design they will receive. Gp CC received a threaded modified post, a composite core and a metal coping, while Gp RC received a two-component retrievable crown design. Fracture resistance was assessed by a 90 degrees vertical load to the center of the occlusal surface, using universal testing machine, under a constant crosshead speed of 0.5 mm/min until failure. Microleakage was assessed by placing specimens in methylene blue dye for 12 hours, sectioning the teeth longitudinally, and then examining the sectioned samples under stereomicroscope. Retrievability testing was conducted by 5 prosthodontists who attempted to uncover and unscrew the posts. Data were statistically evaluated using computer software (SPSS version 17; SPSS Inc.).

Results

No significant difference between the 2 designs tested regarding microleakage tests (P=.34) whereas the experimental design, was significantly more resistant to fracture and more retrievable than the conventional one (P>.5).

Conclusions

The proposed retrievable crown design showed promising results and may be considered as an option to substitute the conventional design. Further studies are needed to confirm that.

Author(s) **Taouk B., Abiad R., Abo Elsaad N.**

ARTICLE TITLE	**Evaluation of Extruded Debris Amount During Instrumentation Using Reciprocation Vs. Full Rotation Techniques: in vitro Study**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	2(1): 1-6
THEME / SUBTHEME	Health and Wellbeing/ Oral Health Related Quality of Life

ABSTRACT

Apical extrusion of infected debris into the periradicular tissues during endodontic instrumentation may lead to postoperative pain and flare-up. Debris usually contain dentine chips, necrotic pulp tissue, microorganisms and irrigant. The existing studies are inconclusive about which engine-driven system pushes less debris in the apical direction. The aim of the present study was to evaluate the amount of apically extruded debris associated with full rotation single-file nickel–titanium instrumentation systems compared to another system used in reciprocation motion.

Methodology

After approval of BAU institutional review board, twenty extracted human mandibular premolar teeth were randomly assigned to two groups (n=10 per group), the root canals were instrumented according to the manufacturers' instructions using the reciprocating single-file system Reciproc Blue (VDW), and the single-file rotary system OneCurve (MicroMega). The apically extruded debris were collected and dried in pre-weighed Eppendorf tubes. The amount of debris was assessed with a micro balance and statistically analyzed using Mann-Whitney U Test. The results showed that both systems produced debris with no statistically significant difference between them.

Conclusions

Under the condition of this study, both systems caused apical debris extrusion. Reciprocal instrumentation was associated with more debris extrusion compared to rotary instrumentation, however without statistically significant difference.

Author(s) **Hadrous R., Bouserhal J., Osman E.**

ARTICLE TITLE	**Evaluation of Shear Bond Strength of Orthodontic Molar Tubes Bonded Using Hydrophilic Primers: An in vitro Study**
JOURNAL	**International Orthodontics**
YEAR	2019
PUBLICATION INFO	17(3): 461-468
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Objective

To evaluate and compare the shear bond strength (SBS) of orthodontic molar tubes bonded using two hydrophilic primers along with a moisture tolerant adhesive system to dry and saliva-contaminated enamel surfaces; and to assess the mode of their bond failure.

Materials and Methods

A total of 60 extracted human mandibular molars were randomly divided into three major groups according to the primer used, each consisting of 20 molars: XT group acts as a control and bonded with the conventional hydrophobic Transbond XT primer, OS group bonded with the hydrophilic Ortho Solo primer, AP group bonded with the hydrophilic Assure Plus all surface bonding resin. Each major group was further divided into two subgroups, of 10 molars each, according to presence or absence of saliva. All the specimens were thermocycled 500 cycles between 5° and 55°C. Shear forces were applied to the specimens with a universal testing machine at a crosshead speed of 1mm/min and SBS was measured in megapascals (MPa). The mode of failure was determined using the adhesive remnant index (ARI). Data were analysed using two-way analysis of variance (ANOVA) followed by univariate analysis and Bonferroni post hoc tests.

ABSTRACT

Results

The three tested primers did not show a significant difference in the mean SBS in dry conditions (P=0.137); the mean SBS of OS and AP primers were 15.60±5.879MPa and 12.51±2.583MPa respectively which were comparable to that of the hydrophobic XT primer (12.76±2.952MPa). In saliva-contaminated conditions, the mean SBS values were 10.41±4.457MPa and 9.22±3.422MPa for OS and AP primers respectively, which were significantly higher than that of XT primer (4.82±2.050MPa) (P=0.004). When comparing the mean SBS for each group according to the bonding condition, it was significantly higher in dry bonding compared to saliva-contaminated bonding for the three primers; XT (P<0.001), OS (P=0.003) and AP (P=0.011). In the dry field, most of the bond failures of the three primers were adhesive (score 3), whereas in the saliva-contaminated field, most of the failures were cohesive (score 1).

Conclusion

Dry bonding yielded the highest SBS for the three primers. Saliva contamination significantly decreased the bond strength of both hydrophilic primers; however, the values were above the clinically acceptable limit. The hydrophilic primers tested in the present study can be successfully used for bonding orthodontic molar tubes under dry and saliva-contaminated enamel surface conditions.

Author(s) **Ayash G. , Osman E., Segaan L., Rayyan M., Joukhadar C.**

ARTICLE TITLE	**Influence of Resin Cement Shade on the Color and Translucency of Zirconia Crowns**
JOURNAL	**Journal of Clinical and Experimental Dentistry**
YEAR	2020
PUBLICATION INFO	12(3): 257-263
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Background

Zirconia crowns are highly attractive for clinicians, although have poor translucency when used as single restorations, in addition to unknown effect of resin cement shade on final cemented crown shade. This study aimed to assess effect of resin cement opacity on color replication potential of different zirconia frameworks with target tooth color, in addition to different zirconia crowns translucency evaluation.

Material and Methods

Twenty-four zirconia crown restorations were fabricated to restore single central maxillary incisor for 8 patients, divided into 3 groups according to color and type of zirconia used (white Zr core, colored Zr core and monolithic HT Zrcowns). Each group was further subdivided into 2 subgroups according to resin cement shade. Using Easyshade spectrophotometer, Delta E color difference was calculated between each crown parameters using 2 different resin luting cement shades and adjacent target tooth. Translucency parameters (TP) were tested for finished crowns. ΔEs obtained were assessed based on ΔEof 1.6 which represented color difference that could not be detected by human eye and considered clinically acceptable.

Results

No statistically significant values were found between subgroups related to different resin cement shade. Translucency parameters showed statistically significant different values. Monolithic crowns showed highest translucency parameters followed by Zr crowns on white cores then Zr crowns on colored cores.

Conclusions

Resin cement shade didn't affect final color perception. Monolithic high translucency crowns usage gained advantages of high translucency and delamination prevention. Zirconia crowns could be cemented by opaque or transparent cement without affecting final color.

Author(s) **Jbara L.,** Ghoneim M., **Ragab H.**

ARTICLE TITLE	**Influence of the Thickness of Enamel Layer on Overall Color of Composite Restoration Using Different Polychromatic Composite Resins**
JOURNAL	**Egyptian Dental Journal**
YEAR	2019
PUBLICATION INFO	65(4): 3769-3775
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

The purpose of this study was to calculate and study the color components (Chroma and Value) and translucency of resin composites at different thicknesses.

Method

Resin composites shade A1 were used in this study; Filtek Z350 XT 3M (FT), Harmonize Kerr (HK), and Empress Direct Ivoclar Vivadent (ED). All samples were fabricated with same dentin thickness of 2mm, while the enamel samples were prepared in two thickness; 0.5mm and 1mm. Transparency parameter evaluation was done by measuring the CIELAB parameters of each sample once against white background and once against black. ΔE was used to evaluate the change in color of composite resin at different thicknesses. One-way ANOVA and Tukey HSD test were used to analyze the descriptive statistics. Pearson correlation coefficient was used to conclude a relation between thickness and chroma; and thickness and value.

Results

There was a significant difference in translucency in all composite groups at enamel thickness 0.5 and 1mm. ΔE showed significant difference when comparing group FT with ED and HK, but no significant difference when comparing groups ED and HK. As for chroma, groups ED and FT showed a decrease in chroma as thickness increased and the results were significant at ($p<0.05$), while groups HK showed increase in chroma but the results were insignificant.

Conclusion

As thickness increases the translucency and chroma of the composite resin decreases.

Author(s) **Jaafar N., Ragab H.,** Abedrahman A., **Osman E.**

ARTICLE TITLE	**Performance of Fissure Sealants on Fully Erupted Permanent Molars with Incipient Carious Lesions: A Glass-Ionomer-Based Versus a Resin-Based Sealant**
JOURNAL	**Journal of Dental Research, Dental Clinics, Dental Prospects**
YEAR	2020
PUBLICATION INFO	14(1): 61-67
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Background

The effectiveness of fissure sealants in caries prevention depends on their long-term retention and ability to stop caries progression. This randomized controlled clinical trial compared the retention rate and cariostatic properties of a contemporary glass-ionomer-based sealant (GIS) versus a resin-based sealant (RS) placed on fully erupted permanent molars in a split-mouth design.

Methods

The sealants were placed on fully erupted permanent teeth (8–12 years of age) in 45 children. The evaluation was conducted after one week and three and six months.

Results

There was a statistically significant difference in the retention rate and caries transition between the two groups over a six-month clinical evaluation period. The resin-based sealant group showed a better retention rate than the GIS group (75.56% and 48.88%, respectively). The resin-based sealant was superior to GIS in preventing caries progression.

Conclusion

Resin-based fissure sealant with fluoride releasing properties might be preferable in preventing caries progression of incipient non-cavitated carious lesions in fully-erupted teeth.

Author(s) **Saad N., Osman E.,** Abdelhamid A., **Shokry M., Farghaly E.**

ARTICLE TITLE	**Radiographic Evaluation of Crystal Bone Level of Immediate Loaded Implant Restored with Two Different CAD-CAM Materials**
JOURNAL	**Egyptian Dental Journal**
YEAR	2020
PUBLICATION INFO	66(3): 1749-1755
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry

ABSTRACT

Purpose

This study was conducted to radiographically evaluate the effect of two different superstructure CAD/CAM fabricated materials, on crestal bone loss around immediately loaded implant

Materials and Methods

A total of twelve healthy patients having mandibular bilateral missing first molars with acceptable bone volume were selected based on specific inclusion and exclusion criteria, each patient received a CAD/CAM monolithic zirconia, in one site, while the other site received a CAD/CAM Enamic superstructure, in 48 hours after implant insertion. Implants and abutments were examined for stability, gingival and periodontal health prior to crown cementation. Radiographic evaluation was done immediately at the time of crown cementation then at 6 and 12 months

Results

Marginal bone loss was measured at two points, the most buccal crestal bone, and the most lingual crestal bone. Radiographic results showed no significant difference regarding mean MBL between Zirconia and Enamic on 6 and 12 months.

Conclusion

Immediate loading of a single mandibular molar implant with the final restoration seem to be a reliable technique when certain parameters are respected. Type of implant superstructure material has no significant influence on the bone supporting the implant within the time period of this study.

Author(S) **Abyad A., Jarrah Z., Hallak A., Ragab H., Osman E.**

ARTICLE TITLE	**Resin Gingival Barrier as a Polymerizable Try-In Paste for Dynamic Try-In of Crowns and Veneers**
JOURNAL	**European Journal of Dentistry**
YEAR	2020
PUBLICATION INFO	14(2): 327-330
THEME / SUBTHEME	Health and Wellbeing/ Esthetics and Oral Rehabilitation
ABSTRACT	Try-in sessions are often performed to check the fit and shape of restorations; however, try-in pastes do not exhibit enough viscosity to keep the restoration in place especially in the case of veneers that keep falling off during try-in. The use of polymerizable soft resins similar to those used as a gingival barrier in bleaching treatment can lock the veneer or crown in place during try-in for dynamic assessment of the restoration, at the same time easy removal of the paste is possible since the resin film is peeled off in one piece leaving no residues for cleanup.

