# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>Faculty of HUMAN SCIENCES</td>
<td>15</td>
</tr>
<tr>
<td>Academic Journal Articles</td>
<td>17</td>
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<tr>
<td>Faculty of LAW &amp; POLITICAL SCIENCE</td>
<td>19</td>
</tr>
<tr>
<td>Academic Journal Articles</td>
<td>21</td>
</tr>
<tr>
<td>Faculty of BUSINESS ADMINISTRATION</td>
<td>29</td>
</tr>
<tr>
<td>Academic Journal Articles</td>
<td>31</td>
</tr>
<tr>
<td>Book Chapters</td>
<td>43</td>
</tr>
<tr>
<td>Faculty of ARCHITECTURE - DESIGN &amp; BUILT ENVIRONMENT</td>
<td>45</td>
</tr>
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<td>47</td>
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<tr>
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<td>69</td>
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<td>71</td>
</tr>
<tr>
<td>Academic Journal Articles</td>
<td>73</td>
</tr>
<tr>
<td>Proceedings</td>
<td>94</td>
</tr>
<tr>
<td>Book Chapters</td>
<td>101</td>
</tr>
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<td>105</td>
</tr>
<tr>
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</tr>
<tr>
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<td>157</td>
</tr>
<tr>
<td>Book Chapters</td>
<td>158</td>
</tr>
<tr>
<td>Faculty of PHARMACY</td>
<td>161</td>
</tr>
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<td>Academic Journal Articles</td>
<td>163</td>
</tr>
</tbody>
</table>
INTRODUCTION

Beirut Arab University has always been true to its mission as a beacon of knowledge and academia in Lebanon and the region. It was also our mission for the past few years to support and achieve research excellence and to prepare our researchers to lead the way in different research fields and disciplines.

BAU has established and still adopts 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) and they govern BAU’s research production which helps enhance BAU’s visibility, collaboration opportunities and partnerships. This was translated into BAU’s scores in the Times Higher Education (THE) Impact Rankings for the year 2022 where BAU ranked 3rd in Lebanon in its first year of participating and also ranked first in Lebanon on SDG 4, Quality Education; BAU also maintained its position as 3rd in Lebanon and rose to the 401-600 bracket worldwide for the year 2023. Moreover, our University ranked in the top bracket in Lebanon according to THE World University Rankings for the year 2024, and first in Lebanon and twelfth in the Arab world according to THE Arab University Rankings for the year 2023.

Our University has also 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. We strive on serving our community and pursuing relevant and contemporary research ideas and topics. We maintain our agreements and collaborations with our research partners and grant and funding bodies to better serve the community and to support and motivate research production. Despite the circumstances governing the situation in Lebanon, whether the repercussions of the COVID-19 pandemic or the economic situation with the downfall of the value of the Lebanese Pound in reference to the U.S. Dollar, our researchers remained keen on producing quality publications in the best journal, where more than 50% of the research production for the academic year 2022-2023 was published in top-ranked Q1 and Q2 journals.
BAU has always strived to become a leader in experiential learning to support opportunities for all of our students to work in different research fields. We have also worked hard on improving the quality and quantity of our research and aligning it with our academic programs. Thus, we have endorsed the importance of research activity in the learning process as well as in the advancement of the academic mission of our Faculty members. Our mission to deliver practical and innovative research opportunities is a process that hinges on the talent and dedication of our professors, administrators and students working on projects in all of our Faculties. Together, we work to become leaders in our research fields of expertise with the determination to better serve our community.

Beirut Arab University always seeks research and academic excellence and continues to strive to prepare researchers to lead the way in the different research areas. BAU remains 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, despite the challenges and obstacles they may face.

This annual report documents the research outcome of our Faculty members throughout the academic year 2022-2023, the year of standing strong despite all odds.

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.

<table>
<thead>
<tr>
<th>THEME 1</th>
<th>Health and Wellbeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME 2</td>
<td>Science and Technology</td>
</tr>
<tr>
<td>THEME 3</td>
<td>Society, Culture and Human Behavior</td>
</tr>
<tr>
<td>THEME 4</td>
<td>Creative Sustainable Development</td>
</tr>
</tbody>
</table>

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 above. 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  
|                                   | - Recent Development of Medical Responsibility/Liability (Civil-Criminal and Administrative)  
|                                   | - حقوق العمال وبيئة العمل  
|                                   | - 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  
|                                   | - E-transactions + E-Banking  
|                                   | - جرائم المعلوماتية  
|                                   | - المعاملات الإلكترونية + المصرفي 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 Behavior
- 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)
- Social Justice between Constitutional Text and Application
- The Effect of Economic Changes in the Criminal Behavior
- Recent Developments in the Civil and Criminal Procedures and Accomplished Justice

#### 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)
- Role of NGO’s in the Sustainable Development (The Role of Local Bodies in the Sustainable Development)

#### 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 2022-2023 Classified According to Type of Publication

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Academic Journal Articles</th>
<th>Conference Proceedings</th>
<th>Books</th>
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### TABLE 2

Publications for the Academic Year 2022-2023 Classified According to Journal Ranking and Indexing

<table>
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<th>Q1</th>
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<td>1</td>
<td>3</td>
<td></td>
<td>1</td>
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</table>

*APJ Architecture & Planning Journal
**BAU Journal-Journal of Legal Studies
BAU Journal-Health & Wellbeing
BAU Journal-Society Culture, & Human Behavior
BAU Journal-Creative Sustainable Development
BAU Journal-Science & Technology
I. PUBLICATIONS

ARTICLES

| ARTICLE TITLE | L’écriture Comme Réhabilitation Du Moi Traumatisé Dans Vivre Vite De Brigitte Giraud |
|---------------|---------------------------------------------------------------------------------
| JOURNAL       | BAU Journal-Society, Culture and Human Behavior                                  |
| YEAR          | 2023                                                                              |
| PUBLICATION INFO | 5(1): 1-5                                                                        |
| THEME / SUBTHEME | Society, Culture and Human Behavior/ Language and Literature                     |

**ABSTRACT**

Dans son roman Vivre vite, Brigitte Giraud écrit le récit d’une catastrophe qui l’obsède : le 22 juin 1999, son compagnon Claude est mort d’un accident de moto, à Lyon. Cet engin, une Honda puissante et dangereuse était interdite sur le territoire japonais et était réservée à l’exportation vers l’Europe. Elle n’appartenait pas à Claude, mais au frère de l’écrivaine. Celle-ci n’a pu revenir au drame qui l’habitait qu’en 2022, c’est-à-dire vingt-trois ans après la mort de Claude. Le lecteur ne peut s’empêcher de poser la question sur ce long silence et pourquoi ce retour aux menus détails de cet accident. Peut-être vouaite-elle croire que cet accident tragique aurait pu être évité, c’est pourquoi elle entreprend une ultime enquête, en "un conte à rebours", en analysant les différentes suppositions ou possibilités qui pourraient se présenter pour empêcher la catastrophe. Elle multiplie les "si" pour montrer tout ce qu’il y a de fortuit dans la vie et d’accidentel dans le drame. Les temps verbaux utilisés révèlent une forme de fatalité ou de destin. Ils soulignent l’absence de choix réel et affirment la prédestination des événements. Pour comprendre l’attitude de Giraud de revenir au drame après une souffrance taciturne d’une vingtaine d’années, nous analyserons : La mémoire traumatisée, sidérée par le souvenir tragique : - Les procédés narratifs utilisés pour comprendre ce qui a conduit à l’accident ; elle y revient avec une "litanie de si" : est-ce le hasard, le destin ou une simple coïncidence ? Où l’importance des temps verbaux dans "le conte à rebours" : - La thérapie par l’écriture.
الأسلوب الحكيم وأثره في الدرس البلاغي (القول بالموجب)

**أووقات ثقافية - مجلة الآداب والعلوم الإنسانية**

**Society, Culture and Human Behavior/ Language and Literature**

**AUTHOR(S)**

Faraj B.

**ARTICLE TITLE**

الأسلوب الحكيم وأثره في الدرس البلاغي (القول بالموجب)

**JOURNAL**

**YEAR**

2023

**PUBLICATION INFO**

1(26): 8-24

**THEME / SUBTHEME**

Society, Culture and Human Behavior/ Language and Literature

**ABSTRACT**

أدت من خلال هذا البحث أن أثرًا الأسلوب البلاغي لأخذ موضوعات علم الديماغوجي في الدرس البلاغي يجعله إثراءً مهذبًا، حيث يزوغ من خلال المحور النزاعي للتدريس الإنساني، ومن خلال العادات الثقافية المпередات للغة، عن صفاتها وسحرها، وَّهَوْعَةً أداةً أن الإنسان يقوم بالأعمال، والتعلم، وتعزيز فهم واستعمال المتصرف الثقافي والفنون. لكل ذلك يساعد على فهم ماهو في الكتاب، وتحقيق النجاح، والشعور بالإنسان، أمام نظام علمي في تواصل، وتفهم، من خلال الجمل والصوائد، وسُلّبَ الجُنْحَ أن تتلقى المخاطب بأمر لا يتوقعه. ولَهُ طرق منها، تترك سؤاله والإجابة عن سؤال، أو الإجابة عن سؤال سؤال، غير ما يُخص السائل، كذلك أقول له كان ينبغي أن تسأل عن كُل حُكْمٍ، أو إجابة عن QUESTION ما هو الهدف من الألف؟ في هذا، فإن الألف هي موافقة للقياس والحلم، فإن بعض المحبيات سأقرأ-onsا على هذه الإجابة، وسُلّبَ الجُنْحَ أن تتلقى المخاطب بأمر لا يتوقعه. ولَهُ طرق منها، تترك سؤاله والإجابة عن سؤال، أو الإجابة عن سؤال سؤال، غير ما يُخص السائل، كذلك أقول له كان ينبغي أن تسأل عن كُل حُكْمٍ، أو إجابة عن QUESTION ما هو الهدف من الألف؟ في هذا، فإن الألف هي موافقة للقياس والحلم، فإن بعض المحبيات سأقرأ-onsا على هذه الإجابة، وسُلّبَ الجُنْحَ أن تتلقى المخاطب بأمر لا يتوقعه. ولَهُ طرق منها، تترك سؤاله والإجابة عن سؤال، أو الإجابة عن سؤال سؤال، غير ما يُخص السائل، كذلك أقول له كان ينبغي أن تسأل عن كُل حُكْمٍ، أو إجابة عن QUESTION ما هو الهدف من الألف؟ في هذا، فإن الألف هي موافقة للقياس والحلم، فإن بعض المحبيات سأقرأ-onsا على هذه الإجابة، وسُلّبَ الجُنْحَ أن تتلقى المخاطب بأمر لا يتوقعه. ولَهُ طرق منها، تترك سؤاله والإجابة عن سؤال، أو الإجابة عن سؤال سؤال، غير ما يُخص السائل، كذلك أقول له كان ينبغي أن تسأل عن كُل حُكْمٍ، أو إجابة عن QUESTION ما هو الهدف من الألف؟ في هذا، فإن الألف هي موافقة للقياس والحلم، فإن بعض المحبيات سأقرأ-onsا على هذه الإجابة، وسُلّبَ الجُنْحَ أن تتلقى المخاطب بأمر لا يتوقعه. ولَهُ طرق منها، تترك سؤاله والإجابة عن سؤال، أو الإجابة عن S
المادة (1195) الجديدة من القانون المدني الفرنسي ومتلازمة كرابون

I. PUBLICATIONS
ARTICLES

Author(S)  Kassem M.

ARTICLE TITLE

JOURNAL

YEAR

PUBLICATION INFO

THEME / SUBTHEME

ABSTRACT

إذا كانت الأزمة الصحية العالمية الناشئة عن فيروس كوفيد-19، وتداعياتها وتونسها المستمرة على الأ讷، قد وقعت دول العالم أمام تحدي كبير بشأن مدى استعداداتها الرئيسية لمواجهة هذا التهديد الخطير، المستمر وغير المترقب. فبالرغم من أن الأثناء لم تكن ضعيفة أبداً، فان الأزمة الصحية والأثر المتواصل عليها أثر عظيم.

فمما تأثّرته أكثر، لذلك في زمن يأكل، دون سبب واضح. وهو زمن غير المتوقع، وفناً في زمن الرموز، ونفارس العالم، واللغة، واللغز، التي يعيش العالم حالياً تحت الأوضاع والظروف التي تشهدها.

وإذا كانت الأزمة الصحية ناجمة عن التهديدات في العالم، والتحديات التي تواجه العالم في القرن الحادي والعشرين، فإنه تشكل، إما هذا الأزمة الصحية في العالم، إلى الأذى العظيم في الأوضاع والتحديات من انتقالها.

وذلك في مختلف دول العالم، ولعل ذلك في مصدر ضرور في إغلاق وتوقف العديد من القطاعات والأنشطة الاقتصادية لعدّة سنوات متتالية، مما أدى بالضرورة إلى الأثر على تأثر الاقتصاد العالمي.

وإن هذه الأزمة الصحية ناجمة عن أزمة العقد المتصلة، من خلال هذا الواقع، من حيث ظروف الحياة بالذات، في مواجهة أزمة العقد الناشئة عن الأزمات غير المتوقعة، صحة كانت أم غير طبيعية أخرى.
مقالة الالغاء بارادة منفردة

حول قرار قضائي صادر عن محكمة النقض الفلسطينية في غزة في الطعن الجزائي رقم 95/2018

مجلة المحاماة التي تصدرها نقابة المحاميين النظاميين فلسطينيّين في غزة

2022

12: 12-24

Society, Culture and Human Behavior/ Social Justice Between Constitutional Text and Application

من المبادئ المقررة وفقاً لاجتهاد محكمة التمييز، وخلال حقه المطلق في تقدير الوقائع والأدلة، يتوجب على هذه المحكمة أن تقدّر حسب الأدلة والمعلومات المتاحة لها، كما أن المحكمة تتمتع بحرية مطلقة في تقديم裁د حسب الأدلة والمعلومات المتاحة لها.

ويعود للمحكمة أن تعتمد في تكوين اقتضاء على أي دليل يطمئن إليها، وتحدد في تحديد منصفة من حيث نسبتها، على تقييم الأخلاق والأخلاق، وتقييمها ونسبة خصوصية هذا المدين من محكمة النقض، أي أن يظل هذا المدين يظل ملتزماً بالأخلاق والأخلاق، وتحدد المحكمة في إطارها الأول، بما يضمن للمدين صحة حقه في تقديم الوقائع والأدلة.

وعند تقديم المحكمة على أي دليل يطمئن إليها، وتحدد في تحديد منصفة من حيث نسبتها، على تقييم الأخلاق والأخلاق، وتقييمها ونسبة خصوصية هذا المدين من محكمة النقض، أي أن يظل هذا المدين يظل ملتزماً بالأخلاق والأخلاق، وتحدد المحكمة في إطارها الأول، بما يضمن للمدين صحة حقه في تقديم الوقائع والأدلة.

ويعود للم.author(s) Zein S.

العهد شريعة المجتمعات، وهو المبدأ الأساسي الذي يحكم العقّود، يحدد الإلتزام القانوني بتنفيذ العقد، وهو المبدأ الأساسي الذي يحكم العقّود، يحدد الإلتزام القانوني بتنفيذ العقد.

هـو المبـدأ الأسسـي الـذي يحكم العـقّود و الـذي يحتـم التزام المتعاقدان بتنفيذ العقّد شريعة المتعاقدين

جميـع مـا يشـتمل عليـه العقـد و بطـريقـة تفـقـع مـع مـا يوجبـه حسـن النيـة. الا أنـه قد يحـصل أن يخـل أحدهـم بواجباته بأن يتخلـف عـن التنفيـذ او ينفـذهـا بصـورة جزئيـة او بصـورة معيبـة. فـي هـذه الحـالة، يترـبـع علـى مرتكـب الـخطأ المسـؤولية وتنـزل بـه الجـزاءات المـقرـرة بموجـب النـصـوص القانونيـة.

فـي القانـون اللبنـاني، يعتبـر التنفيذ العينـي الاصـل فـي تنفيـذ الموجبـات العقديـة. إذاً وـمن حـيث المبـدأ يـتم التنفيذ عـيناً لان للدائـن حقـاً مكتـساً فـي اسـتيفاء حقـه بالـذات الا إذا اسـتحـال ذلـك، عـندهـا يتحـول الـى حـقـال الغـاء او الفسـخ مـع التعويـض كإسـتثناء عـلـى الاصـل. الا ان هـذا الجـزاء الاخيـر يكـون مـقرـراً قضائيـاً فـلا يمكـن لـلارادة المـنفـردة ان تقضـي بـحل العقـد دون ان يكـون هنالـك بنـد مـدرج بهـذا الخـصـوص. إذاً غـاب عـن نـصـوص قانـون الموجبـات العقـود مبـدأ الغـاء بـالارادة المنفـردة حتـى ان القـرارات القضائيـة كانـت خجولـة ومتقاعسـة عـن تكريـس هـذا المبـدأ الـذي يتناسب والواقـع العملـي.

، ادخـل مبـدأ الالغـاء بـارادة منفـردة كمـبـدأ 2016

أما المشـريع الفرـنسي وفـي آخـر تعديـل لقانـون العقـود سـنة منافـس للالغـاء القضائـي بحيـث سـمح للمتعاقـد المضـرور مـن اخـلال الطرف الآخـر بحـل الرابطـة العقديـة دون الرجـوع الـى القضـاء وضـمن الشـروط المـحددة فـي النـصـوص القانونيـة الجديـدة. امـا اجتهـادات المحاكـم الإنجـليزيـة كانـت سـباقه فـي تكريـس الالغـاء بـارادة منفـردة كأصـل والتنفيذ العينـي كإسـتثناء. ولقـد ذهـبـت ابعـد مـن ذلـك بتكريـس مبـدأ الالغـاء بـارادة منفـردة الاستباقي واعطـت الحـق لاحـد أطـراف العقـد ان ينهـي الرابطـة العقديـة قبـل حلـول الاجـل واثبـات تقاعـس الطـرف آخـر، وذلـك اذ استـشعر الدائـن ان المدـين بالموجـب لن يـسـتطيع ان يوفـي التزامـاتـه العقـديـة فـي المواعيـد المحـددة.

واختـراً يعتبـر الدفـع بعـدم التنفيذ دفعًا يتمسـك بـه أحـد أطـراف العقـد بسـبب عـدم تنفيـذ الطـرف الآخـر بـما تـزمـبـ بـه. بحيـث يحـق لأي طـرف مـن أطـراف العلاقـة التعاقديـة ان يمتنع عـن الوفـاء كوسـيلة ضعـط يمارسـها لإجـباره عـلـى ذلـك. ولقـد اورد المشـريع الفرـنسي هـذا الجـزاء صراحـةً فـي التعديـل الجـديد لقانـون العقـود ووصـفت محكمـة التمييـز اللبنانيـة بأنـه وسـيلة اكـراه لقـام أحـد أطـراف العلاقـة التعاقديـة مبـعداً عن الماجمـعة السنوية.

تكمـن اهميـة هـذه الدراسـة فـي تحديـد التوجهـات الحديثـة لجـزاءات الاخـلال بالعقـد، والاضـاءة عـلـى نواقـص قانـون الموجبـات العقـود اللبناني مـن خـلال مقارنـته مـع القانـون الفرـنسي. إذاً تمكـن الاشـكالية فـي معرفـة ما إذا كان المشـريع الفرـنسي قد أورـد الإلتزامات المعـهودة، والذى كان يعـود تلك الجـزاءات إلى حقـال العقـود، وأيضاً يعـود تلك الجـزاءات إلى حقـال العقّود للدّوانة.

المبحث الأول: الالغاء بارادة منفردة

المبحث الثاني: الدفع بعدم التنفيذ

Author(s) Zein S.
**ARTICLE TITLE**
Le Crédit et les Autres Modalités de Financement de L’entreprise au Sein d’un Groupe

**JOURNAL**
USEK Law Journal

**YEAR**
2023

**PUBLICATION INFO**
2023: 20-30

**THEME / SUBTHEME**
Society, Culture and Human Behavior/ Corporate Social Responsibility (in the Scope of Recent Development in the Corporate Law)

**ABSTRACT**
Les groupes de sociétés sont courants dans le monde des affaires et sont souvent utilisés pour diverses raisons, telles que la réduction des coûts, l’expansion des activités et la diversification des risques. La société mère peut exercer un certain degré de contrôle sur les filiales en fonction de sa participation dans ces dernières. Cela peut se traduire par une coordination des activités, une centralisation des décisions et une mise en commun des ressources. Les filiales peuvent bénéficier de l’expertise et des ressources de la société mère, tandis que la société mère peut bénéficier de la diversification des activités et de la réduction des risques. Les relations entre les sociétés d’un groupe peuvent être complexes et nécessitent une gestion minutieuse pour assurer le succès du groupe dans son ensemble. Toutes ces considérations nous poussent à nous interroger sur l’étendue de l’indépendance économique au sein d’un même groupe? Et sur la possibilité de la société mère d’intervenir afin de sauver une filiale en difficulté sans recourir au crédit bancaire?

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**ARTICLE TITLE**
SME Financial Status Analysis and the Essential Requirement for Financial, Operational and Legal Restructuring (in Light of the Lebanese Legal System)

**JOURNAL**
USEK Law Journal

**YEAR**
2023

**PUBLICATION INFO**
2023: 10-40

**THEME / SUBTHEME**
Creative Sustainable Development/ Balanced Development, Cultural, Social and Economical in the Lebanese Constitution

**ABSTRACT**
Small and medium enterprises are important pillars in every economy, but in terms of financial performance some of them are inherently more exposed to financial volatility. Financial crisis affecting enterprises is predominantly caused internally and it endangers the continued existence of the business. This article presents an integrative approach that correlates the financial performance of an enterprise with the need to develop and implement a compatible and constructive restructuring plan, therefore, a broad range of fundamental processes will be introduced, explained and analyzed.

For this purpose, we shall first define in this monograph the financial statements of an enterprise and interpret their content inclusive of financial transactions and operations. Furthermore, we shall describe how to evaluate the financial standing of an enterprise and its financial performance. The financial evaluation process will be accomplished by means of an enterprise’s Financial statements analysis using ratio analytical techniques as a financial key performance indicator (KPI) or metrics, to track, measure and analyze enterprise financial health and assess its economic viability; a case study will be employed to focus on the computation methods and techniques.

Enterprises showing financial turmoil as a consequence of financial statements analysis will undergo a Restructuring process in order to avoid insolvency and business failure. Financial and operational restructuring are effective ways to assist small and medium enterprises improving their capital structure and re-organizing their operations. Accordingly, the last part of this paper will focus on the paramount importance of the legal aspect of restructuring, the criteria to validate a restructuring process and the potential reasons of enterprise’s financial distress. The latter will culminate with the development of a restructuring plan that includes a set of remedial steps and recovery measures determined in order to ensure the reasonable efficiency of the enterprise, its products and services.
<table>
<thead>
<tr>
<th>ARTICLE TITLE</th>
<th>The Civil Liability for Artificial Intelligence</th>
</tr>
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<tbody>
<tr>
<td>JOURNAL</td>
<td>BAU Journal-Journal of Legal Studies</td>
</tr>
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<td>2023</td>
</tr>
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<td>PUBLICATION INFO</td>
<td>2022: 1-7</td>
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<tr>
<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Recent Developments in the Civil and Criminal Procedures and Accomplished Justice</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>Artificial intelligence (AI) is rapidly transforming the way we live and work, with applications in fields as diverse as healthcare, finance, and transportation. However, with the increasing use of AI comes new legal and ethical challenges, including the question of civil liability for harm caused by AI systems. In the French legal system, there is a growing need to address these issues and develop a clear framework for defining and attributing responsibility for harm caused by AI. This article will explore the legal and ethical issues surrounding civil liability for AI in France, including the applicable legal norms and principles, and the challenges involved in defining and attributing responsibility. Ultimately, the goal is to provide a comprehensive overview of the legal landscape in France and to highlight the key issues that need to be addressed in order to ensure that AI is used in a responsible and ethical manner.</td>
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<th>ARTICLE TITLE</th>
<th>Virtual Hearings in Arbitration</th>
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</tr>
<tr>
<td>PUBLICATION INFO</td>
<td>2022: 40-50</td>
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<tr>
<td>THEME / SUBTHEME</td>
<td>Creative Sustainable Development/ Role of NGOs in the Sustainable Development/ the Role of Local Bodies in the Sustainable Development</td>
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<tr>
<td>ABSTRACT</td>
<td>Two decades ago, &quot;technology&quot; and &quot;arbitration&quot; were never mentioned together in the same sentence. Today, in 2023, technology and arbitration are inseparable due to the fact that a wide spectrum of technology related disputes are being arbitrated. The world has witnessed a vast evolution of technology in arbitration where the expansion of cloud data storage, mobile communications, social networking platforms, have produced many new topics for arbitration. Some of these technologies (zoom, Microsoft teams) have influenced the way arbitration is conducted in a cyber space setting. Holding a hearing in person may sometimes be impossible or cause a delay in the arbitration process, the pandemic revealed this weakness, resorting to technology has solved the problem by conducting hearings via several platforms; virtual hearings have replaced the in-person ones in particular during the Covid-19 pandemic. This paper will focus on the concept and legal framework for virtual hearings in arbitration. It will first examine the existing laws in different jurisdictions and how they deal with issues regarding to arbitration. An analysis of several institutional arbitration rules will also be conducted. The paper will further examine the legal and technical objections which are frequently encountered in the practice of virtual hearings.</td>
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Author(S) | Zein T.
### I. PUBLICATIONS

#### ARTICLES

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Nasser H., Beydoun A., Ali A.</th>
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<tbody>
<tr>
<td>ARTICLE TITLE</td>
<td>A Review on Hotel Reputation: Dimensions and Theories</td>
</tr>
<tr>
<td>JOURNAL</td>
<td>Pakistan Journal of International Affairs</td>
</tr>
<tr>
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</tr>
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<td>DOI: 10.52337/pjia.v6i1.708</td>
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<tr>
<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Human Behavior in Organizations</td>
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<tr>
<td>ABSTRACT</td>
<td>The last decades have observed an escalating growth of research on corporate reputation because of its importance as a source of competitive advantage. Service industries rely on corporate reputation to differentiate themselves from competitors, and to send different signals to multiple stakeholders about their performance. Nevertheless reputation in the hotel industry can be damaged easily because of the intangibility and the simultaneous production and consumption of provided services. The current article provides a review on the different dimensions used to measure corporate reputation, also it summarizes the different theories that is used to explain the reputation phenomenon. Finally, it spots the light on some concepts that are different from reputation, however used interchangeably by researchers in many contexts.</td>
</tr>
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* Names in Bold Indicate BAU Authors
### Deciphering the Dynamics of Entrepreneurial Motivation and Critical Entrepreneurial Intention Among Lebanese Graduates: Unveiling the Role of Perceived Risk in the Post-Pandemic

#### Author(s)
Zakheim N., Ramadan M., Baydoun H., Bou Zakhem N., Chahine S., Al Haddad M., El Fawal A., Al Maalouf, N.

#### ARTICLE TITLE
Exploring the Paradoxical Link between Employee Loneliness and Employee Creativity in the Post-Pandemic

#### JOURNAL
Kepes

#### YEAR
2023

#### PUBLICATION INFO
21(3): 379-392

#### THEME / SUBTHEME
Society, Culture and Human Behavior/ Human Behavior in Organizations

#### ABSTRACT
This study investigates the paradoxical relationship between employee loneliness induced by the pandemic and subsequent creativity in the post-pandemic era. Mediating the link between loneliness and creativity, intrinsic motivation is examined alongside the moderating influence of self-efficacy. Data collected from 208 teachers in Lebanon was analyzed through the PLS-SEM. The results unveil a significant mediating effect of intrinsic motivation, shedding light on how pandemic-induced loneliness propels employees towards heightened creative output. Furthermore, self-efficacy is identified as a significant moderator, influencing the strength of the loneliness-creativity relationship. This study contributes to a profound understanding of the intricate interplay between emotional experiences, intrinsic motivation, and efficacy in shaping post-pandemic creativity among employees.

### Factors Influencing Online Shopping Intentions in the Post-Pandemic Era: A Retrospective Study Among Lebanese and Iraqi Consumers

#### Author(s)
Mawlawi A., El Fawal A., Ibrahim G., Ramadan M., Baydoun H., Massoud M., Bou Zakhem N., Hamieh M., Yassine D.

#### ARTICLE TITLE
Factors Influencing Online Shopping Intentions in the Post-Pandemic Era: A Retrospective Study Among Lebanese and Iraqi Consumers

#### JOURNAL
Kepes

#### YEAR
2023

#### PUBLICATION INFO
35(1): 171-204

#### THEME / SUBTHEME
Society, Culture and Human Behavior/ Human Behavior in Organizations

#### ABSTRACT
Amidst the post-pandemic paradigm, this study delves into the interplay between entrepreneurial motivation factors and the intention of Lebanese students towards entrepreneurship. Employing a quantitative approach, a survey was administered to 326 randomly selected students. Through Principal Component Analysis (PCA) and structural modeling, the research examines how entrepreneurial motivation influences entrepreneurial intention, with a focus on the mediating role of perceived risk. The findings underscore the pivotal role of motivational drivers, including autonomy, achievement, locus of control, participation in entrepreneurial education, and profit motives, all significantly shaping Lebanese university students’ entrepreneurial intention. Notably, the correlation between entrepreneurial motivation and intention is mediated by risk perception. In a world recalibrating post-pandemic, universities are pivotal in fostering entrepreneurship through robust education, enhancing students’ motivation for entrepreneurial pursuits. Thus, bolstering entrepreneurial motivation augments students’ intention to embark on entrepreneurial endeavors. Moreover, this study acknowledges the significance of sustainable development in the post-pandemic context, where fostering entrepreneurship aligned with sustainable goals can contribute to both economic growth and societal well-being. This study contributes to understanding student entrepreneurial motivation, risk perception, and intention, offering a validated framework for future research. These findings hold practical implications for educators, advocating the integration of entrepreneurship in post-pandemic higher education curricula, enriching knowledge dissemination in an evolving environment.
ABSTRACT

The COVID-19 pandemic has accelerated the transition to a more digitized world and brought about significant changes in online shopping habits that could have long-term implications. With governments implementing restrictions and consumers concerned about potential health risks associated with in-store buying, there has been a notable surge in online shopping. However, since late 2022, governments have started easing regulations, and consumers are gradually returning to brick-and-mortar establishments. The primary objective of this study is to investigate the factors influencing internet shopping following the pandemic. A retrospective quantitative study was conducted over two periods, focusing on the same sample of consumers in Lebanon and Iraq. The findings reveal that previous online purchasing experiences, attitudes toward online shopping, and perceived usefulness all play crucial roles in shaping online shopping intentions in the post-COVID-19 era.

Author(s)  Nasser H., Beydoun A., Ali A.

ARTICLE TITLE  Investigating the Mediating Role of Perceived Corporate Reputation on the Relationship between Customer Satisfaction, Customer Trust, and Loyalty: A Study of Lebanese Hotels

JOURNAL  European Journal of Science, Innovation and Technology

YEAR  2023

PUBLICATION INFO  3(1): 112-126

THEME / SUBTHEME  Society, Culture and Human Behavior/ Human Behavior in Organizations

ABSTRACT

The last decades have observed an escalating growth of research on corporate reputation because of its importance as a source of competitive advantage. Service industries rely on corporate reputation to differentiate themselves from competitors, and to send different signals to multiple stakeholders about their performance. Nevertheless reputation in the hotel industry can be damaged easily because of the intangibility and the simultaneous production and consumption of provided services. In addition, reputation had a significant role in hotels' recovery in Lebanon during the post COVID-19 period where reputed hotels were able to survive and recover faster. The current paper examined the influence of customer satisfaction and trust on perceived corporate reputation and customer loyalty among 135 hotel customers in Lebanon using path analysis with AMOS23 software. The results showed that customers in the hotel context in Lebanon exhibited no loyalty towards their hotels. Moreover, customer trust and customer satisfaction has a great role in influencing perceived corporate reputation.
<table>
<thead>
<tr>
<th>ARTICLE TITLE</th>
<th>Nurses' Emotional Intelligence Behavior and the Mediating Role of Job Stress in Lebanon</th>
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<tr>
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<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Human Behavior in Organizations</td>
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<tr>
<td>ABSTRACT</td>
<td>The aim of this paper is to examine the influence of emotional intelligence, namely self-awareness, self-management, social awareness and management's relationship on the nurse's behavior within the Lebanese context. It specifically examines the indirect effect of the nurses' EI and its sub skills on behavior, exit, voice, loyalty, neglect, through the mediating role of job stress. A total sample of subjects consisted of 365 registered nurses actively working in the Lebanese hospitals during the COVID 19 period. Mediation was tested using Baron and Kenny (1986)’s framework. The findings demonstrate that the EI elements (Self-awareness, self-management, social awareness and management’s relationship) had a significant positive effect on nurses’ behavior. Another finding revealed the negative effect of emotional intelligence with the subskills, namely SA, SM, SoA, and SK, on job stress. In particular, SM was the most important factor in decreasing stress. Moreover, SM had a greater negative influence on job stress than SA did, followed RR and the least one is the SoA. In addition, the results proved the existence of the negative partial mediation of job stress among the four skills of emotional intelligence and behavior. This result highlights the importance of skills like emotional intelligence to maintain the good behavior of the nurses.</td>
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<td>13(2); 1-9</td>
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<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Human Behavior in Organizations</td>
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<tr>
<td>ABSTRACT</td>
<td>This study aims to examine the direct effect of nurses’ emotional intelligence (EI) on their job satisfaction, as well as the indirect effect through the mediating role of job stress (JS). The sample consisted of 365 nurses working in Lebanese hospitals during the COVID-19 period. The results revealed that EI elements (Self-awareness, self-management, social-awareness and relationship-management) had a significant positive effect on nurses’ job satisfaction. The existence of the negative mediation of job stress between the four EI skills and attitudes was found. The generalizability is limited to the Lebanese registered nurses in hospitals. Future research needs to incorporate other samples like the private nurses. A comparative study to provide further clarify the effect of EI and JS on the nurses at different levels is needed. This study extends research on organizational behavior to Eastern culture by examining the direct effect of EI on attitudes as well as the indirect effect through the mediating effect of JS which was not previously tackled. It suggests that the four skills of EI have a significant positive effect on nurses’ attitudes. It emphasizes the full mediation role of JS. The obtained results indicated that hospitals can increase job satisfaction bettering the employees’ EI.</td>
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ARTICLE TITLE
Offshore Companies Audit Process Effectiveness: Evidence from Lebanese Auditing Profession

JOURNAL
BAU Journal-Society, Culture and Human Behavior

YEAR
2023

PUBLICATION INFO
4(2): 1-15

THEME / SUBTHEME
Society, Culture and Human Behavior/ Human Behavior in Organizations

ABSTRACT
This research aims to examine whether audit planning, audit strategy, and audit documentation have a significant impact on the effectiveness of the audit process. It also aims to explore the impact of audit technology on the audit process for offshore companies in Lebanon. This study adds to and contributes to the literature that has examined the separate impacts of each of the above variables on the effectiveness of the audit process. The sample size of this study is 106 certified public accountants who are members of the Lebanese Association of Certified Public Accountants (LACPA). Empirical data was collected using a questionnaire form to test four generated hypotheses. Results show that for e-commerce companies, there is a positive and significant impact of audit planning and audit documentation, on the effectiveness of the audit process. In contrast, there is no significant positive impact of audit strategy on the effectiveness of the audit process. On the other hand, the outcome for offshore companies shows that there is no positive significant impact of audit planning on the effectiveness of the audit process, while there is a positive significant impact of audit strategy and audit documentation on the effectiveness of the audit process. Regarding the association between the adoption of audit technology tools and the effectiveness of the audit process, results show that offshore companies support this association. The researcher faced restrictions on the size of the sample used in this study. This limitation can affect the final results, as the smaller the sample size, the higher the marginal error.

Author(s)
Kibrit J., Nouraldeen R., Hegazy W.

ARTICLE TITLE
Risk Tolerance, Time Horizon, and Estate Intentions: Just How Important Are “Circumstances and Associated Emotions?”

JOURNAL
BAU Journal-Society, Culture and Human Behavior

YEAR
2023

PUBLICATION INFO
4(2): 1-13

THEME / SUBTHEME
Society, Culture and Human Behavior/ Human Behavior in Organizations

ABSTRACT
This study tests the importance of socio-demographic and psychological variables for investor intentions, including risk tolerance, time horizon, and estate intentions. Overall, hope is the psychological variable most consistently related to the dependent variables of risk tolerance, time horizon, and estate intentions. Age, household income, investment experience, and work experience pale in comparison with the psychological variables of hope and openness to new experience, both of which are positively associated with the dependent variables. Pre-social attitudes are also important as a moderating variable. The most interesting findings are that women with higher levels of education have higher levels of risk tolerance, whereas men with higher levels of education have lower levels of risk tolerance, findings contrary to previous research showing education to be positively associated with risk tolerance, and males to be more risk tolerant than females. Old stereotypes regarding gender preferences need to be re-examined. Much of the existing literature is based on findings from decades past, when sex roles were more differentiated, same sex marriage was illegal, and women’s career opportunities were more constrained. As Pan and Statman (2012; 2013) suggest, circumstances such as changing family patterns can affect investor preferences and behaviors. This study also demonstrates that positive psychology emotions such as hope or confidence in the future may serve to inoculate investors from panic selling or lessen the likelihood of excessive trading. Consequently, in a crisis investors with attitudes associated with positive psychology may be less prone to wealth-destroying behavior such as “going to cash.” Conversely, investors low in such attitudes are more likely to engage in such behaviors.

Author(s)
Beydoun A., Paul K.
<table>
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<tr>
<th>ARTICLE TITLE</th>
<th>The Determinants of E-commerce Audit Process Effectiveness: Does Audit Technology Matter?</th>
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<td>JOURNAL</td>
<td>BAU Journal-Society, Culture and Human Behavior</td>
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<td>YEAR</td>
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<td>PUBLICATION INFO</td>
<td>4(2): 1-16</td>
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<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Human Behavior in Organizations</td>
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<tr>
<td>ABSTRACT</td>
<td>This paper examines the impact of audit planning, audit strategy, and audit documentation on the effectiveness of the audit process of e-commerce companies, along with the moderating role of audit technology on these associations. Data was collected through a questionnaire filled by 106 auditors who are members of the Lebanese Association of Certified Public Accountants. Results showed that audit planning and audit documentation have a positive significant impact on the effectiveness of the audit process, while audit strategy has no impact. The outcome also confirmed the association between audit technology tools and the effectiveness of the audit process. Moreover, the results showed that there is a moderating effect of audit technology tools on the association between audit strategy and the effectiveness of the audit process, but in contrast, there is no significant moderating effect of audit technology tools on the relationships between audit planning, audit documentation, and the effectiveness of the audit process.</td>
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<th>ARTICLE TITLE</th>
<th>The Impact of Business Intelligence and Big Data on Tourism in Europe</th>
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<td>JOURNAL</td>
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<td>PUBLICATION INFO</td>
<td>13(3): 1793-1800</td>
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<td>THEME / SUBTHEME</td>
<td>Creative Sustainable Development/ Sustainability in Business</td>
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<tr>
<td>ABSTRACT</td>
<td>The purpose of this study is to examine the impact of business intelligence and big data on tourism in Europe. Surveying a sample of 500 tourism professionals from a range of tourism sectors, including hotels, travel agencies, tour operators, and destination management organizations (DMOs) over a two-month period, the study found that the implementation of business intelligence and big data is associated with an increase in revenue, a higher level of customer satisfaction, and improved decision-making processes. Recommendations for practice and future research are then proffered.</td>
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<th>ARTICLE TITLE</th>
<th>The Impact of Technology Readiness and Use Perceptions on Students’ Adoption of Artificial Intelligence: The Moderating Role of Gender</th>
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<td>JOURNAL</td>
<td>Development and Learning in Organizations</td>
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<td>YEAR</td>
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<td>PUBLICATION INFO</td>
<td>37(3): 7-10</td>
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<td>THEME / SUBTHEME</td>
<td>Society, Culture and Human Behavior/ Human Behavior in Organizations</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>The aim of this study is to examine the effect of technology readiness (TR), perceived usefulness (PU) and perceived ease of use (PEOU) on the adoption of Artificial Intelligence (AI) by accounting and auditing students. The moderating role of gender is also examined in this research. The data of this study was collected through a questionnaire filled by 330 accounting and auditing students enrolled in the Lebanese private universities during the academic year 2021–2022. The hierarchical multiple regression analysis was conducted to test the study’s hypotheses. The results show that TR and PU affect positively the adoption of AI; however, PEOU has an insignificant impact on the students’ decision to adopt AI. The outcomes also reveal that males tend more to adopt AI than females and gender moderates the associations between TR, PU, PEOU and adoption of AI.</td>
</tr>
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</table>
Practical Implications
The results of this study suggest that accounting educators should adjust the curricula of the accounting programs and prepare students to be well equipped with technological skills through training them on AI software.

Originality/Value
According to the researcher’s knowledge, this study is the first that examines the moderating effect of gender on the associations between TR, use perceptions and AI adoption by accounting and auditing students. Besides, this research is the first that investigates the antecedents of AI adoption by students in Lebanese private universities. Furthermore, this study contributes to the limited literature that addresses this contemporary and vital issue in the Middle East.

ARTICLE TITLE
Toward Digital Transformation and Business Model Innovation: The Nexus between Leadership, Organizational Agility, and Knowledge Transfer

JOURNAL
Administrative Sciences

YEAR
2023

PUBLICATION INFO
DOI: 10.3390/admsci13080185

THEME / SUBTHEME
Science and Technology/ Information and Communication Technology in Business

ABSTRACT
The post-pandemic age has heightened the importance of digitalizing organizational practices and fostering innovation for SMEs to ensure resilient business operations in a volatile work environment. This research paper examines the impact of digital transformation leadership on the digitalization of business practices and the development of innovative business models while considering the roles of organizational agility and knowledge transfer. A survey of 270 employees from SMEs in Lebanon was conducted using the convenience sampling technique. Data analysis was performed quantitatively through Partial Least Squares—Structural Equation Modeling (PLS-SEM). The results reveal that adopting digital transformation leadership fosters organizational agility, enabling effective digital transformation and business model innovation with a robust knowledge transfer system. This study contributes to the fields of digital transformation and innovation, and offers practical insights for SME managers navigating uncertainties and market volatility in the post-pandemic period.

2. BOOK CHAPTERS

Author(S)
Abdul Hay D.

BOOK CHAPTER TITLE
The Accounting of Human Capital

BOOK TITLE
The Routledge Handbook on the Middle East Economy

YEAR
2023

PUBLISHER
Suliman S. Olayan School of Business - American University of Beirut

ISBN
0533018627

THEME / SUBTHEME
Creative Sustainable Development/ Sustainability in Business

ABSTRACT
This chapter explores the accounting perspective of human capital (HC) by applying its main principles of recognition, measurement, presentation, and disclosure. In general, HC is recognized as assets that are rights managed by entity and have the potential to make profits. However, some indicators don’t describe an asset and need to be derecognized as expenses based on other standards. There is no agreed-upon monetary model for applying human capital measurement, despite exploring its general models. Some HC indicators have an economic value, whereas most are evaluated based on quantitative or qualitative measures. Semi-structured interview and questionnaires are used to indicate the following: a survey study is performed with a model of thirty CFOs (Chief Financial Officers) from banks in Lebanon and 35 academic people from the Lebanese High schools. The survey’s result reveals that the real level of HC (Human Capital) demonstration and declaration in the Lebanese banks is rising and that the stakeholders accept the suggested plan for accounting of HC. This chapter will interest rule makers, managers, accounting bodies, and lawmakers to create appropriate reporting guidelines.
The Relationship Between Customer Perceptions of Green Marketing Influence on Buying Behavior

Handbook of Research on Artificial Intelligence and Knowledge Management in Asia’s Digital Economy

2023

IGI Global

9781668458501

Society, Culture and Human Behavior/ Personality and Behavior

The aim of this chapter is to examine the relationship between consumer perception of green advertising and consumer buying behavior. This study was conducted on consumers in Lebanon using a structured questionnaire. A total of 135 responses are included in this study using a convenience sample approach. Results showed that within green marketing, first, environmental knowledge is a determinant of purchasing green products. Secondly, the company image influences consumer intention to purchase green products. The improved features of the product influence significantly the green purchasing intention. Finally, the company credibility and skepticism towards green claims has a negative influence. Moreover, the result accredited facets of green marketing that companies need to focus on while designing advertising strategies.
### ARTICLE TITLE

A Comparative Study of Mediterranean Courtyard Houses and the Bioclimatic Impact on Their Design from Four Axes: Historical, Environmental, Social and Geometry

**JOURNAL**

Green Building & Construction Economics

**YEAR**

2023

**PUBLICATION INFO**

4(1): 123-137

**THEME / SUBTHEME**

Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

**ABSTRACT**

As a result of the many efforts made in recent decades to implement bioclimatic criteria and passive house models in Mediterranean areas, traditional architectural typologies can play a role in the contemporary environmental architectural framework. The interactive and adaptive relationship between climate, site, and building is a fundamental rule in the climate-responsive approach to reducing environmental impacts. Lately, this idea has been extended to include protecting the cultural identities of places. Many cases in the Mediterranean Basin show that conventional courtyard houses can provide high adaptability, sustainability, and functionality. Mediterranean courtyard houses are founded on a set of adaptable and sustainable standards derived from a combination of active and passive design approaches. This paper presents a comparative study of courtyard houses in five Mediterranean countries: Spain, Türkiye, Greece, Libya, and Palestine, addressing four areas of interest: history, environment, society and geometry. Considering the bioclimatic approach as a critical component in reorienting the construction process, the study's goal is to compare and evaluate the inner courtyards of these Mediterranean countries, analysing the most important constant factors and modification paths. The study concludes that the courtyard morphology is a shared human legacy with a past and future as it meets its inhabitants' physical and sociocultural requirements. Furthermore, despite the differences in some aspects, courtyard houses were constructed throughout the Mediterranean with a common meaning of heaven on earth, this could imply that the courtyard garden is the world’s meaning.

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**Author(s)**

Bassal C., Rabea M., Felix M.

* Names in Bold Indicate BAU Authors
### A Hybrid Approach Based on Building Physics and Machine Learning for Thermal Comfort Prediction in Smart Buildings

**ARTICLE TITLE:** A Hybrid Approach Based on Building Physics and Machine Learning for Thermal Comfort Prediction in Smart Buildings  
**JOURNAL:** Architecture & Planning Journal-APJ  
**YEAR:** 2023  
**PUBLICATION INFO:** 28(3): 1-8  
**THEME / SUBTHEME:** Science and Technology/ Digital Technology in Architecture  
**ABSTRACT:** One of the most important challenges facing the world is the application of modern technology in order to create smart buildings that achieve sustainable development goals (SDGs). Thermal comfort and reduction of energy consumption in buildings are considered important factors which, in turn, are reflected in creating a healthy environment and improving human productivity. Internet of Things (IoT) provides an ideal solution for collecting real-time data on the factors affecting indoor thermal comfort and energy consumption. However, comfort level is subjective and depends on many factors, which may not be learned by conventional models, an integrated model depending on thermal comfort factors is needed. In this work, a hybrid physics-based model incorporated with machine learning techniques is used for the prediction of thermal comfort inside buildings. XGBoost (xXtreme Gradient Boost) algorithm method was used due to its abilities to handle complex problems. A calculated dataset was extracted from the physics-based model gathered with the environmental variables data such as humidity, moisture, temperature, and air velocity collected from IoT devices. The results show an improvement in the prediction of the thermal comfort approach as compared with the conventional models. The XGBoost algorithm can exhibit an effective solution for eliminating deficiencies of traditional models and can be used when designing smart buildings, simulating, and evaluating the designed buildings, controlling energy consumption, and achieving thermal comfort.

### Applying 3D Printing Technology in Constructing Sustainable Houses

**ARTICLE TITLE:** Applying 3D Printing Technology in Constructing Sustainable Houses  
**JOURNAL:** Architecture & Planning Journal-APJ  
**YEAR:** 2023  
**PUBLICATION INFO:** 29(1): 1-26  
**THEME / SUBTHEME:** Science and Technology/ Digital Technology in Architecture  
**ABSTRACT:** Innovation is advancing at an ever-expanding pace and has been for decades. Regular objects have gotten to be minimal in measure and cheaper to deliver. 3D printing technology (3DP), also known as additive manufacturing (AM), has gained rapid development in recent years, as a method for turning a computer file into 3D solid objects of any shape or geometry. The creation is accomplished by building up layers of a certain substance until the full item is produced. The 3D printing technologies, comparing to traditional techniques of constructing the buildings, could be considered as environmentally friendly because they give almost unlimited possibilities for geometric complexity realizations. The primary issue is that the building sector has a significant negative influence on the environment. Some modern technologies are being applied to reduce materials usage and carbon emissions like 3D printing. The major purpose of this article is to compare between conventional approaches and 3D printing technology to assess their effects on sustainable housing, evaluate how 3D printing functions and consider its advantages and disadvantages. To conduct the research, a comparison between traditional techniques and 3D printing technology will take place to see their impacts on sustainable houses; theoretical studies will be done on both 3D printing concepts and application in architecture and its effectiveness on environment and sustainability. In addition to the practical studies, experimental ones where case studies are selected according to the inductive method mentioning the selection criteria. Three case studies will be analysed, where the 3D printing technology is achieved, TECLA, a circular housing prototype in Ravenna, Italy, the Dubai municipality and Beckum First 3D Printed house in Germany.
Architectural Representations of Human Rights

The United Nations defines the Human Rights as the rights of all human beings, regardless of race, gender, language, religion, nationality, or any other status. These rights include all claims to live freely, to educate and work in equality, and to inhabit humanistic urban and architectural spaces. Throughout the history of architecture, civilizations have generated different perspectives towards respecting the human rights. Temples of Ancient Egyptian Architecture crushed the human scale to introduce religious experiences to their visitors. Tibetan temples over mountains enforced people to make anti-humanistic journeys to reach them. After thousands of years, the mega-scale palaces and cathedrals in the Gothic era underestimated the human scale due to the powerful rule of Church in Europe. On contrary, pioneers of Renaissance Era made an intellectual revolution to respect humanism through humane proportions. After a while, the Industrial Revolution employed all materials, machines, and sciences to serve humanism. Architectural projects therefore fulfilled the physical without covering the spiritual and emotional human needs. This remained until 1960s when the postmodern architecture emerged. Nowadays, several architectural projects have unfortunately neglected achieving equality for all categories of users. Critics, such as Jane Jacobs 2000, have pointed out that a number of starchitects - pioneers of the architectural world - have designed anti-humanistic spaces. Within the onslaught of digitization, deconstruction, and free forms, some architects have celebrated the power of building technology in designing non-traditional compositions, disregarding the humane essence. These uncanny forms have missed the feeling of humane dimension.

This research aims to investigate the relationship between architecture and human rights, trying to propose a new architectural manifestation putting the human rights as the first priority. In order to achieve this aim, the paper followed scientific methods, starting by literature review defining the meaning of human rights, its values, and its relation to the humane architecture. To collect this data, the authors depended on desk research and reviewed previous readings to highlight the examples that put the humane factor at the first place as the main design-concept. A deep analysis for two case studies has been conducted, based on observations, photos, and documentation. Authors experienced these two projects during personal site visits. The analysis detected the architectural representations of humane design in both projects. A comparison between the case studies presented the most important elements and features that their architects were keen to apply. The research concludes that architecture and human rights are inseparable, and the design of human space needs a symphony of multiple tasks and elements including specific materials, meaningful spaces, and advanced technology.

Calculating Vandalism Risk Assessment for Archaeological Findings Within Heritage Buildings: The Case of Al-Attar Historical Mosque in Tripoli Lebanon

A heritage building is a genuine witness for the past and it mostly correlates with communities’ collective memory. It involves a considerable economical asset for cultural tourism in addition to other emotional values. However, building archeology is slightly exposed when handling historical buildings; it is subject to reburial to minimize potential risks and to keep it for future generations. The aim of this research is to explore the validity of exposing an archeological feature by establishing an estimation for vandalism risk through an assessment for society's attitude concerning the new image given to a historic mosque with exposed archeological features. This research handles the ABC calculation method for vandalism risk assessment, and it concludes the risk magnitude by analyzing the social impact for the existence of an archeological feature within Al-Attar historic mosque in Tripoli by performing focus group research targeting persons in direct relation with the subject. The research will open doors for further studies basing on risk magnitude assumption, risk potential sources and different perspectives when handling archeological features; the findings will lead to significant implications for similar cases in Lebanon and in other global similar cases.
**ARTICLE TITLE**  
Digital Storytelling: Youth’s Vision of Beirut’s Contested Heritage

**JOURNAL**  
Storytelling, Self, Society

**YEAR**  
2022

**PUBLICATION INFO**  
18(1): 1-27

**THEME / SUBTHEME**  
Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture

**ABSTRACT**  
This article presents a framework for strengthening the capacity of youth to participate effectively in preserving the heritage of Beirut, Lebanon. We facilitated ground-testing methodologies, best practice examples, and new avenues for collaboration that brought education development into play in addition to facilitating a series of capacity-building workshops with the youth that comprised digital data gathering and presentation methods for designing online digital platforms to raise their engagement with and awareness of the city’s contested heritage. The tool kit provides an opportunity and guidelines for developing an effective participatory approach that enables youth to tell their stories.

**ARTICLE TITLE**  
Effect of Green Façade on the Urban Microclimate with Different Street Canyon

**JOURNAL**  
Architecture & Planning Journal-APJ

**YEAR**  
2023

**PUBLICATION INFO**  
29(1): 1-10

**THEME / SUBTHEME**  
Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

**ABSTRACT**  
Using simulation tools, this study investigates the effect of green walls (GWs) on the urban heat island (UHI) phenomenon within different street sizes. It can be planted without taking up more area and could enhance the microclimate environment, which is why it has a wide range of use potential in urban areas. Because Mina City has a threat of UHI, it was chosen for this study. The temperature within various street sizes in the research region was evaluated using only software called ENVI-met that simulates climate, and three common scenarios were chosen. In the first experiment, green walls extending over an area of 50 m in the south facades of the street building, including a 3m Street width, are simulated to show the effect of GWs on UHI. In the second experiment, the Street width changed to 6 m, and the GWs are placed in the same condition. The last experiment is the same with a 9m street width. Temperature decreases from each green wall were contrasted with the street canyon situation as it was at the time of evaluation 1’s highest heat. In comparison to evaluation 1, the temperature decreases achieved by evaluation alternatives 2, 3, 4, and 5 were 2.17 °C, 1.97 °C, 1.78 °C, and 0.90 °C, accordingly.

**Conclusion**  
A well-planned urban green wall can significantly improve UHI in tropical Lebanon.

**ARTICLE TITLE**  
Effect of Memory on the Contemporary Architectural Design Concept

**JOURNAL**  
Ain Shams Engineering Journal

**YEAR**  
2023

**PUBLICATION INFO**  
DOI: 10.1016/j.asej.2022.101979

**THEME / SUBTHEME**  
Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture

**ABSTRACT**  
The human memory is the mental storehouse that preserves the events, facts, and dreams that happen to him in his life or his mind creates them. According to psychologists and sociologists, the memory pursued by human beings is linked to the mine of creativity as it generates special human emotions. Architects embodied the Double Code Theory through the content of their personal memories. They presented architectural formations that carried two meanings: the first is visible to the audience, and the other is hidden and related to the memory of the architect, where the architect relied on recalling events related to his memory. Architects recall their memories and work to recall their own memories and are inspired by their designs, as the architectural buildings become of historical, civilizational, and cultural value. Thus, the scope of this research belongs to the field of diaries of architecture, trying to unveil the secrets and intentions of architects who inspire their design concepts from the memory of civilizations and their own memories.
This paper exposes the ideas of the most prominent designers who worked on buildings around the world, whereas the main aim of this paper is to re-read and interpret contemporary architectural languages that rely on memory in their design concepts to enable us to deconstruct and understand them from the perspective of memories of the past and to understand the intended message beyond, depending on methods of analysis by tracing particles, definitions, and theories through presenting a literature review to highlight what came in the precedent research in this topic. This research hypothesizes that the memory is the inspiration source for contemporary architecture. Throughout the paper, the analytical method investigates this hypothesis using certain parameters of analysis on three case studies, followed by a comparison to explore how each architect of these projects inspired his own memory to lead the design setting. One of the most prominent findings is the process of comprehending the design concept can't be easy for virtual reality. They make an intellectual and physical effort to disclose the secret of architect and truly detect the inspirational memory. Another important finding is that the memory of architect, implemented in the design ideas, always touches whether religious or political events or personal experiences.

**Author(S)**
Mohsen H., Tohme M., Nashi R.

**ARTICLE TITLE**
From Passive to Immersive: Metaverse as a Pedagogical Approach in History Class-Presenting a Constant Reminder of Historical Remnants and a Customizable Reality for Future Preferences; Beirut as a Case Study

**JOURNAL**
Architecture & Planning Journal-APJ

**YEAR**
2023

**PUBLICATION INFO**
28(3): 1-13

**THEME / SUBTHEME**
Science and Technology/ Digital Technology in Architecture

**ABSTRACT**
It is widely acknowledged that passive, non-immersive strategies of teaching adopted in history classes in Lebanon do not offer the right platform for knowledge retention in students. With that said, virtual reality and the use of Metaverse as a pedagogical approach is prophesied as the most apt to invoke a positive attitude from children towards the topic being studied, and thus, in this case, it increases their awareness of the existing built heritage they live amidst. This research sets out from a recent project implemented by Beirut Arab University, together with three UN agencies. The latter aimed for “developing children emotional attachment to the territory of Beirut Blast through activating their participation in the construction of cognitive maps by playing with spatial maps strategically designed in a game environment”. A thorough assessment of the outcomes of the activities implemented throughout the project, including the executed physical models and game boards that simulate myriad neighborhoods in Beirut, is carried out, followed by an analytical comparison of these outcomes with those from using the proposed innovative digital tools. A pilot study is conducted on Martyr’s square to assess how virtual tools can enhance the sensory experience and perception of the built space, making youth active learners rather than passive.

**ARTICLE TITLE**
Improving Assessment Criteria of Universal Design: Towards an Equitable Approach (Joint Publication with the Faculty of Human Sciences)

**JOURNAL**
MSA Engineering Journal

**YEAR**
2023

**PUBLICATION INFO**
2(3): 132-167

**THEME / SUBTHEME**
Society, Culture and Human Behavior/ Theories, History, and Humanities in Architecture

**ABSTRACT**
Architecture is for everyone, thus it needs to give a chance to all individuals and groups of society to feel included and satisfied in the various facilities and public spaces. The misconception is given when architects design built environments following the ADA regulations as a burden instead of using an innovative approach to accommodate the needs and expectations of all users. To ensure the operation of equitable spaces, an innovative architectural approach is needed. A universal space is a place where all people can fit, it is a space where people from all social categories and individual characteristics are equal and satisfied. The concept of a universal design is either used wrongly or divided into accessible or / and inclusive architecture. Therefore, the aim of this research is to investigate the significance of universal design and to put down relevant assessment criteria in order to create spaces and environments that everyone can use without feeling any discrimination. This research uses a scientific methodology to accomplish its goal by first reading the literature on universal design and its application in the design of spaces, and then by examining and comparing four chosen case studies. KWK Promes’ Prizelmy centre for dialogue and Steven Holl’s winter visual art centre as international examples, Sinoetta’s Bibliotheca Alexandrina as a regional example and Zaha Hadid’s Issam Fares Institute as a local example. These facts support the authors’ argument that universal design is a solid starting point for appropriate design solutions to increase the equity of spaces and respond to the abilities and needs of a variety of users. As guidelines for the design of spaces, a series of recommendations are made about the effective use of this architectural approach.

**Author(S)**
Farhat B., Alaeddine H.
ABSTRACT

By using Geoportal Interactive Tool, conducted by UN-Habitat and UNICEF to create cartography of the existing conditions of the pilot study, and then analyzes the aspects and indicators of livability based on cartography, walk through analysis and face-to-face interviews with inhabitants in area. After analyzing the commercial urban corridor and identifying the effective indicators, the research resulted in proposing some guidelines for enhancing livability in commercial urban corridors, which were mainly related to the physical aspect since it defines the most inadequate quality and performance.

Author(S)  Traboulsi C., Hassoun A., Rabea M., Felix M.

JOURNAL  BAU Journal-Creative Sustainable Development

Publications

Investigating Commercial Urban Corridors – A Pilot Study in Beirut Lebanon

El Baba N., El-Bastawissi I., Afify A., Mohsen H.

By narrowing the scope on commercial urban corridors, which are a concentration of retail stores that serve a common trade area and lie along a single street (Catherine Dyste, 2012). These corridors can be seen as a dynamic space, but at the same time, they are created to create a range of experiences (Shaban et al., 2018). Improving commercial urban corridors requires several indicators for reviving the companionable and sociable life of a street. Problems occur when space use is not driven. The society therefore uses the urban commercial corridor according to their own interests. This condition may generate conflict between users of the «Link» and users of the «Space», may make the corridor an uncomfortable location, and may decreases its livability. Rapid urbanization and unplanned rapid changes of commercial activities in corridors that have an impact on the surrounding streets and users’ activities imposes burdens on surrounding land use and mobility. However, this problem has contributed to various issues such as traffic congestion, pollution, decrease in green areas and degradation of the urban quality of living. That’s why investigating these corridors is imperative to know its utilization and functioning to identify the existing problems and chaos in the corridor since they are facing significant challenges, which is the lack of reliable knowledge on their characteristics and development; important for local authorities to provide wealth of knowledge and data collection. The paper aims to investigate commercial urban corridors to identify and analyze livability aspects and indicators for reviving its companionable and sociable life.

Author(S)  El Baba N., El-Bastawissi I., Afify A., Mohsen H.

JOURNAL  Architecture & Planning Journal-APJ

ABSTRACT

Urban environments are multifaceted, varied, dynamic, complex, and evolving as are the underlying features for human health and wellbeing (Bai, Nath, Capon, Hasan & Jaron, 2020). Healthy and resilient cities can be entry points and platforms for change, adaptation and innovation to achieve optimal health for urban communities and the environment (Regional Framework for Urban Health in the Western Pacific 2016–2020: Healthy and Resilient Cities, 2016). Planners considered urban corridors, which are connection and access between urban districts, as major elements in shaping the city image and forming its identity and investigating them are vital for enhancing healthy and resilient cities. Narrowing the scope on commercial urban corridors, which are a concentration of retail stores that serve a common trade area and lie along a single street (Catherine Dyste, 2012). These corridors can be seen as a dynamic space, but at the same time, they are created to create a range of experiences (Shaban et al., 2018). Improving commercial urban corridors requires several indicators for reviving the companionable and sociable life of a street. Problems occur when space use is not driven. The society therefore uses the urban commercial corridor according to their own interests. This condition may generate conflict between users of the «Link» and users of the «Space», may make the corridor an uncomfortable location, and may decreases its livability. Rapid urbanization and unplanned rapid changes of commercial activities in corridors that have an impact on the surrounding streets and users’ activities imposes burdens on surrounding land use and mobility. However, this problem has contributed to various issues such as traffic congestion, pollution, decrease in green areas and degradation of the urban quality of living. That’s why investigating these corridors is imperative to know its utilization and functioning to identify the existing problems and chaos in the corridor since they are facing significant challenges, which is the lack of reliable knowledge on their characteristics and development; important for local authorities to provide wealth of knowledge and data collection. The paper aims to investigate commercial urban corridors to identify and analyze livability aspects and indicators for reviving its companionable and sociable life.