Author(S) **Rayyan M., Alwaely A.**

ARTICLE TITLE	**Simplified Technique for Removal of Prefabricated Threaded Posts**
JOURNAL	**BAU Journal-Creative Sustainable Development**
YEAR	2019
PUBLICATION INFO	1(1): 1-7
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry
ABSTRACT	This paper describes a time-saving procedure for the removal of prefabricated threaded posts. In this technique, a slit is prepared in the head of the post to-be-removed so that it can be engaged by a jewelers' precision stainless steel flat-blade screwdriver which would drive it out when rotated counterclockwise. This simple technique spares the clinician valuable time and effort during removal, requires minimal or no loss of valuable tooth structure compared to other techniques. It is also conservative in the sense that it does not expose dental tissue to thermal insults from use of ultrasound.

Author(S) **Rayyan M., Abdallah J., Segaan L.,** Bonfante E., **Osman E.**

ARTICLE TITLE	**Static and Fatigue Loading of Veneered Implant-Supported Fixed Dental Prostheses**
JOURNAL	**Journal of Prosthodontics**
YEAR	2020
PUBLICATION INFO	29(8): 641-734
THEME / SUBTHEME	Science and Technology/ Towards Digital Dentistry
ABSTRACT	**Purpose** This study aimed to compare the load to failure and the probability of survival of porcelain fused to zirconia (PFZ) three-unit, implant-supported, fixed dental prostheses (FDPs) to those of indirect composites veneered to either zirconia (CVZ) or milled fiber-reinforced composite (FRC) frameworks under static and fatigue loading. **Materials and Methods** One-hundred and twenty posterior three-unit FDP (second premolar pontic) frameworks were fabricated via milling from a single Standard Tessellation Language (STL) file. The FDPs were divided into three groups. Each group (n = 40) was subjected to static (n = 20) and fatigue (n = 20) loading tests, as follows: (1) PFZ: zirconia framework layered with porcelain veneer; (2) CVZ: zirconia framework veneered with indirect composite resin; and (3) FRC: FRC framework veneered with indirect composite resin. After porcelain veneering onto sintered zirconia frameworks, or resin composite veneering onto zirconia or FRC frameworks, FDPs were cemented on their abutments using self-adhesive resin cement. After thermal cycling, half of the FDPs were subjected to an accelerated fatigue test. The other half of the FDPs were subjected to single load-to-failure (SLF) testing at a crosshead speed (1 mm/min). Lifetime analysis was conducted to determine the probability of survival, and fractographic analysis was performed.

ABSTRACT

Results

Significant differences were observed among the studied groups for SLF with the highest characteristic strength values observed for PFZ (2154 N), followed by 1905.47 N for CVZ and 1679.56 N for FRC. The probability of survival for 100,000 cycles at 500 N was the highest for FRC (98%) and CVZ (100%) and was significantly lower for PFZ (88%). Different fracture patterns were observed in the fractography.

Conclusions

In fatigue testing, which simulates masticatory function better than static tests, a higher probability of survival was observed for FRC and CVZ than for PFZ. Framework fractures were not observed only for the FRC group, indicating that chairside repair with the addition of indirect composite could be performed for continued function.

Author(s) Ghoneim M., **Aboelsaad N.**

ARTICLE TITLE	**Treatment of Dentinal Hypersensitivity Using Desensitizing Agents Plus Soft Laser Irradiation. A Randomized Comparative Clinical Trial**
JOURNAL	**Egyptian Dental Journal**
YEAR	2020
PUBLICATION INFO	66(1): 397-403
THEME / SUBTHEME	Health and Wellbeing/ Esthetics and Oral Rehabilitation

ABSTRACT

This study aimed to evaluate the efficacy of diode laser combined with two in-office desensitizing agents 8% Arginine-$CaCO_3$ and 1.23 NaF varnish on reducing dentine hypersensitivity (DH) in periodontitis patients.

Materials and Methods

Forty patients having stage I and Stage II periodontitis were selected according to the criteria of AAP (2017) with complaint of (DH) after routine periodontal therapy . Patients were randomly divided into two groups: group1- received NaF varnish then diode laser application at 1 W (PW) ,(CW) for 30 seconds using 320µ fiber. Group-2, treated with 8%Arginine-$CaCO_3$ plus same laser irradiation. Each tooth received three application Dentine hypersensitivity evaluation was by tactile, air-blast, and thermal stimuli and measured using VAS scores. The patient's response was recorded at baseline, one month and 3 month after the application.

ABSTRACT

Results and Conclusions

The results were statistically analyzed, and it was found that 8% Arginine-$CaCO_3$ plus laser treatment was more effective than 1.23% NaF-varnish plus laser at time intervals. Sensitivity score differences between the groups were statistically significant at one and three months. The 8% Arginine-$CaCO_3$ group exhibited statistically significant reduction in dentine hypersensitivity on three stimuli at baseline to one and three months. It was concluded that 8% Arginine- $CaCO_3$ plus laser irradiation is more effective than 1.23% NaF varnish plus laser irradiation in reduction of patients' pain in periodontitis patients.

Faculty of Health Sciences

Research Report 2019 - 2020

ACADEMIC JOURNAL ARTICLES

Author(s) **Sokhn E.,** Salami A., El Roz A., Salloum L., Bahmad H., Ghssein G.

ARTICLE TITLE	**Antimicrobial Susceptibilities and Laboratory Profiles of Escherichia coli, Klebsiella pneumoniae, and Proteus mirabilis Isolates as Agents of Urinary Tract Infection in Lebanon: Paving the Way for Better Diagnostics**
JOURNAL	**Medical Sciences**
YEAR	2020
PUBLICATION INFO	8(3): 1-11
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

Urinary tract infections (UTIs) are major healthcare problems that are usually treated empirically. However, antimicrobial resistance has been increasing across many settings. This study aims to elucidate the antibiotic resistance profiles of three common uropathogens, Escherichia coli (E. coli), Klebsiella pneumoniae (K. pneumoniae), and Proteus mirabilis (P. mirabilis) and compare between extended spectrum beta-lactamase (ESBL) and non-ESBL strains among Lebanese patients.

Methods

This retrospective study was conducted at multiple tertiary healthcare centers in South Lebanon, between January and September 2017, including 551 patients of all age groups. Demographic, clinical, and laboratory data of patients were collected and analyzed statistically.

Results

The prevalence of UTI in Lebanon was highest in adults between 19 and 64 years (44%). E. coli was the predominant uropathogenic organism (67.1%) followed by K. pneumoniae (10%) and P. mirabilis (3.7%). ESBL represented 32.9% of the UTI agents. The three common uropathogens studied were found to be most susceptible to imipenem (100%) and meropenem (100%). Interestingly, 115 (25.1%) out of the 458 E. coli isolates were resistant to more than eight antibiotics while 107 (23.4%) were susceptible to all antibiotics studied.

Conclusions

Our study underlined the importance of adequate antimicrobial prescription for UTIs in Lebanon to avoid multidrug resistance.

* Names in Bold Indicate BAU Authors

Author(s) **Rifai L., Saleh F.**

ARTICLE TITLE	**A Review on Acrylamide in Food: Occurrence, Toxicity, and Mitigation Strategies**
JOURNAL	**International Journal of Toxicology**
YEAR	2020
PUBLICATION INFO	DOI: 10.1177/1091581820902405
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion
ABSTRACT	Acrylamide (AA) is a food contaminant present in a wide range of frequently consumed foods, which makes human exposure to this toxicant unfortunately unavoidable. However, efforts to reduce the formation of AA in food have resulted in some success. This review aims to summarize the occurrence of AA and the potential mitigation strategies of its formation in foods. Formation of AA in foods is mainly linked to Maillard reaction, which is the first feasible route that can be manipulated to reduce AA formation. Furthermore, manipulating processing conditions such as time and temperature of the heating process, and including certain preheating treatments such as soaking and blanching, can further reduce AA formation. Due to the high exposure to AA, recognition of its toxic effect is necessary, especially in developing countries where awareness about AA health risks is still very low. Therefore, this review also focuses on the different toxic effects of AA exposure, including neurotoxicity, genotoxicity, carcinogenicity, reproductive toxicity, hepatotoxicity, and immunotoxicity.

Author(s) **Tfaily M., Moussa S.**

ARTICLE TITLE	**Assessment of Healthcare Waste Management in Hospitals of South Lebanon**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-12
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT

Healthcare wastes (HCW) are produced in any healthcare setting during diagnosis, medical care, operation or injection process or during research studies. The management of such wastes is becoming a great issue since they pose many health risks and environmental damage. Hence, this study was carried out to assess the level of healthcare waste management in hospitals of South Lebanon. A cross sectional study was conducted in five hospitals located in South Lebanon (A, B, C, D and E). The Individualized Rapid Assessment Tool (I-RAT) developed in 2009 as part of the UNDP GEF Global Project on Healthcare Waste, was the instrument used for data collection. A part of the IRAT-HCWM questionnaire was completed through on site observation and the other part of the questionnaire was filled by the nurses, nurse managers, quality and environmental managers and infection control managers in different wards of the hospitals. In general, the five evaluated hospitals showed a good management of healthcare wastes. However, there are still unsatisfactory practices in these hospitals regarding policies, regulations, procedures, safety issues and awareness. Thus, future interventions are required in order to improve the healthcare waste management practices in hospitals of South Lebanon.

Author(s) **Kreidieh D., Itani L., El Masri D., Tannir H., El Ghoch M.**

ARTICLE TITLE	**Association Between Reduced Daily Steps and Sarcopenic Obesity in Treatment-Seeking Adults With Obesity**
JOURNAL	**Frontiers in Endocrinology**
YEAR	2020
PUBLICATION INFO	DOI: 10.3389/fendo.2020.00022
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Objectives** Understanding the condition that describes the coexistence of obesity and sarcopenia, termed sarcopenic obesity (SO), is becoming a scientific and clinical priority. In this study, we aimed to assess the prevalence of SO in treatment-seeking adults with obesity and investigate any potential association between SO and a sedentary lifestyle, expressed in terms of daily steps. **Methods** In this cross-sectional, prospective observational study, body composition and daily steps measurements were obtained using a segmental body composition analyser (Tanita BC-418) and an Omron HJ-320 pedometer, respectively, in 111 adults of both genders with obesity (body mass index; BMI $\geq$ 30 kg/m^2), referred to the Outpatient Clinic in the Department of Nutrition and Dietetics at Beirut Arab University (BAU) in Lebanon. The participants were then categorized according to the presence of absence of SO, defined as an appendicular lean mass divided by body weight (ALM/weight) × 100%) of less than 23.40 and 29.60 in females and males, respectively.

ABSTRACT

Results

Fifty-five of the 111 participants with obesity, with a mean age of 39.62 ± 16.55 years and a mean BMI of 38.05 ± 5.33 kg/m2 met the criteria for SO and displayed a significantly higher prevalence of inactivity (<5,000 daily steps), i.e., nearly double (54.5% vs. 32.1%; p = 0.017) and they had a lower mean number of daily steps than those in the group without SO (5,279 ± 2,641 vs. 6,732 ± 2,989; p = 0.008). Linear regression analysis showed that SO is associated with a lower number of daily steps by 1,421 (β = -1421.4; -2508.9, -333.9; p = 0.011) after adjusting for age, gender employment and the presence of cardiometabolic disease.

Conclusion

Sarcopenic obesity affects nearly 50% of treatment-seeking adults with obesity. Moreover, it seems to be associated with a lower number of daily steps and a sedentary lifestyle. Future studies are needed to clarify whether this may influence clinical outcomes. If this is shown to be the case, weight management programmes should incorporate additional physical activity strategies in this population.

Author(s) **Khadra D., Itani L., Chebaro Y., Obeid M., Jaber M., Ghanem R.,** Ayton A., **Kreidieh D., Masri D.** Kimura A.**, Tannir H., El Ghoch M.**

ARTICLE TITLE	**Association Between Sarcopenic Obesity and Metabolic Syndrome in Adults: A Systematic Review and Meta-Analysis**
JOURNAL	**Current Cardiology Reviews**
YEAR	2020
PUBLICATION INFO	16(2): 153-162
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

In the last two decades, a new phenotype termed Sarcopenic Obesity (SO), in which sarcopenia and obesity coexist, has emerged.

Objective

The aim of this systematic review and meta-analysis was first to assess the prevalence of Metabolic syndrome (Mets) among individuals with and without SO, and second, to determine if SO may increase the relative risk of Mets.

ABSTRACT

Methods

This study was conducted in adherence to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines and the data were collated by means of metaanalysis and narrative synthesis.