Author(S)  El Baba N., El-Bastawissi I., Afify A., Mohsen H.

JOURNAL  Architecture & Planning Journal-APJ

November 2012

Investigating Commercial Urban Corridors – A Pilot Study in Beirut Lebanon

El Baba N., El-Bastawissi I., Afify A., Mohsen H.

ABSTRACT

Outdoor Artificial Lighting Effects on Livability of Pedestrian Paths in Urban Heritage Context

Traboulsi C., Hassoun A., Rabea M., Felix M.

JOURNAL  BAU Journal-Creative Sustainable Development

September 2023

Lighting is an important ecological factor that influences individuals’ outdoor activities as well as the development of livable communities in cities. Artificial outdoor lighting is vital in improving the quality of urban open places throughout the nighttime and has a significant impact on the pedestrians’ night-time perception and mental safety. This study aims to uncover whether outdoor lighting has indeed an effect on the livability of the pedestrian paths of a community and if so, what is the optimal design that fits an urban heritage setting. The research employs a mixed methods approach, where both qualitative and quantitative methods are used. The first part of the study, being qualitative, used a survey conducted in the historic region of the city of Batroun in Lebanon to collect data concerning what the paths’ users regard as important when it comes to artificial outdoor light design with concerns to perceived urban design qualities related to neighborhood livability. The second part of the study is based on simulations of proposals of outdoor artificial light using Dialux in order to find the design the most appropriate to the context of Batroun.
### Redefining Contemporary Housing Spaces Through Architectural Transformation

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

**JOURNAL:** MSA University Engineering Journal

**YEAR:** 2023

**PUBLICATION INFO:** 2(1): 6-37

**THEME / SUBTHEME:** Health and Wellbeing/ Quality of Life in the Built Environment

**ABSTRACT:**

Today, the need for designing appropriate housing spaces becomes a fundamental aspect of architecture. To ensure the operation of these spaces and their sustainability, an architectural approach is needed. Transformable architecture, which encompasses designs that can be transformed according to different functions and used for many purposes, is the architectural approach for enhancing housing spaces that might adapt with the ongoing process of changing needs. Hence, architects are challenged to create innovative spaces to satisfy the needs of all users. Therefore, the main aim of this research is to explore the role of transformable architecture in redefining contemporary housing spaces in respect to the various needs of users in different psychological, environmental and economic contexts. To achieve this aim, this research employs a scientific methodology starting by reviewing the literature that provides knowledge about transformable architecture and its implementation in contemporary housing spaces; then analyzing four selected international case studies: Suitcase house in China, Safe house in Poland, Living Room House in Germany, and Sharifi-ha House in Iran and comparing them. These facts serve as the foundation for the authors’ argument that transformable architecture is a good stand point for suitable design strategies to improve the functionality of housing spaces and to respond to diverse users’ needs. A set of recommendations regarding the application of this architectural approach are drawn as guidelines in designing contemporary housing spaces.

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### Revitalizing the Borderlines Through Architecture of Green Networking- Case Study: Beirut, Lebanon

**Author(S):** Al-Khatib K., Youssef M., Salem M.

**JOURNAL:** BAU Journal-Creative Sustainable Development

**YEAR:** 2023

**PUBLICATION INFO:** 4(2): 1-21

**THEME / SUBTHEME:** Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

**ABSTRACT:**

Borders are an essential part of cities and countries, and they can create both physical and cultural divides. Inner-city borders can lead to social isolation and inequality, which can contribute to tensions and conflicts. Borders around the world have become a symbol of conflict, racism, fear, inequity, and division. One single line could divide between opportunity and hope and poverty and oblivion. Accordingly, some borders create social isolation between various cultures in cities that increase socio-political problems and remove urban connectivity. Green networking involves using urban green spaces, such as parks and gardens, to connect different areas of a city and facilitate movement and interaction between people. This research aims to examine the impact of inner-city borders on social integration between different cultural groups by using green networking to break down barriers and promote social interaction. The study will contribute to a better understanding of how urban green spaces can promote social integration and reduce inequality in inner cities. The study will use scientific methodology, including site visits, experimental examinations, and analytical research, to provide a comprehensive understanding of the borderline area of research.
Three-dimensional (3D) printing has become a fundamental issue in modern global technology, touching practically every element of modern human life. Three-dimensional (3D) printing (also known as additive manufacturing) is an advanced manufacturing technology that can autonomously manufacture complicated shape geometries from a 3D computer-aided design model without the use of equipment or fixtures. However, there is a friction between traditional designs and the rise of 3D printed technology when it comes to architectural healing approaches, and this adaptability is hurting human healing tactics that are dependent on the relationship between space and environment. Due to its capacity to create products in a wide range of materials rapidly and at a lower cost, additive manufacturing is having a significant impact on production in a variety of areas. Even though it encompasses a wide range of techniques and applications, additive manufacturing (AM) may be described as a system for converting solid model data from a computer-based model into a physical prototype by the incremental addition of material via layer superposition. Therefore, this research aims to examine the 3D printed green walls as new proposed design elements that can upgrade the natural healing architecture. To achieve this goal, the study begins with a literature review that includes scientific methodology based on principles that assist architects dealing with advanced tools in transforming their intentions from digital to analogue means as part of a controlled system intended to innovate design and construction principles of the use of 3D printed green walls. It will also assist in the quest for a concept design that confronts the regeneration of a new spatial delineation ideology.
**ARTICLE TITLE**
The Impact of Plastering on The Hygrothermal Behaviour of Historical Sandstone Located in the Coastal Region of Lebanon

**JOURNAL**
Architecture & Planning Journal-APJ

**YEAR**
2022

**PUBLICATION INFO**
28(1): 1-7

**THEME / SUBTHEME**
Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

**ABSTRACT**
In an unusual trend in the conservation practice of built heritage in Lebanon, the external plaster layer, which protects the sandstone from weathering factors, is being removed for aesthetic reasons. These buildings are in a coastal region, hot humid climate in the summer and moderate cold weather in the winter. This paper discusses the importance of external and internal plastering of the historical sandstone bearing wall, by the mean of a computational tool that underlines the role of the plastering in the hygrothermal behaviour of the historical stone, in the aim to validate the practice of the ancestors in covering the envelope of their buildings to avoid the degradation of these natural stones. The methodology adopted in this paper is a comparative quantitative study, using a hygrothermal simulation modelling tool, named Wufi Pro, which is a standard program for evaluating moisture conditions in building envelopes developed by the Fraunhofer Institute for Building Physics (IBP) Stuttgart, Germany. The results are in the form of values for the heat and moisture fluxes through the high porosity sandstone assembly that composes the building envelope. These values represent the hygrothermal behaviour of the stone, and they are compared between two cases, one without plastering while the second has the inner and outer layers of traditional plaster. The analysis of the results is guiding to a conclusion that favours one of the two cases, taking into consideration the interstitial condensation threat avoided by the means of plastering.

**ARTICLE TITLE**
The Suitable Density of Vertical Greenery Systems on Office Buildings for Energy Saving

**JOURNAL**
Green Building & Construction Economics

**YEAR**
2023

**PUBLICATION INFO**
4(1): 138-149

**THEME / SUBTHEME**
Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

**ABSTRACT**
One of the more optimistic strategies to generate energy savings in buildings and help mitigate the effect of the urban heat island is to “green” the building envelopes. In general, a vertical greenery system (VGS) has excellent possibilities for cutting building energy use, particularly during cooling periods. One of the most important factors is the shadow effect factor, which is greatly affected by the plants. Simulating the facade foliar density using Revit energy analysis is one technique to describe the potential shadow effect of flora. This paper will analyse and investigate to answer the following question: Does the variation in density of the VGS affect the energy savings of the building? The VGS has several factors that affect the energy savings of the building, such as the types that thrive in each region, the facade’s direction, the thickness of the foliage, the presence of air layers in the context of green walls, and the makeup and thickness of the substrate layer. This paper will focus on one factor: the density of the green vertical system. The goal of this study is to develop a standard and simple method for calculating the leaf area index (LAI) and connecting it to the energy savings offered by VGS studies on the office building. Additionally, research was done on the energy savings made at the “Karim Centre”, an office building located in Tripoli, Lebanon. Moreover, the facade direction has many impacts on the indoor thermal system that affect energy savings using the VGS, including green walls and double-skin green facades. There is, however, a dearth of information on operating during the heating season as well as throughout the entire year. This paper will discuss the four evaluation variations of the density of VGS on the facade of the office building, resulting in the suitable density of VGS4, which saves 15.7% less energy with 50% green density on the facade.
Author(S): Srour A., Farahat B.

**ARTICLE TITLE**
Towards a New Paradigm in the Lebanese Urban Management System for Enhanced Master Plans' Generation

**JOURNAL**
Architecture & Planning Journal-APJ

**YEAR**
2023

**PUBLICATION INFO**
29(1): 1-13

**THEME / SUBTHEME**
Health and Wellbeing/Quality of Life in the Built Environment

**ABSTRACT**
With the fact that 88% of the population living in urban areas, Lebanon is a highly urbanized country. However, this high urbanization undergoes the severe lack of the proper urban planning methodologies and approaches resulting in the sprawl along infrastructure paths. The weakness or even the complete absence of the plans escorting the urban growth made every city or town a single urban area confronted by plenty of challenges. Decentralization has been a recurrent theme in Lebanese politics for many years, yet it’s now limited by an administrative scale, and at the municipal level only. This administrative decentralization affects the planning process directly and makes it impossible to create righteous plans. The paper will focus on Master Plans by introducing their current procedure, implementation, actors, and challenges. It will highlight the Lebanese national system’s complications and limitations by following the descriptive methodology, and to present similar worldwide cases where all the difficulties were resolved by a comparative one. Finally introducing a new conceptual paradigm involving the national, regional, and local levels reshaping the Lebanese planning framework to enhance the Master Plan’s creation.

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Author(S): Abdulghany A., Farahat B.

**ARTICLE TITLE**
Towards Urban Biodiversity: Simulating Design Parameters for Wildlife-Inclusive Green Infrastructure

**JOURNAL**
BAU Journal-Creative Sustainable Development

**YEAR**
2023

**PUBLICATION INFO**
4(2): 1-22

**THEME / SUBTHEME**
Creative Sustainable Development/Environmental Studies and Sustainability in Architecture

**ABSTRACT**
As of 2021, more than half of the global population resides in urban areas. This resulted in an overwhelming footprint affecting species habitat areas leading to biodiversity loss. By definition, urban biodiversity is the diversity of living things within the urban realm. By providing chances for habitat as part of new developments, preserving on-site habitats, and attempting to connect with the local ecosystems, we can help promote biodiversity. Green infrastructure (GI), which includes all semi-natural areas in the urban context, can serve as a vessel for biodiversity. Therefore, the problem can be defined by the urban footprint that expands on the expense of native habitats, leading directly to biodiversity loss and impacts on human health, and indirectly affecting livelihoods. Moreover, often times the approaches are sometimes limited to ‘green’ in more aesthetic ways than operational. It is also important to seek socio-ecological frameworks to promote adequate interaction of urban communities with wildlife. Therefore, this research aims to simulate design parameters for wildlife-inclusive green infrastructure to contribute to the creation of built environments that support urban biodiversity. If equipped with a socio-ecological framework, beyond ‘green’ results can be yielded. Using a case study method, the author will provide an application of the extracted parameters from the literature on a chosen geography with reference of ecological data provided of the ‘Shouf Biosphere Reserve’ of Lebanon to provide supported insight into wildlife-inclusive green infrastructure examples. In the context of this literature, we need to examine the manifestation of those concepts mainly on an operative level with respect to ecology. Also, it is required to examine the socio-cultural aspects of this interaction through architecture. In conclusion, as presented in the case study of SBR, the additional ecological and socio-cultural layers in planning of green infrastructure, can yield beyond ‘green’ results as a whole system designed with both the local ecosystems and urban inhabitants in mind within the landscape. Each geography will display its endemic version of ‘green’ as well. Variations of wildlife species can become parameters that also help shape our built environments. ‘Our’ built environment exists in the larger scope of the natural setting. Nature-based solutions can be implemented for our urban problems. A geographically specific GI network can provide alternative infrastructure for local ecosystems. Therefore, with increasing repercussions of urban expansion on habitat areas, immediate action plans must be formulated to stop species loss.
### Article 1: Tree Provision Achieving Kid’s Thermal Comfort Through Finishing Material Performance in Subtropical Outdoor Playgrounds. Comparisons Between King Fahed and Al Biaa Garden in Tripoli, Lebanon

**Author(s):** Kabbara H., Elsamahy E., Felix M.

<table>
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<tr>
<th>ARTICLE TITLE</th>
<th>Tree Provision Achieving Kid’s Thermal Comfort Through Finishing Material Performance in Subtropical Outdoor Playgrounds. Comparisons Between King Fahed and Al Biaa Garden in Tripoli, Lebanon</th>
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<td>THEME / SUBTHEME</td>
<td>Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture</td>
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<tr>
<td>ABSTRACT</td>
<td>Outdoor playgrounds are one of the most spaces needed for kids to make different types of activities, and enhancing thermal comfort in such space consist a critical value due to its impact on kids’ health. Unfortunately, the acceleration of urban heat island (UHI) in outdoor spaces, caused by the presence built-up area has affected the temperature of outdoor spaces especially playgrounds. Many researches highlighted the importance of studying outdoor playground materials to achieve kid’s thermal comfort. Nevertheless, analyzing the impact of providing trees on material performance consist a new research perspective. This research highlight on the importance of using trees as natural element to decrease temperature in outdoor playgrounds to achieve kid’s thermal comfort. The aim of this research is to achieve kid’s thermal comfort by enhancing the performance of outdoor playgrounds finishing materials through providing trees. The study will focus on the variation of playground surfaces temperature through simulating different scenario applied in Malek Fahed and Al Biaa garden in Tripoli, Lebanon. The simulation will be applied in subtropical climate using Envi-Met software. The present study provides an overview of outdoor playgrounds finishing materials and its relations with kid’s thermal comfort. Research findings define the performance level of each playground finishing material in chinaberry shading during summer. Results demonstrate that natural surfaces such as sand, grass and stone enhance kids’ thermal comfort more than artificial ones like concrete during summer days.</td>
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### Article 2: Upgrading Heritage Urban Public Spaces By Using Recycling Waste Plastic Materials

**Author(s):** Hassoun A., Khalifa M., Elsamahy E., El-Daghar K., Felix M.

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<tr>
<th>ARTICLE TITLE</th>
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<td>THEME / SUBTHEME</td>
<td>Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture</td>
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<tr>
<td>ABSTRACT</td>
<td>In low-income countries, population expansion and urbanization bring challenges of inadequate living standards to the fore. Some of the issues could be solved if well-functioning plastic recycling systems were built. To reduce the environmental burden and improve the overall situation in dense cities, the already existing local informal waste treatment system, which is widespread in many low-income nations, needs to be developed with efficient sorting and composting solutions. A case study is carried out in the city of Mina, Lebanon, with the goal of establishing a viable decentralized recycling plastic pavilion material. The effort aims to lessen the climate harm caused by non-recycled waste, improve the quality of life for residents, and enhance the affected locations- aesthetical, educational, and recreational attributes. The concepts were generated according to the residents' needs and to find solutions to the existing problem of the area under study. The goals are based on data and observations about the city, the current waste management system, the stakeholders, the project organization, and any roadblocks. The project’s overall work method is known as the Logical Framework Approach. It's a goal-oriented project planning method that relies on disciplined thinking and logical analysis. Literature review, observations, study visits, site analyses, photography, drawing, 3D modeling, and other sub-methods are included in the study. Proposals for plastic pavilions and plastic features for open public spaces in Al Mina are the result of the process. Because the areas have both comparable and dissimilar characteristics, site-specific solutions are required.</td>
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**Faculty of Architecture - Design and Built Environment**
ARTICLE TITLE: Urban Waterfront Revitalization Through Landscape Design Enhancing Social-Cultural Conditions of El-Mina, Tripoli

JOURNAL: Architecture & Planning Journal-APJ

YEAR: 2023

PUBLICATION INFO: 29(1): 1-14

THEME / SUBTHEME: Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

ABSTRACT: The concept of waterfront revitalization has been a prominent notion in the field of urban planning and is considered an effective strategy to enhance deteriorated sites and inspire the identity and authenticity of communities. Nevertheless, there is no definite prescription for success when it comes to linking waterfront landscape design with improving the social and cultural site conditions in a deteriorating historical area. This paper examines the revitalization of the waterfront through greenway design in El-Mina, Tripoli, Lebanon in order to put emphasis on the local culture of the city and create socio-cultural opportunities for the area of study and better improve the quality of life of its residents. The research employs a mixed method approach, where both qualitative and quantitative methods are applied. The qualitative approach is based on theoretical study and the analysis of three case studies and the quantitative part of the study consists of both a survey and simulations to understand the various struggles and problems that the residents of the zone of study face and to find the optimum landscape design proposal that links the waterfront to the existing urban fabric along with sustainable environmental solutions to enhance the surrounding heritage context through the design of a Cultural Park that is applied on a lot by the city’s waterfront. A set of design recommendations regarding the connectivity of landscape waterfront spaces to heritage spaces were then issued and developed based on the synthesis of the simulation results and urban analysis.

2. BOOK CHAPTERS

BOOK CHAPTER TITLE: Bringing the SDGs to Life by 2030: Best Practices in Higher Education Within the Middle East Region

BOOK TITLE: SDGs in Africa and the Middle East Region

PUBLISHER: Springer, Cham

YEAR: 2023

ISBN: 9783030912604

THEME / SUBTHEME: Creative Sustainable Development/ Environmental Studies and Sustainability in Architecture

ABSTRACT: Higher education is facing countless challenges globally. Consequently, universities have been forced to undergo urgent changes to adapt to the evolving circumstances. As part of their commitment to working locally on the Sustainable Development Goals (SDGs), many universities are dedicated to leading local initiatives to foster a culture of sustainability in local communities. This chapter considers the role of higher education within the Middle East region in promoting the implementation of the SDGs in universities, schools and communities. Several activities in this regard have taken place at different levels in this region within universities, faculties, community-based partnerships, NGOs including various research initiatives, innovation hubs, etc. The aim of this chapter is to provide information about how higher education can bring the SDGs to life by 2030 (Agenda 2030) in the Middle East region. This information will support these universities to speed up the implementation of the SDGs and will engage the academic community, industry and civil society by providing data and sharing experiences and best practices that focus on the SDGs, in order to improve the health and wellbeing of communities. Various successful initiatives and best practices with the aim of achieving the SDGs by 2030 are presented in this chapter. Findings indicate that to achieve sustainability at universities in the Middle East region, action plans and programmes must be put into place as a matter of urgency. For these universities to contribute to sustainable development effectively, several steps must be taken, such as training of academic staff in sustainability topics, utilizing research centres and working groups to facilitate a variety of specific sustainability initiatives, and fostering intra- and inter-institutional partnerships and networks to exchange ideas and experiences on sustainability, as well as organizing, developing and implementing a range of related projects.
Rethinking the Sustainable Housing Concept in the Post-pandemic Era

There was a surge of change during the Coronavirus period—even in the way we thought about architecture principles to improve sustainability. This period of quarantine gave scientists time to reconsider the main principles behind theories of sustainable housing because many new factors had emerged, such as the health and wellbeing of occupants, the science of providing a clean indoor environment without the contamination of coronavirus, etc. People eventually adjusted to the prevailing situation despite a lot of discrepancies initially, allowing them to continue functioning. A temporary change is one type of change, while a permanent change is another. After the outbreak of COVID, residential architecture has also seen many changes in priorities, just like any other industry. Changes in lifestyles and habits have influenced home designs. A sustainable housing environment needs to be addressed in the design and construction sectors. With this disease affecting our design and construction methods, as well as standards and regulations, how should we adjust and review them? In what ways can new technologies in construction and design make a difference? Architects face a huge challenge now, compared to before the Coronavirus period, with new houses since there is no guarantee that the indoor spaces will be free from Coronavirus contamination. Creating a safe, clean, and sustainable dwelling in the post-pandemic age is the goal of this chapter. It explains the principles that can assist in creating a clean environment in the house. One of the most significant contributions of this chapter is the formulation of new theories and principles for sustainable housing in the post-pandemic era. The development of guidelines or a framework for architects intent on designing sustainable housing concepts worldwide is also a contribution.
## I. PUBLICATIONS

### ARTICLES

<table>
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<tr>
<th>ARTICLE TITLE</th>
<th>A Novel Specialized Search Engine for AI-Models and Their Comparison</th>
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<tr>
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<td>2023</td>
</tr>
<tr>
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<td>4(2): 1-6</td>
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<tr>
<td>THEME / SUBTHEME</td>
<td>Creative Sustainable Development/ Advances in Technology</td>
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**ABSTRACT**

In recent years, the world of AI has tremendously increased in size and depth. Both new and old researchers are facing the problem of fast emerging AI researches, models and services. One needs to continuously read complete papers to understand the idea behind any novel research. This work presents a novel AI service that removes the burdens of long text reading and uncategorized search. It consists of a website that categorizes all the AI researches in a well-designed database. The users just have to select the models they are interested in, and the website will return a table containing the technical data in addition to a graph that shows visual relationships between the AI models, features and datasets. Future work will emphasize on developing the tool by applying NLP in two directions: one on the search box to retrieve the main keyword to search for, and the other on research papers to automatically extract the data into the website categorized database.

**Author(S)**

Haidar I., Doughan Z., Haidar A.

* Names in Bold Indicate BAU Authors
### Artificial Neural Network Vision: Between Myth and Reality

**Author(s)** Doughan Z., Kassem R., El-Hajj A., Haidar A.

**ARTICLE TITLE** Artificial Neural Network Vision: Between Myth and Reality

**JOURNAL** IEEE Potentials

**YEAR** 2023

**PUBLICATION INFO** 42(3): 51-56

**THEME / SUBTHEME** Science and Technology/ Advances in Technology

**ABSTRACT** Decades have passed since the world went crazy about the revolution of the machine. Through the years, pioneers in the field tried to imagine how such progress in artificial intelligence (AI) could influence our lives. Were we going to witness sentient machines among us? What would their capabilities, superpowers, and limitations be? Were there ghosts in the machines? Many of these questions confused the greatest minds of our era.

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### Assessment of the Effect of Different Loading Combinations Due to Truck Platooning and Autonomous Vehicles on the Performance of Asphalt Pavement

**Author(s)** Merhebi G., Joumblat R., Elkordi A.

**ARTICLE TITLE** Assessment of the Effect of Different Loading Combinations Due to Truck Platooning and Autonomous Vehicles on the Performance of Asphalt Pavement

**JOURNAL** Sustainability

**YEAR** 2023

**PUBLICATION INFO** DOI: 10.3390/su151410805

**THEME / SUBTHEME** Science and Technology/ Materials Engineering

**ABSTRACT** In this research, the effect of the controlled positioning of autonomous and non-autonomous truck loadings on the long-term performance of pavement was estimated using different variables such as climate, uniform wandering values of distance between trucks, and percentage of autonomous trucks by using MEPDG/AASHTO Pavement ME Design software. This was achieved by first computing the strain and stress of the different loading combinations, resulting in the computation of the failures in the pavement infrastructure and the pavement thickness needed to support each combination. The second part of the research consisted of designing a platoon strategy that was developed for a series of autonomous and connected trucks such that the lateral position of the trucks and the spacing between them could be explicitly optimized to minimize flexible pavement damage. The findings revealed that a small percentage of autonomous trucks can be beneficial to pavement life and that truck platooning following a well-studied skeleton can open a whole new world of pavement design. This can be revolutionary in changing roads around the world to improve traffic and infrastructure.

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### Compaction and Shear Behaviors of Sandy Soil Treated with Lime and Metakaolin

**Author(s)** Alhakim G., Baalbaki O., Jaber L.

**ARTICLE TITLE** Compaction and Shear Behaviors of Sandy Soil Treated with Lime and Metakaolin

**JOURNAL** Geotechnical and Geological Engineering

**YEAR** 2023

**PUBLICATION INFO** DOI: 10.1007/s10706-023-02555-w

**THEME / SUBTHEME** Science and Technology/ Materials Engineering

**ABSTRACT** With civilization and urbanization growth, appropriate construction sites with satisfactory geotechnical conditions become less available. Hence, the chemical stabilization of soil has always been an issue of concern for engineers, applied for ground improvement. The present article discusses the influence of metakaolin on the geotechnical properties of sandy soil treated with lime. For this purpose, Proctor and Direct Shear tests were performed to study the mechanical behavior of both untreated and treated soil specimens. The lime in percentages of 3, 6, 9, and 12% by dry weight of sand was utilized, and the metakaolin was added to partially substitute this stabilizer by 10, 20, and 30% of its weight. The results indicated that the inclusion of lime increased the maximum dry unit weight and decreased the optimum moisture content of the soil. While the metakaolin addition slightly augmented the moisture content of the lime-soil mixtures and improved their maximum unit weights at high contents. The research findings showed that for all the stabilizer contents, the shear strength and shear strength parameters of the soil were improved. Yet, the highest improvement was detected when lime was partly replaced by the metakaolin admixture for some contents. The brittleness index of the soil mixtures augmented with the incorporation of lime or L-MK and reduced by increasing the normal stress.
<table>
<thead>
<tr>
<th>ARTICLE TITLE</th>
<th>Comparative Analysis of Anchored and Pre-stressed Pile Walls: A Case Study of a Water Front Project in Beirut, Lebanon</th>
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<td>PUBLICATION INFO</td>
<td>DOI: 10.1016/j.matpr.2023.03.565</td>
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<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Simulation, Modeling and Design</td>
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<td>ABSTRACT</td>
<td>The need for underground space in overpopulated areas makes it demanding to perform deep excavations. Retaining an excavation using a shoring system is necessary to protect the retained earth and surrounding structures from potential damage or failure. Most of the shoring systems are composed of vertical structural elements supported laterally by tie-back anchors or struts, such as diaphragm walls, retaining walls, sheet piles or piles. Although shoring works are essential, they are costly. Hence, designing a successful shoring system at a lower cost and time is a challenging need. Pre-stressing the concrete is commonly used to control the deflection in reinforced concrete elements, yet this technique has not been applied in reinforced concrete piles. The aim of this paper is to analyze the performance of an alternative shoring system using the pre-stressing technique, where the reinforced concrete shoring piles are post-tensioned vertically (PTP) without a lateral support. This study investigates the behavior of the PTP system by comparing it to that of the conventional reinforced concrete piles (RCP). A finite element analysis was conducted by employing PLAXIS 2D software. Data is collected from a shoring project performed on a site located at the water front area in Beirut, Lebanon. The project consists of 306 (RCP), laterally supported by one row of tie back anchors, retaining an 8.5 m deep excavation and covering an area of about 5000 m². The results indicated that PTP system is safe in terms of global stability and control of deformation. Furthermore, it has been proven to be more economical as it can be executed with 30% less cost in less time.</td>
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<th>Correlations Between Different Shrinkage Parameters and Expansion of Paste and Mortar Containing Limestone Fines</th>
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<td>1(2): 71-79</td>
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<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Materials Engineering</td>
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<td>ABSTRACT</td>
<td>Shrinkage is definitely a crucial parameter for long-term sustainability of cement paste, mortar and concrete structures. This paper examines the correlation between different shrinkage parameters of paste and mortar with different percentage of limestone fines (LF). Furthermore, the correlation between each shrinkage parameter and compressive strength, and between expansion and compressive strength are also investigated. In the experimental program, cement was substituted with different percentages of LF (0, 5, 10, 15 and 20% by mass). For paste and mortar mixtures, the water to binder ratio (w/b) was 0.45 and the sand to binder ratio (s/b) was 2. Results indicated that there is a positive linear relationship between length change and the percentage weight change. Similarly, there was a positive correlation between expansion and compressive strength for pastes and mortars. However, there was a negative correlation occurring between both shrinkage parameters and compressive strength. As shrinkage increased, the compressive strength dropped.</td>
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<td>PUBLICATION INFO</td>
<td>DOI: 10.3390/machines10080686</td>
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<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Advances in Technology</td>
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Author(S) | Mekdash H., Jaber L., Temsah Y., Sadek M. |
Author(S) | Ramadan R., Ghanem H., Khatib J., Elkordi A. |
Author(S) | Yakhni M., Hosni H., Cauet S., Sakout A., Etien E., Rambault L., Assoum H., El-Gohary M. |
ABSTRACT

Nowadays, hot weather is an essential motivator that leads concrete to lose its special characteristics. The high loss of moisture by evaporation and rapid hardening encourage the cracking potential and placement operations. The fresh mixed and hardened concrete tend to be damaged due to several conditions such as: high concrete temperature, low relative humidity, and high wind speed. These circumstances accelerate the rate of moisture loss and cement hydration. This article briefly reviews hot weather concreting problems precautions, and curing methods and also discusses the role of incorporation SCMs in reducing the temperature of concrete and enhancing its mechanical and durability performance.

ARTICLE TITLE
Effect of Hot Weather Concreting on the Mechanical and Durability Properties of Concrete-A Review

JOURNAL
BAU Journal-Science and Technology

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2022

PUBLICATION INFO
4(1): 1-22

THEME / SUBTHEME
Science and Technology/ Materials Engineering

ABSTRACT

The concept of a digital twin is increasingly appearing in industrial applications, including the field of predictive maintenance. A digital twin is a virtual representation of a physical system containing all data available on site. This paper presents condition monitoring of ventilation systems through the digital twin approach. A literature review regarding the most popular system faults is covered. The motor current signature analysis is used in this research to detect system faults. The physical system is further described. Then, based on the free body diagram concept and Newton’s second law, the equations of motion are obtained. Matlab/Simulink software is used to build the digital twin. The Concordia method and the Fast Fourier Transform analysis are used to process the current signal, and physical and numerical system current measurements are obtained and compared. In the final step of the modeling, specific frequencies were adjusted in the twin to achieve the best simulation. In addition, a statistical approach is used to create a complete diagnostic protocol.

ARTICLE TITLE
Effects of Incorporation of Cement and Metakaolin on the Mechanical Properties of Poorly Graded Sand

JOURNAL
Arabian Journal of Geosciences

YEAR
2022

PUBLICATION INFO
DOI: 10.1007/s12517-022-11080-8

THEME / SUBTHEME
Science and Technology/ Materials Engineering

ABSTRACT

Cemented soils have been admitted globally as a ground improvement technique to enhance the soil performance. Chemical stabilization becomes progressively appealing to researchers, especially when it comes to partially replace the cement content by an efficient admixture such as metakaolin. This study evaluates the stabilization of sandy soil by using cement and cement-metakaolin (C-MK) mixes. Cement was added in percentages of 3, 6, 9, and 12% by dry weight of soil, and the metakaolin was incorporated to partly substitute the cement content by 10, 20, and 30% of its weight. Proctor and direct shear tests were performed to analyze the behavior of the treated and untreated soils. The cement improved the maximum dry unit weight and reduced the optimum moisture content of the soil as predicted. However, it was observed that the metakaolin inclusion to cemented sand resulted in an increase in the compaction characteristics at high C-MK contents. The experimental results reveal that the addition of the cement and metakaolin stabilizers agents improved the shear strength and parameters of the soil, for all the contents. In terms of shear strength and cohesion, the optimum replacement percentage of metakaolin is found to be 30%. The brittleness index of the soil raised by increasing the stabilizers contents and by decreasing the normal pressure.
Experimental and Numerical Investigation of the Flexural Behavior of Mortar Beams Strengthened with Recycled Plastic Mesh

The generation of plastic waste is increasing all over the world at an alarming rate, therefore raising concerns related to its disposal. As space for landfilling is becoming scarce and as incinerating the plastic waste leads to the release of toxic elements into the environment, recycling becomes a viable and an attractive option in pursuit of sustainable development. This paper investigates the flexural behavior of mortar beams reinforced with recycled plastic mesh. To achieve this objective, 27 mortar beams were prepared, with 24 of them containing waste plastic mesh with different void ratios and effective widths. All beams were cured for 28 days and then tested using a three-point bending test. Mid-span deflection was measured for each increment of load to obtain the load deflection curve. Moreover, a numerical simulation was performed on all mortar specimens using finite element software ABAQUS and a comparison was made with the experimental analysis. Test results showed that the addition of plastic mesh increased the flexural toughness and ductility of mortar beams. Furthermore, it was noticed that as the effective width ratio increased from 0 to 0.58, the ultimate capacity and flexural toughness increased. Beyond this level, a decrease was observed. On the other hand, the ductility index was proportional to the flexural toughness for all mesh effective width ratios. Comparing the ultimate capacity, flexural toughness and ductility index between the experimental and numerical data, there was a difference of up to 7%. This indicates that the numerical output can be a good predictor of the performance of plastic inside the mortar. Hence, using recycled plastic mesh could be recommended for improving the flexural performance of mortar beams, creating a sustainable composite.

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

Experimental Application and Accuracy Assessment of 2D-DIC in Meso-Direct-Shear Test of Sandy Soil

The examination of the meso-mechanical properties of soils is fundamental to understand its macro-behaviour. This paper aims to evaluate the potential application of Digital Image Correlation (DIC), an optical image processing approach, in direct shear test (DST) for soils. Hence, a new shear box was designed to investigate the close behaviour of granular materials. The noise-floor and shear displacement accuracy were discussed to assess the reliability of DIC, besides the effectiveness of the new box was also examined. The distribution of the displacements, strains, and shear angle were measured under four different normal stresses. From the results, the immediate settlement, and the dilative behaviour of the sand during shearing were observed. Furthermore, the investigation revealed a strain concentration at the interface between the boxes, where a shear band was formed. The use of DIC opens up new ways in soil mechanics, overcoming some limitations of the conventional DST.

Author(s) Alhakim G., Núñez-Temes C., Ortiz-Sanz J., Arza-Garcia M., Jaber L., Gil-Docampo M.
The production of plastic material continues to increase around the world. Consequently, large amount of waste plastic is generated. This will lead to environmental concern due to its disposal. In order to reduce the environment effects and cost, waste plastic can be recycled and utilized in other applications including construction. This paper investigated the flexural behavior of non-structural concrete beams containing waste plastic meshes as a replacement of traditional steel reinforcement. To achieve this objective, beams with steel reinforcing bars and waste plastic sheets with different effective widths and patterns were prepared. After 28 days of curing, the beams were subjected to an increasing load until failure and the central deflection was measured at each load increment. Furthermore, a numerical analysis was performed on the specimens using ABAQUS software. This will allow the comparison between the experimental and numerical results. The experimental data indicated that using plastic sheets improved the flexural toughness and ductility of concrete beams. Additionally, correlations were carried out between the ultimate capacity of the beams, the flexural toughness and the effective width of the plastic meshes. As the effective mesh width increased, the flexural toughness and ultimate capacity of the beams increased. The results of this investigation will allow greater utilization of waste plastic in construction activities.

ABSTRACT
The results of the experiment showed that the addition of Phragmites australis fibers slightly decreased the compressive and tensile strength of the concrete compared to the control mix. However, the inclusion of 0.5% Phragmites australis fibers enhanced the split tensile and flexural strength of the concrete. In terms of reinforced concrete beams, the maximum load-bearing capacity was realized for the mix with 10% glass and 0% Phragmites australis fibers. However, the highest ductility index and deflection were achieved for the mix with 10% glass and 0.5% Phragmites australis fibers. Therefore, the use of Phragmites australis fibers can improve the structural performance of concrete.

ABSTRACT
The continuous evolution in computing and interfacing has been extended to develop multi-sensory experiences in many domains such as neurological, auditory, vision, and haptic domains. So far, only a few remarkable system approaches have been approved to be serving the taste sensation digitally. Although taste sensation is linked to the brain, there is a lack of optimal neurocomputing digital taste sensation systems. Our study provides a new neurocomputing method to digitally stimulate the sense of taste by electrical stimulation on the human tongue. We aim to link chemical stimulation and electrical stimulation in order to design an electronic interface for inducing taste digitally. The design proposes a module that is responsible for electric and stimulation to produce different taste sensations. In addition, the taste is delivered through the tongue interface by silver electrodes, coupled with a control system responsible for generating specific stimulation parameters based on user inputs selected on his mobile. A spoon for implementing the taste interface is issued in order to provide a user-friendly tool as a solution for various problems. Experimental results showed that the new model and design of the digital taste system works well and testing results showed clearly that 90% of the tested members were able to distinguish the taste. Among the taste categories, the initial results recommended that sourness and saltiness are the most probable sensations that would be induced. Besides the Biomedical importance of the new taste system for people suffering from taste problems, it is very probable that this system could be considered for sharing tastes in social networking and adapting it in virtual reality, gaming and other domains, also the sensation of tastes could be improved by involving others senses such as olfactory and sounds and increasing the population of tested members.

ABSTRACT
The construction industry has seen a growing emphasis on the use of sustainable materials in recent years. This is driven by various factors, including a desire to reduce environmental impact, improve indoor air quality, and promote the health and well-being of building occupants. One sustainable material that is being increasingly utilized in construction is natural fibers. Phragmites australis fibers, in particular, are renewable, biodegradable, and have a low carbon footprint. The present study aims to evaluate the impact of Phragmites australis fibers on the behavior of reinforced concrete beams. Five concrete mixes were utilized in the experiment, with the control mix having a 1:1.5:3 ratio of cement to sand to coarse aggregate by weight. The other four mixes incorporated Phragmites australis fibers at 0%, 0.5%, 1%, and 1.5% of the volume of the mix, with cement replaced by 10% glass by weight. The water-to-cement ratio was set at 0.4 for all mixes. Concrete cubes, cylinders, and prisms were prepared to determine mechanical and physical properties, while reinforced concrete beams were used to assess structural performance.
Nonlinear Numerical Analysis of Influence of Pile Inclination on the Seismic Response of Soil-Pile-Structure System

Inclined piles are commonly used in civil engineering constructions where significant lateral resistance is required. Many researchers proved their positive performance on the seismic behavior of the supported structure and the piles themselves. However, most of these numerical studies were done within the framework of linear elastic or elastoplastic soil behavior, neglecting therefore the soil non-linearity at low and moderate soil strains which is questionable and could be misleading in dynamic analysis. The main objective of this study is to examine the influence of the pile inclination on the seismic performance of the soil-pile-structure system when both the linear elastic and the nonlinear soil models are employed. Based on the comparative responses, the adequacy of the soil’s linear elastic behavior will be therefore evaluated. The analysis is conducted by generating a three-dimensional finite difference model, where a full interaction between the soil, structure, and inclined piles is considered. The numerical survey proved that the pile inclination can have a significant impact on the internal forces generated by seismic activity, specifically on the bending moment and shear forces. The main disadvantages of using inclined piles in this system are the bending forces at the head and pile-to-head connection. It is crucial to account for soil nonlinearity to accurately assess the seismic response of the soil-pile-structure system.

Author(s) Jaber L., Mezeh R., Zein Z., Azab M., Sadek M.

Optimizing a Spark-Ignition Engine Fuelled with Methane Using a Two-Zone Combustion Model

Methane which can be produced from biogas has a great potential to be used as an alternative renewable fuel for spark-ignition engines. However, engines need to be optimized for methane use. The aim of this study was to numerically optimize a spark-ignition engine fueled with methane and operated at a constant speed of 1,500 rpm via using a validated two-zone combustion model. The model was able to predict engine performance parameters, NO emission, and engine knock at different engine operating conditions including inlet pressure, compression ratio, and excess air factor. Engine knock was prevented by increasing the excess air factor up to 1.2 when the engine operated with higher inlet pressure and compression ratio. It was found that a maximum inlet pressure of only 120 kPa could be used with an engine compression ratio of 14 and excess air factor of 1.2 for knock free operation. The peak engine power was produced when the engine operated with an inlet pressure of 200 kPa and compression ratio of 8 or 9. It was also found that the optimum operating condition which resulted in high engine power accompanied with low fuel consumption and high efficiency was obtained when the engine operated with an inlet pressure of 180 kPa and a compression ratio of 11. This condition required the engine to operate with an excess air factor of 1.19 to prevent engine knock. However, operating the engine at this optimum condition would be accompanied with high NO emission.

Author(s) Ibrahim A.
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<th>ARTICLE TITLE</th>
<th>Fly Ash Using the Stress Sweep Rutting Test</th>
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<td>JOURNAL</td>
<td>Innovative Infrastructure Solutions</td>
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<td>YEAR</td>
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<td>Science and Technology/ Materials Engineering</td>
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**ABSTRACT**

The use of non-traditional alternatives in asphalt as substitution to virgin aggregates has been extensively spread in an attempt to shift towards sustainable road construction practices. Municipal Solid Waste Incineration Fly Ash (MSWI-FA) is amid the non-traditional materials that are used as a substitution for raw aggregates in bituminous mixtures. This paper investigates the rutting resistance of different AC mixtures with several percentages of filler and fine aggregate replacement. For this purpose, an experimental program comprising Dynamic Modulus Test and Stress Sweep Rutting Test is utilized to characterize permanent deformation evolution in the different asphalt mixtures. Furthermore, the Rutting Strain Index (RSI) is quantified to provide a comparative assessment of permanent deformation susceptibility between the asphalt mixtures with various MSWI-FA incorporation percentages. The work provided herein aimed to study aspects associated to various fields notably enhancing the sustainability of AC mixtures through the exploration of the potential of using MSWI-FA to substitute virgin aggregate and the assessment of the rutting performance of these mixtures using advanced material characterization. The findings revealed that the use of MSWI-FA as filler or fine aggregates replacement affected the mix properties. All mixtures with MSWI-FA were advocated for a standard traffic level when used as surface layers. Using 5% of MSWI-FA as fine aggregates or full filler replacement yielded a slightly higher RSI value (4.42% and 4.83%, respectively) than the threshold limit for heavy traffic level (4%) which might be acceptable and recommended in situations where asphalt pavement is to be constructed in climatic zones where permanent deformation is not a concern or is considered with standard traffic loads.

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<th>ARTICLE TITLE</th>
<th>Power Quality Enhancement of Grid-Connected Renewable Systems Using a Matrix-Pencil-Based Active Power Filter</th>
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<td>Science and Technology/ Energy and Environment</td>
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**ABSTRACT**

Power electronic converters are used for integrating renewable energy sources such as wind and photovoltaic into the grid. This integration gives rise to many challenges in power systems, especially regarding power quality. Indeed, integrated systems generate a non-linear current full of harmonics, which degrades power quality. Active power filters are usually used to compensate for these harmonics at the point of common coupling. In the control of active power filters, harmonics need to be extracted from the non-linear current. In this paper, the matrix pencil method—a model-based technique for estimating parameters of exponentially damped or undamped sinusoids in noise—is proposed to extract the reference signal in shunt active power filter applications. The performance of the proposed matrix pencil method is studied for current harmonic compensation and power factor correction under different modulation schemes and two DC links: an external DC voltage source and a capacitor. Using a capacitor for the DC link requires not only including a proportional-plus-integral controller to maintain a constant capacitor voltage, but also accounting for the loss current in the formulation of the matrix pencil method. Compared with the instantaneous reactive power theory and synchronous reference frame, results obtained from simulated data using MATLAB/Simulink under different loading conditions show that the proposed method corrects the power factor and affords a lower source current total harmonic distortion and fast response.
Reinforcement of Concrete Shoring Systems by Prestressing

Advances in Civil Engineering

2022

DOI: 10.1155/2022/2383781

Science and Technology/ Construction, Planning and Design

Abstract

Reinforced concrete piles are useful structural elements to support deep excavations. A pile wall is usually supported by one or several rows of anchors, depending on the depth of the excavation and the nature of the soil retained. The purpose of this work is to investigate the efficacy of posttensioned piles in retaining a 10.0 m deep excavation without using tieback anchors. In addition to the conventional passive steel reinforcement, the piles in this system include steel strands placed eccentrically in their sections, and they are referred to as posttensioned piles. The performance of posttensioned piles is investigated using the finite element modeling software PLAXIS 2D. The results are experimentally validated on a large-scale construction site. The horizontal displacement of posttensioned piles in a 10 m deep excavation was found to be within allowable limits with a 7.36% difference in the horizontal displacement of pile top at the final excavation level in PLAXIS 2D. In terms of cost, PTP is executed at 35% cost less than the conventional reinforced method.

State-of-the-Art Review on Permanent Deformation Characterization of Asphalt Concrete Pavements

Sustainability

2023

DOI: 10.3390/su15021166

Science and Technology/ Materials Engineering

Abstract

Rutting is one of the significant distresses in flexible pavements. Examining the methods to decrease permanent deformation is of considerable importance to provide long service life and safe highways. The main objective of this paper is to undertake a state-of-the-art review to combine the existing work on the permanent deformation of asphalt concrete pavements. For this purpose, the review synthesizes the evolution of the permanent deformation models, the tests methods used to evaluate and quantify the rutting potential of asphalt mixtures with a particular focus provided on the stress sweep rutting test which is gaining popularity as it tackles the shortcomings of its predecessor for the exact characterization and prediction of permanent deformation. Additionally, some advanced computational intelligence methodologies such as finite element model and soft computing are reviewed. Furthermore, the most common permanent deformation solutions are reviewed. It was found that efforts are put towards improving either the rheological properties of base asphalt by using modifiers or asphalt mixture by using selected aggregates to enhance the aggregate interlock and by implementing semi-flexible asphalt pavements which is expected to be a promising method against permanent deformation. This state-of-the-art work is expected to supply a comprehensive perception of the available models, rutting test, and solutions, and to suggest future studying areas related to the rutting of asphalt pavements.

The Influence of Bio-inhibitor on the Corrosion Resistance of Reinforced Concrete Beams Containing MSWI-BA as a Partial Sand Replacement

BAU Journal-Science and Technology

2023

4(2): 1-15

Science and Technology/ Materials Engineering

Abstract

In this paper, the corrosion behavior of reinforced concrete beams containing municipal solid waste incineration bottom ash (MSWI-BA) as a partial sand replacement and Ceratonia siliqua extract as a green corrosion inhibitor was investigated. Four mixes were prepared: (0 and 20% replacement of sand by MSWI-BA with and without Ceratonia siliqua extract). Tests conducted were UPV, compressive strength, split tensile strength, and elastic modulus. RC beams were prepared for determining the flexural performance. Eight beams were casted. Four beams were exposed to accelerated corrosion test and four beams were kept at room temperature. It was found that the compressive strength, tensile strength, and elastic modulus decreased when 20% of fine aggregate was substituted by MSWI-BA and when adding Ceratonia siliqua extract. In addition, the deflection and strain of beams increased. However, the presence of corrosion also affected the deflection and strain and led to increase their values.
The Metaverse: A Virtual World in the Palm of Your Hand

JOURNAL: BAU Journal - Science and Technology
YEAR: 2022
THEME / SUBTHEME: Science and Technology/ Simulation, Modeling and Design

ABSTRACT: This paper explores the actual and future impact of the Metaverse as a virtual space. Thus, it focuses the probe on the technical challenges that face this everlasting emerging technology. Today, the Metaverse presents a digital environment to build collective architecture and historical heritage in a virtual space. In this digital world, the modeling and design methodology is based on individual archetypes that can puzzle new elements. Currently, traditional methods require change and adaptation in both the education and work market, especially due to the remote-work integration in the last few years. For example, many components are required to build a Virtual Reality (VR) laboratory or a VR museum. Virtual environments present us with novel opportunities to bring together the real world with a virtual extension or duplication. This technology will remove physical boundaries and design constraints and consequently will open a gate to a metaphysical world. Imagine a world with limitless space where gravity doesn’t exist, and water can float upward. There is no limit for art and architecture but even this magic has its limitation related to computer technology. Therefore, this paper surveys the state-of-the-art computational technologies and the ecosystems of the Metaverse. The paper covers the fields of Computer Vision, Human-Computer Interaction, Artificial Intelligence, Robotics, Internet of Things (IoT), Cloud Computing, and future mobile networks. In application, the Metaverse will allow users to have a fantastic experience being part of worldwide entertainment and socio-economic network.

Towards Energy Sustainability in University Campuses: A Case Study of Beirut Arab University

JOURNAL: Sustainability
YEAR: 2023
PUBLICATION INFO: DOI: 10.3390/su15097695
THEME / SUBTHEME: Science and Technology/ Energy and Environment

ABSTRACT: Lebanon has been suffering from severe challenges in its electric sector for decades owing to chronic supply shortages and faults in its aging power grid infrastructure. The deplorable situation of the Lebanese electric sector has been made worse by the economic meltdown that started in 2019, which eventually led to total power blackouts across the country. In this paper, we present a case study on the design and implementation of a solar microgrid system for Beirut Arab University, Lebanon. As a first step, simulation software for a microgrid and a distributed generation power system is used to compare different design scenarios. Considering the available installation area and the fact that the greatest demand occurs during the daytime, when both the educational and managerial facilities are running, it is found that a 500-kW photovoltaic system tied to the university’s already present diesel generators is the optimal solution in terms of return on investment. The second step details the actual implementation of the system in the Beirut campus and the evaluation of the system’s performance in terms of diesel cost savings and emissions reduction. We expect that the results of this case study will encourage other institutions and communities to adopt sustainable and renewable energy sources.
### Utilization of Fan Palm, Date Palm, and Phragmites Australis Fibers for Improving the Mechanical Behavior of Sandy Soil

**ARTICLE TITLE**
Utilization of Fan Palm, Date Palm, and Phragmites Australis Fibers for Improving the Mechanical Behavior of Sandy Soil

| JOURNAL | Geomechanics for Energy and the Environment |
| YEAR | 2023 |
| PUBLICATION INFO | DOI: 10.1016/j.gete.2022.100427 |
| THEME / SUBTHEME | Science and Technology/ Materials Engineering |
| ABSTRACT | Interests in the use of natural fibers as soil reinforcement are developing rapidly due to their cost effectiveness, high availability, and eco-friendliness. Many published studies investigated the advantages of fiber-reinforced soil, yet few of them used fibers extracted from Fan Palm (F.P), Date Palm (D.P) trees, and Phragmites Australis (Ph.A) stems, which are considered as by-products of these plants. Standard Proctor and Direct Shear tests were conducted with varying fiber contents of 0.5, 1, 1.5, and 2 %. It was demonstrated that the fiber inclusion increased the optimum moisture content, ductility, and dilation, while it decreased the maximum dry density and the brittleness of the soil. Moreover, the shear strength was significantly improved upon adding the fibers for all the contents and under the different normal stresses of 100, 200, 300, and 400 kPa. The optimum fiber percentages were found to be 2, 0.5, and 1 % for F.P, D.P, and Ph.A fibers, respectively, resulting in increasing the cohesion drastically by 10.6, 14.6, and 11.1 times the initial cohesion of the unreinforced soil, whereas, the angle of internal friction augmented by 11.9, 3.17 and 5.1 %. In summary, the application of the mentioned natural fibers improves the strength characteristics of the sand and is entirely in line with the principle of sustainable development and environmental conservation. |

### Variable Speed Induction Motors’ Fault Detection Based on Transient Motor Current Signatures Analysis: A Review

**ARTICLE TITLE**
Variable Speed Induction Motors’ Fault Detection Based on Transient Motor Current Signatures Analysis: A Review

| JOURNAL | Mechanical Systems and Signal Processing |
| YEAR | 2022 |
| PUBLICATION INFO | DOI: 10.1016/j.ymssp.2022.109737 |
| THEME / SUBTHEME | Science and Technology/ Advances in Technology |
| ABSTRACT | Induction motor is a major component in the industrial sector. It is experiencing great development concerning size, market share, and technological design. Any sudden failure in this element may lead to great damage. Condition monitoring is a fast emerging technology for the online detection of induction motor incipient faults. It avoids unexpected failure of a critical system, by increasing the life expectancy of the concerning elements while reducing operation and maintenance costs. This paper presents the condition monitoring techniques used with these machines, focusing on the Transient Motor Current Signatures Analysis method that has proven its effectiveness in diagnosing faults of electrical rotating machines, gathering a review on the most important applications that can be used with this technology, and how to process these signals to find out the type and cause of the fault. What distinguishes this paper is that it focuses on applications with variable speeds, so two promising techniques that will be effective in non-stationary signals frequency estimation are presented, which are the Adaptive Notch Filtering method and the Adaptive-Observer approach. Challenges and future goals are also discussed to guide researchers wishing to delve into this field. |
2. PROCEEDINGS

Author(S)  Zaylaa A., Wehbe G., Ouahabi A.

PROCEEDING TITLE  Bringing AI to Automatic Diagnosis of Diabetic Retinopathy from Optical Coherence Tomography Angiography

CONFERENCE TITLE  Sixth International Conference on Advances in Biomedical Engineering (ICABME 2021)

DATE  7/10/2021

PLACE  Werdanyeh, Lebanon

THEME / SUBTHEME  Science and Technology/ Simulation, Modeling and Design

ABSTRACT  Artificial Intelligence (AI) is significantly gaining interest in the field of Diagnostic and Functional Optical Imaging. As cutting-edge algorithms for decision-making are vast and medical imaging machines are diverse, the choice of the ultimate algorithm remains challenging. As a breakthrough in the field, our aim is to explore the adequate machine and deep learning algorithms that improve the classification of Optical Coherence Tomography Angiography (OCTA) Images, between normal and Diabetic Retinopathy (DR) images. The target was to provide an automatic paradigm for the medical staff to detect the presence of DR Lesions from OCTA images for diagnostic and monitoring purposes. Data were collected prospectively over a year from a comprehensive medical center in Lebanon. The mixed Convolution Neural Network (CNN)-Support Vector Machine Network (CNN, SVM) algorithm was utilized in the new paradigm and compared to the feed forward backpropagation NN, to the SVM and to the modified SVM. Results were evaluated independently for the presence or absence of DR using statistical metrics. Experimental results showcased promising association of deep learning to the early diagnosis of DR. Results manifested the high performance of the new paradigm, where the mixed algorithm applied to the functional OCTA surpassed the performance of the feed forward backpropagation NN. The sensitivity of the mixed (CNN, SVM) algorithm was 22.22% higher than that obtained by the feed forward backpropagation NN. Moreover, the specificity of classification of DR from OCTA images using mixed (CNN, SVM) algorithm was 24.44% higher than that obtained by the feed forward backpropagation NN. The precision was 25.47% higher in the new paradigm than that obtained by the feed forward backpropagation network, and the accuracy was 23.35% higher in the mixed (CNN, SVM) than that obtained by the feed forward backpropagation NN. This high performance plays a massive role in improving the diagnosis of DR, and thus Healthcare system and processing of information. As a future prospect, we aim to consider more algorithms and variables in the diagnosis of DR from OCTA images.

Author(S)  El-Halabi H., Moughnieh H., El Nakouzi L., Harb N., Kabbani O., Fattoum M.

PROCEEDING TITLE  Compact Dual Band Branch Line Coupler for Wireless Applications

CONFERENCE TITLE  IEEE 3rd International Maghreb Meeting of the Conference on Sciences and Techniques of Automatic Control and Computer Engineering (MI-STA 2023)

DATE  21/5/2023

PLACE  Benghazi, Libya

THEME / SUBTHEME  Science and Technology/ Advances in Technology

ABSTRACT  This work describes the design of a compact size dual band branch line coupler for wireless applications. In this design, open stubs are inserted at the middle of each classical coupler arm to convert it into an equivalent T shape line. ABCD-matrix analysis are used to derive the design formulas necessary for calculating the characteristic impedances and the electrical lengths of the modified coupler arms. To attain compactness in size, stubs are 90-degree bended in the outer and the inner area of the coupler. Rectangular ground slots are added to enhance the coupler performance at the designed frequencies. The designed coupler operates at 2.45 and 5 GHz corresponding to wireless applications. Simulations are done using Ansys HFSS software on RO4003 substrate with a thickness of 0.813 mm and a dielectric constant of 3.55. Values of the simulated S-parameters show that both the isolation coefficient and the return loss are lower than -20 dB at the targeted frequencies.

Author(S)  El-Halabi H., Fattoum M.

PROCEEDING TITLE  Dual Band Branch-Line Coupler Using Stub-Loaded Lines

CONFERENCE TITLE  6th International Conference on Technology, Engineering and Science (IConTES 2022)

DATE  16/11/2022

PLACE  Antalya, Turkey

THEME / SUBTHEME  Science and Technology/ Advances in Technology
This paper describes the design of a center-tapped stub loaded branch line coupler for dual band operation. In this design, the quarter wavelength transmission lines of the conventional branch line coupler are replaced with an equivalent T-shaped transmission lines. Design equations for evaluating the characteristic impedances and the electrical lengths of the coupler arms are derived based on ABCD-matrix. The proposed coupler operates at 2 and 4 GHz corresponding to S-band applications like weather radar and satellite communications. Simulations are done using Agilent ADS software on Roger RO4003 substrate with dielectric constant of 3.38. The simulated results of the S-parameters show that the return loss and isolation loss are well below -20 dB at the designed frequencies. The phase difference between the output ports is -89.5° at 2 GHz and -270° at 4 GHz. Efforts are done on reducing the size of the coupler by folding the stub towards the inner area of the coupler to be ready for fabrication.

**Abstract**

This paper presents the design of a dual-band microstrip circular patch antenna for GPS and WiMAX applications. The dual-band circular patch antenna was created from a single-band conventional circular patch antenna after introducing slots to the circular patch and using defected partial ground plane structure. Simulation results show that the antenna radiates at 1.228 GHz, 3.32529 GHz and 3.553 GHz with a return loss lower than -20 dB at these frequencies. Antenna gain at the resonating frequencies is 4.917 dBi, 5.5 dBi, and 6.145 dBi respectively. The antenna is designed over Rogers RO4003C substrate and simulated using CST microwave studio.

**Author(s)**

El-Halabi H., Fattoum M., Khatib M., Itani A.

**Abstract**

System of Systems (SoS) engineering is an essential concept in engineering education. It provides students with the skills and knowledge to design, build, and manage complex systems that involve multiple interdependent subsystems. By incorporating the concept of SoS into the engineering curriculum, engineering educators can better prepare students to address the challenges of the 21st century. Improvement of teaching methodologies and technologies plays an important role in the enhancement of engineering education. In this paper, we will discuss and focus on how to improve the engineering education program as a larger system, based on the relation between all the constituted elements (subsystems) of the engineering curriculum, and how their work together for its development and enhancement. Subsystems of the engineering education program are divided into three main parts: course design, instructor role model, and modern teaching methodologies. To achieve our goal, we will discuss and review, the design of an engineering course based on Bloom’s taxonomy technique, the role of the instructor/educator as the best role model for the students, and the different modern teaching methodologies in higher education. This paper is a theoretical study concerning the engineering education program enhancement. As results and findings, we present the challenges and difficulties that the professors and engineering teachers should be aware of to develop and support the engineering education system.

**Author(s)**

Ayache M., Daher A.
Hybrid Active Power Filter Using a Filter-Less Extraction Technique

**PROCEEDING TITLE**

Hybrid Active Power Filter Using a Filter-Less Extraction Technique

**CONFERENCE TITLE**

11th International Conference on Renewable Energy Research and Application (ICRERA 2022)

**DATE**

18/9/2022

**PLACE**

Istanbul, Turkey

**THEME / SUBTHEME**

Science and Technology/ Energy and Environment

**ABSTRACT**

Harmonics lower power quality and degrade system performance for sensitive electrical loads. To enhance power quality, an active power filter (APF) is usually used owing to its excellent dynamic response to reduce total harmonic distortion (THD) of the source current. An APF consists of an extraction and modulation modules. The precision of harmonic extraction improves the performance of the APF. This paper proposes the matrix pencil method (MPM) for reference current extraction in the hybrid active power filter (HAPF). Unlike the widely used time-domain instantaneous reactive power theory (IRPT), the MPM does not rely on the low-pass filter in its implementation. Modeling and simulation of the HAPF with the MPM extraction technique are carried out using MATLAB/Simulink and show that MPM achieves a better performance with lower THD and faster response when compared to IRPT.

**Author(s)**

El Ghaly A., Tarnini M., Moubayed N., Chahine K.

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Logic-Based Neural Network for Pattern Correction

**PROCEEDING TITLE**

Logic-Based Neural Network for Pattern Correction

**CONFERENCE TITLE**

International Conference on Smart Systems and Power Management (IC2SPM 2022)

**DATE**

10/11/2022

**PLACE**

Beirut, Lebanon

**THEME / SUBTHEME**

Science and Technology/ Advances in Technology

**ABSTRACT**

As the 21st century continues, Deep Learning (DL) has become an important part in the digital world. The use of Artificial Neural Networks (ANNs), the core of DL, has led to the development of many novel applications, like speech recognition, character recognition, autonomous cars, etc. In this paper, we present a logic-based neural network processor for pattern correction, which can detect anomalies in a certain character, and can regenerate the character after removing the anomalies. The processor constitutes of sub-networks, namely the Generator network, the Inverter network, the Locator network, the Identifier network, and the Replacer network. A test for the proposed processor was done on the dataset of numeric characters.

**Author(s)**

ABSTRACT

Thalassemia is the most common single-gene disorder throughout the world and represents a major public health problem resulting in abnormal ratios of hemoglobin subunits. It is widely spread throughout the Mediterranean region, Middle East, Southeast Asia, and some parts of Africa. There are different types of Thalassemia characterized by abnormal hemoglobin production. Most of the current hemoglobinopathy screening methods include High Performance Liquid Chromatography (HPLC), hemoglobin electrophoresis, screening of Polymerase Chain Reaction (PCR) mutations, and Deoxyribonucleic Acid (DNA) tests. However, all these methods are costly and require specialized instrumentation and trained technicians. Despite some studies used Artificial Intelligence (AI) they focused merely on Machine Learning (ML) and results were not optimal. This study aims to design a new AI-based framework for Thalassemia diagnosis using Deep Learning (DL) and a new combination of metrics for evaluation. This was achieved through the development and evaluation of a supervised semantic image segmentation model, and the implementation of different data engineering methods such as data annotation, augmentation, pre-processing, and preparation. Transfer learning was utilized and the Prediction Time Augmentation (PTA) was employed to get smoother and more accurate predictions. Quantitative results showed that, the mean Intersection Over Union (IoU) score of prediction of Thalassemia was 88% with PTA and 82% without PTA. Results also showed that as the combined metric of loss scores decreases the prediction of Thalassemia increases. Qualitative results showed that the final prediction of Thalassemia focuses on the Codocytes and labels the other unidentified cells as the background. Also, the resulting image was smoother and less bulky than the original annotated ground truth, and thus could be feasibly diagnosed. As a future prospect we aim to implement more algorithms and extend the diagnosis to include other diseases.

Author(S) Daher A., Ayache M., El-Halabi H., Fattoum M., Hajj O.

PROCEEDING TITLE Wireless Healthcare Monitoring System for Heart Diseases Classification using Efficient ECG-Based Wave Modeling and Machine Learning Techniques

CONFERENCE TITLE Fifth International Conference on Advances in Computational Tools for Engineering Applications (ACTEA 2023)

DATE 5/7/2023

PLACE Zouk Mosbeh, Lebanon

THEME / SUBTHEME Science and Technology/ Advances in Technology

ABSTRACT This paper presents a new methodology for developing a low-cost wireless ECG transmission and monitoring system based on IoT technology, designed for real-time detection and classification of heart diseases. The study focuses on using ECG data for heart disease classification, which is an area of growing interest in recent years. The study collected data from 1000 subjects using our designed system to collect the normal data (300 patients) and a Biopac MP160 data acquisition system for the collection of 10 diseases abnormal data, where all the data are acquired from lead 1.