Results

Twelve studies including a total of 11,308 adults with overweight or obesity of both genders met the inclusion criteria and were reviewed, revealing two main findings. First, a similar overall prevalence of Mets in individuals with SO (61.49%; 95% CI: 52.19-70.40) when compared to those without SO (56.74%; 95% CI: 47.32-65.93) was identified. Second, the presence of SO appears not to increase the risk of Mets with respect to those without SO (RR = 1.08, 95% CI: 0.99- 1.17, p = 0.07).

Conclusion

No higher prevalence of Mets among individuals with SO when compared to those with obesity only, nor a significant association between SO and a higher risk of Mets was found.

Author(s) **Saleh F.,** Harb A., Soudani N., Zaraket H.

ARTICLE TITLE	**A Three-dimensional A549 Cell Culture Model to Study Respiratory Syncytial Virus Infections**
JOURNAL	**Journal of Infection and Public Health**
YEAR	2020
PUBLICATION INFO	13(8): 1142-1147
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

Respiratory syncytial virus (RSV) is a primary cause of morbidity and mortality worldwide, affecting infants, young children, and immune-compromised patients; however, currently no vaccine is available for prevention of RSV infections. The overwhelming majority of our knowledge of how RSV causes infection is based upon studies that have been carried out using traditional 2D methods, with cells cultured on flat plastic dishes. Although these simplified culture systems are essential to gain an insight into the fundamentals of host-pathogen interactions, cells in 2D are not exposed to the same conditions as cells in 3D tissues in the body and are therefore a poor representation of thein vivo microenvironment. In this study, we aim to develop the first 3D culture model for RSV infection using A549 cells to test its utility for RSV pathogenesis.

ABSTRACT

Methods

To generate spheroids, A549 cells were cultured using ultra-low attachment plates to generate 25 × 103 cell spheroids. The viability of the spheroids was assessed by trypan blue exclusion assay and flow cytometry showing prominent live cells throughout the spheroids confirming high viability over seven days of incubation.

Results

Immunostaining of A549 spheroids inoculated with RSV, showed time-dependent dissemination of the viral antigen RSV-F within the spheroid, resulting in syncytia formation and a 3-fold increase in mucin secretion compared to the uninfected cells. Additionally, RSV successfully replicated in the spheroids producing infectious virus as early as day one post-inoculation and was sustained for up to 7 days post-inoculation.

Conclusions

Results show that A549 spheroids are susceptible and permissive for RSV since they exhibit the characteristics of RSV infection including syncytia formation and mucin overexpression, suggesting that A549 spheroids can be used a promising model for studying RSV in vitro.

Author(s) Bekhet A., Abdallah A., Ismail H., Genena D., Osman N., **El Khatib A., Abbas R.**

ARTICLE TITLE	**Benefits of Aerobic Exercise for Breast Cancer Survivors: A Systematic Review of Randomized Controlled Trials**
JOURNAL	**Asian Pacific Journal of Cancer Prevention**
YEAR	2019
PUBLICATION INFO	20(11): 3197-3209
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Background** Physical exercise may be beneficial to breast cancer (BC) survivors. Here, we systematically summarized the effects of aerobic exercise in BC survivors. We conducted a systematic review of randomized controlled trials (RCTs).

ABSTRACT

Methods

We searched PubMed, Web of knowledge, Scopus, Cochrane Central, Virtual Health Library and PEDRO databases for relevant RCTs, comparing aerobic exercise with usual care among BC survivors. Data were extracted and evidence was synthesized narratively.

Results

Twelve studies were included in this systematic review. Studies reported that aerobic exercise can significantly improve the quality of life in BC survivors. Moreover, aerobic exercise alleviated the symptoms of depression and anxiety. However, current evidence from the included studies showed that there was no significant benefit for aerobic exercise in terms of weight loss.

Conclusion

Our study suggests that aerobic exercise is beneficial to BC survivors.

Clinical Relevance

Aerobic exercise should be recommended in the therapeutic and rehabilitative regimens of BC survivors.

Author(s) **Idriss M.,** Hodroj M., **Fakhoury R.,** Rizk S.

ARTICLE TITLE	**Beta-Tocotrienol Exhibits More Cytotoxic Effects than Gamma-Tocotrienol on Breast Cancer Cells by Promoting Apoptosis via a P53-Independent PI3-Kinase Dependent Pathway** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Biomolecules**
YEAR	2020
PUBLICATION INFO	10(4): 577-596
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Studies on tocotrienols have progressively revealed the benefits of these vitamin E isoforms on human health. Beta-tocotrienol (beta-T3) is known to be less available in nature compared to other vitamin E members, which may explain the restricted number of studies on beta-T3. In the present study, we aim to investigate the anti-proliferative effects and the pro-apoptotic mechanisms of beta-T3 on two human breast adenocarcinoma cell lines MDA-MB-231 and MCF7. To assess cell viability, both cell lines were incubated for 24 and 48 h, with different concentrations of beta-T3 and gamma-T3, the latter being a widely studied vitamin E isoform with potent anti-cancerous properties. Cell cycle progression and apoptosis induction upon treatment with various concentrations of the beta-T3 isoform were assessed.

ABSTRACT

The effect of beta-T3 on the expression level of several apoptosis-related proteins p53, cytochrome C, cleaved-PARP-1, Bax, Bcl-2, and caspase-3, in addition to key cell survival proteins p-PI3K and p-GSK-3 α/β was determined using western blot analysis. Beta-tocotrienol exhibited a significantly more potent anti-proliferative effect than gamma-tocotrienol on both cell lines regardless of their hormonal receptor status. Beta-T3 induced a mild G1 arrest on both cell lines, and triggered a mitochondrial stress-mediated apoptotic response in MDA-MB-231 cells. Mechanistically, beta-T30 s anti-neoplastic activity involved the downregulation of phosphorylated PI3K and GSK-3 cell survival proteins. These findings suggest that vitamin E beta-T3 should be considered as a promising anti-cancer agent, more effective than gamma-T3 for treating human breast cancer and deserves to be further studied to investigate its effects in vitro and on other cancer types.

Author(S) Rajha H., El Khoury G., **El Darra N., Raafat K.,** Debs E., Maroun R., Louka N.

ARTICLE TITLE	**Biological Activities of Saussurea lappa Antioxidants Recovered by Solid-Liquid, Ultrasound and Ired-Irrad®** ***(Joint Publication with the Faculty of Pharmacy)***
JOURNAL	**Current Bioactive Compounds**
YEAR	2020
PUBLICATION INFO	DOI: 10.2174/1573407216666200227094059
THEME / SUBTHEME	Science and Technology/ Food Technology and Processing

ABSTRACT

Background

Saussurea lappa is a traditionally well-known plant appreciated for its biological activities and medicinal uses.

Objective

In the present study, the recovery of antioxidants from Saussurea lappa was optimized using Response Surface Methodology (RSM). The efficiency of a newly-patented infrared (IR) technology, Ired-Irrad®, was compared to that of the emerging ultrasound method (US) and the conventional solid liquid water bath (WB) extraction.

Methods

The effects of time (t) and temperature (T), mostly known to affect the extraction process, were tested on maximizing the total phenolic compounds concentration (TPC) and the radical scavenging activity (AA). Response surface methodology was used for the optimization process.

ABSTRACT

Results

A multiple response optimization of both time (t) and temperature (T) was conducted, showing the best extraction conditions to be for WB: t= 43.86 min, T=33.79°C, for US: t= 65.47 min, T= 57.97°C and for IR: t= 42.5 min, T=34.19°C. The quantity of the optimally extracted polyphenols by WB, US and IR; as well as many of their bioactivities were compared. IR extraction gave the highest yield of TPC (15.3 mg GAE/g DM) followed by US (14.8 mg GAE/g DM) and lastly WB (13.9 mg GAE/g DM). The highest antioxidant and antiradical activities were also obtained by the IR treatment. The optimal IR extract inhibited the growth of Staphylococcus aureus and Escherichia coli up to 65 and 35%, respectively. Moreover, all Saussurea lappa extracts (WB, US and IR) inhibited up to 96% the production of Aflatoxin B1 (AFB1) by Aspergillus flavus.

Conclusion

Our findings on the extraction of antioxidants from Saussurea lappa demonstrated that IR technology is an efficient novel method that can be used to extract the maximum yield of polyphenols, with the highest antioxidant, antiradical and antibacterial activities.

Author(S) **Fawaz M., El Khatib A., El Kassas G. El Shamieh S.**

ARTICLE TITLE	**Concept Mapping Versus Traditional Teaching Method on Health Sciences' Students' Score**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-8
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences

ABSTRACT

In the recent years, health care systems have been dynamically changing which demanded modifications in health care education. Current educational models are becoming more and more obsolete in enhancing the professional level of both teachers and students. Concepts maps are effective tools in processing large amounts of information, comprehending new concepts, as well as in generating information and amplifying creativity levels. The aim of this study is to compare the concept mapping versus traditional teaching method on Health Sciences' students' score. A Quasi-experimental design was implemented in the study. The study revealed that there was a significant difference between learning by traditional method and by concept mapping that can be a predictor of better academic achievement. Concept maps prove to be an efficient teaching-learning method in health sciences education.

Author(s) **Fawaz M.,** Samaha A.

ARTICLE TITLE	**COVID-19 Quarantine: Post-traumatic Stress Symptomatology Among Lebanese Citizens**
JOURNAL	**International Journal of Social Psychiatry**
YEAR	2020
PUBLICATION INFO	DOI: 10.1177/0020764020932207
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

In the light of the global spread of the novel Coronavirus known as COVID-19 and in the absence of an approved treatment and vaccination, Lebanon has taken national measures, among which was home quarantine of the general public in an attempt to flatten the epidemic curve and avoid flooding the health care system.

Aim

This study aimed at evaluating the prevalence of post-traumatic stress symptomatology (PTSS) during the times of COVID-19 quarantine among Lebanese citizens.

Method

This quantitative cross-sectional study recruited 950 civilians and is aimed at measuring the prevalence of PTSS among the Lebanese citizens at an interval of 2weeks and 1month of COVID-19 quarantine.

Results

The results have shown that quarantine in Lebanon has started to give rise to Post-traumatic Stress Disorder symptomatology during the second week which was worsened in the fourth week of COVID-19 quarantine.

Conclusion

COVID-19 quarantine has influenced the psychology of Lebanese citizens and might have persistent effects after the end of this phase which is recommended to be explored.

Author(s) Samaha A., **Al Tassi A.,** Yahfoufi N., Gebbawi M., Rached M., **Fawaz M.**

ARTICLE TITLE	**Data on the Relationship Between Caffeine Addiction and Stress Among Lebanese Medical Students in Lebanon**
JOURNAL	**Data in Brief**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.dib.2019.104845
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Stress continues to be a global burden. It may be thought of as necessary to human thriving; however, challenging and unfavorable functioning may take place when many significant stressors are imposed repetitively or concurrently without resolve. Research suggests that medical students perceive higher levels of stress than students in other health-related disciplines [1–3]. Since caffeine is a psychoactive substance that stimulates the central nervous system, medical students use to consume it more than other students to overcome the stress they face due to studying. The paucity of knowledge regarding the trends of caffeine consumption among medical students in developed countries and especially in Lebanon has encouraged us to examine the relationship between caffeine addiction and stress among Lebanese medical students in Lebanon. A non-experimental cross-sectional correlational design was employed to gather data from a sample of 800 medical students enrolled in different studying years in different Lebanese universities. Well-established psychometric instruments were used in primary data collection method, which are the Medical Student Stressor Questionnaire (MSSQ) and the Caffeine Consumption and Dependence Scale. The analyzed data is provided in the tables included in this article.

Author(S) Samaha A., **Fawaz M.,** Eid A., Gebbawi M., Yahfoufi N.

ARTICLE TITLE	**Data on the Relationship Between Internet Addiction and Stress Among Lebanese Medical Students in Lebanon**
JOURNAL	**Data in Brief**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.dib.2019.104198
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Stress and behavioral addiction are becoming major health problems growing in strength and prevalence. They are often associated with a large array of debilitating diseases and conditions including psychosocial impairments. Medical students remain a vulnerable territory for developing stress and addiction mainly relating to Internet use. Data was gathered from medical students around Lebanon on the relationship between stress and internet addiction. The data in this article provides demographic data about medical students in Lebanon, their stress levels, sources of stress as well as the level of internet addiction recorded in relation to their stress levels. The analyzed data is provided in the tables included in this article.