ABSTRACT

The aim of this study is to develop an accurate and reliable classification model for heart diseases using ECG data. Pre-processing steps were taken to prepare the data for feature extraction, including the use of Empirical Mode Decomposition (EMD) and digital filters such as low pass, high pass, and derivative pass filters. A new feature extraction steps based on a new ECG peak detection, segmentation, and wave modeling for each segment is also presented. Two classification methods were used: Multi-Layer Perceptron (MLP) and Radial Basis Function (RBF). The results showed that MLP had a much higher accuracy of 99.1% compared to RBF, which had an accuracy of 97.4%. The study emphasizes the potential of using ECG data for accurate classification of heart diseases. The results demonstrate that proper pre-processing and feature extraction techniques are crucial for improving accuracy. This study is significant for remote patient monitoring and telemedicine applications, as it provides a low-cost, non-invasive method for detecting and classifying heart diseases using ECG data.

3. BOOK CHAPTERS

Author(S) Al Mubasher H., Doughan Z., Sliman L., Haidar A.

BOOK CHAPTER TITLE A Novel Neural Network-Based Recommender System for Drug Recommendation

BOOK TITLE Engineering Applications of Neural Networks

YEAR 2023

PUBLISHER Springer, Cham

ISBN 9783031342042

THEME / SUBTHEME Science and Technology/ Advances in Technology

ABSTRACT

With the advancement of Machine Learning, recommender systems have emerged with the aim of improving the user experience in a world where data and available alternatives are tremendously growing. Employing Natural Language Processing with such systems can provide them with a sense of empowerment, given that most of the users’ opinions are reflected through reviews. Artificial Neural Networks, the core of Deep Learning, have sparked a lot of interest in many research fields, owing to the appealing property of learning feature representations out of nowhere. To that end, this paper presents a novel hybrid recommender system that is based on Natural Language Processing and Artificial Neural Networks. The proposed model is evaluated and compared with a similar model, where the advantages of the proposed model are clearly presented. The paper is concluded by highlighting research opportunities that can be done in the future.
Effect of Adding Phragmites-Australis Plant on the Chemical Shrinkage and Mechanical Properties of Mortar

Building structures would be impossible without concrete, which is the world’s most commonly used construction material after water. Resources, recycling, durability, and environmental quality are just a few of the many areas of concrete production that have seen advancements. The use of natural fibers in concrete is one of these methods. Plant-based materials derived from natural fibers are readily available, low-cost renewable resources. In this study, the use of natural fiber from the Phragmites-Australis plant (PA) has been investigated. The effect of incorporating PA in different volume percentages (0 to 2%) on the chemical shrinkage and mechanical properties of mortar has been examined. In this experiment, the PA stems were cut into pieces 1 cm long and 2 cm wide and treated with 4% sodium hydroxide solution (NaOH). The w/c was kept constant for all mixes. Mortar samples were tested for 28 days. Testing involved chemical shrinkage, density, ultra-pulse velocity (UPV), and compressive and flexural strengths. Results showed that the addition of PA reduced the chemical shrinkage of mortars. The addition of 1% PA increased the UPV, compressive strength, and flexural strength of mortar samples. Furthermore, a strong correlation was found between chemical shrinkage and compressive strength, indicating that as the pozzolanic reaction progressed, the chemical shrinkage increased. Therefore, the inclusion of PA plant as an eco-friendly material in mortar mixtures contributes to a sustainable building.
**BOOK CHAPTER TITLE** | Use of Alternative Recycled Fillers in Bituminous Mixtures: A Review
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**BOOK TITLE** | Advance Upcycling of By-products in Binder and Binder-Based Materials
**YEAR** | 2023
**PUBLISHER** | Woodhead Publishing
**ISBN** | 9780323998048
**THEME / SUBTHEME** | Science and Technology/ Materials Engineering

**ABSTRACT**
Advance Upcycling of By-products in Binder and Binder-Based Materials focuses on research trends in binder and binder-based materials containing by-products. The book covers the properties of these materials, both physical and mechanical, and their durability, as well as their inner structure, both at the micro and nano-scale. The reuse of by-products within binder systems is also discussed as well as innovative approaches and advanced solutions for making cost-, ecology-, and environmental-friendly hydraulic binder and binder-based materials from the upcycling of by-products. The book also looks at additive manufacturing and explains the effects of by-products on the properties of binder and binder-based materials.
As a consequence of the popularity of additive manufacturing, various by-product materials, in terms of constructional application, are also identified. These include latent hydraulic supplements, activators of transport properties, and increase in inner strength and durability. The book will be an essential reference resource for academic and industrial researchers, materials scientists and civil engineers and all those who are working in the development of ‘greener’ construction materials and utilization of waste and other fine by-products in the production of environmentally-friendly concrete.
**ARTICLE TITLE**  
Actinomycetes, Promising Therapeutic Agents: Characteristics and Active Metabolites

**JOURNAL**  
Journal of Biology and Today’s World

**YEAR**  
2022

**PUBLICATION INFO**  
11(6): 1-8

**THEME / SUBTHEME**  
Science and Technology/ Environmental Studies

**ABSTRACT**  
Actinomycetes are gram-positive bacteria detected in various terrestrial and aquatic environments. Many of them develop mycelia and exhibit complicated structural differentiation. Actinomycetes have been identified using a variety of methods, namely morphological, chemotaxonomic, and molecular techniques. Because of the extensively emerging antimicrobial-resistant organisms affecting human health and agriculture, as well as the increasing incidence of cancer, new drugs are urgently needed to combat different diseases and microbial infections. The majority of antimicrobials now in use are of natural origin. Among them, actinomycetes constitute a significant source of bioactive compounds used in drug development. Actinomycetes provide almost 45% of the secondary metabolites, followed by fungi recording 38%, and other bacteria that produce only 17%. Secondary metabolites derived from actinomycetes exhibit a wide spectrum of biological activities targeting both the pathogens and the host. This review emphasizes the classification of diverse actinomycetes and lists their importance, with an emphasis on the secondary metabolites and their different biological activities.
**Adsorption Performance of Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Fe$_{2-x}$O$_4$ Nanoparticles Doped with Gadolinium and Lanthanum for Lead (II) Removal**

**Author(s)** Rabaa M., Aridi A., Younes G., Awad R.

**JOURNAL** BAU Journal-Science and Technology

**YEAR** 2023

**PUBLICATION INFO** 4(2): 1-11

**THEME / SUBTHEME** Science and Technology/ Advanced Materials

**ABSTRACT**

The issue of water pollution has become a major concern in recent times, and the need for effective strategies for treating contaminated water sources has become more urgent. One promising approach that has been gaining attention in the field of wastewater treatment is the use of nano-ferrites. In this regard, novel Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Fe$_{2-x}$O$_4$ and Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$GdxFe$_{2-x}$O$_4$ nanoparticles (NPs), where $x = 0.00$, 0.01 and 0.08, were synthesized to test their adsorption performance for the removal of Pb (II). The structural properties and morphology were investigated using X-ray diffraction (XRD) and transmission electron microscopy (TEM). As Gd and La content increase, the bandgap energy increases while Urbach energy decreases. The experimental condition for the adsorption process was the adsorbent dosage of 40 mg and contact time of 30, 60, and 90 min at room temperature. Under the recommended conditions, Pb (II) removal % were obtained as 38 %, 41 % and 75 % for Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Fe$_{2}$O$_4$, Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$La$_{0.01}$Fe$_{1.99}$O$_4$ and Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Gd$_{0.08}$Fe$_{1.92}$O$_4$, respectively. Therefore, doping ferrite nanoparticles with rare earth metals improve their properties and enable its usage in wastewater treatment particularly for the removal of heavy metals.

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**A Finite Element Scheme for a 2D-Wave Equation with Dynamical Boundary Control**

**Author(s)** Bzeih M., El Arwadi T., Wehbe A., Madureira R., Rincon M.

**JOURNAL** Mathematics and Computers in Simulation

**YEAR** 2023

**PUBLICATION INFO** 205: 315-339

**THEME / SUBTHEME** Science and Technology/ Mathematical and Computational Science

**ABSTRACT**

We study the 2D linear wave equation with dynamical control on the boundary. New mathematical difficulties appear due to the boundary conditions. By adding some artificial viscosity term, we introduce a penalized problem, and the well posedness is done by using the Faedo–Galerkin method. A numerical scheme is proposed and the decay of the associated discrete energy is obtained. At the end, an a priori error estimate is obtained and some numerical results are presented.

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**Anion Complexation by an Azocalix[4]arene Derivative and the Scope of Its Fluoride Complex Salt to Capture CO$_2$ from the Air**

**Author(s)** Danil de Namor A., Al Hakawati N.

**JOURNAL** Molecules

**YEAR** 2023

**PUBLICATION INFO** DOI: 10.3390/molecules28166029

**THEME / SUBTHEME** Science and Technology/ Advanced Materials

**ABSTRACT**

A newly synthesized upper rim azocalix[4]arene, namely 5,11,17,23-tetra(4-ethylacetoxyphenyl) azo]calix[4]arene, CA-A2 has been fully characterized, and its chromogenic and selective properties for anions are reported. Among univalent anions, the receptor is selective for the fluoride anion, and its mode of interaction in solution is discussed. The kinetics of the complexation process were found to be very fast as reflected in the immediate colour change observed with a naked eye resulting from the receptor-anion interaction.
ARTICLE TITLE: Assessment of X-ray Shielding Properties of Polystyrene Incorporated with Different Nano-Sizes of PbO

JOURNAL: Radiation and Environmental Biophysics

YEAR: 2023

PUBLICATION INFO: 62: 235-251

THEME / SUBTHEME: Science and Technology/ Advanced Materials

ABSTRACT: PbO (lead oxide) particles with different sizes were incorporated into polystyrene (PS) with various weight fractions (0, 10, 15, 25, 35%). These novel PS/PbO nano-composites were produced by roll mill mixing and compressing molding techniques and then investigated for radiation attenuation of X-rays (N-series/ISO 4037) typically used in radiology. Properties of the PbO particles were studied by X-ray diffraction (XRD). Filler dispersion and elemental composition of the prepared nano-composites were characterized using scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDS), revealing better filler distribution and fewer agglomerations with smaller PbO particle size. Linear and mass attenuation coefficients ($\mu$ and $\mu_m$), total molecular and atomic cross-sections ($\sigma_{mol}$ and $\sigma_{atm}$), as well as effective atomic number and electron density ($Z_{eff}$ and $N_{eff}$), were calculated for the energy range N40 to N200. The influence of PbO weight percentage on the enhancement of the shielding parameters of the nano-composites was expected; however, the effect of PbO particle size was surprising. Linear and mass attenuation coefficients for PS/PbO composites increased gradually with increasing PbO concentrations, and composites with a small size of nanoparticles showed best performance. In addition, increasing PbO concentration raised the effective atomic number $Z_{eff}$ of the composite. Hence, the electron density $N_{eff}$ increased, which provided a higher total interaction cross-section of X-rays with the composites. Maximum radiation shielding was observed for PS/PbO(B). It is concluded that this material might be used in developing low-cost and lightweight X-ray shielding to be used in radiology.
Asymmetric Dimethylation of Ribosomal S6 Kinase 2 Regulates Its Cellular Localisation and Pro-Survival Function

Ribosomal S6 kinases (S6Ks) are critical regulators of cell growth, homeostasis, and survival, with dysregulation of these kinases found to be associated with various malignancies. While S6K1 has been extensively studied, S6K2 has been neglected despite its clear involvement in cancer progression. Protein arginine methylation is a widespread post-translational modification regulating many biological processes in mammalian cells. Here, we report that p54-S6K2 is asymmetrically dimethylated at Arg-475 and Arg-477, two residues conserved amongst mammalian S6K2s and several AT-hook-containing proteins. We demonstrate that this methylation event results from the association of S6K2 with the methyltransferases PRMT1, PRMT3, and PRMT6 in vitro and in vivo and leads to nuclear localisation of S6K2 that is essential to the pro-survival effects of this kinase to starvation-induced cell death. Taken together, our findings highlight a novel post-translational modification regulating the function of p54-S6K2 that may be particularly relevant to cancer progression where general Arg-methylation is often elevated.

Attenuation Parameters of HDPE Filled with Different Nano-Size and Bulk WO3 for X-ray Shielding Applications

High-density polyethylene (HDPE) was obtained through a compression molding technique, and incorporated with different filler weight fractions (10, 15, 25, and 35%) of bulk WO3, and two different WO3 nanoparticle sizes (45 and 24 nm). The radiation attenuation ability of the new category of polymer composite HDPE/WO3 was evaluated using X-rays of narrow-spectrum N-series range from 40 to 200 kV. The synthesized composites with filler weight fractions of 15 and 35% were characterized by scanning electron microscope and energy-dispersive X-ray. The results showed that WO3 nanoparticles have uniform dispersion at low filler weight fractions in the polymer matrix, and confirmed that polymer composite was mainly composed of tungsten and carbon. The optimum thickness range is calculated and the HVL of the synthesized composites is compared with that of pure lead as a conventional shielding material. The apparent density values exhibited an outstanding effect of the size and weight fraction of WO3 filler on the attenuation parameters of HDPE composite. The linear and mass attenuation coefficients (μ and μm), the total molecular cross-section σmol, and the effective atomic cross-section σatm were increased with the increase in WO3 wt% as well as the decrease in WO3 size. The total electronic cross-section σel, the effective atomic number Zeff, and electron density Neff were also increased with the increment in WO3 filler. HDPE composite filled with the smaller size of WO3 nanoparticle shows good improvement in the attenuation parameters, which suggests promising applications in radiation protection and diagnostic X-ray shielding.

B3 Block Representations of Dimension 6 and Braid Reversions

We construct a family of six-dimensional block representations of the braid group B3 on three strings. We show that some of these representations can be used to separate braids from their reversed braids of some known knots and others of 9 and 10 crossings.
### ARTICLE TITLE
Characterization and Evaluation of the Therapeutic Benefits of Pure and Lanthanides Mono- and Co-doped Zinc Oxide Nanoparticles

### JOURNAL
Saudi Journal of Biological Sciences

### YEAR
2023

### PUBLICATION INFO
DOI: 10.1016/j.sjbs.2023.103608

### THEME / SUBTHEME
Science and Technology/ Advanced Materials

### ABSTRACT
The effect of Lanthanides-doping on the structural, optical, morphological, antibacterial and anticancer properties of zinc oxide (ZnO) nanoparticles was investigated. Pure ZnO, Zn0.9La0.1O, Zn0.9Ce0.1O, and Zn0.9La0.05Ce0.05O were fabricated through the chemical co-precipitation route. The structural and morphological properties were studied using the X-ray diffraction (XRD) and transmission electron microscopy (TEM), respectively. The optical properties were analyzed by photoluminescence spectroscopy (PL). The inhibitory effect of the synthesized nanoparticles (NPs) was assessed against six bacterial strains using the agar well diffusion and broth micro-dilution methods. The anticancer potential of the synthesized NPs was assessed against two human colon cancer cell lines Caco-2 and HCT-116. The appearance of the La2O3 and CeO2 secondary phases upon doping La3+ and Ce3+ ions induced structural and morphological changes. The large distorted hexagonal morphology of pure ZnO is transformed into small sized distorted hexagonal form. The photoluminescence spectra revealed the point defects resulting from Lanthanum (La) and cerium (Ce) doping. The prepared NPs significantly inhibited the growth of the six investigated bacteria and induced cytotoxic effects and morphological changes against Caco-2 and HCT-116 cell lines. This study showed that doping ZnO with lanthanide ions such as La3+ and Ce3+ provide promising biological applications. These NPs showed a potent antibacterial and anticancer effect towards the investigated bacterial strains and colon cancer cell lines. These findings point to the importance of the biological applications of NPs, and the possibility of investigating other biomedical applications for NPs.

### ARTICLE TITLE
ChatGPT: Empowering Lifelong Learning in the Digital Age of Higher Education

### JOURNAL
Education and Information Technologies

### YEAR
2023

### PUBLICATION INFO
DOI: 10.1007/s10639-023-12114-8

### THEME / SUBTHEME
Science and Technology/ Impact of Communication Technology on Social Relationships

### ABSTRACT
Artificial intelligence (AI) technologies have the potential to completely transform how we teach and learn in higher education. ChatGPT, a language model developed by OpenAI, is one such tool that can deliver individualized recommendations to students, increase collaboration and communication, and improve student learning results. However, there are some obstacles to overcome, such as ethical concerns and implementation issues. This study reviews related work on the use of artificial intelligence in education, with a focus on ChatGPT and its possible applications in higher education. It also examines the benefits and drawbacks of adopting ChatGPT in higher education, as well as implementation advice. Finally, the report discusses future directions for ChatGPT research in higher education. According to the findings of this paper, ChatGPT represents a significant opportunity for higher education institutions to improve the quality and accessibility of education; however, its implementation must be approached with caution and a clear understanding of the opportunities and challenges involved.

### ARTICLE TITLE
Comparative Analysis of Centralized and Federated Learning Techniques for Sensor Diagnosis Applied to Cooperative Localization for Multi-Robot Systems

### JOURNAL
Sensors

### YEAR
2023

### PUBLICATION INFO
DOI: 10.3390/s23177351

### THEME / SUBTHEME
Science and Technology/ Software and Computing
ABSTRACT

Cooperation in multi-vehicle systems has gained great interest, as it has potential and requires proving safety conditions and integration. To localize themselves, vehicles observe the environment using sensors with various technologies, each prone to faults that can degrade the performance and reliability of the system. In this paper, we propose the coupling of model-based and data-driven techniques in diagnosis to produce a fault-tolerant cooperative localization solution. Consequently, prior knowledge can guide a discriminative model that learns from a labeled dataset of appropriately injected sensor faults to effectively identify and flag erroneous readings. Going further in security, we conduct a comparative study on learning techniques: centralized and federated. In centralized learning, fault indicators generated by model-based techniques from all vehicles are collected to train a single model, while federating the learning allows local models to be trained on each vehicle individually without sharing anything but the models to be aggregated. Logistic regression is used for learning where parameters are established prior to learning and contingent upon the input dimensionality. We evaluate the faults detection performance considering diverse fault scenarios, aiming to test the effectiveness of each and assess their performance in the context of sensor faults detection within a multi-vehicle system.

Author(S)

Khattar R., Habanjar K., Awad R., Anas M.

ARTICLE TITLE

Comparative Study of Structural, Electrical, and Mechanical Properties of \(\text{Tl}_0.8-x\text{Hg}_{0.2}\text{Pb}_x\text{Ba}_2\text{Ca}_2\text{Cu}_3\text{O}_9-x_{\delta}\) High Temperature Superconducting Phase Substituted by Lead Oxide and Lead Dioxide

JOURNAL

Journal of Low Temperature Physics

YEAR

2023

PUBLICATION INFO

211(3-4): 166-192

THEME / SUBTHEME

Science and Technology/ Advanced Materials

ABSTRACT

To compare between the effect of partial substitution of lead ions (\(\text{Pb}^{4+}\) and \(\text{Pb}^{2+}\)) at thallium (Tl) site in \(\text{Tl}_0.8-x\text{Hg}_{0.2}\text{Pb}_x\text{Ba}_2\text{Ca}_2\text{Cu}_3\text{O}_9-x_{\delta}\) superconductor, two different compounds, lead (II) oxide (\(\text{PbO}\)) and lead (IV) oxide (\(\text{PbO}_2\)), were used for the synthesis of the superconducting samples. Samples with nominal compositions \(\text{Tl}_0.8-x\text{Hg}_{0.2}\text{Pb}_x\text{Ba}_2\text{Ca}_2\text{Cu}_3\text{O}_9-x_{\delta}\), with \(x= 0.00, 0.05, 0.10, 0.15,\) and \(0.20,\) were synthesized via solid state reaction technique. The x-ray diffraction (XRD) results showed that the partial substitution of both lead ions has not affected the tetragonal structure. Moreover, the volume fraction was increased from 75.95% to 90.38% and 89.41% as \(x\) increased up to 0.20 for \(\text{PbO}\) and \(\text{PbO}_2\) substitutions, respectively. The scanning electron microscopy (SEM) images demonstrated better grain connectivity and rectangular-shaped plates, supporting the phase formation of \(\text{Tl(Hg)}-1223\). The energy-dispersive x-ray (EDX) analysis revealed good agreement between the nominal and real compositions. Moreover, the elemental composition and oxidation states were proved by x-ray photoelectron spectroscopy (XPS).

ARTICLE TITLE

Computer Vision Aided Hotspot Creation in Virtual Environments

JOURNAL

Architecture & Planning Journal-APJ

YEAR

2023

PUBLICATION INFO

28(3): 1-9

THEME / SUBTHEME

Science and Technology/ Software and Computing

ABSTRACT

Hotspot creation is one of the most important modules within virtual environments which helps show the navigators of these environments some information about semantic elements within it and facilitate the navigation between the virtual spaces. In this paper, a system for automatic hotspot proposals and creation in virtual environments is proposed. The system uses computer vision modules to automatically propose hotspot locations in addition to identifying and creating these hotspots with candidate labels. Two main modules used in the system are object detection and scene segmentation. The scene segmentation helps give candidate hotspot areas and provides an overall understanding of the semantics of the virtual environment. The object detection module also uses pretrained deep networks for automatic hotspot creation over these objects. The system helps speed up the hotspot creation process and offers a tool for virtual environment users and creators.

Author(S)

Affara L., Nakhal B.
### ARTICLE TITLE
EEBA: Energy-Efficient and Bandwidth-Aware Workload Allocation Method for Data-intensive Applications in Cloud Data Centers

### JOURNAL
IAENG International Journal of Computer Science

### YEAR
2021

### PUBLICATION INFO
48(3): 703-715

### THEME / SUBTHEME
Science and Technology/ Mathematical and Computational Science

### ABSTRACT
Cloud computing is a promising technology for providing efficient virtualized compute and storage resources to users on a pay-per-usage model. Large-scale geographically distributed data centers have been established to support the increasing demand for cloud services. Execution of data-intensive workloads is a challenging problem especially when objectives such as load balancing and energy reduction are essential to reduce cloud providers operational cost while providing high quality-of-service to users. Meantime, the high rates of data transfers result in network congestion that increases the makespan of workloads. This paper presents a novel Energy-Efficient and Bandwidth-Aware workload allocation method to run data-intensive applications on geo-distributed cloud DCs. We formulated the workload allocation problem as a multi-objective optimization problem to minimize the workload makespan, data centers energy consumption, and communication network congestion overhead. We designed a meta-heuristic genetic algorithm to find a near-optimal workload allocation. Extensive simulations using synthetic and real traces showed a 32% average reduction of workload makespan and 35% average reduction in network traffic compared to benchmark allocation methods.

### ARTICLE TITLE
Effect of Fluorine Substitution on Magnetoresistance Pinning Energy and Irreversibility of [Cu, Tl]-1223 Phase

### JOURNAL
Journal of Low Temperature Physics

### YEAR
2023

### PUBLICATION INFO
210: 166-181

### THEME / SUBTHEME
Science and Technology/ Advanced Materials

### ABSTRACT
The magnetoresistance behavior of (CuF$_x$)$_x$-substituted [Cu$_{0.5-x}$, Tl$_{0.5}$]Ba$_2$Ca$_2$Cu$_3$O$_y$ superconducting samples with $x = 0.1, 0.2, 0.3,$ and $0.4$ was investigated by varying the flux pinning mechanism. A pronounced broadening of resistive transitions, $\Delta T$, was observed by applying external magnetic fields ranging from 0.29 to 4.40 kOe. The thermally activated flux creep, TACF, and Ambegaokar–Halperin, AH, models have been studied to explain the broadening of the resistive transition and magnetoresistance. The results revealed that the flux pinning energy, $U(H)$, was reduced as the magnetic field increased while it was raised with increasing (CuF$_2$)$_x$ substituted up to an optimum concentration of $x = 0.2$. Moreover, the critical current density, $J_c$, and the upper irreversibility field, $H_{irr}$, were enhanced with (CuF$_2$)$_x$—substituted in the [Cu$_{0.5-x}$, Tl$_{0.5}$]Ba$_2$Ca$_2$Cu$_3$O$_y$ phase, showing a strong flux pinning for $x = 0.2$ at different magnetic fields.

### ARTICLE TITLE
Effect of Hard Magnetic Ferrite (Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$) Nanoparticles on the Mechanical Properties of the (Bi, Pb)-2223 Phase

### JOURNAL
Applied Physics A: Materials Science and Processing

### YEAR
2023

### PUBLICATION INFO
DOI: 10.1007/s00339-023-06557-6

### THEME / SUBTHEME
Science and Technology/ Advanced Materials
To manifest the effect of hard magnetic Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$ nanoparticles on the mechanical performance of the (Bi,Pb)-2223 superconducting phase, nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$/Bi$_1$$_2$Pb$_2$Sr$_2$Ca$_2$Cu$_{2-2x}$O$_{10+x}$, with $x=0.00, 0.01, 0.02, 0.03, 0.04, 0.05, 0.10$, and $0.20$ wt%, were synthesized using a conventional solid-state reaction method. The X-ray diffraction (XRD) data revealed that adding nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$ to the host (Bi,Pb)-2223 phase preserved the orthorhombic structure. The porosity (P%) calculations revealed a decrease until $x=0.04$ wt%, which suggests that the addition of nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$ reduces the number of voids and improves inter-grain connections, as confirmed by SEM micrographs. The superconducting transition temperature ($T_c$) increased to 112 K with the inclusion of nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$ up to $x=0.04$ wt%. Vickers microhardness (HV) measurements were conducted at various applied loads (0.245–9.800 N) and a duration time of 45 s. The HV number increased with the addition of $x$ up to $x=0.04$ wt% but then decreased with further addition. Various models were employed for analysis and modelling of Vickers hardness ($H_v$) versus test load ($F$), including Meyer’s law, Hays–Kendall ($H–K$) model, the elastic/plastic deformation (EPD) model, the modified proportional sample resistance (MPSR) model, and indentation-induced cracking (IIC) model. It was found that the PSR model was the most appropriate theoretical model for describing the microhardness of nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$/ (Bi,Pb)-2223 composites. Moreover, the elastic modulus ($E$), yield strength ($Y$), fracture toughness ($K$), brittleness index ($B$), and elastic stiffness coefficient ($C_{11}$) were estimated as a function of the inclusion of nano-(Ba$_{0.5}$Sr$_{0.5}$Fe$_{12}$O$_{19}$)$_x$. Furthermore, the indentation creep test (time-dependent Vickers microhardness) revealed that the dislocation creep mechanism exists in composite samples with low concentrations ($x<0.05$ wt%), whereas the dislocation climbs creep mechanism was observed for $x>0.05$ wt%.

**Article Title:** Effect of La$^{3+}$ and Ce$^{3+}$ Dopant Ions on Structural, Optical, Magnetic, and Antibacterial Activity of ZnO Nanoparticles

**Authors:** Al Bitar M., Khalil M., Awad R.

**Journal:** Materials Today Communications

**Year:** 2022

**Publication Info:** DOI: 10.1016/j.mtcomm.2022.104683

**Theme/Subtheme:** Science and Technology/Advanced Materials

**Abstract:** In the present study, pure and co-doped zinc oxide (ZnO) nanoparticles (Zn$_{1-x}$La$_x$Ce$_y$O$_2$) with atomic percentages $x=0.0, 0.5, 1.5, 2.5$, and $3.5\%$ were synthesized via the chemical co-precipitation method. The impact of lanthanum and cerium dopant ions (La$^{3+}$ and Ce$^{3+}$ ions, respectively) on the structural, morphological, optical, magnetic, and antibacterial activity of the ZnO nanoparticles was investigated.

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**Article Title:** Effects of Thallium Fluoride Substitution on the Flux Pinning Energies of (Cu$_{0.5}$Tl$_{0.5}$)Ba$_2$Ca$_2$Cu$_3$O$_{10-\delta}$ Superconductors

**Authors:** Hassan M., Khalaf A., Kamar A., Awad R., Matar M.

**Journal:** Applied Physics A: Materials Science and Processing

**Year:** 2022

**Publication Info:** DOI: 10.1007/s00339-022-06170-z

**Theme/Subtheme:** Science and Technology/Advanced Materials

**Abstract:** X-ray diffraction patterns reveal the wurtzite hexagonal crystal structure of ZnO nanoparticles (NPs) with the formation of two secondary phases (CeO$_2$ and La$_2$O$_3$) when $x=1.5$ and 2.5 at% or higher, respectively. La$^{3+}$ and Ce$^{3+}$ ions show a high impact on the morphology of ZnO NPs, as revealed by transmission electron microscopy analysis. Fourier transform infrared spectroscopy results indicate that La$^{3+}$ and Ce$^{3+}$ ions induce a red shift in the zinc-oxygen (Zn–O) vibrational mode. The incorporation of La$^{3+}$ and Ce$^{3+}$ ions into the ZnO matrix showed a remarkable impact on the ZnO NP optical properties. At room temperature, the M–H magnetic hysteresis of the synthesized samples reveal a combination of both diamagnetic and ferromagnetic contributions. The antibacterial properties of the synthesized NPs were also evaluated against six bacterial strains using the agar well diffusion method. The synthesized NPs suppressed the growth of the investigated bacteria with various degrees of toxicity.
### Energy, Network, and Application-Aware Virtual Machine Placement Model in SDN-Enabled Large Scale Cloud Data Centers

**Author(s)**: Rawas S.

**JOURNAL**: Multimedia Tools and Applications

**YEAR**: 2021

**PUBLICATION INFO**: DOI: 10.1007/s11042-021-10616-6

**THEME / SUBTHEME**: Science and Technology/ Mathematical and Computational Science

**ABSTRACT**: Cloud computing has been considered a core model of elastic on-demand resource allocation using a pay-as-you-go model. One of the big challenges of this environment is to provide high quality service (QoS) through efficient and stringent management of cloud data center resources. With the increasing demand for cloud based services, the traffic volume inside cloud data centers (DC) has been increased exponentially. Accordingly, and to provide high QoS, a proper scheduling mechanism has to be followed by the cloud service provider. Furthermore, accurate scheduling is necessary for advancing the problem of energy consumption and resource utilization. In this paper, we propose an optimal resource allocation and consolidation virtual machine (VM) placement model for multi-tier applications in modern large cloud DCs. The proposed model targets to optimize the DCs’ energy and communication cost that influence the overall cloud performance through Software Defined Networking (SDN) control features. To solve the formulated multi-objective optimization problem, a novel adaptive genetic algorithm is proposed. The experimental results validate the efficacy of the proposed model through extensive simulations using synthetic and real workload traces. These results show that the proposed model jointly optimizes cloud QoS as well as energy consumption.

### Enhanced Adsorption Performance of Magnetic Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$/Zn$_{0.95}$Co$_{0.05}$O Nanocomposites for the Removal of Malachite Green Dye

**Author(s)**: Aridi A., Basma H., Chehade W., Sayed Hassan R., Yaacoub N., Naoufal D., Awad R.

**JOURNAL**: Environmental Science and Pollution Research

**YEAR**: 2023

**PUBLICATION INFO**: 30: 58399-58411

**THEME / SUBTHEME**: Science and Technology/ Advanced Materials

**ABSTRACT**: This investigation reports the synthesis and characterization of (1-x)Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$/xZn$_{0.95}$Co$_{0.05}$O nanocomposites, with 0.0 ≤ x ≤ 0.5. Fourier transform infrared (FTIR) and Raman spectroscopies confirmed the purity of the samples and the presence of bands corresponding to octahedral and tetrahedral iron occupancies for Ni$_{0.5}$Zn$_{0.5}$Fe$_2$O$_4$ nanoparticles. A shift in peak positions of these bands was detected upon the addition of Zn$_{0.95}$Co$_{0.05}$O nanoparticles. The magnetic properties of the nanocomposites were examined using Mössbauer spectrometry at both room temperature and 77 K. Room temperature analysis showed the existence of both ferromagnetic and superparamagnetic behaviors, while at 77 K, all nanocomposites showed ferromagnetic behavior. The adsorption performance of the nanocomposite on the removal of malachite green (MG) dye solution was investigated by varying the contact time, adsorbent concentration, and reaction temperature. The adsorption reaction followed the second-order kinetics and the sample with x = 0.3 showed the highest adsorption rate. The adsorption rate showed an increase with the increase in the reaction temperature. The adsorption isotherm was determined by applying different adsorption isotherms (Langmuir, Freundlich, and Temkin isotherms), and the results are well-fitted with the Langmuir theoretical model.
### ARTICLE TITLE

**(Joint Publication with the Faculty of Architecture-Design & Built Environment)**

**JOURNAL**
Architecture & Planning Journal-APJ

**YEAR**
2023

**PUBLICATION INFO**
28(3): 1-17

**THEME / SUBTHEME**
Science and Technology/ Digital Technology in Architecture

**ABSTRACT**
An important part of a city, that gives it a sense of community and character, is its history. One way of acknowledging this heritage is by preserving historic building and structures. Old buildings are witnesses to the aesthetic and cultural history of a city, helping to give people a sense of place and connection to the past. Unfortunately, despite their importance within the city, historical buildings are most of the time subject to demolition and to be replaced- leaving behind stories told and untold of what use to be. The paper, therefore, aims to explore the capability of the metaverse, using virtual reality touring, to revive the memory of historical buildings that are subject to fade. Where preserving historical buildings can not only act as a symbol of grandeur but is also vital for reviving the community’s collective memory. The case study focused upon in the research paper shows a first step in the development of an immersive virtual tour for the significant building of “The Egg” or “Beirut City Center” in Downtown- which is a building that witnessed a series of unfortunate events that lead to destruction, erasure, and demolition of the building. Therefore, examining the recovery and revival of this unique historic site in an unconventional way which is in the metaverse, specifically the Virtual Reality (VR). The paper assumes that virtual reality, as the main metaverse approach, would help people ‘remember’ and ‘mentally revive’ the destroyed historical buildings that once acted as the building blocks in the impacted city. To prove this hypothesis, two different methodologies will be used, by theorical analysis and literature review, such as analyzing the main keyword, and analyzing datum from previous works. The second method will rely on the physical methodology, where virtual 3D Models will be built in a computer software, Autodesk Revit, then imported within a VR experience for an enhanced experience within the historical site to preserve the historic buildings and revive the collective memory within the community, enabling people to view how these historic sites once were and how they have now become.

### Author(S)
Chehab A., Nakhal B.

### ARTICLE TITLE
Exponential Stability for a Thermoelastic Bresse System: Theoretical and Numerical Study

**JOURNAL**
Mathematical Methods in the Applied Sciences

**YEAR**
2023

**PUBLICATION INFO**
46(5): 6002-6024

**THEME / SUBTHEME**
Science and Technology/ Mathematical and Computational Science

**ABSTRACT**
This study aims to investigate numerically and theoretically a thermoelastic Bresse system where the heat conduction given by the Green and Naghdi theories. Theoretically, we establish the existence and uniqueness of solutions as well as the exponential stability regardless of the system’s parameters. Numerically, we present a finite element approximation, and we show the discrete energy decay. At the end, we provide some numerical results with an error estimate based on additional regularity of the solution.

### Author(S)
Bouraoui H., Djebabla A., El Arwadi T., Haiour M.

### ARTICLE TITLE
FamAid: A Tool for Aiding People with Disability

**JOURNAL**
BAU Journal-Science and Technology

**YEAR**
2022

**PUBLICATION INFO**
4(1): 1-10

**THEME / SUBTHEME**
Science and Technology/ Software and Computing

**ABSTRACT**
People with disabilities suffer from discrimination and obstacles that restrict them from participating in society on an equal basis with others every day. They are deprived of their rights to be included in ordinary school systems and even in the work market. In the process of raising awareness, facilitating daily routines, and developing guidance, the idea of assisting such people with handy tools/software arose and was implemented in the FamAid tool.

### Author(S)
Maad M., Owaydate A., Kojok M., Aboudaher F., Abou Daher L., Itani M.
Gamma-Ray Attenuation Parameters of HDPE Filled with Different Nano-Size and Bulk WO₃

ARTICLE TITLE
Applied Radiation and Isotopes

YEAR
2023

DOI: 10.1016/j.apradiso.2023.110790

THEME / SUBTHEME
Science and Technology/ Advanced Materials

ABSTRACT
High-density polyethylene (HDPE) was obtained through a compression molding technique, and incorporated with different filler weight fractions (0, 10, 15, 25, and 35%) of bulk WO₃, and two different WO₃ nanoparticle sizes (45 nm and 24 nm). The radiation attenuation ability of the new category of polymer composite HDPE/WO₃ was evaluated using gamma-ray energies ranging from 59.53 up to 1332.5 keV of four radioactive sources: ²⁴¹Am, ¹³³Ba, ¹³⁷Cs, and ⁶⁰Co. The mass attenuation coefficients, the total molecular cross-section, the effective atomic cross-section, the total electronic cross-section, the effective atomic number, electron density, the half value layer (HVL), the tenth value layer (TVL), and the relaxation length were investigated. The obtained results of the gamma-ray attenuation parameters exhibited an outstanding influence of the size and weight fraction of WO₃ filler on the gamma-ray shielding ability of the HDPE composite. A significant improvement was detected at low gamma-ray energies. The HVL of the synthesized HDPE composites is compared with that of pure lead as a conventional shielding material. HDPE composite filled with the smaller size of WO₃ nanoparticle shows good improvement in the attenuation parameters, which suggests promising applications in radiation protection and gamma-ray shielding.

Author(S)
Gouda M., Obeid A., Awad R., Badawi M.
HAS 1: A Natural Product from Soil-Isolated Streptomyces Species with Potent Activity Against Cutaneous Leishmaniasis Caused by Leishmania Tropica

**Article Title**
HAS 1: A Natural Product from Soil-Isolated Streptomyces Species with Potent Activity Against Cutaneous Leishmaniasis Caused by Leishmania Tropica

**Journal**
Frontiers in Pharmacology

**Year**
2022

**Publication Info**
DOI: 10.3389/fphar.2022.1023114

**Theme/Subtheme**
Health and Wellbeing/Industrial and Medical Microbiology

**Abstract**
Cutaneous Leishmaniasis (CL) is a neglected tropical disease, classified by the World Health Organization (WHO) as one of the most unrestrained diseases. The Syrian war and the significant displacement of refugees aggravated the spread of this ailment into several neighboring countries in the Eastern Mediterranean Region (EMR). In Syria, Leishmania tropica is identified as one of the most aggressive and endemic identified species, causing localized or generalized lesions, often chronic or relapsing. Pentavalent antimonial drugs are currently used as first line treatment against CL. Nonetheless, these drugs exhibit several limitations, including the repetitive painful injections, high cost, poor availability, and mainly systemic toxicity. Besides, the emergence of acquired parasitic resistance hinders their potency, stressing the need for new therapies to combat CL. Natural products (NPs) epitomize a valuable source in drug discovery. NPs are secondary metabolites (SMs) produced by plants, sponges, or a wide variety of organisms, including environmental microorganisms. The EMR is characterized by its immense biodiversity, yet it remains a relatively untapped area in drug discovery. NPs of the region were explored over the last 2 decades, but their discoveries lack biogeographical diversity and are limited to the Red Sea. Here, we isolated previously uncultured environmental soil-dwelling Streptomyces sp. HAS1, from Hasbaya region in southeast Lebanon. When fermented in one of our production media named INA, HAS1 produced a crude extract with significant potency against a clinical Leishmania tropica isolate. Using bi-guided fractionation, the bioactive compound was purified and the structure was elucidated by NMR and LC-HRMS. Our findings establish NPs as strong candidates for treating Leishmania tropica and further dwells on the importance of these natural sources to combat microbial infections.

**Authors**
Improved Photocatalytic and Antibacterial Activity of Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$GdxFe$_{2-x}$O$_4$ Nanoparticles Synthesized via the Co-precipitation Method

This study reports the synthesis of Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$GdxFe$_{2-x}$O$_4$ nanoparticles (NPs) with $0.00 \leq x \leq 0.08$ by the co-precipitation method. The structural and optical properties of NPs are investigated. As Gd content increases, the lattice parameter and the bandgap energy increase whereas the particle size decreases. The photocatalytic performance of NPs is evaluated in the degradation of methyl violet (MV) dye under sunlight irradiation. The best activity is exhibited by Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Gd$_{0.04}$Fe$_{1.96}$O$_4$ NPs. The rate of the photodegradation reaction is boosted by increasing the pH and temperature. 95.4% of MV is degraded after 240 min upon the addition of 5 wt. % carbon dot. The NPs are tested against Gram-positive (Staphylococcus aureus and Enterococcus faecium) and Gram-negative bacteria (Escherichia coli and Leclercia adecarboxylata) isolated from wastewater. The antibacterial activity was tested by the minimum inhibitory concentration and minimum bactericidal concentration broth microdilution assay, agar well diffusion assay and time-kill test. The results show that the NPs exhibit inhibitory activity against Gram-positive bacteria. Furthermore, NPs show bacteriostatic activity after 3 hours of incubation. The antibiofilm activity of the NPs is tested by the inhibition of biofilm formation and the destruction of pre-formed biofilm assays. The results show an inhibitory activity of the NPs against Gram-positive biofilms.

Influence of Lanthanum Doping on the Photocatalytic and Antibacterial Capacities of Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Fe$_2$O$_4$ Nanoparticles

The increase in environmental pollution, especially water pollution, has intensified the requirement for new strategies for the treatment of water sources. Furthermore, the improved properties of nano-ferrites permit their usage in wastewater treatment. In this regard, novel Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$LaxFe$_{2-x}$O$_4$ nanoparticles (NPs), where $0.00 \leq x \leq 0.08$, were synthesized to test their photocatalytic, antibacterial and antibiofilm activities. The structural and optical properties of the prepared NPs were investigated by X-ray powder diffraction (XRD), transmission electron microscopy (TEM), UV-Vis spectroscopy and photoluminescence (PL) analysis. As La content increases, the bandgap energy increases, whereas the particle size decreases. The photocatalytic activity of the prepared NPs is evaluated by the degradation of methylene blue (MB) dye under sunlight irradiation. Superior activity is exhibited by Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$La$_{0.01}$Fe$_{1.99}$O$_4$ NPs. The influence of catalyst dosage, pH, temperature and addition of graphene (Gr) on the photodegradation reaction was studied. Increasing the pH and temperature improved the rate of the photodegradation reaction. The antibacterial and antibiofilm activities of the NPs were assessed against Escherichia coli, Leclercia adcarboxylata, Staphylococcus aureus and Enterococcus faecium. Mg$_{0.33}$Ni$_{0.33}$Co$_{0.33}$Fe$_2$O$_4$ NPs inhibited bacterial growth. They had bacteriostatic activity on all isolates, with a greater effect on Gram-positive bacteria. All tested nano-ferrites had significant antibiofilm activities against some biofilms.
**ARTICLE TITLE**

Influence of (Mg, Cu) Codoping on the Structural, Optical and Magnetic Properties of NiO Nanoparticles Synthesized by Coprecipitation Method

**JOURNAL**

Physica B: Condensed Matter

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.1016/j.physb.2023.415004

**THEME / SUBTHEME**

Science and Technology / Advanced Materials

**ABSTRACT**

Pure and (Mg, Cu) codoped NiO nanoparticles were prepared via the co-precipitation method. The prepared nanoparticles were investigated by XRD, TEM, SEM-EDX, XPS, FTIR, Raman, UV–vis, PL and VSM. NiO cubic structure forms with no impurities or secondary phases. (Mg, Cu) codoping of NiO lowers its crystallite size and causes variation in the Ni stoichiometry as well as formation of O vacancies. The optical transmittance is enhanced up to 87% for \( x = 0.08 \), becoming beneficial for transparent electrodes. The bandgap and Urbach energies increase from 3.51 to 3.66 eV and 0.43–0.54 eV, respectively, whereas the optical dielectric constant decreases from 7.72 to 7.25 with enhancement of the electron-phonon interaction. Weak ferromagnetic contribution exists, and the ferromagnetic origin is explained by the BMP model. Coercivity and saturation magnetization decrease from 438.42 to 30.12 Oe and 0.267 to 0.178 emu/g, respectively, which is beneficial for data storage applications.

**ARTICLE TITLE**

International Price Earnings and Country Risk Model in an Asian Context

**JOURNAL**

Journal of Asia Business Studies

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.1108/JABS-04-2023-0133

**THEME / SUBTHEME**

Science and Technology / Mathematical and Computational Science

**ABSTRACT**

This paper aims to estimate a statistical model of the country risk determination as represented by the country price earnings ratio (PER) to identify potentially mispriced countries. It uses the gross domestic product (GDP) growth rate and a dummy indicator for market-related events (i.e. financial crises), both approximating the business cycle. The model is used to compare a major Asian country (i.e. Japan) risk with Western countries’ risk.

**Purpose**

The model used finance variables such as the systemic, non-diversifiable, risk and foreign direct investments to characterize any country risk. A random effects model with panel data estimated the effects of macroeconomic and financial variables on PE. The simultaneity problem was checked using two stage least squares and some lagged independent variables.

**Findings**

The results explained to investors the country risk contributing factors: PE was positively correlated with variables that may increase dividends and market risk premia similar to GDP growth rates and total risk and negatively correlated with variables that increase market risk, namely, nominal risk-free interest rates and financial crises. Japan’s PE seemed to exceed most of the Western countries considered here, implying lower risks, lower interest rates and higher growth in the major Asian country Japan.

**Originality/ Value**

This paper focuses on the effectiveness of country risk measures in predicting periods of intense instability, similar to financial crises. This study contributes a model to measure market risk premium, using PE (or inversely, the earnings yield) as a proxy variable. Investors can use this risk measure in picking less risky stocks to include in their portfolio, calling for liberalizing Asian countries’ financial markets to improve their stock market capitalization.
Inventory Planning Under Supplier Uncertainty in a Two-Level Supply Chain

**Purpose**

Due to uncertainty in supply chains caused by the coronavirus disease 2019 (COVID-19), organizations are adjusting their supply chain design to address challenges faced during the pandemic. To safeguard their operations against disruption in order quantities, supply chain members have been looking for alternative suppliers. This paper considers a two-level supply chain consisting of a manufacturer and two suppliers of a certain type of components required for the production of a finished product. The primary supplier (supplier A) is unreliable, in the sense that the quantity delivered is usually less than the ordered quantity.

**Design/Methodology/Approach**

A mathematical model describing the production/inventory situation of the supply chain is formulated. The model allows the determination of the manufacturer’s optimal ordering policy.

**Findings**

An expression for the expected total cost per unit time function is derived. The optimal solution is determined by solving a system of nonlinear equations obtained by minimizing the expected total cost function.

**Practical Implications**

The proposed model can be used by supply chain managers aiming at identifying various ways of handling the uncertainty in the flow of supplies across the chain.

**Originality/Value**

This proposed model addresses a gap in the production/inventory literature.
The Raman spectra disclosed the major phonon modes of CdO without any indicator from the co-dopants, proving that they were well integrated into the CdO lattice. The UV-Vis spectra revealed the tunable energy gap with the co-dopants’ concentration. The photoluminescence spectroscopy indicated the abundance of Cd interstitials and O/Cd vacancies. The DC conductivity indicated the metallic behavior of the prepared samples, triggered by Cd\(^{2+}\) vacancies, and the semiconducting behavior at high temperatures for co-1 and co-2. CdO and co-0.5 showed a weak ferromagnetic behavior combined with diamagnetic behavior; however, superparamagnetic along with an antiferromagnetic behavior was detected for higher doping concentrations. The origin of ferromagnetism may be related to O/Cd vacancies. Remarkably, all the samples prevented the growth of bacteria and formed well-defined zones around the samples with a stronger antibacterial activity on gram-negative (Escherichia coli, Citrobacter Braakii, and Klebsiella pneumoniae) than on gram-positive bacteria (Staphylococcus aureus, Staphylococcus epidermidis, and Streptococcus intermedius).

**ABSTRACT**

In the current study, nanoparticles (NPs) with Zn\(_{0.33}\)Co\(_{0.33}\)Mg\(_{0.33}\)Fe\(_2\)O\(_4\) (F), Zn\(_{0.33}\)Co\(_{0.33}\)Mg\(_{0.33}\)Cr\(_{0.33}\)O\(_4\) (C), and Zn\(_{0.33}\)Co\(_{0.33}\)Mg\(_{0.33}\)Al\(_2\)O\(_4\) (A) were used to prepare various nanocomposites (NCs). Different NCs 0.5 F / 0.5 C (FC), 0.5 F / 0.5 A (FA), 0.5 A / 0.5 C (AC), and 0.33 F / 0.33 A / 0.33 C (FAC) were prepared via the co-precipitation method followed by the ball milling technique, starting from F, A, C (NPs). X-ray diffraction confirms the formation of NCs with minor impurities with cubic spinel structures. The transmission electron micrographs display the nearly spherical and cubic shapes of FC, AC, and FAC NCs. However, the FA nanocomposite (NC) has a nearly spherical shape. The existence of the vibrational modes of NPs, constituting each NCs, is verified by the bandgaps of various NCs, determined from ultraviolet-visible spectroscopy, are related to the crystallite size variations X-ray photoelectron spectroscopy results confirm the elemental composition as well as the oxidation states of the elements present in the NCs. M-H loops, measured by the vibrating sample magnetometer demonstrate a soft ferromagnetic behavior. The saturation magnetization Ms for FA is higher than that of FC, AC, and FAC.

**ARTICLE TITLE**

Investigation of the Structural and the Physical Properties of ZnO–NiO–Mn\(_2\)O\(_3\) Nanocomposites for Photocatalytic Applications

**JOURNAL**

Applied Physics A: Materials Science and Processing

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.1007/s00339-023-06670-6

**THEME / SUBTHEME**

Science and Technology/Advanced Materials

**ABSTRACT**

The antibacterial activity of the synthesized NCs against four bacterial strains (Staphylococcus aureus, Stenotrophomonas maltophilia, Escherichia coli, and Enterococcus faecium) was evaluated by means of broth microdilution assay, minimum bactericidal concentration (MBC), and time-kill test. The synthesized NCs displayed different impacts against the targeted bacteria due to several factors, including size, shape, doping, secondary phase, optical, and magnetic parameters. These findings emphasize the potential application of these NCs in treating bacterial infections, including multidrug-resistant bacterial infections.

**ARTICLE TITLE**

Investigation of the Structural and the Physical Properties of Various Ferrite, Chromite, and Aluminate Nanocomposites

**JOURNAL**

Journal of Alloys and Compounds

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.1016/j.jallcom.2023.171953

**THEME / SUBTHEME**

Science and Technology/Advanced Materials

**ABSTRACT**

The aim of this work is to fabricate ZnO–NiO–Mn\(_2\)O\(_3\) nanocomposites with exceptional features and im-proved physical and magnetic properties, compared to their pure counterparts. The pure oxides ZnO, NiO and Mn\(_2\)O\(_3\) nanoparticles (NPs) were first synthesized via co-precipitation method. The as-prepared pure oxides were then ball milled in different mass percentages to form four ternary metal oxide nanocomposites (NCs) C1 (0.33 ZnO, 0.33 NiO, 0.33 Mn\(_2\)O\(_3\)), C2 (0.66 ZnO, 0.166 NiO, 0.166 Mn\(_2\)O\(_3\)), C3 (0.166 ZnO, 0.66 NiO, 0.166 Mn\(_2\)O\(_3\)) and C4 (0.166 ZnO, 0.66 NiO, 0.66 Mn\(_2\)O\(_3\)). Structurally, X-ray powder diffraction (XRD) analysis confirmed the formation of pure ZnO, NiO and Mn\(_2\)O\(_3\) with hexagonal (a=b=3.247 Å, c=5.201 Å), FCC (a=b=c=4.174 Å) and BCC (a=b=c=9.498 Å) crystal structures, respectively. In NCs, the formation of spinel oxides (ZnMn\(_2\)O\(_4\), NiMn\(_2\)O\(_4\) and Mn\(_2\)O\(_3\)) of tetragonal structures was revealed through micro-Raman analysis confirmed the formation of tetragonal ZnMn\(_2\)O\(_4\) in the four nanocomposites. DC-conductivity was used to investigate the conduction mechanisms in pure NPs and NCs along with their counterparts. The pure oxides ZnO, NiO, and Mn\(_2\)O\(_3\) nanoparticles (NPs) were first fabricated with exceptional features and improved physical and magnetic properties, compared to their pure counterparts. The pure oxides ZnO, NiO, and Mn\(_2\)O\(_3\) nanoparticles (NPs) were first fabricated with exceptional features and improved physical and magnetic properties, compared to their pure counterparts.
The wide adoption of the cloud computing model in the business environment has led to a rapid increase in the development of geo-distributed data centers (DCs) to support customers' needs. On the other hand, cloud DCs that contain thousands of computing and storage nodes consume a large amount of energy that leads to a high carbon footprint. Therefore, minimizing the geo-distributed DCs' energy consumption is a must which will decrease the cloud providers' operational cost and minimize the high non-environment carbon emission. In addition, minimizing the cloud users' network latency, in such a distributed environment, is one of the important challenges faced by cloud providers. Thus, to address these challenges, this paper proposes a novel location, energy, carbon, and cost-aware (LECC) virtual machine (VM) placement model for geo-distributed cloud DCs. Both online and offline placement problems are tackled. The migration technology is employed in consolidating the VMs to less number of active servers for significant energy reductions. The VM placement problem is formulated as a multi-objective optimization problem and solved by greedy policies. Also, an intelligent machine-learning model is constructed and implemented to leverage the performance of the LECC model. The experimental results showed the merits of our proposed LECC model in solving the important VM placement problem.

In this work, an analytical solution for a linear and nonlinear system of conformable fractional PDEs is obtained by applying a New conformable fractional homotopy perturbation technique (NCFHPT) with the help of fractional series expansion. In fact, the current method is a natural extension of NHPM for partial differential equation of real order in conformable sense. By constructing the homotopy transformation for a given system and gathering the coefficients with the identical power of \( p \), a system of recursive equations is established. In addition, by a convenient assumption on the initial approximate solution. We can consecutively starting with this solution and working upward until getting general term of the intended coefficients to deduce a closed form series solution. The NCFHPT gives an analytical solution without making any linearization, rough conditions or discretization, especially for non-linear problems. This technique shows a powerful and a promise tool to solve linear and nonlinear systems of CFPDEs. The practicable validation and effectiveness of this method are demonstrated by three typical examples.
Physical Properties and Dielectric Response of (Gd, Pr)-Dual Doped Samarium Iron Garnet

Samarium iron garnet, $\text{Sm}_3\text{Fe}_5\text{O}_{12}$, co-doped with Gd$^{3+}$ and Pr$^{3+}$ ions, having the chemical formula $\text{Sm}_{3-2x}\text{Gd}_x\text{Pr}_x\text{Fe}_5\text{O}_{12}$ ($0 \leq x \leq 0.8$), were synthesized by the co-precipitation method. The structural study confirmed the cubic crystallization of the $\text{Sm}_3\text{Fe}_5\text{O}_{12}$ phase in the addition of two secondary phases, $\alpha$-$\text{Fe}_2\text{O}_3$ and $\text{SmFeO}_3$. The variation of the lattice parameters and crystalline size indicated that both Gd$^{3+}$ and Pr$^{3+}$ ions were incorporated into the lattice. The elemental analysis confirmed the stoichiometry proposed for $\text{Sm}_{3-2x}\text{Gd}_x\text{Pr}_x\text{Fe}_5\text{O}_{12}$. The co-doping process of SmIG affected the absorbance of photo-radiations, making them possible candidates for transparent electrodes and optoelectronic devices. Energy band gap values were in the range of 2.921–3.004eV. DC electrical conductivity measurements studied the transport properties through which two activation energies were determined. The co-doping process affected the dielectric constants ($\varepsilon'$, $\varepsilon''$, tan δ), which reached a maximum value for $x = 0.2$. Dielectric relaxation was observed in the measurements, which could be due to the presence of oxygen vacancies as detected in XPS results. The Nyquist plots revealed that all the samples exhibited a negative temperature coefficient of impedance, where the arc of the semicircles decreased as the temperature increased from 413 to 743K.

Sour A., Bitar Z., Badreddine K., Awad R.

Polynomial and Exponential Decay Rates of a Laminated Beam System with Thermodiffusion Effects

Also, the contribution of the resistance at high-frequency was related to the grains and grain boundaries. The ac conductivity mechanism followed the small polaron and the correlated barrier hopping models. In the temperature range between 333 and 583K, the prepared samples are promising for ion-conducting glasses and ionic crystals.

Zahr S., Zahr R., El Hajj R., Khalil M.

Phytochemistry and Biological Activities of Citrus sinensis and Citrus limon: An Update

Citrus is among the main tree crops cultivated worldwide, with orange and lemon being well-known species. In this review, a thorough investigation of the literature was conducted to compare the phytochemistry of sweet orange and lemon fruits and reveal their nutritional and health implications. This review gives a thorough and critical evaluation of the composition and traditional medical uses of Citrus sinensis and Citrus limon with their pertinent bioactivity.

Feng B., Youssef W., El Arwadi T.
In this paper, we consider a laminated beam system with thermodiffusion effects with two kinds of boundary conditions, in which the mass diffusion introduces a new critical thickness in addition to the conventional critical thickness of thermoelastic damping. By using the method of semi-group, we prove the system is global well posed. The polynomial stability is established by using frequency domain method if the wave speeds are nonequal. We also establish exponential decay of energy under the assumption of equal wave speeds. At last, we present some numerical experiments to illustrate our theoretical results. The result is new and is the first time when the stabilization of the laminated beam system with thermodiffusion effects is obtained.

In this paper, we consider a porous–elastic system where the dissipation mechanisms act on the elastic and on the porous structures. Here, we consider the one-dimensional porous–elastic system defined on bounded domains in space and we proved the polynomial stability when a particular relationship between the damping parameters is equal to zero. We also prove the optimality of the rate of polynomial decay.

This study reports the synthesis of pure ZnFe₂O₄, pure Mn₂O₃ nanoparticles and ZnFe₂O₄/Mn₂O₃ nanocomposites by a simple coprecipitation method. The prepared samples were characterized by X-ray diffraction, transmission electron microscopy, N₂ adsorption/desorption, and photoluminescence spectroscopy (PL). The prepared samples were further applied as photocatalysts for UV-exposed degradation of nitrobenzene at 254 nm. The photocatalytic performance showed that ZnFe₂O₄/Mn₂O₃ nanocomposites with various Mn₂O₃ content exhibited a higher activity compared to that of pure ZnFe₂O₄ and Mn₂O₃. Furthermore, among the prepared nanocomposites, the best photocatalytic performance was exhibited by 0.9ZnFe₂O₄/0.1Mn₂O₃ nanocomposites. The improved photocatalytic activity was mainly attributed to the separation of electron–hole pairs, as verified by PL analysis. To achieve the highest degradation rate, the photodegradation reaction was carried out in the presence of various catalyst doses, in acidic, neutral, and basic mediums and at different reaction temperatures. Finally, the compounds produced from the photodegradation reaction were determined by applying the optimal experimental conditions.
Prevalence of Antibiotic-Resistant Bacteria in Domestic Water Storage Tanks in Sidon, Lebanon

**JOURNAL** Water  
**YEAR** 2023  
**DOI**: 10.3390/w15020335  
**THEME / SUBTHEME** Science and Technology/ Environmental Studies

**ABSTRACT** Safe, accessible, and good water quality are essential characteristics for reducing various waterborne diseases. Since domestic water is the water most consumed by Lebanese people, cleaning household water tanks is important to prevent their exposure to pathogenic microorganisms. Generally, all the stages of the value chain of the Lebanese water sector are still imperfect. Thus, the domestic water should be regularly tested, especially in the impoverished landmarks where water quality is the worst. The aim of this study is to evaluate the physicochemical parameters and microbiological quality of the water in the storage tanks of homes in Sidon, Lebanon. Fifty water samples were collected aseptically from domestic water storage tanks. The microbiological assessment was performed using basic plating techniques. Identification of isolated bacteria was performed using MALDI-TOF-MS. Physicochemical parameters were assessed using titration, pH, and conductivity measurements. Antibiotic-susceptibility testing was performed using antibiotic disks. Screening for virulence genes in bacteria was carried out via polymerase chain reaction (PCR). Most of the physicochemical parameters were within the permissible limits of the World Health Organization (WHO) for drinking water. The heterotrophic plate count (HPC) varied between the water samples. The total coliform, fecal coliform, and Escherichia coli (E. coli) contaminant was 54%, 20%, and 16% in each of the samples, respectively. Other bacteria isolated from household water included intestinal Enterococcus faecalis (E. faecalis) (68%), Staphylococcus aureus (S. aureus) (68%), and Pseudomonas aeruginosa (P. aeruginosa) (22%). Other predominant isolates recovered from the samples were also identified. The bacterial isolates showed a prevalence of resistance and intermediate resistance against the tested antibiotic agents. Multi-resistant Staphylococcus aureus (MRSA) was detected in 21% of the collected S. aureus, using cefoxitin agent and meca gene detection. A prevalence of virulence genes in both P. aeruginosa and S. aureus was also noticed. Our data show that Sidon domestic water is not suitable for either drinking or home applications.

Proapoptotic and Antiproliferative Effects of the Desert Truffle Terfezia boudieri on Colon Cancer Cell Lines

**JOURNAL** Evidence-Based Complementary and Alternative Medicine  
**YEAR** 2023  
**DOI**: 10.1155/2023/1693332  
**THEME / SUBTHEME** Health and Wellbeing/ Human Disorders at the Molecular Level

**ABSTRACT** Colon cancer is the second leading cause of cancer-related mortality, and ranks third among cancers in terms of prevalence. Despite advances in early detection and treatment with chemotherapy and surgery, colon cancer continues to be associated with high recurrence rates, thereby resulting in a heavy disease burden. Moreover, the effectiveness of currently available treatment modalities is limited by the occurrence of toxic side effects. Hence, there is an urgent need to develop alternative treatments. Extracts from the black desert truffle Terfezia boudieri (T. boudieri) have shown promising anticancer properties. However, the cellular mechanisms underly ing this activity remain poorly understood.

**Methods** In this study, the colon cancer cell lines HCT-116 and Ca-co-2 were treated with either water or ethanolic extract of T. boudieri. Cell viability and the half-maximal inhibitory concentration were determined using MTT assays. Then, the activity of the more potent water extract was further verified using crystal violet assays, and its role in inhibiting colony formation and wound healing was investigated. Protein levels of p53, B-cell lymphoma 2 (Bcl-2), Bcl-2-associated X (Bax), cyclin D1 (CCND1), and c-Myc were measured in cells treated with different doses of the water extract.

**Results** Treatment with the water extract of T. boudieri reduced the capacity of cells for wound healing and colony formation in a dose-dependent manner. The Bax/Bcl-2 ratio and p53 expression were elevated in both cell lines. In contrast, the levels of cyclin D1 and c-Myc were suppressed.