Author(S) Watson I., Kamble P.,Shanks C., Khan Z., **El Darra N.**

ARTICLE TITLE	**Decontamination of Chilli Flakes in a Fluidized Bed Using Combined Technologies: Infrared, UV and Ozone**
JOURNAL	**Innovative Food Science and Emerging Technologies**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.ifset.2019.102248
THEME / SUBTHEME	Science and Technology/ Food Technology and Processing

ABSTRACT

An initial study of the combination of IR, UV and ozone on treating raw and artificially inoculated chilli flakes (CF, Capsicum annum L) was assessed using a specially designed fluidised bed system, in a fused quartz tube, using a distributor plate and filtered air, to keep the CF in an air suspension. The untreated samples, as bought, were contaminated with ~1 × 10^6 cfu/g, they were subsequently autoclaved, and inoculated with Escherichia coli (MG1655). The individual treatments were all effective in reducing the bioburden with log reduction and treatment times ~6 logs (cfu/g) in ≤20 min for ozone (300 mgO3$hr^{->1}$); ~7 logs (cfu/g) in ≤40 min, for UV (4 W); and ~7 logs (cfu/g) in ≤20 min, for IR (100 W); for stationary air with ozone, and an airflow of 108 L$min^{->1}$ with UV and IR treatment. The IR was modulated so that the external tube temperature was 58–60 °C. The treatment order was more effective for the IR and UV followed by ozone, than ozone followed by UV and IR (ozone, 10 min, UV and IR 10 min combined), this was due to the higher intial reduction of the UV and IR (0.80 log (cfu/g)) than with ozone first (0.13 log (cfu/g)). Such decontamination systems could be used efficiently when conveying the spices, just prior to aseptic packaging.

Author(S) **Moussa S., Saleh F., El Shamieh S.,** Assi T., Othman A., Farhat F.

ARTICLE TITLE	**Detection of PIK3R1 (L449S) Mutation in a Patient with Ovarian Cancer: A Case Report**
JOURNAL	**Case Reports in Oncology**
YEAR	2020
PUBLICATION INFO	13(1): 188-192
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Ovarian cancer (OC) is one of the most dangerous gynecological diseases and greatly increases the death risk worldwide. The heterogeneity of the ovarian tumors among patients and the lack of sufficient therapies for these tumors make the selection of the appropriate treatment a hard challenge. Understanding the mechanisms leading to OC becomes an urgent need in order to find out better therapeutic strategies. In this study, we have identified a point mutation (L449S) in the regulatory subunit of PI3K in an OC Lebanese patient. This genomic alteration had not been previously reported in OC and could plausibly enhance the PIK3CA amplification effect in strengthening AKT/mTOR pathway activity and leading to tumorigenesis.

Author(s) Abd El Aziz H., **El Khatib A.,** Hamada H.

ARTICLE TITLE	**Does the Type of Toeing Affect Balance in Children With Diplegic Cerebral Palsy? An Observational Cross-sectional Study**
JOURNAL	**Journal of Chiropractic Medicine**
YEAR	2019
PUBLICATION INFO	18(3): 229-235
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Objective

The purpose of the study was to find out effect of toeing on balance in children with diplegic cerebral palsy.

Methods

An observational study was conducted. Thirty children with spastic diplegic cerebral palsy, aged 5 to 8 years, participated in this study. They were classified into 2 groups: group A was children with out-toeing, and group B was children with in-toeing. Foot progression angle was measured by using dynamic footprint, and balance was evaluated using Biodex Balance System equipment. The outcome of interest was postural control (overall stability, anteroposterior stability, and mediolateral stability).

Results

Statistical analysis revealed a significant difference for the tested variables of interest between the 2 tested groups. Multiple pairwise comparison tests revealed that there was significantly better overall stability, anteroposterior stability, and mediolateral stability ($P < .05$) in group A.

Conclusion

It can be concluded that children with out-toeing have higher balance and stability than children with in-toeing.

Author(s) **Assaf I., Moussa S.**

ARTICLE TITLE	**Effectiveness of a Health Education Intervention About Influenza and Vaccine in Secondary Schools in South Lebanon**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-11
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences

ABSTRACT

Seasonal influenza is an intense respiratory illness caused by influenza viruses that circulate all around the world. In Lebanon, there is a lack of national flu awareness campaigns. Schools' students are truly outstanding and viable sources to spread the awareness and strive for the conduct change in the general population. Hence, this study was carried out to test the effectiveness of a health education intervention in improving the knowledge, attitudes, and practices (KAP) toward influenza and its vaccine among secondary schools' students in South Lebanon. This is a Pre/Post research study conducted in four schools located in South Lebanon. A health educational intervention was presented to the secondary schools' students aged between 14 to 19 years old. They were asked to fill the same self-administrated questionnaire, pre and post the educational intervention. A total of 372 participants completed the questionnaire. The results showed a statistically significant improvement in the KAP of students towards influenza and influenza vaccination ($p < 0.05$) except for the attitudes towards seasonal influenza ($p > 0.05$). Students' KAP had been improved towards seasonal Influenza viruses and the vaccine after getting the educational intervention. A broad mass instructive campaigns should be performed to control the spread of influenza in the country.

Author(s) Ashem H., Hamada H., **Abbas R.**

ARTICLE TITLE	**Effect of Aerobic Exercise on Immunoglobulins and Anemia after Chemotherapy in Breast Cancer Patients**
JOURNAL	**Journal of Bodywork and Movement Therapies**
YEAR	2020
PUBLICATION INFO	24(3): 137-140
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Women who go through short- and long-term breast cancer treatment may experience adverse psychosocial and physiological outcomes related to treatment that negatively affect prognosis, function and consequently quality of life. Exercise and physical activity are considered effective in improving prognosis and may relieve effects associated with cancer therapy. This study was conducted to identify the effect of specific aerobic exercise training on immunoglobulin and anemia after chemotherapy among breast cancer patients. Thirty breast cancer patients volunteered in this study. Participants were randomly and equally assigned to either Group A or B. Group A, undergoing chemotherapy and assigned to do aerobic exercise training, 3 times per week for 5 months; group B received solely chemotherapy and served as control group. The clinical findings of the patients were analyzed before and after the treatment via serum blood analysis. All patients completed the study. Serum immunoglobulin IgA and hemoglobin (Hb) analysis difference before and after the treatment was statistically significant (p = .0001). It was concluded that aerobic exercise has significant effect on immunoglobulin IgA hemoglobin (Hb) and plasma hematocrit levels.

Author(s) Awad E., Ahmed H., Yousef A., **Saab I.**

ARTICLE TITLE	**Effect of Antenatal Exercise on Mode of Delivery in Gestational Diabetic Females: A Single-Blind Randomized Controlled Trial**
JOURNAL	**Physiotherapy Quarterly**
YEAR	2019
PUBLICATION INFO	27(2): 1-5
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Introduction

Gestational diabetes mellitus (GDM) is common in pregnancy. Maternal consequences might include an increased rate of caesarean delivery. This study was conducted to determine the effect of an exercise program on the mode of delivery in gestational diabetic females.

Methods

A prospective, randomized, single-blind, pre-post-test, controlled trial was performed. Overall, 60 pregnant females with GDM were included, at their 20–24 weeks of gestation, aged 25–35 years, with body mass index not exceeding 40 kg/m^2. The participants were randomly assigned into 2 equal groups: group A, undergoing an exercise program with a moderately restricted diet and insulin therapy, and group B (control group), receiving solely the same diet protocol with insulin therapy.

Results

The chi-square test revealed significant differences between the groups in the mode of delivery ($p < 0.05$), with a significant decrease in caesarean deliveries in group A. Group A showed a statistically significant difference in neonates' Apgar scores at the 1st and 5th minute of life ($p < 0.05$) compared with the participants in group B.

Conclusions

It can be concluded that antenatal exercises can be considered effective in decreasing labour complications and shifting the mode of delivery towards normal, complication-free delivery in females with GDM and their offspring.

Author(s) Talhouk O., Al Nuqaidan H., **Tassi A., Fawaz M.**

ARTICLE TITLE	**Effect of Confusion Assessment Tool Application on Critical Care Nurses' Knowledge of Delirium Recognition**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	2(1): 1-9
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

In critically ill patients, delirium is a serious and frequent disorder that is associated with a prolonged intensive care and hospital stay and an increased morbidity and mortality. The lack of education, knowledge of delirium and the lack of a delirium screening instrument makes delirium often overlooked by critical care nurses and physicians. The aim of this study was to examine the effect of Confusion Assessment Method-Intensive Care Unit (CAM-ICU) tool implementation on the recognition of delirium by critical care nurses. A Pre-Posttest research design was implemented; 40 critical care nurses at Clemenceau Medical Center at three critical care units participated in the study. The participants were surveyed regarding recognition of delirium before and after the application of CAM-ICU tool and after a CAM-ICU education program was implemented. Highly significant difference in the test scores of the nurses between pre and post intervention were noted. The training concerning delirium and the application of validated assessment tools CAM-ICU increases the knowledge of critical care nurses and effective in recognizing patients with delirium.

Author(s) Aboelmagd F., Hamada H., **Saab I.**

ARTICLE TITLE	**Effect of Inspiratory Muscle Training on Diaphragm Mobility and Functional Capacity in Elderly: A Randomized Clinical Trial**
JOURNAL	**Fizjoterapia Polska**
YEAR	2019
PUBLICATION INFO	19(2): 28-32
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Aim

Aging resulted in decrease in respiratory muscle strength which limits the exercise performance and quality of life. The purpose of this study was to evaluate the clinical and the functional outcomes of inspiratory muscle training in elderly.

Material and Methods

48 nonsmoker's elderly from both genders aging 60 to 70 years were recruited. They were assigned randomly into two groups of equal number. The study group received training with threshold inspiratory muscle trainer (IMT) at 40% of the PImax measured during the initial evaluation which was readjusted weekly by evaluating the PImax while the control group received training with threshold IMT at the lowest pressure offered by the device, 3 times/week for 10 weeks. Diaphragmatic mobility was measured by ultrasonography, Maximal inspiratory pressure measurement and the functional capacity was measured by 6MWT before and after the end of the training program for both groups.

ABSTRACT

Results

The diaphragmatic mobility, Maximal inspiratory pressure measurement and the distance walked during 6MWT increased significantly within the study group at the end of the study ($p < 0.05$) with non-significant change in the control group ($p > 0.05$). Comparison between both groups at the end of the study revealed significant increase in diaphragmatic mobility and Maximal inspiratory pressure measurement in study group compared with control group ($p <0.05$) with non-significant difference between both groups regarding the distance walked during 6MWT ($p > 0.05$).

Conclusion

Inspiratory muscle trainer should be a part in elderly daily routine as it has a positive effect on the clinical outcome measure and there is a tendency to improve the functional outcome.

Author(s) **Abbas R., El Khatib A., Saab I.**

ARTICLE TITLE	**Effect of Segmental Vibration on Hand and Pinch Grip Strengths in Healthy Subjects**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2020
PUBLICATION INFO	2(2): 1-8
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT

Handgrip and pinch strengths are important markers in many sports as well as in determining health status. Many interventions have been proposed for increasing hand muscle strength. The aim of this study was to investigate the effect of segmental hand vibration on hand and pinch grip strengths. Ninety-two healthy university students were randomly assigned into two equal groups. By the end of the study, Group (A) and (B) consisted of 40 and 37 participants, respectively. The measurements consisted of the hand grip and pinch grip strengths using electronic dynamometer, measured in Kg, before, after three weeks, and after six weeks of training. Group (A) underwent isometric exercise training using hand gripper as follows: 4 seconds maximum grip, release for 2 seconds, repeated for 1 minute for three sets and with 3 minutes rest in between. Group (B) had the same exercise implemented in group (A) with the addition of five minutes of segmental vibration on both upper limb with 30Hz and amplitude of 2mm. The training was done two times per week for six weeks. Results revealed that both groups did demonstrate significant increase in hand and grip strengths after six weeks (p.05). It can be concluded that, segmental upper limb vibration does not have additional effect over isometric muscle training alone on hand grip and pinch grip strengths.