**Conclusion** T. boudieri water extract exerted a cytotoxic effect on colon cancer cells, and blocked colony formation and wound healing potentially through inhibition of proliferation. Mechanistically, these effects are attributed to influence the mitochondrial pathway of apoptosis, proteins involved in cellular proliferation, and the cell cycle.
### Article 1: Prospecting the Structural and Magnetic Features of \((x)\text{CuO}/(1-x)\text{CdFe}_2\text{O}_4\) Nanocomposite System \((0.0 \leq x \leq 1.0)\)

**Author(s):** Yassine R., Abdallah A., Sayed Hassan R., Yaacoub N., Awad R., Bitar Z.

<table>
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<th>ARTICLE TITLE</th>
<th>Prospecting the Structural and Magnetic Features of ((x)\text{CuO}/(1-x)\text{CdFe}_2\text{O}_4) Nanocomposite System ((0.0 \leq x \leq 1.0))</th>
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<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Advanced Materials</td>
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<tr>
<td>ABSTRACT</td>
<td>The structural properties of ((x)\text{CuO}/(1-x)\text{CdFe}_2\text{O}_4) nanocomposites for (x = 0.0, 0.1, 0.2, 0.3, 0.4, 0.5) and 1.0 were studied. The X-ray diffraction (XRD) patterns confirmed the existence of both phases with a secondary phase of (\alpha\text{-Fe}_2\text{O}_3). The Fourier-transform infrared spectroscopy (FTIR) characterization showed the vibrational bands of the synthesized samples. The high resolution transmission electron microscopy (HRTEM) micrographs revealed the presence of CuO, CdFe(_2)O(_4), and (\alpha\text{-Fe}_2\text{O}_3) phases and showed the polycrystalline nature of the prepared nanocomposites. The scanning electron microscope (SEM) study exhibited the morphology of the prepared nanostructures and indicated the agglomeration between them. The energy-dispersive X-ray spectroscopy (EDX) results revealed the presence of all chemical elements within the synthesized nanocomposites. Emission peaks of the samples were analyzed via Photoluminescence (PL) deconvolutions which approved the interface defects. The Mössbauer study showed the presence of hematite impurity and the results were coherent with XRD findings. The obtained M-H loops from the vibrating-sample magnetometer (VSM) analysis depicted a paramagnetic nature of CuO and showed the ferromagnetic behavior of the nanocomposites.</td>
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### Article 2: Reinforcement Learning in the Sky: A Survey on Enabling Intelligence in NTN-Based Communications

**Author(s):** Naous T., Itani M., Awad M., Sharafeddine S.

<table>
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<th>ARTICLE TITLE</th>
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<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Software and Computing</td>
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<td>ABSTRACT</td>
<td>Non terrestrial networks (NTN) involving ‘in the sky’ objects such as low-earth orbit satellites, high altitude platform systems (HAPs) and Unmanned Aerial Vehicles (UAVs) are expected to be integral components of next generation cellular systems. With the deployment of 5G services and beyond, NTNs are leveraged to assist as aerial base stations in providing ubiquitous network connectivity and service to ground users or be deployed as aerial users connected to the cellular network. NTN-aided wireless communication offers multiple benefits such as mobility, flexibility, resistance to ground physical attacks and wide coverage. However, due to their limited resources and the current design of terrestrial cellular systems that do not account for aerial users, and other restrictions such as service requirements, limited available power and storage resources on high-throughput satellites, resource allocation, location of the high altitude platform base station and the flight trajectory of the UAVs need to be intelligently controlled to satisfy various objectives both from an aerial base station and overall network perspectives. To achieve this, many works have explored Reinforcement Learning (RL) techniques to allow aerial platforms in non-terrestrial networks to learn from past observations and achieve some optimal control policy. In this paper and differently from prior surveys, we contribute a comprehensive review of the control objectives required by non-terrestrial platforms that have been solved using RL formulations. We provide an up-to-date overview of the latest applications of RL techniques for different NTN-aided wireless communication aspects. The survey focuses on Markov Decision Process (MDP) formulations in terms of states, actions, and rewards. We synthesize a taxonomy from the surveyed literature and provide a comprehensive representation of the current usages of RL in NTN-aided wireless communications. A qualitative analysis of the level of realism achieved in the works presented in the literature is provided based on several factors that pertain to the simulation environment, station deployment setting, wireless channel assumption, and energy considerations. We also curate a list of challenges that remain to be considered by the research community in order to achieve more efficient deployments and close the simulation-to-reality gap.</td>
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Structural, Electrical and Mechanical Properties of the (NdFeO\(_3\))\(_x/(CuTl)-1223\) Superconductor Phase

**Author(s)**: El Makdah M., El Ghouch N., El-Dakdouki M., Awad R., Matar M.

**ARTICLE TITLE**
Structural, Electrical and Mechanical Properties of the (NdFeO\(_3\))\(_x/(CuTl)-1223\) Superconductor Phase

**JOURNAL**
Applied Physics A: Materials Science and Processing

**YEAR**
2023

**PUBLICATION INFO**
DOI: 10.1007/s00339-023-06547-8

**THEME / SUBTHEME**
Science and Technology/ Advanced Materials

**ABSTRACT**
The impact of adding the orthoferrite NdFeO\(_3\), at the nanoscale, on the (CuO.5Tl0.5) Ba\(_2\)Ca\(_2\)Cu\(_{1-x}\)Sn\(_x\)O\(_{10}\)\(_{0.8}\)_phase formation, microstructure, electrical and mechanical performance was studied. The nano-(NdFeO\(_3\))\(_x/(CuTl)-1223\) composites, with x = 0.00, 0.25, 0.50, 0.75, 1.00, and 2.00 wt.%, were prepared using the solid-state reaction technique. The X-ray diffraction (XRD) confirmed that supplementing the host (CuTl)-1223 phase with nano-NdFeO\(_3\) did not alter the unit cell parameters (a and c) and preserved the tetragonal structure. SEM micrographs suggested that the inclusion of nano-NdFeO\(_3\) reduced the number of voids and boosted the intergrain connections. The energy-dispersive X-ray (EDX) spectra revealed the elemental compositions of the various superconductor composites. The superconducting transition temperature (Tc) and the critical current density (Jc) increased with the inclusion of nano-NdFeO\(_3\) up to x = 0.50 wt.%. X-ray photoelectron spectroscopy (XPS) spectra analysis revealed the elemental composition and oxidation state of all elements. The Vickers microhardness (HV) measurements were analyzed and compared with five different theoretical models. According to HV measurements, the modified proportional sample resistance (MPSR) model provided the best theoretical analysis of Hv within the plateau limit regions. Moreover, various mechanical parameters were estimated as a function of the inclusion of nano-NdFeO\(_3\). The indentation creep test showed that the composite samples with high nanoparticle concentration (x > 0.50 wt.%) have dislocation creep mechanism, while those with x ≤ 0.50 wt.% followed a dislocation climbs creep mechanism. A comparison between NdFeO\(_3\) nanoparticles and other magnetic ferrites and nano-magnetic oxides was reported.

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**ARTICLE TITLE**
Structural, Morphological, and Magneto-optical Investigations of Pure and (Sn, Zn) Co-doped CuO Nanoparticles: A Novel Corrosion Inhibitor in Acidic Media

**Author(s)**: El Sayed M., El Ghouch N., Younes G., Awad R.

**ARTICLE TITLE**
Structural, Morphological, and Magneto-optical Investigations of Pure and (Sn, Zn) Co-doped CuO Nanoparticles: A Novel Corrosion Inhibitor in Acidic Media

**JOURNAL**
Materials Today Communications

**YEAR**
2023

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**THEME / SUBTHEME**
Science and Technology/ Advanced Materials

**ABSTRACT**
The present study reports work to synthesize metal oxide semiconductors of pure and (Sn, Zn) co-doped copper oxide (CuO) nanoparticles, with the chemical formula of Cu\(_{1-x}\)Sn\(_x\)Zn\(_x\)O (x = 0.000, 0.005, 0.010, and 0.020), via the co-precipitation method. The structural, morphological, optical, and magnetic properties were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FTIR), ultraviolet-visible spectroscopy (UV–vis), photoluminescence spectroscopy (PL), and vibrating-sample magnetometer (VSM), respectively. XRD results revealed the successful preparation of the monocrystalline CuO phase, with small traces of secondary phase SnO appearing at samples of x = 0.010 and x = 0.020. The size of the prepared nanoparticles, obtained from XRD and TEM, showed an overall decrease when increasing the (Sn, Zn) co-doping concentrations, leading to an increase in the surface area appropriate for magnetic applications. At samples of x = 0.005 and x = 0.010, the co-dopants changed morphology from large spheres into nanorods and nanokernels. The diameters of the nanorods increased from 8.5 nm to 24.15 nm, while their lengths decreased from 51 nm to 48 nm. However, a flower-shaped nanostructure was observed in the x = 0.020 sample. FTIR confirmed the fingerprint vibration modes represented by antisymmetric vibration vs(\text{Cu}=\text{O}) in the crystal lattice. The first decrease in size was accompanied by a decrease in the energy gap caused by the lattice shrinkage, which in turn is caused by the vacancies and energy states in the bandgap stimulated by Sn and Zn ions. Following this decrease, there was an increase in the energy gap because of the shift in Fermi level to a higher energy state that is suitable for solar cell applications. PL results confirmed the excitation dependence nature of these nanoparticles. Correspondingly, the prepared nanoparticles can be utilized as potential applicants for blue chip and near-UV white light-emitting devices. VSM data revealed that paramagnetic and weak ferro-magnetic behavior coexist in the co-doped nanoparticle samples. Through the electrochemical impedance spectroscopy and polarization measurements, the anticorrosion performance of these nanoparticles on mild steel has been studied in 0.5 M HCl solutions at 30 °C. The impedance results revealed that the corrosion process takes place under activation control. The polarization measurements showed that the prepared nanoparticles behave as a mixed-type inhibitor with 83 % efficiency in the x = 0.020 sample.
Structural, Optical, and Dielectric Properties of CuO/CdFe$_2$O$_4$ Nanocomposites Synthesized by the Co-precipitation Method

In this study, $x$CuO/$(1-x)$CdFe$_2$O$_4$ nanocomposites (NCs) were prepared with different weight percentages ($x = 0.0, 0.1, 0.3, 0.5,$ and $1.0$) using the co-precipitation method. X-ray powder diffraction patterns revealed the formation of copper oxide (CuO) and cadmium ferrite (CdFe$_2$O$_4$) phases in each NC with hematite as a secondary phase. Transmission electron microscope study confirmed the existence of CuO and CdFe$_2$O$_4$ crystal grains with sizes of 17.86 and 18.45 nm, respectively. Optical analysis indicated that the addition of CuO caused variations in bandgap energy and shifts in the emission wavelength of the NCs. Dielectric measurements were carried out in the frequency range of 1 kHz–5 MHz, and dielectric study was performed by analyzing the frequency, temperature, and composition dependence of the dielectric parameters for the samples. Dielectric results showed the dispersion behavior of the NCs with increasing frequency and composition concentration corresponding to low dielectric losses, which makes them suitable for optoelectronics and high-frequency devices.

Ni$_{1-2x}$Mg$_x$Ru$_x$O Nanoparticles were synthesized via the coprecipitation method. The prepared NiO nanoparticles are characterized by thermogravimetric analysis (TGA) that reveal the successful codoping and assure the thermal stability of the samples beyond 550 °C. X-ray powder diffraction (XRD) confirms the formation of the NiO cubic structure with RuO$_2$ secondary phase that appears at high codoping concentrations. As the codoping concentration increases, the lattice parameter increases and crystallite size decreases. Transmission electron microscopy (TEM) and scanning electron microscopy (SEM) show slightly agglomerated pseudo-spherical nanoparticles. Energy dispersive x-ray (EDX), X-ray photo-induced spectroscopy (XPS), Fourier transform infrared spectroscopy (FTIR), and Raman spectroscopy reveal the elemental composition and deviation from perfect stoichiometry. UV-vis and photoluminescence (PL) spectroscopies are utilized to study the optical properties, where Ni$_{0.84}$Mg$_{0.08}$Ru$_{0.08}$O nanoparticles show the highest direct band gap energy and lowest Urbach energy and electron-phonon interaction. Vibrating sample magnetometer (VSM) shows single domain nanoparticles, such that the coercivity and magnetocrystalline anisotropy decrease as the size decreases. The bound magnetic polaron model was utilized to investigate the weak ferromagnetism exhibited by the prepared Ni$_{1-2x}$Mg$_x$Ru$_x$O nanoparticles.

Sustainable Supply Chains Based on Supplier Selection and HRM Practices

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.

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.
ABSTRACT
This study aims to investigate the effect of magnesium (Mg) doping on the characteristics and antibacterial properties of copper oxide (CuO) nanoparticles (NPs). The Mg-doped CuO NPs were fabricated by the co-precipitation method. NPs were characterized by X-ray Powder Diffraction (XRD), Transmission Electron Microscope (TEM), Energy Dispersive X-ray (EDX) analysis, Fourier Transform Infrared Spectroscopy (FTIR), and Photoluminescence (PL). Broth microdilution, agar-well diffusion, and time-kill assays were employed to assess the antibacterial activity of the NPs. XRD revealed the monoclinic structure of CuO NPs and the successful incorporation of Mg dopant to the Cu1−xMgxO NPs. Mg doping affected the morphology of NPs and decreased their agglomeration. EDX patterns confirmed the high purity of the undoped and Mg-doped CuO NPs. FTIR analysis revealed the shifts in the Cu–O bond induced by the Mg dopant. The critical transition temperature (Tc) and the critical current density (Jc) increased with the nano-YIG addition up to x = 0.25 wt.% with values of 119.25 K and 638.37 A/cm², respectively. X-ray photoelectron spectroscopy (XPS) revealed the elemental composition and oxidation state of all elements in the prepared samples. Room temperature Vickers microhardness (Hv) measurements were performed at different applied loads (0.49–9.80 N) and a duration time of 20 s. The best enhancement in Vickers microhardness (Hv) was achieved at x = 2.00 wt.%. The modified proportional sample resistance (MPSR) model provided the best theoretical analysis at the plateau limit region based on Vickers microhardness (Hv) observations. Moreover, nano-YIG addition into the (Bi,Pb)-2223 superconductor adversely affected several mechanical parameters such as the elastic modulus (E), yield strength (Y), and fracture toughness (K).

Author(S) El Makdah M., El Ghouch N., El-Dakdouki M., Awad R., Matar M.

ARTICLE TITLE Synthesis, Characterization, and Vickers Microhardness for (Y10)x/(Bi,Pb)-2223 Superconducting Phase

JOURNAL Ceramics International

YEAR 2023

PUBLICATION INFO 49(13): 22400-22422

THEME / SUBTHEME Science and Technology/ Advanced Materials

ABSTRACT The current study investigated the effect of adding yttrium iron garnet (Y3Fe5O12; YIG) nanoparticles to the (Bi1.8Pb0.4)Sr2Ca2.1Cu3.2Oy ((Bi,Pb)-2223) superconductor. The classical solid-state reaction technique was used to synthesize the nano-(YIG) x/(Bi,Pb)-2223 composites (0.00 ≤ x ≤ 2.00 wt.%). X-ray diffraction (XRD) confirmed the formation of tetragonal (Bi,Pb)-2223 as the major phase. The morphology and elemental composition of the synthesized samples were investigated using scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDX), respectively. Iodometric titration analysis proved that the addition of nano-YIG increased the oxygen content in the CuO2 planes. The critical transition temperature (Tc) and the critical current density (Jc) increased with the nano-YIG addition up to x = 0.25 wt.% with values of 119.25 K and 638.37 A/cm², respectively. X-ray photoelectron spectroscopy (XPS) revealed the elemental composition and oxidation state of all elements in the prepared samples. Room temperature Vickers microhardness (Hv) measurements were performed at different applied loads (0.49–9.80 N) and a duration time of 20 s. The best enhancement in Vickers microhardness (Hv) was achieved at x = 2.00 wt.%. The modified proportional sample resistance (MPSR) model provided the best theoretical analysis at the plateau limit region based on Vickers microhardness (Hv) observations. Moreover, nano-YIG addition into the (Bi,Pb)-2223 superconductor adversely affected several mechanical parameters such as the elastic modulus (E), yield strength (Y), and fracture toughness (K).
### ARTICLE TITLE
The Alteration of Mechanical Behavior for Ba<sub>0.5</sub>Sr<sub>0.5</sub>Fe<sub>12</sub>O<sub>19</sub>/x(Ni<sub>0.5</sub>Zn<sub>0.5</sub>)Fe<sub>2</sub>O<sub>4</sub> Nanocomposites

### JOURNAL
Journal of Engineering Science and Technology

### YEAR
2023

### PUBLICATION INFO
18(3): 1713-1734

### THEME / SUBTHEME
Science and Technology/ Advanced Materials

### ABSTRACT
Ba<sub>0.5</sub>Sr<sub>0.5</sub>Fe<sub>12</sub>O<sub>19</sub>/x(Ni<sub>0.5</sub>Zn<sub>0.5</sub>)Fe<sub>2</sub>O<sub>4</sub> nanocomposites with x = 10, 20, 30, and 50 wt.% derived from nickel zinc ferrite added to barium strontium hexaferrite were synthesized and characterized in this work. The prepared nanoparticles and nanocomposites were manufactured by co-precipitation and high-speed ball milling approaches. FTIR spectroscopic analysis revealed the absorption peaks that are characterized of both soft spinel and hard hexagonal ferrites in the nanocomposites. Additionally, the mechanical parameters have been computed from the FTIR data. Besides, force constant on A-site and B-site, Debye temperature, longitudinal, transverse and mean elastic wave velocities of the prepared samples, have been calculated. Furthermore, Vickers microhardness (HV) tests were made to analyse the mechanical properties of the prepared samples under a range of applied loads (0.49-9.8 N) and temperatures (30−80 °C). The HV measurements revealed that the prepared samples exhibited the behaviour of normal indentation size effect. Diverse models were theoretically used to study the obtained HV values. The most appropriate theoretical model to depict the actual HV values is the modified proportional sample resistance model. Besides, with increasing temperature, the BaSr/10%NiZn sample had the highest HV values among the nanocomposites.

### ARTICLE TITLE
The Electrochemical Corrosion Behaviour of Compacted (Bi, Pb)-2223 Superconductors in Aqueous Solutions

### JOURNAL
Scientific Reports

### YEAR
2022

### PUBLICATION INFO
DOI: 10.1038/s41598-022-22663-6

### THEME / SUBTHEME
Science and Technology/ Advanced Materials

### ABSTRACT
The corrosion behaviour of (Bi, Pb)-2223 samples compacted at 0.3–1.9 GPa in 0.5 M of HCl, NaCl, and NaOH solutions at 30 °C was investigated using potentiodynamic polarization curves measurements and electrochemical impedance spectroscopy (EIS) technique as well as scanning electron microscopy (SEM) and energy dispersive X-ray emission spectroscopy (EDX). Polarization results showed that the increase in compaction decreases both cathodic hydrogen evolution or oxygen reduction and anodic (BiPb)-2223 superconductor dissolution in 0.5 M HCl, and 0.5 M NaOH. On the other hand, compaction mainly affects the anodic part of the polarization curves of (Bi, Pb)-2223 in 0.5 M NaCl solution. EIS measurements revealed that the highest protection of the superconductors was achieved in 0.5 M NaCl, while the lowest degree of protection was observed in 0.5 M HCl. The compacted sample at 1.9 GPa indicates deformation of the grains and the formation of a micro-crack. The corrosion mechanism of the superconductor at different pH values was also discussed.

### ARTICLE TITLE
The Irreducibility of the Complex Specialization of Lawrence-Krammer Representation of P4 on Band Generators

### JOURNAL
Indian Journal of Mathematics

### YEAR
2023

### PUBLICATION INFO
65(1): 117-133

### THEME / SUBTHEME
Science and Technology/ Mathematical and Computational Science

### Author(S)
Nasser M., Abdulrahim M.
2. PROCEEDINGS

**ABSTRACT**

We define Lawrence-Krammer representation of the pure braid group \( P_n \) on band generators. For \( t = q^{-5/2} \) and \( q \neq 1 \), we prove that the complex specialization of Lawrence-Krammer representation \( P_4 \rightarrow GL(6; \mathbb{Z}[q^{\pm 1}]) \) is irreducible if and only if \( q^{-1} \neq \pm 2 \sqrt{2} \). A similar result for the pure braid group \( P_3 \) was done by Abdulrahim and Al-Tahan.

**Author(S)**

Rayes W., Samrouth K., Bakir N.

**PROCEEDING TITLE**

Using Blockchain and Vazka Authentication for the Security of Smart Home Devices

**CONFERENCE TITLE**

Arab ICT Conference 2024

**DATE**

27/2/2024

**PLACE**

Manama, Bahrain

**THEME / SUBTHEME**

Science and Technology/ Software and Computing

**ABSTRACT**

Using Blockchain and Vazka Authentication for the Security of Smart Home Devices

Smart home devices are increasingly used to automate daily tasks and provide enhanced comfort and convenience. However, as these devices become universal, their security risks also increase. These risks are caused by a lack of implementation of secure safety methods embedded within these devices and the nature of the data generated by these devices that could be used for malicious activities. In this paper, we propose an innovative approach to improve the security of smart home devices by combining Blockchain with “Vazka” Authentication. Our solution involves creating a decentralized system for managing and verifying device interactions that stores all data on the blockchain. In addition, we introduce our new authentication mechanism that utilizes a new technique that makes two offline devices work together to decrypt a dynamic password generated instantly and get authorized access to read the data saved on the server. This provides an extra layer of security, making it more difficult for malicious actors to gain unauthorized access to smart home devices or reach collected data. We also discuss the practical considerations of using this approach, such as the need for a reliable, unique, and advanced authentication system, as well as highlight areas for future research. Overall, our proposed solution has the potential to significantly enhance the security of smart home devices, providing users with more peace of mind and enabling the continued growth of this emerging market.

**ARTICLE TITLE**

Zero Touch in Fog, IoT, and MANET for Enhanced Smart City Applications: A Survey

**JOURNAL**

Future Cities and Environment

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.5334/fce.166

**THEME / SUBTHEME**

Science and Technology/ Software and Computing

**ABSTRACT**

Every year global cities swell in size. Modernization in techniques helps create sustainable cities for all. Cloud infrastructure providers strive to offer the highest level of availability across the infrastructure stack with the help of Fog Computing (FC) that was invented to deal with IoT interacting with wireless sensor networks (WSN) to enhance services. For intelligent devices to communicate efficiently, the Mobile ad-hoc network (MANET) in IoT is required. Intelligent devices that are connected together through the aforementioned networks may suffer from sudden errors in data storage and transfer thus the need for zero touch networks where devices can heal and adjust themselves to form autonomous networks based on data collected from different integrated network devices. In this work we aim to provide an overview of recent research works that combine FC, IoT and MANET technologies integrated together to build up sustainable cities. We illustrate works of three important applications that affect human daily life. While zero touch technologies are still in their early stages, we set a study of the latest information related to zero touch technologies and how AI supported by machine learning and data analytics constitutes a key enabler to fully autonomous future generation cities.

**Author(S)**

Basheer H., Itani M.

**JOURNAL**

Future Cities and Environment

**ABSTRACT**

Every year global cities swell in size. Modernization in techniques helps create sustainable cities for all. Cloud infrastructure providers strive to offer the highest level of availability across the infrastructure stack with the help of Fog Computing (FC) that was invented to deal with IoT interacting with wireless sensor networks (WSN) to enhance services. For intelligent devices to communicate efficiently, the Mobile ad-hoc network (MANET) in IoT is required. Intelligent devices that are connected together through the aforementioned networks may suffer from sudden errors in data storage and transfer thus the need for zero touch networks where devices can heal and adjust themselves to form autonomous networks based on data collected from different integrated network devices. In this work we aim to provide an overview of recent research works that combine FC, IoT and MANET technologies integrated together to build up sustainable cities. We illustrate works of three important applications that affect human daily life. While zero touch technologies are still in their early stages, we set a study of the latest information related to zero touch technologies and how AI supported by machine learning and data analytics constitutes a key enabler to fully autonomous future generation cities.

**Author(S)**

Basheer H., Itani M.
### 3. BOOK CHAPTERS

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>El Ghor H., Nakhal B.</th>
<th>Author(s)</th>
<th>Dhaini I., Rawas S., El-Zaart A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOK CHAPTER TITLE</td>
<td>A Blockchain-Enabled Approach for Secure Data Sharing in 6G-based Internet of Things Networks</td>
<td>BOOK CHAPTER TITLE</td>
<td>An Intelligent and Green E-healthcare Model for an Early Diagnosis of Medical Images as an IoMT Application</td>
</tr>
<tr>
<td>BOOK TITLE</td>
<td>Wireless Networks</td>
<td>BOOK TITLE</td>
<td>Lecture Notes in Networks and Systems- Distributed Computing and Artificial Intelligence (DCAI 2022)</td>
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<tr>
<td>YEAR</td>
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<td>ABSTRACT</td>
<td>The 6th generation of wireless networks (6G) promises to provide ultra-reliable, high-speed, and low latency communication for Internet of Things (IoT) devices. However, securing data transmission and storage in these networks is a critical challenge due to potential security threats. Blockchain technology provides a solution to enhance security in IoT networks by enabling secure, decentralized, and tamperproof data sharing. In this paper, we proposed a novel solution for securing data sharing and storage in 6G-based IoT networks using blockchain technology, hybrid encryption, and IPFS. The proposed approach consists of four algorithms that enhance the security of the system: a user authentication algorithm, a data access algorithm, a data storage algorithm, and a secure data sharing algorithm. The secure data sharing algorithm enables secure, tamper-proof data sharing among authorized devices using a permissioned blockchain. These algorithms are implemented using hybrid encryption, which ensures data confidentiality, and have been evaluated for their effectiveness in enhancing security in 6G-based IoT networks. Our work contributes to the growing body of research on blockchain-enabled solutions for securing data in IoT networks and provides insights into the potential of blockchain technology, hybrid encryption, and IPFS to enhance security in 6G-based IoT networks. The proposed approach using these algorithms provides secure and tamper-proof data sharing, making the system more secure and reliable. We presented the technical details of our approach and evaluate its effectiveness in terms of security, with a particular focus on the role of hybrid encryption and IPFS in enhancing the security and reliability of the system. Our results demonstrate that the proposed approach enhances data security in 6G-based IoT networks by providing secure and tamper-proof data sharing. The use of hybrid encryption and IPFS makes the system more secure and reliable, with hybrid encryption ensuring data confidentiality and IPFS providing decentralized and fault-tolerant storage.</td>
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Iron, Zinc, and Multiple Sclerosis Patients

Vitamins and Minerals in Neurological Disorders

2023

Academic Press-Elsevier

9780323898355

Health and Wellbeing/ Human Disorders at the Molecular Level

Multiple sclerosis (MS) is a neurodegenerative disorder that attacks the myelin sheath in the central nervous system. MS is believed to be due to an interplay between environmental and genetic factors. Minerals such as iron and zinc are also thought to be involved in MS pathogenesis and/or progression. Iron exerts different roles inside the body where it serves as a cofactor for several proteins and enzymes engaged in neurotransmitters and myelin synthesis, and in nucleic acid repair. Similarly, zinc represents a crucial element for more than 300 proteins including neuronal ones. Iron and zinc dysregulation may promote neurodegeneration through different mechanisms: reactive oxygen species production, worsening of the immune system, oligodendrocytes toxicity, mitochondrial potential loss, and many others. Hence, iron and zinc homeostasis may be considered as one of the most important postulates for preventing neurodegeneration in MS.
I. PUBLICATIONS
ARTICLES

Author(s)  Alaa Eddine N., Schreiber J., El-Yazbi A., Shmaytilli H., Amin M.

<table>
<thead>
<tr>
<th>ARTICLE TITLE</th>
<th>A Pharmacist-led Medication Review Service with a Deprescribing Focus Guided by Implementation Science</th>
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<tbody>
<tr>
<td>JOURNAL</td>
<td>Frontiers in Pharmacology</td>
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<tr>
<td>YEAR</td>
<td>2023</td>
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<td>THEME / SUBTHEME</td>
<td>Health and Wellbeing/ Clinical Pharmacy and Practice</td>
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ABSTRACT

Background

Little research addressed deprescribing-focused medication optimization interventions while utilizing implementation science. This study aimed to develop a pharmacist-led medication review service with a deprescribing focus in a care facility serving patients of low income receiving medications for free in Lebanon followed by an assessment of the recommendations’ acceptance by prescribing physicians. As a secondary aim, the study evaluates the impact of this intervention on satisfaction compared to satisfaction associated with receiving routine care.

Methods

The Consolidated Framework for Implementation Research (CFIR) was used to address implementation barriers and facilitators by mapping its constructs to the intervention implementation determinants at the study site. After filling medications and receiving routine pharmacy service at the facility, patients 65 years or older and taking 5 or more medications, were assigned into two groups. Both groups of patients received the intervention. Patient satisfaction was assessed right after receiving the intervention (intervention group) or just before the intervention (control group). The intervention consisted of an assessment of patient medication profiles before addressing recommendations with attending physicians at the facility. Patient satisfaction with the service was assessed using a validated translated version of the Medication Management Patient Satisfaction Survey (MMPSS). Descriptive statistics provided data on drug-related problems, the nature and the number of recommendations as well as physicians’ responses to recommendations. Independent sample t-tests were used to assess the intervention’s impact on patient satisfaction.
**Application of Box-Behnken Design in the Preparation, Optimization, and In-Vivo Pharmacokinetic Evaluation of Oral Tadalafil-Loaded Niosomal Film**

**Author(S)**
Abla K., Mneimneh A., Allam A., Mehanna M.

**ABSTRACT**

Benign prostatic hyperplasia (BPH) affects about 90% of men whose ages are over 65. Tadalafil, a selective PDE-5 inhibitor, was approved by FDA for BPH, however, its poor aqueous solubility and bioavailability are considered major drawbacks. This work intended to develop and evaluate oral fast dissolving film containing tadalafil-loaded niosomes for those who cannot receive the oral dosage form. Niosomes were statistically optimized by Box-Behnken experimental design and loaded into a polymeric oral film. Niosomes were assessed for their vesicular size, uniformity, and zeta potential. The thickness, content uniformity, folding endurance, tensile strength, disintegration time, and surface morphology were evaluated for the prepared polymeric film. The optimized niosomes revealed high entrapment efficiency (99.78 ± 2.132%) and the film was smooth with good flexibility and convenient thickness (110 ± 10 µm). A fast release of tadalafil was achieved within 5 min significantly faster than the niosomes-free drug film. The in-vivo bioavailability in rats established that the optimized niosomal film enhanced tadalafil systemic absorption, with higher peak concentration (Cmax = 0.63 ± 0.03 µg/mL), shorter Tmax value (0.66-fold), and relative bioavailability of 118.4% compared to the marketed tablet. These results propose that the oral film of tadalafil-loaded niosomes is a suitable therapeutic application that can be passed with ease to geriatric patients who suffer from BPH.

**A Qualitative Exploration of Children’s Willingness to Take the COVID-19 Vaccine in Jordan**

**Author(S)**

**ABSTRACT**

Vaccine willingness has an important role in COVID-19 adult vaccination programs in many countries. However, there are limited data about vaccine willingness among children, which is largely confined to parents’ opinions. With the emergence of new variants affecting this age group, children’s opinions on COVID vaccination are important. This study aimed to explore children’s willingness and opinions regarding COVID-19 vaccination. Focus group discussions, including children, were carried out in different Jordanian schools. Purposive sampling was implemented to select students of different socioeconomic statuses. A total of 54 school students aged 6–14 years from three schools participated in nine focus groups. Overall, participating children were willing to take the COVID-19 vaccine, and three overarching themes described their view regarding the vaccine: benefits, motivators, and hesitancy and barriers. Participating children reported that the vaccine could be beneficial as it protects them from being infected, and they are motivated to take it as it has been approved for children in other countries. However, some children were hesitant regarding taking the vaccine as it could be harmful, and they believed that COVID-19 is not severe in children. In conclusion, this study shows a clear willingness among participants from primary and secondary schools to take the COVID-19 vaccine. Such outcomes should be tested further on a larger scale to deliver future recommendations to include younger children in the vaccination program.
**ARTICLE TITLE**: A Review on Aerosol Drug Delivery: Fundamentals, Classifications, Particle Size Analysis and the Engagement of Nanoparticulate Systems

**JOURNAL**: Drug Delivery Letters

**YEAR**: 2022

**PUBLICATION INFO**: 12(4): 258-275

**THEME / SUBTHEME**: Health and Wellbeing/Therapies

**ABSTRACT**

**Background**

The pulmonary route of administration has shown viability and effectiveness in local and systemic delivery, as a non-invasive method, not only for active pharmaceutical ingredients but also for genes, proteins, and enzymes for pulmonary and non-pulmonary diseases.