Author(s) Mohamed D., Okeil F., Yousef A., Mustafa M., Hamada H., **Saab I.**

ARTICLE TITLE	**Effect of Ultraviolet on Vitamin D and Quality of Life in Postmenopausal Women: A Randomized Controlled Study**
JOURNAL	**Physiotherapy Quarterly**
YEAR	2019
PUBLICATION INFO	27(3): 6-11
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Introduction

To determine the influence of ultraviolet radiation on vitamin D plasma levels and quality of life in postmenopausal women with vitamin D deficiency.

Methods

In a single-blinded randomized controlled trial design, 30 postmenopausal women were chosen suffering from a progressive, generalized muscle weakness, associated with decrease in physical function and poor quality of life. The subjects were aged 45–65 years and were randomly assigned into group A, treated by ultraviolet radiation in addition to regular aerobic exercises; and group B, receiving solely aerobic exercises. All participants had 3 sessions per week for 3 months. Outcome measures determined before and after the 3 months of intervention were vitamin D level and the results of the short form (SF-36) of a specific quality of life questionnaire.

Results

A significant increase in vitamin D was observed along with an improvement in quality of life in group A compared with group B after the treatment period.

Conclusions

The 12-week program of ultraviolet radiation in addition to regular aerobic exercises yielded more improvement in vitamin D and quality of life than aerobic exercises alone in the management of postmenopausal chronic musculoskeletal disorders.

Author(s) Cheaib D., **Raafat K., El Darra N.**

ARTICLE TITLE	**Evaluation of Phenolic Content, Antiradical and Antibacterial Activities of Orange and Carrot Pomace Extracts** ***(Joint Publication with the Faculty of Pharmacy)***
JOURNAL	**BAU Journal-Health and Well-Being**
YEAR	2019
PUBLICATION INFO	1(2): 1-8
THEME / SUBTHEME	Science and Technology/ Food Technology and Processing

ABSTRACT

Orange and carrot pomace are considered as food wastes, despite their high content in beneficial health compounds. The comparison of phenolic extracts from orange and carrot pomace, showed higher values for Orange pomace, with a polyphenols concentration (130 mg/L), flavonoids (8.67 mg/L) and tannins (2.5 mg/L). A higher antiradical activity was also noted for orange pomace. However, carrot pomace presented a higher anti-bacterial activity. The beneficial activities of these extracts were owed to their high content in phenolic acids. Our study exhibited that orange and carrot pomace might be utilized as natural preservatives for many industrial applications.

Author(s) **El Kojok H., El Darra N., Khalil M.,** Capo A., Pennacchio A., Staiano M., Camarca A. D'Auria S., Varriale A.

ARTICLE TITLE	**Fluorescence Polarization Assay to Detect the Presence of Traces of Ciprofloxacin** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Scientific Reports**
YEAR	2020
PUBLICATION INFO	DOI: 10.1038/s41598-020-61395-3
THEME / SUBTHEME	Science and Technology/ Food Technology and Processing

ABSTRACT

Detection of ciprofloxacin residues in milk by sensitive and rapid methods is of great interest due to its use in the treatment of dairy livestock health. Current analytical approaches to antibiotics detection, are laboratory-based methods and they are time-consuming and require trained personnel.

ABSTRACT

To cope this problem, we propose an assay, based on fluorescence polarization principle, able to detect the presence of ciprofloxacin in diluted milk sample without any pre-treatment. The proposed method is based on the use of ciprofloxacin-protein conjugate labeled with near infrared fluorescence dye, which upon binding to specific antibody causes an increase of the fluorescence polarization emission signal. The developed assay allows for the detection of ciprofloxacin at a concentration of 1ppb, which represents an amount lower than the maximum residual limit (MRL) of ciprofloxacin in milk, as set by the European Union regulation (100 ppb).

Author(S) **Itani L., El Masri D., Kreidieh D., Tannir H., El Ghoch M.**

ARTICLE TITLE	**How Valuable Is Cardiopulmonary Exercise Testing in Patients With Severe Obesity Undergoing Bariatric Surgery?**
JOURNAL	**Internal and Emergency Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s11739-020-02285-4
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Obesity is a growing health problem, with prevalence increasing continually worldwide. Poor cardiorespiratory fitness (CRF) and exercise capacity (EC) are two strong predictors of mortality and also known to be strongly associated with obesity. However, there is a significant lack of knowledge about the changes that occurs in these two outcomes (i.e. CRF and EC) in patients with obesity who undergo bariatric surgery. In this paper we summarized the few available data on the topic; where bariatric surgery seems to improve the "peak work capacity" and "exercise tolerance", but reduce the "aerobic capacity", due to the significant muscle mass loss and impairment of the peripheral oxidative muscle metabolism. We underline the relevance of these findings in terms of clinical implications, where health professionals dealing with patients with obesity who are candidates for bariatric surgeries, should be encouraged to include cardiopulmonary exercise testing routinely in their clinical practice. However, we conclude that these findings cannot be considered conclusive; but should open up a new direction for future investigations by researchers to better understand this area of interest.

Author(S) **El Shamieh S.**, Salami A., Stathopoulou M., Chedid P., Visvikis-Siest S.

ARTICLE TITLE	**Increased Risk of Hypercholesterolemia in a French and Lebanese Population due to an Interaction between rs2569190 in CD14 and Gender**
JOURNAL	**Clinica Chimica Acta**
YEAR	2020
PUBLICATION INFO	509: 172-176
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Rationale** Since identifying gender-specific genetic associations may have a significant impact on public health, we studied the interaction between rs2569190 in CD14 (cluster of differentiation 14) and gender in relation to the lipid traits in two independent populations. **Methods** We first tested the interaction in a discovery population (SFS, n = 956), then replicated it in an independent population (LGP, n = 460), followed by a meta-analysis (n = 1,416). Finally, stratification according to gender was conducted to test the association between rs2569190 and lipid traits. Binary multiple logistic regression models were used while correcting for many confounders. Power calculations were also performed. **Results** An interaction between rs2569190 and gender, which increased the risk of total cholesterol levels in SFS, was found (OR = 2.151 and P = 0.05). This interaction was further replicated in the LGP (OR = 1.353 and P < 0.001), and the meta-analysis showed an overall significant interaction (OR = 1.436 and Pmeta = 0.02). Similarly, the meta-analysis showed an overall significant positive effect (OR = 1.204 and P_{meta} = 0.004) for low-density lipoprotein cholesterol levels. Overall, 1,416 patients were evaluated, and the statistical heterogeneity was low, with I2 estimates ranging between 0% and 22.2%. In contrast, rs2569190 in CD14 did not show any significant interaction with gender influencing high-density lipoprotein levels and triglycerides levels in both populations. **Conclusion** An interaction between rs2569190 in CD14 and gender increased the risk of hypercholesterolemia in two independent populations with a gender-specific effect in males.

Author(s) **Saleh G., El Darra N.,** Kharroub S., Farran M.

ARTICLE TITLE	**Influence of Storage Conditions on Quality and Safety of Eggs Collected from Lebanese Farms**
JOURNAL	**Food Control**
YEAR	2020
PUBLICATION INFO	111: 1-8
THEME / SUBTHEME	Science and Technology/ Food Technology and Processing
ABSTRACT	Egg is considered a nutritionally complete food and an excellent source of protein. However, storing eggs for a prolonged period of time under uncontrolled temperature results in egg quality deterioration. The objective of this study is to determine the effect of storage conditions (time & temperature) on the egg's internal and external quality parameters as well as the microbiological load of eggs. For that purpose, a total of 2160 (white, brown vaccinated and brown non-vaccinated for salmonella) eggs were collected from Lebanese egg farmers in Bekaa valley and stored at 7 °C, 18 °C, 24 °C and 33 °C/20 °C (cyclic) for 2, 4 and 6 weeks. At each time point and temperature setting, 30 eggs were analysed for external and internal quality traits as well microbiological testing. Results showed that brown eggs had significantly higher weight ($P < 0.001$), shell thickness ($P < 0.01$), and darker yolk colour than white eggs. As the storage temperature and time increased, a decrease in Haugh unit (HU) and yolk colour was observed ($p < 0.05$). In addition, a decrease ($p < 0.001$) in the egg weight, specific gravity and shell thickness. For the eggs microbial analysis, a total absence was observed for eggs stored at 7 °C at all-time points. The results suggest that the interaction between temperature, time, and group significantly affect the eggs internal and external quality, by causing significant deterioration in HU, yolk colour, weigh, specific gravity, and shell thickness. This work has concluded that eggs should be stored at a refrigerated temperature (7 °C) for a period not exceeding 4 weeks.

Author(s) **Khalife S., Bissar-Tadmouri N.**

ARTICLE TITLE	**Inherited Thrombophilia in a Lebanese Family of Four Generations: A Case Report of Recurrent Miscarriage**
JOURNAL	**Vascular Health and Risk Management**
YEAR	2020
PUBLICATION INFO	16: 53-56
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion
ABSTRACT	**Introduction** Factor V Leiden (G1691A), prothrombin (G20210A) and MTHFR (C677T) gene mutations were investigated in many studies for their association with Deep Venous Thrombosis. **Case Presentation** A North Lebanese family has been examined, from an index case, a 40-year-old woman, who had a history of venous thrombosis with unexplained recurrent miscarriage. The index case was found to be heterozygous for factor V Leiden G1691A, prothrombin G20210A, and methylenetetrahydrofolate reductase C677T gene variants. Her family members were heterozygous for at least two of the three-point mutations, and multiple risk factors associated with thrombophilia were identified. **Conclusion** Our findings emphasize the need for clarifying the utility and futility of thrombophilia testing in the era of molecular diagnostics.

Author(s) **Rifai L., Mohammad M., Raafat K., Saleh F.**

ARTICLE TITLE	**In Vitro and In Vivo Evaluation of the Protective Potential of Moringa oleifera Against Dietary Acrylamide-induced Toxicity** ***(Joint Publication with the Faculty of Pharmacy)***
JOURNAL	**Open Medicinal Chemistry Journal**
YEAR	2020
PUBLICATION INFO	14(3): 26-34
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion
ABSTRACT	**Background** Acrylamide (AA) in food is a public health concern that has attracted scientists' attention worldwide. **Objective** This study was carried out to investigate the efficiency of Moringa oleifera (M. olifera) leaves in the reduction of AA in French fries in vitro and its hepato-protective properties against AA-induced liver toxicity in vivo. **Materials and Methods** Total phenolic, flavonoid, tannin contents and antioxidant potential of M. oleifera leaves were evaluated and the phenolic constituents characterized via HPLC. AA content was also monitored in French fries using LC-MS/MS. For in vivo assay, mice were treated with AA alone or in combination with M. oleifera (150 and 250 mg/kg IP). **Results** Phytochemical screening showed that gallic acid, ellagic acid, epicatechin, and quercetin were the most abundant phenolic compounds identified. This work also demonstrated a nearly 37% reduction in AA when French fries were soaked in 1% M. oleifera. Moreover, AA-intoxicated mice resulted in a significant ($P < 0.05$) elevation in the liver enzyme alanine aminotransferase (ALT), which was restored when pre-treated with M. oleifera. **Conclusion** This study proved that M. olifera could be effective in reducing AA levels in French fries and that treatment with M. oleifera extract can restore the hepatic damage in AA-intoxicated mice.

Author(s) **Safadi S.,** Kavuran E., Al Nuqiadan H., **Tassi A., Fawaz M.**

ARTICLE TITLE	**Knowledge, Attitude and Practice for Healthcare Workers and Clinical Students About Infection Control Measures Awareness at Hospitals**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	2(1): 1-10
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Healthcare-associated infections are a major global public health concern. Health care workers are on the front line of protecting themselves and clients from infection, through preventing the transmission of nosocomial infections and that is through the implementation of infection control measures. Therefore, the purpose of this study is to investigate the knowledge, attitude and practice of infection prevention among healthcare workers at Lebanese hospital. A descriptive cross-sectional research design was implemented in the study, where the sample included 240 participants (80 nurses, 80 medical lab, and 80 clinical students). Participants were surveyed using pre-tested self-administered questionnaire. The results showed that knowledge between the three groups was good regarding standard precautions, but moderate regarding post exposure prophylaxis and vaccination. The results showed 41.7% of participants know the correct vaccines recommended, and medical labs were significantly higher than the other two groups, (p=0.00). Despite the good knowledge about standard precautions, the main reason for noncompliance was that they don't have time to wear PPE's while working and nurses were significantly higher than the other two groups, (p=0.00). The adherence to the use of PPE's was significantly related to if they have regular access to them in the facility, (p=0.00).Among those who had occupational exposure nurses were significantly higher in reporting the exposure, (p=0.001). In addition, 62.9% reported that PEP medications were available at their work place, while 52.5% experienced sometime unavailability of these medications. This study revealed a good knowledge and attitude of infection prevention among the majority of participants with relatively minimal practice rate.

Author(s) **Fawaz M.,** Kavuran E.

ARTICLE TITLE	**Lebanese Nursing Students' Perceptions Regarding Use of Concept Mapping**
JOURNAL	**Teaching and Learning in Nursing**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.teln.2020.05.003
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences
ABSTRACT	Innovative teaching/learning methodologies in nursing education are needed to prepare professional and skilled nurses. Concept mapping (CM) has been implemented in nursing programs to facilitate learning. The aim of this study was to explore the perceptions of nursing students regarding the use of CM in the study site nursing program. The study adopted an exploratory qualitative research design. The sample comprised of 20 nursing students who participated in the research voluntarily. Data was collected by one-on-one semi structured interviews. Four themes emerged upon thematic analysis including; "Improved Learning and Establishing Knowledge," "Promote Self-directed Learning," "Improving Cognitive Skills," and "Fostering Comprehensive Care." Understanding student perceptions of CM as a teaching/learning technique facilitates design of learner centered curricula to promote excellence in education and practice.

Author(s) **El Ghoch M.,** Valerio A.

ARTICLE TITLE	**Let Food be the Medicine, but not for Coronavirus: Nutrition and Food Science, Telling Myths from Facts**
JOURNAL	**Journal of Population Therapeutics and Clinical Pharmacology**
YEAR	2020
PUBLICATION INFO	27(SP1): e31-e36
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences
ABSTRACT	The entire globe is facing a dangerous pandemic due to the coronavirus disease (COVID-19). The medical and scientific community is trying to figure out and adopt effective strategies that can lead to (i) preventing virus expansion; (ii) identifying medications for the management of critical care and reducing rates of mortality; and (iii) finally discovering the highly anticipated vaccine. Nutritional interventions have attained considerable scientific evidence in disease prevention and treatment. The main question, "What is the role of nutrition and food science in this scenario?" requires urgent answer as many theories suggesting that specific food or dietary supplements can fight coronavirus infection have received extensive coverage in most popular social media platforms. In this editorial, we focus on some frequent statements on the role of nutrition and food science in the battle against COVID-19, distinguishing between myths and facts. We highlight that social distancing and hygiene precautions are the best practices for reducing the risk of COVID-19 transmission. We further underline the importance of nutrition in its wholistic concept, pointing out the risk of unproven dietary options that could lead individuals to weaken effective precautionary measures.

Author(s) **Tannir H., Itani L., El Masri D., Kreidieh D., El Ghoch M.**

ARTICLE TITLE	**Lifetime Weight Cycling and Central Fat Distribution in Females With Obesity: A Brief Report**
JOURNAL	**Diseases**
YEAR	2020
PUBLICATION INFO	8(2): 1-7
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Weight cycling (WC) is a common phenomenon in patients with obesity, however, its consequence on body composition has not yet been fully understood. Therefore, we aimed to determine whether multiple WC can negatively affect the latter, especially in terms of body fat distribution in female adults seeking treatment that are overweight or obese. Body composition was obtained using a segmental body composition analyser (MC-780MA, Tanita Corp., Tokyo, Japan) in 125 adult females who had been referred to the Department of Nutrition and Dietetics at the Beirut Arab University (Lebanon). WC was defined as intentional weight loss of ≥3 kg followed by involuntary weight regain of ≥3 kg, and participants were categorized as WC if they had experienced ≥2 cycles. Ninety of the 125 participants met the criteria for WC and displayed a higher total and trunk fat mass than those without WC. This was confirmed through linear regression analysis, showing that multiple WC were associated with increased fat mass (FM) by nearly 4.2 kg (β = 4.23, 95%CI: 0.81-7.65, p = 0.016)-2.4 kg in the trunk region (β = 2.35, 95%CI: 0.786-3.917, p = 0.004) when compared to the non-WC group, after adjusting for age and fat-free mass. In conclusion, multiple WC is associated with increased body fat, especially in the central region. Future studies are needed to examine the impact of this fat distribution on health outcomes in this phenotype of patients.

Author(s) **Deek H., Itani L.,** Davidson P.

ARTICLE TITLE	**Literacy Critical to Heart Failure Management: A Scoping Review**
JOURNAL	**Heart Failure Reviews**
YEAR	2020
PUBLICATION INFO	DOI: 10.1007/s10741-020-09964-6
THEME / SUBTHEME	Health and Wellbeing/ Prevention and Health Promotion
ABSTRACT	Heart failure is a complex clinical syndrome most commonly encountered among older adults. This complex clinical syndrome is associated with poor health outcomes such as frequent admissions and mortality. These adverse outcomes are commonly associated with poor self-care and lower health literacy. Literacy is a combination of knowledge and skills and often reflected by appropriate interaction with the community, while health literacy is the cognitive and social skills reflected by accessing and comprehending health information and making appropriate health decisions. These decisions are common and challenging to patients with heart failure. Poor outcomes are said to be reduced by adequate self-care, which is associated with health literacy among heart failure patients. Better self-care was also shown to be associated with self-efficacy and self-confidence that were in turn associated with health literacy. Hence, enhancing health literacy among patient with heart failure is critical to enable them to increase control over their disease by better understanding and participating in health care, while being empowered to take part in designing health care services and even tailoring research to serve their needs and consequently improve outcome at the individual and community level. In clinical practice, assessing health literacy, measuring health literacy, and identifying patients at risk of low nutrition literacy is important to enhance health literacy and health outcomes. Hence, developing reliable and valid methods and tools for assessment and developing tailored and targeted interventions is of critical importance.

Author(s) **Sleem A., Saleh F.**

ARTICLE TITLE	**Mesenchymal Stem Cells in the Fight Against Viruses: Face to Face with th Invisible Enemy**
JOURNAL	**Current Research in Translational Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1016/j.retram.2020.04.003
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	The relative ease of isolation of mesenchymal stem cells (MSCs) from different tissues coupled with their culture expansion in vitro and their differentiation capacity to mesodermal, endodermal and ectodermal lineages have made these cells attractive for a large number of therapeutic applications. In recent years, there has been remarkable progress in the utilization of MSCs in diverse clinical indications both in animal models and human clinical trials. However, the potential of MSCs to control or treat viral diseases is still in its infancy. In this study, we report quantitative data on the MSC-based clinical trials over the last ten years as they appear on the online database of clinical research studies from US National Institutes of Health. In particular, we provide comprehensive review of either completed or ongoing clinical trials using MSCs for virus-associated diseases focusing on HIV, hepatitis B virus and COVID-19 virus.

Author(s) **Jaffal L.,** Joumaa W., Assi A., Helou C. Cherfan G., Zibara K., Audo I., Zeitz C. **El Shamieh S.**

ARTICLE TITLE	**Next Generation Sequencing Identifies Five Novel Mutations in Lebanese Patients with Bardet–Biedl and Usher Syndromes** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Genes**
YEAR	2019
PUBLICATION INFO	DOI:10.3390/genes10121047
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Aim

To identify disease-causing mutations in four Lebanese families: three families with Bardet–Biedl and one family with Usher syndrome (BBS and USH respectively), using next generation sequencing (NGS).

Methods

We applied targeted NGS in two families and whole exome sequencing (WES) in two other families. Pathogenicity of candidate mutations was evaluated according to frequency, conservation, in silico prediction tools, segregation with disease, and compatibility with inheritance pattern. The presence of pathogenic variants was confirmed via Sanger sequencing followed by segregation analysis.

Results

Most likely disease-causing mutations were identified in all included patients. In BBS patients, we found (M1): c.2258A > T, p. (Glu753Val) in BBS9, (M2): c.68T > C; p. (Leu23Pro) in ARL6, (M3): c.265_266delTT; p. (Leu89Valfs*11) and (M4): c.880T > G; p. (Tyr294Asp) in BBS12. A previously known variant (M5): c.551A > G; p. (Asp184Ser) was also detected in BBS5. In the USH patient, we found (M6): c.188A > C, p. (Tyr63Ser) in CLRN1. M2, M3, M4, and M6 were novel. All of the candidate mutations were shown to be likely disease-causing through our bioinformatic analysis. They also segregated with the corresponding phenotype in available family members.

Conclusion

This study expanded the mutational spectrum and showed the genetic diversity of BBS and USH. It also spotlighted the efficiency of NGS techniques in revealing mutations underlying clinically and genetically heterogeneous disorders.

Author(s) Anshasi H., **Fawaz M.,** Alhalalmeh S., Ahmad W., **Tassi A.**

ARTICLE TITLE	**Nurses' Stressors and their Quality of Life: A Study on Nurses Caring for Older Patients**
JOURNAL	**Nursing Open**
YEAR	2020
PUBLICATION INFO	DOI: 10.1002/nop2.553
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Aim

To determine the sources of occupational stress and the level of quality of life among nurses caring for older people in Lebanon and examine the underlying factors to predict nurses' quality of life.

Design

A descriptive correlational design.

Methods

Data were collected from 119 nurses using Nursing Stress Scale and WHOQuality of Life Brief.

Results

Nurses reported the highest frequency of stressful events related to their workload (mean = 16.42, SD 1.03), followed by "death and dying" (mean = 14.61, SD 1.02). Nurses reported the highest level of quality of life domains was physical health (mean = 15.74, SD = 2.63), while the lowest level was environmental domain (mean = 11.15, SD = 1.86). After controlling for demographic and work-related variables, occupational stress explained a large variance in the physical (R2 change = .43), psychological (R2 change = .44) and social relationship (R2 change = .35) domains of quality of life.

Author(s) Valerio A., Nisoli E., Rossi A., Pellegrini M., Todesco T., **El Ghoch M.**

ARTICLE TITLE	**Obesity and Higher Risk for Severe Complications of COVID-19: What to do When the Two Pandemics Meet**
JOURNAL	**Journal of Population Therapeutics and Clinical Pharmacology**
YEAR	2020
PUBLICATION INFO	27(SP1): e31-e36
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	The coronavirus disease 2019 (COVID-19) pandemic has spread around the globe, infecting more than ten million individuals, with more than 500,000 dead; about one half of the infected people have recovered. Despite this fact, a subgroup of individuals affected by COVID-19 is at greater risk of developing worse outcomes and experience a high rate of mortality.

ABSTRACT

Data on the association between obesity and COVID-19 are growing; the available studies, have reported a high prevalence of overweight and obesity in patients experiencing a severe COVID-19 course, with serious complications requiring hospitalization and admission to intensive care units. This paper attempts to highlight potential mechanisms behind the greater vulnerability to COVID-19 of individuals with obesity. The presence of uncontrolled chronic obesity-related comorbidities, particularly pulmonary diseases, can present a primary fertile soil for respiratory tract infection. Combined with immune system impairments, such as alteration in the T-cell proliferation and macrophage differentiation, and the high pro-inflammatory cytokine production by the adipose organ, this may worsen the general condition toward a systemic diffusion of infection. Prevention remains the first line of intervention in these patients that can be achieved by adhering to social distancing and adopting hygiene precautions, combined with a healthy lifestyle. Patients with obesity require preferential access dedicated to primary care services to ensure they are regularly taking their medications for the treatment of any concurrent chronic diseases. Finally, their physicians must promptly manage any medical signs or symptoms in the case of suspected severe acute respiratory syndrome coronavirus-2 (SARS-CoV2) infection to prevent the risk of severe outcomes.

Author(s) **El Shamieh S.,** Stathopoulou M., Bonnefond A., Ndiaye N., Lecoeur C., Meyre D., Dadé S., Chedid P., Salami A., Shahabi P., Dedoussis G., Froguel P., Visvikis-Siest S.

ARTICLE TITLE	**Obesity Status Modifies the Association between rs7556897T>C in the Intergenic Region SLC19A3-CCL20 and Blood Pressure in French Children**
JOURNAL	**Clinical Chemistry and Laboratory Medicine**
YEAR	2020
PUBLICATION INFO	DOI: 10.1515/cclm-2019-0292
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

Growing evidence reports an association between inflammatory markers, obesity and blood pressure (BP). Specifically, the intergenic single nucleotide polymorphism (SNP) rs7556897T > C (MAF = 0.34) located between SLC19A3 and the CCL20 was shown to be associated with chronic inflammatory diseases. In addition, CCL20 expression was found increased in pancreatic islets of obese rodents and human pancreatic β cells under the influence of inflammation. In this study, we hypothesized that SNP rs7556897 could affect BP levels, thus providing a link between inflammation, BP and obesity.

Methods

BP was measured under supine position with a manual sphygmomanometer; values reported were the means of three readings. We analyzed rs7556897 in 577 normal weight and 689 obese French children. Using real-time polymerase chain reaction (PCR), we quantified CCL20 and SLC19A3 expression in adipose tissue and peripheral blood mononuclear cells (PBMCs) of normal weight and overweight children.

ABSTRACT

Results

The rs7556897C allele was negatively associated with diastolic BP in normal weight children (β = -0.012 ± 0.004, p = 0.006) but positively associated in obese children (β = 2.178 ± 0.71, p = 0.002). A significant interaction between rs7556897T > C and the obesity status (obese or normal weight) was detected (β = 3.49, p = 9.79×10^{-5}) for BP in a combined population analysis. CCL20 mRNA was only expressed in the adipose tissue of overweight children, and its expression levels were 10.7× higher in PBMCs of overweight children than normal weight children. Finally, CCL20 mRNA levels were positively associated with rs7556897T > C in PBMCs of 58 normal weight children (β = 0.43, p = 0.002). SLC19A3 was not expressed in PBMCs, and in adipose tissue, it showed same levels of expression in normal weight and overweight children. The gene expression results may highlight a specific involvement of CCL20 via communicating obesity/inflammation pathways that regulate BP.

Conclusion

Childhood obesity reverses the effect of rs7556897T > C on diastolic BP, possibly via the modulation of CCL20 expression levels.

Author(s) Boulanger-Scemama E., Mohand-Saïd S., **El Shamieh S.,** Démontant V., Condroyer C., Antonio A., Michiels C., Boyard F., Saraiva J., Letexier M., Sahel J. Zeitz C., Audo I.

ARTICLE TITLE	**Phenotype Analysis of Retinal Dystrophies in Light of the Underlying Genetic Defects: Application to Cone and Cone-Rod Dystrophies**
JOURNAL	**International Journal of Molecular Sciences**
YEAR	2019
PUBLICATION INFO	20(19): 1-18
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Phenotypes observed in a large cohort of patients with cone and cone-rod dystrophies (COD/CORDs) are described based on multimodal retinal imaging features in order to help in analyzing massive next-generation sequencing data. Structural abnormalities of 58 subjects with molecular diagnosis of COD/CORDs were analyzed through specific retinal imaging including spectral-domain optical coherence tomography (SD-OCT) and fundus autofluorescence (BAF/IRAF). Findings were analyzed with the underlying genetic defects. A ring of increased autofluorescence was mainly observed in patients with CRX and GUCY2D mutations (33% and 22% of cases respectively). "Speckled" autofluorescence was observed with mutations in three different genes (ABCA4 64%; C2Orf71 and PRPH2, 18% each). Peripapillary sparing was only found in association with mutations in ABCA4, although only present in 40% of such genotypes. Regarding SD-OCT, specific outer retinal abnormalities were more commonly observed in particular genotypes: focal retrofoveal interruption and GUCY2D mutations (50%), foveal sparing and CRX mutations (50%), and outer retinal atrophy associated with hyperreflective dots and ABCA4 mutations (69%).

ABSTRACT

This study outlines the phenotypic heterogeneity of COD/CORDs hampering statistical correlations. A larger study correlating retinal imaging with genetic results is necessary to identify specific clinical features that may help in selecting pathogenic variants generated by high-throughput sequencing.

Author(S) **El Masri D., Itani L., Kreidieh D., Tannir H., El Ghoch M.**

ARTICLE TITLE	**Predictive Equations Based on Body Composition for Resting Energy Expenditure Estimation in Adults With Obesity**
JOURNAL	**Current Diabetes Reviews**
YEAR	2020
PUBLICATION INFO	16(4): 381-386
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background and Aim

An accurate estimation of Resting Energy Expenditure (REE) in patients with obesity is crucial. Therefore, our aim was to assess the validity of REE predictive equations based on body composition variables in treatment-seeking Arab adults with obesity.

Methods

Body composition and REE were measured by Tanita BC-418 bioimpedance and Vmax Encore 229 IC, respectively, and predictive equations based on fat mass and fat-free mass were used in REE estimations among 87 adults of both genders, in the Outpatient Clinic in the Department of Nutrition and Dietetics at Beirut Arab University (Lebanon). The mean differences between the measured and estimated REE values were calculated to assess the accuracy, and the Bland-Altman method was used to assess the level of agreement.

Results

Ten predictive equations were included. In males, all the predictive equations gave significantly different estimates of REE when compared to that measured by IC. On the other hand, in females, the mean difference between the REE value estimated by Huang and Horie-Waitzberg equations and that measured using IC was not significant, and the agreement was confirmed using Bland-Altman plots.

Conclusion

Huang and Horie-Waitzberg equations are suggested for accurate REE estimation in females; however, new validated REE estimation equations for males in this population are still needed.

Author(S) **Tannir H., Kreidieh D., Itani L., El Masri D. El Ghoch M.**

ARTICLE TITLE	**Reduction of Resting Energy Expenditure and Sarcopenic Obesity in Adults With Overweight and Obesity: A Brief Report**
JOURNAL	**Current Diabetes Reviews**
YEAR	2020
PUBLICATION INFO	16(4): 376-380
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background and Aim

The last decade has seen the emergence of a new condition, describing the coexistence of obesity and sarcopenia, termed Sarcopenic Obesity (SO). The aim of this study was to assess the potential association between SO and reduced Resting Energy Expenditure (REE).

Methods

Body composition and REE were measured using a bioimpedance analyser (Tanita BC-418) and Indirect Calorimeter (Vmax Encore 229), respectively in 89 adults with overweight or obesity of both genders, referred to the Outpatient Clinic of the Department of Nutrition and Dietetics at Beirut Arab University (Lebanon). Participants were then categorized on the basis of having SO or not.

Results

Thirty-nine of the 89 participants met the criteria for SO (43.8%), and these participants displayed a significantly lower REE per unit body weight than those in the group without SO (19.02 ± 2.26 vs. 20.87 ± 2.77; p = 0.001). Linear regression analysis showed that the presence of SO decreases REE by 1.557 kcal/day for each kg of body weight (β = -1.557; CI = -0.261 - (-0.503); p = 0.004), after adjusting for age and gender.

Conclusion

SO appears to be present in a high proportion of treatment-seeking adults with overweight or obesity of both genders, and it seems to be associated with a reduced REE, compared with those without SO. Future studies are needed to clarify whether this may influence clinical outcomes.

Author(s) **Itani L., Kreidieh D., El Masri D., Tannir H., Chehade L., El Ghoch M.**

ARTICLE TITLE	**Revising BMI Cut-Off Points for Obesity in a Weight Management Setting in Lebanon**
JOURNAL	**International Journal of Environmental Research and Public Health**
YEAR	2020
PUBLICATION INFO	17(11): 1-8
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences
ABSTRACT	Obesity is defined by the World Health Organization (WHO) as a body mass index (BMI) ≥ 30 Kg/m^2. This study aimed to test the validity of this BMI cut-off point for adiposity in a weight management clinical setting in Lebanon. This cross-sectional study of 442 adults of mixed gender, categorized by the WHO BMI classification, included: 66 individuals of normal weight, 110 who were overweight and 266 with obesity. The clinical sample was referred to the Outpatient Clinic in the Department of Nutrition and Dietetics at Beirut Arab University (BAU) in Lebanon. All participants underwent anthropometric evaluation. The gold standard for defining obesity was based on the National Institutes of Health (NIH)/ WHO guidelines for total body fat percentage (BF%). The best sensitivity and specificity were attained to predict obesity, according to the receiver operating characteristic curve (ROC) analysis. The BMI cut-off point for predicting obesity in the clinical sample was nearly 31.5 Kg/m^2, and more than 90% of individuals with obesity and cardiometabolic disease were above this cut-off point. In conclusion, this new BMI cut-off point, an obesity definition higher than suggested in Western populations, was demonstrated to have clinical usefulness. Obesity guidelines in Lebanon, therefore, need revising.

Author(s) **Naja K., El Shamieh S., Fakhoury R.**

ARTICLE TITLE	**rs622342A>C in SLC22A1 is Associated with Metformin Pharmacokinetics and Glycemic Response** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Drug Metabolism and Pharmacokinetics**
YEAR	2020
PUBLICATION INFO	35(1): 160-164
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Polymorphisms in SLC22A1 lead to variability in metformin clinical efficacy. Sixty-three Lebanese patients with type 2 diabetes who administered metformin, were followed up for six months and genotyped for rs622342A>C. The area under the plasma concentration-time curve and the maximum concentration of metformin was highest in CC patients ($P \leq 0.03$). There was a significant difference between groups in the percentage decrease in fasting blood sugar (FBS) and glycated hemoglobin (HbA1c). Going into the same direction, rs622342C was associated with decrease in FBS levels after three and six months of treatment ($P \leq 0.02$), whereas with HbA1c, the decrease was noticed after six months ($\beta = -2.78$; $P = 0.03$). In contrast, the serum levels of lactate and creatinine did not vary significantly according to rs622342A>C genotypes.

Author(s) **Naja K.,** Salami A.**, El Shamieh S., Fakhoury R.**

ARTICLE TITLE	**rs622342 in SLC22A1, CYP2C9*2 and CYP2C9*3 and Glycemic Response in Individuals with Type 2 Diabetes Mellitus Receiving Metformin/Sulfonylurea Combination Therapy: 6-Month Follow-Up Study** ***(Joint Publication with the Faculty of Science)***
JOURNAL	**Journal of Personalized Medicine**
YEAR	2020
PUBLICATION INFO	10(2): 53-57
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background and Objective

Since the treatment outcome with oral anti-diabetics differs between individuals, the objective of this study is to evaluate the significance of rs622342 in SLC22A1, CYP2C9*2 (rs1799853) and CYP2C9*3 (rs1057910) with regard to the efficacy of metformin/sulfonylurea combination therapy in individuals with type 2 diabetes mellitus (T2DM).

Methods

Eighty-eight Lebanese individuals with T2DM received metformin/sulfonylurea combination therapy over 3 and 6 months. The clinical and biochemical characteristics were collected. Genotyping of rs622342 in SLC22A1, CYP2C9*2 and CYP2C9*3 was performed using hybridization probes on real-time polymerase chain reaction (PCR) instrument. Statistical analysis was performed using SPSS 22.0.

Results

The levels of fasting blood sugar (FBS) and glycated hemoglobin (HbA1c) showed a statistically significant reduction over 3 and 6 months of follow-up ($p < 0.001$). An interaction between rs622342 in SLC22A1, CYP2C9*2 and CYP2C9*3 ($p = 0.035$) was found associated with reduced levels of HbA1c levels after 3 and 6 months. A significant difference between the means of HbA1c was observed among the different groups after 3 and 6 months ($p = 0.004$ and $p < 0.001$, respectively). The most beneficial group was; AA and AC, *1*3, whereas the individuals that benefited the least were CC, *1*3 at 3 and 6 months. In contrast to HbA1c, no interaction was found between the three polymorphisms to affect FBS ($p = 0.581$).

Conclusion

The combination of metformin/sulfonylurea therapy led to the maximum glycemic control in individuals with T2DM carrying AA or AC genotypes in SLC22A1 and *1*3 in CYP2C9.

Author(s) **Kreidieh D., Itani L., Tannir H., El Masri D. El Ghoch M.**

ARTICLE TITLE	**Sarcopenic Obesity Predicts Early Attrition in Treatment-Seeking Patients With Obesity: A Longitudinal Pilot Study**
JOURNAL	**Journal of Cardiovascular Development and Disease**
YEAR	2020
PUBLICATION INFO	DOI: 10.3390/jcdd7010005
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Attrition is a major cause of failure in obesity treatment, which is still not fully understood. The identification of factors related to this outcome is of clinical relevance. We aimed to assess the relationship between sarcopenic obesity (SO) and early attrition. Early attrition was assessed at six months, and two groups of patients were selected from a large cohort of participants with overweight or obesity enrolled at the Outpatient Clinic of the Department of Nutrition and Dietetics at Beirut Arab University (Lebanon). Body composition was measured using a bioimpedance analyser (Tanita BC-418) and participants at baseline were categorized as having or not having SO. The "dropout group" included 72 participants (cases) compared to 31 participants (controls) in the "completer group", with the former displaying a higher prevalence of SO than the latter (51.0% vs. 25.8%; $p = 0.016$). In the same direction, Poisson regression analysis showed that SO increased the relative risk of dropout by nearly 150% (RR = 1.45; 95% CI = 1.10-1.89; $p = 0.007$) after adjustment for age, gender, body mass index (BMI), age at first dieting, sedentary habits and weight-loss expectation. In conclusion, in a "real-world" outpatient clinical setting, the presence of SO at baseline increases the risk of dropout at six months. New directions of future research should be focused on identifying new strategies to reduce the attrition rate in this population.

Author(s) **El Darra N., Raafat K.,El-Ghazzawi I.**

ARTICLE TITLE	**Screening of Nasal and Hands Carriage of Methicillin-Resistant Staphylococci Colonization among Lebanese Nutraceuticals Handlers** ***(Joint Publication with the Faculty of Pharmacy)***
JOURNAL	**Pharmacognosy Journal**
YEAR	2019
PUBLICATION INFO	11(6): 1336-1341
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Introduction** Poor personal hygiene of the nutraceuticals handlers could be a potential source of diseases due to the high occurrence of bacterial contamination. **Methods** A cross sectionnal study was conducted among Lebanese nutraceuticals handlers. A pretested structured questionnaire was used for collecting information on age, sex, marital status, service years, educational status, status of training of nutraceuticals-handlers.

ABSTRACT

Results

Nasal and hands swabs were investigated for S. aureus, MRSA, CoNS and MRSE.Among 144 nutraceuticals handlers, 41% and 69% exhibited no bacterial growth in their nasal and hand swabs.The carrier rate of S. aureus was 11.8 and 5.6% for nose and hands in nutraceuticals handlers.The nasal and hands carrier rate of MRSA is 6.3% and 2.1%, respectively.MRSE presented a rate of 10.4% and 7.6% for the nasal and hands carriage.

Conclusion

The findings showed that the Lebanese nutraceuticals handlers are a vehicle of different resistant bacterial strains in their nasal and hands carriage,which poses a significant risk to the Lebanese consumer.

Author(S) **Fawaz M.,** Anshasi H.

ARTICLE TITLE	**Senior Nursing Student's Perceptions of an Interprofessional Simulation-Based Education (IPSE): A Qualitative Study**
JOURNAL	**Heliyon**
YEAR	2019
PUBLICATION INFO	DOI: 10.1016/j.heliyon.2019.e02546
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	**Purpose** The purpose of this study was to explore the perceptions and attitudes toward interprofessional simulation-based education among Lebanese senior nursing students. **Methods** The study used an exploratory descriptive qualitative approach and collected data through focus groups. All focus group discussions were audiotaped, transcribed verbatim, and narratives were compared with the recordings to establish accuracy, credibility and reliability of data. Qualitative narratives were translated to English and analyzed through an inductive thematic content analysis. This study was reported according to the Standards for Reporting Qualitative Research (SRQR).

ABSTRACT

Results

Four major themes were identified: understanding roles and responsibilities, enhancing collaboration, improve personal and interpersonal skills, and patient outcomes.

Conclusion

The senior nursing students showed a positive perception and attitude toward interprofessional simulation-based education. They found that interprofessional simulation-based education increased their knowledge and understanding of the importance of the roles of other professions, as well as their own role in providing patient care. Furthermore, they perceived that interprofessional simulation-based education improved their personal and interpersonal skills. These positive findings may contribute to their future success in an interprofessional team, which could lead to improved patient outcomes. Therefore, future research is needed to see how the reported benefits of interprofessional simulation-based education training are reflected in clinical practice and related to patient outcomes.

Author(S) Kbaysi M., Kavuran M., **Tassi A., Fawaz M.**

ARTICLE TITLE	**The Effect of Educational Intervention on the Knowledge of Nurses Regarding Catheter Indications and Associated Urinary Tract Infection Preventive Measures**
JOURNAL	**BAU Journal-Health and Wellbeing**
YEAR	2019
PUBLICATION INFO	2(1): 1-7
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy
ABSTRACT	Catheter associated urinary tract infection (CAUTI) is the fourth leading cause of healthcare associated infections. The single most important predisposing factor for CAUTI is the insertion of urinary catheter. The aim of this study was to assess the effect of educational intervention on the knowledge of nurses regarding catheter indications and CAUTI preventive measures. A Pre-Post-test study design was utilized in this study which was conducted at two university hospitals one in Saida (South Lebanon) and the other one in Beirut in Lebanon. A self-reported questionnaire about catheter insertion and CAUTI prevention was used before and after the educational intervention, where the results of this study revealed that the educational intervention resulted in a significant increase in the level of knowledge among nurse. Thus, the knowledge regarding indication and preventive measures was suboptimal in our study group. There is a tremendous scope of improvement in catheterization practices in the hospital and education induced interventions would be the most appropriate effort toward reducing the incidence of CAUTI.

Author(S) **Itani L., Kreidieh D., El Masri D., Tannir H., El Ghoch M.**

ARTICLE TITLE	**The Impact of Sarcopenic Obesity on Health-Related Quality of Life of Treatment-Seeking Patients with Obesity**
JOURNAL	**Current Diabetes Reviews**
YEAR	2020
PUBLICATION INFO	16(6): 635-640
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

There is a paucity of studies on health-related quality of life (HRQoL) and sarcopenic obesity (SO).

Objective

This study aimed to assess the potential association between SO and impaired HRQoL.

Methods

The ORWELL 97 questionnaire was used to assess HRQoL and body composition was measured using a bioimpedance analyser (Tanita BC-418) in 130 patients with obesity, referred to the Nutritional and Weight Management outpatient clinic of Beirut Arab University in Lebanon. Participants were then categorized on the basis of the absence or presence of SO.

Results

Sixty-four of the 130 participants met the criteria for SO (49.2%) and displayed significantly higher total ORWELL 97 scores than those in the group without SO (64.00 vs. 41.00, p=0.001), indicative of poorer HRQoL. Linear regression analysis showed that SO was associated with an increase in ORWELL 97 scores by nearly 24 units (β=24.35, 95% CI=11.45-37.26; p<0.0001). Moreover, the logistic regression analysis showed that SO increased the odds of clinically significant impairment of HRQoL (ORWELL 97 score ≥74.25) by nearly seven-fold (OR=7.37, 95% CI=1.92-28.39; p=0.004).

Conclusion

Our findings show that the presence of SO was associated with increased impairment of HRQoL that reaches clinical significance when compared to obesity only. Future studies are needed to clarify whether this may influence clinical outcomes. If this is shown to be the case, weight management programs should incorporate additional strategies to improve HRQoL in individuals with SO.

Author(S) **Fawaz M., Samaha A.**

ARTICLE TITLE	**The Psychosocial Effects of Being Quarantined Following Exposure to COVID-19: A Qualitative Study of Lebanese Health Care Workers**
JOURNAL	**International Journal of Social Psychiatry**
YEAR	2020
PUBLICATION INFO	DOI: 10.1177/0020764020932202
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background

Since the outbreak of the novel Coronavirus (COVID-19), health care professionals in Lebanon have been diligently serving as the frontline of defense. In the light of challenging economic and political circumstances, putting their community wellbeing as a priority, and abiding by quarantine and strict infection control measures, health care professionals risk both their physical and mental wellbeing.

Objective

The aim of this study is to explore the psychosocial effects of being quarantined following exposure to COVID-19 among Lebanese health care professionals.

Method

An exploratory qualitative research design was employed, where semi-structured interviews were carried out involving a sample of 13 Lebanese health care providers working at various COVID-19 units.

Results

The qualitative analysis has revealed four themes namely 'Fears of contracting and spreading the virus', 'Conflict between professional duty and family obligation', 'Stigma of being infected', and 'Inadequate or inaccurate information'.

Conclusion

COVID-19 quarantine has been posing intense psychological challenges among Lebanese health care workers which are worsened at times by the economic instability; thus, health care policymakers are urged to take proper action nationwide to alleviate longlisting implications and support the health care providers in fulfilling their mission.

Author(s) **Nezameddin R., Itani L., Kreidieh D., El Masri D., Tannir H., El Ghoch M.**

ARTICLE TITLE	**Understanding Sarcopenic Obesity in Terms of Definition and Health Consequences: A Clinical Review**
JOURNAL	**Current Diabetes Reviews**
YEAR	2020
PUBLICATION INFO	DOI: 10.2174/1573399816666200109091449
THEME / SUBTHEME	Health and Wellbeing/ Illness and Therapy

ABSTRACT

Background and Aim

Research interests in a new phenotype termed sarcopenic obesity (SO), which refers to a decrease in lean body mass and muscle strength associated with an increase in body fat deposition, has grown. However, neither SO definition, nor its impact on health outcomes is clear. In the current paper, we aim to summarize the available literature on the dilemma surrounding the definition of SO, and the potential health consequences of this phenomenon on individuals with overweight and obesity.

Method

A literature review using the PubMed/Medline database was conducted and data were summarized by applying a narrative approach, based on clinical expertise in the interpretation of the available evidence base in the literature.

Results

Some definitions that account for body mass (i.e., body weight, body mass index) seem to be more suitable for screening of SO and revealed as clinically useful. The association between SO and certain health outcomes has been investigated, especially those related to obesity; however, little remains known about the association of SO with psychosocial distress and health-related quality of life impairment, as well as hard outcomes such as mortality.

Conclusion

International consensus regarding SO definition is needed, which would allow for a better understanding of its prevalence. Moreover, future investigations should be conducted in order to determine whether SO has an adverse effect (i.e., cause-effect relationship, in addition to association) on health. Once these issues are achieved, confirmed and clarified, evidenced-based protocols of treatment may become necessary to address the increase in the prevalence of obesity and sarcopenia worldwide.

Author(s) **Itani L., Tannir H., Kreidieh D., El Masri D., El Ghoch M.**

ARTICLE TITLE	**Validation of Predictive Equations for Resting Energy Expenditure in Treatment-Seeking Adults With Overweight and Obesity: Measured Versus Estimated**
JOURNAL	**Journal of Population Therapeutics and Clinical Pharmacology**
YEAR	2020
PUBLICATION INFO	27(1): 32-47
THEME / SUBTHEME	Health and Wellbeing/ Medical Education in Health Sciences

ABSTRACT

The quantification of resting energy expenditure (REE) in patients with obesity is an important measure. We aimed to evaluate the validity of predictive equations in estimating REE compared with indirect calorimetry (IC) in treatment-seeking Arab adults with overweight or obesity. Twenty-three predictive equations were compared with REE values measured by IC (Vmax Encore 229) in 89 adult participants with overweight or obesity (mean age = 40.62 ± 15.96 years and mean body mass index [BMI] = 35.02 ± 4.60 kg/m^2) referred to the Department of Nutrition and Dietetics of Beirut Arab University (Lebanon). The accuracy of the predictive equations was evaluated on the basis of whether the percentage prediction was within 10% of the measured REE, and the mean difference between predicted and measured values (bias). The Bland-Altman method was used to assess the agreement between the predicted and measured values. The equations that demonstrated the closest agreement with IC were the De La Cruz equation in males (accurate predictions: 68.2%; bias: -19.52 kcal/day) and the Mifflin equation in females (accurate prediction: 61.2%; bias: -36.43 kcal/day). In conclusion, we suggest that these two equations produce the least biased estimations for REE in this population.