**Objectives**

Nanoparticulate systems such as liposomes, solid lipid nanoparticles, nanostructured lipid carriers, emulsions, nanosuspensions, polymeric nanoparticles, and metal-based have been investigated as delivery carriers for the lungs. Nanoparticulate drug delivery systems are known for their optimum small size and suitability for pulmonary absorption as it is well recognized that drug particles within the size range of 1-5 µm are the best for pulmonary deposition.

**Results**

The advantages of these colloidal systems are generated by their small size, large surface area, and rapid absorption. These systems are characterized by ease of preparation as inhalable formulation, the ability to increase drug concentration at the site of disease, preventing and minimizing drug loss and degradation, and the possibility of cell targeting.

**Conclusion**

This article provides a brief review of the features of different aerosol devices, their advantages, limitations, and methods utilized for particle size analysis with a focus on the emerging field of nanocarriers as vehicles for pulmonary delivery for various lung disorders.

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**ARTICLE TITLE**: Assessment of Knowledge, Attitude, and Practice Regarding the Disposal of Expired and Unused Medications Among the Lebanese Population

**JOURNAL**: Journal of Pharmaceutical Policy and Practice

**YEAR**: 2022

**PUBLICATION INFO**: DOI: 10.1186/s40545-022-00506-z

**THEME / SUBTHEME**: Health and Wellbeing/Clinical Pharmacy and Practice

**ABSTRACT**

**Background**

Medication waste is a public health problem affecting developed and developing countries. In Lebanon, a developing country in the Middle East, efforts are being deployed in hospitals but not in the community.

**Objective**

This study aimed to validate a questionnaire to explore the knowledge, attitude, and practice (KAP) towards the disposal of unused and expired medicines among the Lebanese population and then identify the factors associated with these variables comparatively between the general population and healthcare professionals.

**Methods**

A cross-sectional study was conducted among the general Lebanese population in May-June 2022 using a standardized questionnaire. The validity and reliability of the KAP scales were assessed, then a thorough statistical analysis was done to explore the factors associated with these scales.

**Results**

The KAP scales generated by this study were valid and reliable. Using these scales, 24.5%, 22.6%, and 21% of participants demonstrated proper knowledge, attitude, and practice, respectively. Higher knowledge scores were significantly associated with female gender (Beta = 0.97), a high monthly income (Beta = 1.68), a secondary (Beta = 6.11) or university (Beta = 6.80) education level, and postgraduate education (Beta = 7.13). However, older age (Beta = -0.06) and a low monthly income (Beta = -3.06) were significantly associated with lower knowledge scores. A higher knowledge score (Beta = 0.06) was significantly associated with a more positive attitude regarding unused or expired medication disposal. Being a healthcare professional (Beta = 0.72) was significantly associated with a higher practice score, while being a female (Beta = -0.32) and living in a rural area (Beta = -0.37) were significantly associated with lower practice scores.
### ABSTRACT

#### ARTICLE TITLE
Augmented Efficiency of Azithromycin for MRSA Ocular Infections Management: Limonene-based Nanostructured Lipid Carriers in-situ Approach

#### JOURNAL
Journal of Drug Delivery Science and Technology

#### YEAR
2023

#### PUBLICATION INFO
DOI:10.1016/j.jddst.2023.104764

#### THEME / SUBTHEME
Health and Wellbeing/ Therapies

#### ABSTRACT
Staphylococcus aureus (S. aureus) is the main pathogen that leads to serious ocular infectious disorders such as endophthalmitis and keratitis. A major obstacle in managing such infections is antibiotic resistance, as illustrated by the development of methicillin-resistance S. aureus (MRSA) strains. d-limonene, a main constituent of the citrus peel oil, is known for its potential antibacterial effect, thus, the objective of the current study is to fabricate a safe and effective in-situ ocular limonene-based nanostructured lipid carriers (NLCs) gel to improve azithromycin (AZ) solubility and efficacy against methicillin-susceptible S. aureus (MSSA) and MRSA-associated ocular biofilm infections. NLCs consisting of limonene and Gelucire® as an oily phase and Labrasol® and Labrafen® as an aqueous phase were prepared by cold microemulsion technique and characterized regarding their physicochemical characterizations. Besides, in-vitro antimicrobial sensitivity has been assessed on biofilm-forming MSSA and MRSA strains via killing kinetics and biofilm examination. NLCs-based in-situ gel was developed using Pluronic® F 127 and hydroxypropyl methylcellulose (HPMC) and evaluated regarding its physicochemical properties, in-vitro release, ex-vivo trans-corneal permeation through ocular sheep, and its ocular safety profile utilizing HET-CAM test. NLCs displayed a nanometric size of 77.42 ± 0.82 nm, narrow size distribution (0.196 ± 0.006), and spherical shape with ameliorated MRSA biofilm eradicating efficacy, in which MIC and MBC of AZ-loaded NLCs were 4 µg/ml and 64 µg/ml, respectively, significantly less than that of free AZ which were 16 µg/ml and 128 µg/ml, respectively.

### ABSTRACT

#### ARTICLE TITLE
Collagen-Based Scaffolds: An Auspicious Tool to Support Repair, Recovery, and Regeneration Post Spinal Cord Injury

#### JOURNAL
International Journal of Pharmaceutics

#### YEAR
2021

#### PUBLICATION INFO
DOI: 10.1016/j.ijpharm.2021.120559

#### THEME / SUBTHEME
Health and Wellbeing/ Drug Discovery

#### ABSTRACT
Spinal cord injury (SCI) is a perplexing traumatic disease that habitually gives ride to permanent disability, motor, and sensory impairment. Despite the existence of several therapeutic approaches for the injured motor or sensory neurons, they can't promote axonal regeneration. Whether prepared by conventional or rapid prototyping techniques, scaffolds can be applied to refurbish the continuity of the injured site, by creating a suitable environment for tissue repair, axonal regeneration, and vascularization. Collagen is a multi-sourced protein, found in animals skin, tendons, cartilage, bones, and human placenta, in addition to marine biomass. Collagen is highly abundant in the extracellular matrix and is known for its biocompatibility, biodegradability, porous structure, good permeability, low immunogenicity and thus is extensively applied in the pharmaceutical, cosmetic, and food industries as well as the tissue engineering field. Collagen in scaffolds is usually functionalized with different ligands and factors such as, stem cells, embryonic or human cells to augment its binding specificity and activity. The review summarizes the significance of collagen-based scaffolds and their influence on regeneration, repair and recovery of spinal cord injuries.
ARTICLE TITLE
Community Pharmacists’ Commitment to Preventive Measures During the COVID-19 Pandemic in Light of the Economic Crisis in Beirut, Lebanon: A Simulated Client Study

JOURNAL
BAU Journal-Health and Wellbeing

YEAR
2023

PUBLICATION INFO
5(2): 1-9

THEME / SUBTHEME
Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT
The burden on community pharmacists has dramatically increased since the COVID-19 pandemic, where the increased number of clients demands adhering to optimal infection protective measures. We aimed to investigate the level of adopted COVID-19 preventative measures by Lebanese community pharmacies and the influencing factors. One hundred community pharmacies in Beirut, were randomly selected and inspected by a simulated client. Signs of face-mask use, declaration of COVID-19 infection, and social distancing were observed in 62%, 48%, and 35% of pharmacies, respectively. Body temperature screening was absent. Only 20% of the pharmacies had limitations for the number of clients, and only 31% offered free disinfectants. Direct pharmacist-patient encounters were observed in 25% of pharmacies. Social distancing among pharmacists was practiced in only 8% of the pharmacies and 37% of pharmacists were not wearing face masks. Female pharmacists, pharmacists > 40 years, and large pharmacies were associated with a significantly higher score than male pharmacists, younger pharmacists, and smaller pharmacies (6.13 ± 1.73 vs. 4.21 ± 1.70, P = 0.004; 4.27 ± 1.55 vs. 4.40 ± 1.75, P = 0.03; and 6.73 ± 1.66 vs. 4.1 ± 1.74, P = 0.01; respectively). The adherence level of Lebanese community pharmacies to COVID-19 preventive measures is unsatisfactory. The economic crisis in addition to poor pharmacy education about infection control could be behind this level. The authorities are advised to wisely allocate the available resources, strengthen the monitoring process, and revise the pharmacy curriculum to include infection control.

Author(S)
Rahme D., Itani R., Karout S., Khojah H., El-Lakany A.

ARTICLE TITLE
Complementary and Alternative Medicine Use During the COVID-19 Pandemic: Community Pharmacists’ Knowledge, Attitudes, and Practices

JOURNAL
Research in Social and Administrative Pharmacy

YEAR
2022

PUBLICATION INFO
19(3): 502-509

THEME / SUBTHEME
Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT
Background
The challenges in COVID-19 treatment have driven patients to seek Complementary and Alternative Medicine (CAM) for the prevention and/or treatment of the disease. Pharmacists are uniquely positioned to promote the effective and safe use of CAM.

Objective
Assess the beliefs, practices, and knowledge of community pharmacists in Lebanon about existing evidence for the use of CAM for the prevention and/or treatment of COVID-19.

Methods
A national cross-sectional survey was conducted among community pharmacists during the COVID-19 pandemic in Lebanon (n = 310 respondents). Participants completed an online questionnaire addressing, in addition to the socio-demographic characteristics; the beliefs, practices, and knowledge of pharmacists regarding the existing evidence of CAM use for COVID-19 prevention and/or treatment.

Results
Pharmacists (70%) received frequent inquiries about CAM for COVID-19 prevention or treatment. Only 25.5% of the pharmacists reported having enough time to get information about CAM and COVID-19. Almost all participants believed that pharmacists have a major role in the fight against COVID-19 (98%) and that they have enough information to counsel patients in that regard (75%). For practices, the majority of pharmacists reported counseling their patients on proper use (98%) and possible adverse reactions (93%) of CAM, but only 51% reported toxic or undesirable effects. Regarding knowledge, although most pharmacists answered correctly the questions on the role of CAM in preventing COVID-19, few knew about its role in treating the infection. Pharmacists who trust the WHO website as a credible source had a higher knowledge score (β = 0.52, 95%CI: 0.05-0.986).

Conclusions
The positive beliefs and practices of pharmacists towards CAM during the pandemic were coupled with a few gaps, especially in their knowledge about existing evidence for CAM use. Concerted efforts ought to be dedicated to supporting pharmacists in playing a more prominent role during health crises such as the COVID-19 pandemic.

Author(S)
ARTICLE TITLE
COVID-19 Vaccination Acceptability: A Cross-Sectional Study Among Lebanese Residents

JOURNAL
Disaster Medicine and Public Health Preparedness

YEAR
2023

PUBLICATION INFO
DOI: 10.1017/dmp.2023.89

THEME / SUBTHEME
Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT
Objective
Concerns about the side effects of available coronavirus disease (COVID-19) vaccines have posed a significant barrier to vaccination in several countries. Accordingly, the current study aimed to assess the acceptability of COVID-19 vaccination and its predictors among the Lebanese population.

Methods
A cross-sectional study was conducted in February 2021 among Lebanese adults from the 5 main Lebanese districts. The questionnaire included demographic data, questions about COVID-19 experience, COVID-19 anxiety syndrome scale, and attitudes regarding the COVID-19 vaccine. Data were analyzed on SPSS, version 23. Statistical significance was considered at a P value ≤ 0.05 with a 95% CI.

Results
Of 811 participants, 45.4% (95% CI: 41.9-48.9) accepted taking the COVID-19 vaccine. Choices were negatively affected by concerns about the side effects of the vaccine and positively affected by anxiety and seeking COVID-19 news very closely. Moreover, if the COVID-19 vaccination was a requirement for traveling, participants would be more willing to get the vaccine.

Conclusions
Since 54.7% of the studied Lebanese adults were either unwilling or undecided to get the vaccine and COVID-19 news was retrieved mainly from the Ministry of Public Health online site and the local news, the existing targeted campaign should be enforced toward encouraging vaccination to reach herd immunity against COVID-19 and revealing the safety of the vaccines.

Author(S)
Domiati S., Hodeib F., El Majzoub R., Sacre H.

ARTICLE TITLE
Elective Surgery Strengthening: Development, Measurement, and Validation of the Surgical Preparedness Index Across 1632 Hospitals in 119 Countries (Joint Publication with the Faculty of Medicine)

JOURNAL
The Lancet

YEAR
2022

PUBLICATION INFO
400(10363):1607-1617

THEME / SUBTHEME
Health and Wellbeing/ Therapies

ABSTRACT
Background
The 2015 Lancet Commission on global surgery identified surgery and anaesthesia as indispensable parts of holistic health-care systems. However, COVID-19 exposed the fragility of planned surgical services around the world, which have also been neglected in pandemic recovery planning. This study aimed to develop and validate a novel index to support local elective surgical system strengthening and address growing backlogs.

Methods
First, we performed an international consultation through a four-stage consensus process to develop a multidomain index for hospital-level assessment (surgical preparedness index; SPI). Second, we measured surgical preparedness across a global network of hospitals in high-income countries (HICs), middle-income countries (MICs), and low-income countries (LICs) to explore the distribution of the SPI at national, subnational, and hospital levels. Finally, using COVID-19 as an example of an external system shock, we compared hospitals’ SPI to their planned surgical volume ratio (SVR; ie, operations for which the decision for surgery was made before hospital admission), calculated as the ratio of the observed surgical volume over a 1-month assessment period between June 6 and Aug 5, 2021, against the expected surgical volume based on hospital administrative data from the same period in 2019 (ie, a pre-pandemic baseline). A linear mixed-effects regression model was used to determine the effect of increasing SPI score.

Findings
In the first phase, from a longlist of 103 candidate indicators, 23 were prioritised as core indicators of elective surgical system preparedness by 69 clinicians (23 [33%] women; 46 [67%] men; 41 from HICs, 22 from MICs, and six from LICs) from 32 countries. The multidomain SPI included 11 indicators on facilities and consumables, two on staffing, two on prioritisation, and eight on systems. Hospitals were scored from 23 (least prepared) to 115 points (most prepared). In the second phase, surgical preparedness was measured in 1632 hospitals by 4714 clinicians from 119 countries. 745 (45·6%) of 1632 hospitals were in MICs or LICs. The mean SPI score was 84·5 (95% CI 84·1-84·9), which varied between HIC (91.0 [90.7-91.3]), MIC (78.9 [78.6-79.2]), and LIC (64·8 [64.0-65.6]) settings.

Author(S)
Itani R., Karout S., Karout L. from NIHR Global Health Unit on Global Surgery; COVIDSurg Collaborative
ABSTRACT

Evaluation of Stroke Pre-hospital Management in Lebanon from Symptoms Onset to Hospital Arrival and Impact on Patients’ Status at Discharge: A Pilot Study

The study was conducted to investigate the factors that influence hospital arrival time after acute stroke onset in the Lebanese population and to assess the effect of the prehospital phase on patients’ prognosis at discharge.

In the third phase, 1217 (74.4%) hospitals did not maintain their expected SVR during the COVID-19 pandemic, of which 625 (51.4%) were from HIC, 538 (44.2%) from MIC, and 54 (4.4%) from LIC settings. In the mixed-effects model, a 10-point increase in SPI corresponded to a 3.6% (95% CI 3.0-4.1; p<0.0001) increase in SVR. This was consistent in HIC (4.8% [4.1-5.5]; p<0.0001), MIC (2.8 [2.0-3.7]; p<0.0001), and LIC (3.8 [1.3-6.7%]; p<0.0001) settings.

Interpretation

The SPI contains 23 indicators that are globally applicable, relevant across different system stressors, vary at a subnational level, and are collectable by front-line teams. In the case study of COVID-19, a higher SPI was associated with an increased planned surgical volume ratio independent of country income status, COVID-19 burden, and hospital type. Hospitals should perform annual self-assessment of their surgical preparedness to identify areas that can be improved, create resilience in local surgical systems, and upscale capacity to address elective surgery backlogs.

Author(S)
Kamal H., Assaf S., Kabalan M., El Maissi R., Salhab D., Rahme D., Lahoud N.

ABSTRACT

Factors Associated with Children’s Dietary Patterns During COVID19 Pandemic Lockdown: A Multinational Study Across Middle Eastern Arab Nations

This study investigated the impact of the COVID-19 pandemic on Middle Eastern Arab children’s eating habits, bodyweight, lifestyle, physical activity, sleeping hours, use of smart electronic devices, and mental health. The exploratory study utilized a self-administered questionnaire distributed to parents of children aged 4–12 years. Multinomial logistic regression was used to model the relationship between the predictors and children’s body weight changes during the pandemic. A total of 891 responses were collected from Bahrain, Jordan, Lebanon, Saudi Arabia, United Arab Emirates, Iraq, and Oman. The average weight gain among children during the pandemic was 4.19 ± 3.08 Kg.

Author(S)
**Article 1**

**Article Title:** First Trend Analysis of Antifungals Consumption in Lebanon Using the World Health Organization Collaborating Center for Drug Statistics Methodology

**Journal:** BMC Infectious Diseases

**Year:** 2022

**Abstract**

**Background**
Antimicrobial resistance has reached an alarming rate globally, especially in middle-income countries such as Lebanon. The development of antifungal resistance is associated with the increased population's injudicious consumption. This study aims to measure antifungals consumption in Lebanon as a trend analysis of national data from 2004 to 2018.

**Methods**
This is a trend analysis of the consumption of antifungal agents in the Lebanese community. Data were obtained from the Intercontinental Marketing Statistics Database between 2004 and 2018. It measures the total consumptions per year, per drug, and the percentage of its correspondents for three routes of administration (oral, parenteral, and topical). Results were reported by Defined Daily Dose (DDD) per 1000 inhabitants per day and the total number of DDDs.

**Results**
Community consumption of antifungals in Lebanon has increased by approximately 18.64% between 2004 and 2018, as measured by the number of DDDs per 1000 inhabitants per day; and amplified by approximately 87.76% as measured by the number of DDDs. The highest consumption level was noted in 2017, with 1.52 DDDs/1000 inhabitants/day and 3,386,930 DDDs. Fluconazole was the most consumed antifungal while micafungin was the least with 6,723,869.2 (20.99%) and 48.5 (0.0002%) DDDs respectively. Topical antifungals ranked the first type consumed followed by oral and parenteral antifungals representing 51.72%, 48.24%, and 0.033% of the total consumption respectively.

**Conclusion**
The findings from this study indicate a marked increase in antifungal consumption in the Lebanese community. This accelerates the need of implementing disease management guidelines and national antifungal stewardship. Moreover, these findings may be used in further benchmark utilization and antimicrobial resistance studies in Lebanon.

**Author(s):** Rahme D., Ayoub M., Shaito K., Saleh N., Assaf S., Lahoud N.

**Article 2**

**Article Title:** Freeze-Drying: A Flourishing Strategy to Fabricate Stable Pharmaceutical and Biological Products

**Journal:** International Journal of Pharmaceutics

**Year:** 2022

**Abstract**

**Background**
Freeze-drying (FD) of nanoparticles, microorganisms, genes, and vaccines is an auspicious technique used to enhance long-term stability and facilitate transportation mainly for products that require specific conditions like cold chains. Although freeze-drying is considered a delicate drying process, it can cause numerous stresses that induce chemical and physical instabilities. Subsequently, the inclusion of suitable excipients along with optimizing the process parameters is crucial to attain stable lyophilizates with high-quality attributes. The current review highlights the state of the art of the freeze-drying process applications in nanoparticulate systems, microorganisms, genes, and vaccine formulations. Moreover, the work focuses on the different stresses facing these systems during FD cycle and the strategies which are utilized for their stabilizations during lyophilization and storage.

**Results**
Freeze-drying (FD) of nanoparticles, microorganisms, genes, and vaccines is an auspicious technique used to enhance long-term stability and facilitate transportation mainly for products that require specific conditions like cold chains. Although freeze-drying is considered a delicate drying process, it can cause numerous stresses that induce chemical and physical instabilities. Subsequently, the inclusion of suitable excipients along with optimizing the process parameters is crucial to attain stable lyophilizates with high-quality attributes. The current review highlights the state of the art of the freeze-drying process applications in nanoparticulate systems, microorganisms, genes, and vaccine formulations. Moreover, the work focuses on the different stresses facing these systems during FD cycle and the strategies which are utilized for their stabilizations during lyophilization and storage.

**Author(s):** Abla K., Mehnanna M.
Knowledge and Perceptions of Patients Towards Generic and Local Medications: The Lebanese Version

Pharmacia 2022 70(1): 121-127

Health and Wellbeing/ Clinical Pharmacy and Practice

Lebanon is one of the Mediterranean countries that are devastated by economic crisis. Knowing that generic medications are less costly when compared to brands, it is crucial to assess patients’ understanding and views regarding these medications. A 25-item self-administered anonymous questionnaire was distributed to a total of 421 participants. The questionnaire appraised participants’ knowledge and perceptions about generics versus brand medications, in addition to their perceptions and attitudes towards generic substitution. Most respondents agreed that generics are not inferior to their brand equivalents in terms of quality, efficacy and safety (66%, 68.9%, and 66.7%, respectively). On the other hand, 79.4% (n=334) accepted generic substitution for minor ailment medications, whereas, only 56.1% (n=236) accepted this substitution for their chronic medications. As a conclusion, the uncertainty about the use of generic medications, particularly those treating chronic illness is still an obstacle to overcome.

Lipid-Based Nanocarriers Challenging the Ocular Biological Barriers: Current Paradigm and Future Perspectives

Journal of Controlled Release 2022 362: 70-96

Health and Wellbeing/ Drug Discovery

Eye is the most specialized and sensory body organ and treating eye diseases efficiently is necessary. Despite various attempts, the design of a consummate ophthalmic drug delivery system remains unsolved because of anatomical and physiological barriers that hinder drug transport into the desired ocular tissues. It is important to advance new platforms to manage ocular disorders, whether they exist in the anterior or posterior cavities. Nanotechnology has piqued the interest of formulation scientists because of its capability to augment ocular bioavailability, control drug release, and minimize ineffectual drug absorption, with special attention to lipid-based nanocarriers (LBNs) because of their cellular safety profiles. LBNs have greatly improved medication availability at the targeted ocular site in the required concentration while causing minimal adverse effects on the eye tissues. Nevertheless, the exact mechanisms by which lipid-based nanocarriers can bypass different ocular barriers are still unclear and have not been discussed. Thus, to bridge this gap, the current work aims to highlight the applications of LBNs in the ocular drug delivery exploring the different ocular barriers and the mechanisms viz. adhesion, fusion, endocytosis, and lipid exchange, through which these platforms can overcome the barrier characteristics challenges.

Medicinal Plants Stress Factors: Effects on Metabolites and Novel Perspectives for Tolerance


Health and Wellbeing/ Drug Discovery

Medicinal plants are rich in secondary metabolites representing different chemical classes and synthesized by various biochemical pathways. However, these compounds are susceptible to potential herbal predators and to environmental influences. Several factors induce different biotic and abiotic stresses (drought, cold, salinity, heat) that lead to fluctuations in the biogenesis and accumulation of secondary metabolites by which plants react to overcome the threatening stress conditions. This contribution aims to give an overview of the various medicinal plant defense mechanisms against imminent threats and their impact on secondary metabolites profiles in the most effective medicinal plant species such as the levels of vincristine in Catharanthus roseus which is affected by salinity and drought stress, sage (Salvia officinalis) that showed fluctuations in terpenes level under drought stress and mineral contents in the soil and Papaver somniferum that exhibited a decrease in alkaloids content under cold stress. From a wider perspective, the aim of this study is to present novel tools and strategies used for the preservation of some plant species from extinction by minimizing as much as possible the risk of exogenous influences on phytochemicals levels and on plant bio genome and manipulating the stress factors to ensure plants quality and safety.
Molecular Mechanics Simulations and Experimental Investigation of the Effect of Tadalafil on Various Inflammatory Pain Mediators

**Purpose**
Tadalafil’s exact analgesic mechanism is still unclear. The current study aimed to elucidate this mechanism in an inflammatory pain model.

**Methods**
Computer-assisted simulation docking experiments were carried out to assess the binding of tadalafil to different ligands. The anti-inflammatory and analgesic effects of tadalafil were evaluated using formalin-induced paw edema and a von Frey filament test, respectively. The plantar paw of the mice was then dissected to quantify iNOS, nNOS, COX-2, TNF-\(\alpha\), IL1, and IL10 gene expression levels using a real-time polymerase chain reaction. iNOS, TNF-\(\alpha\), and COX-2 inhibition was reassessed in vitro using the ELISA technique. One-way analysis of variance followed by post hoc Tukey test or t-test was used to compare the means.

**Results**
Docking analysis showed a superior binding score of tadalafil to COX-2, iNOS, IL-1, and TNF-\(\alpha\) compared to that of indomethacin and morphine and a similar binding score to nNOS and IL-10 relative to that of indomethacin. In the in vivo study, tadalafil, after an hour of formalin administration, inhibited significantly paw edema, similar to indomethacin. Furthermore, it significantly increased the withdrawal force in the von Frey filament test as compared to the negative control, which was similar to the effect observed with indomethacin and morphine. The RT-PCR revealed that tadalafil reduced significantly the iNOS, COX-2, and TNF-\(\alpha\) gene expressions but had no effect on nNOS, IL-1, and IL10. In vitro ELISA tests confirmed the inhibition of iNOS, COX-2, and TNF-\(\alpha\).

**Conclusion**
Tadalafil probably exerts its analgesic effect through the simultaneous inhibition of iNOS, COX-2, and TNF-\(\alpha\), which is not the case with other nonsteroidal anti-inflammatory drugs. Nevertheless, further studies are required to confirm its mechanism.

**Author(s)**
Domiati S., Abd El Galil K., Ragab H.

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Nomophobia Among University Students in Five Arab Countries in the Middle East: Prevalence and Risk Factors

**Background**
Excessive use of mobile phones leading to development of symptoms suggestive of dependence syndrome with teenagers are far more likely to become dependent on mobile phones as compared to adults. COVID-19 pandemic has had an impact on the mental health of several groups in society, especially university students. This study aimed to explore the prevalence of mobile phone dependence among university students and its associated factors.

**Methods**
Between September 2021 and January 2022, a cross-sectional study was conducted at universities in Jordan, Lebanon, Egypt, Bahrain, and Saudi Arabia utilizing an online and paper-based self-administered questionnaire. We employed a previously developed questionnaire by Aggarwal et al.

**Results**
A total of 5,720 university students were involved in this study (Egypt = 2813, Saudi Arabia = 1509, Jordan = 766, Lebanon = 432, and Bahrain = 200). The mean estimated daily time spent on using mobile phone was 186.4 (94.4) minutes. The highest mobile dependence score was observed for the university students from Egypt and the lowest mobile dependence score was observed for the university students from Lebanon. The most common dependence criteria across the study sample was impaired control (55.6%) and the least common one was harmful use (25.1%). Females and those reported having anxiety problem or using a treatment for anxiety were at higher risk of developing mobile phone dependence by 15% and 75%, respectively.

**Conclusion**
It also aims to raise awareness about the consumption of herbal medicines without respecting the herbal monographs information about the safe dose, the interactions with drugs, and the side effects, in addition to the necessity of performing toxicity studies by pharmaceutical industries, especially on herbal medicines raised under various stress factors because of the risk of SMs (secondary metabolites) accumulation in these plants at a critical level that may be toxic to consumers.

**Author(s)**
**Article Title**: Propranolol-Loaded Limonene-Based Microemulsion Thermo-Responsive Mucoadhesive Nasal Nanogel: Design, In Vitro Assessment, Ex Vivo Permeation, and Brain Biodistribution

**Journal**: Gels

**Year**: 2023

**Publication Info**: DOI: 10.1186/s12913-023-09523-3

**Theme/Subtheme**: Health and Wellbeing/Drug Discovery

**Abstract**: Propranolol is the first-line drug for managing migraine attacks. D-limonene is a citrus oil known for its neuroprotective mechanism. Thus, the current work aims to design a thermo-responsive intranasal limonene-based microemulsion mucoadhesive nanogel to improve propranolol efficacy. Microemulsion was fabricated using limonene and Gelucire® as the oily phase, Labrasol®, Labrafil®, and deionized water as the aqueous phase, and was characterized regarding its physicochemical features. The microemulsion was loaded in thermo-responsive nanogel and evaluated regarding its physical and chemical properties, in vitro release, and ex vivo permeability through sheep nasal tissues. Its safety profile was assessed via histopathological examination, and its capability to deliver propranolol effectively to rats' brains was examined using brain biodistribution analysis. Limonene-based microemulsion was of 133.7 ± 0.513 nm diametric size with unimodal size distribution and spheroidal shape. The nanogel showed ideal characteristics with good mucoadhesive properties and in vitro controlled release with 1.43-fold enhancement in ex vivo nasal permeability compared with the control gel. Furthermore, it displayed a safe profile as elucidated by the nasal histopathological features. The nanogel was able to improve propranolol brain availability with Cmax 970.3 ± 43.94 ng/g significantly higher than the control group (277.7 ± 29.71 ng/g) and with 382.4 % relative central availability, which confirms its potential for migraine management.

**Authors**: Abla K., Domiati S., El Majzoub R., Mehanna M.
Public Perceptions About Home Delivery of Medications Service in Lebanon: A Cross-Sectional Survey

ABSTRACT

Objectives
To investigate the public’s perception of home delivery of medication service offered by community pharmacies in Lebanon and to assess factors affecting the use of this service.

Methods
The present study represents a cross-sectional online survey study that took place in April-May 2022. The survey was uploaded on the google form platform and was distributed on popular social media platforms (Facebook and WhatsApp). Participants were asked to fill out the questionnaire to evaluate their awareness and perception of home delivery of medication service. Statistical analyses were performed using SPSS version 22.

Results
During the study period, 517 participants agreed to fill out the study questionnaire. Only 18.4% of the study’s participants (n=95) had previously utilized home delivery of medications service. The majority of the participants believed that home delivery service made pharmacists less accessible to answer questions (n=332, 64.2%), and prevented pharmacists from explaining important points about prescriptions (n=322, 62.3%) compared to in-store refills. The main disadvantage of the service as perceived by the participants that home delivery of medications services is associated with the excessive cost of transporting medication (n=385, 74.5%), while the main advantage of this service is its ability to serve sick patients, elderly, disabled people (n=460, 88.9%). Finally, being female, being a university graduate or above, or having a monthly income of more than 500$/month are significantly associated with utilizing home delivery of medication service (p<0.05).

Conclusion
The majority of the Lebanese participants reported not utilizing the home delivery of medication service before, however, they have positively perceived medication home delivery service as an efficient pharmaceutical service. Serious efforts are needed by health policymakers to facilitate the implementation of this service in Lebanon.

Recent Advances in Freeze-Drying: Variables, Cycle Optimization, and Innovative Techniques

ABSTRACT

Freeze-drying (FD) is the most substantial drying technique utilized in the pharmaceutical and biopharmaceutical industries. It is a drying process where the solvent is crystallized at low temperatures and then sublimed from the solid-state directly into the vapor phase. Although FD possesses several merits as its suitability for thermolabile materials and its ability to produce dry products with high-quality attributes, it is a complex and prolonged process that requires optimization of both; process and formulation variables. This review attains to disassemble FD complications through a detailed explanation of the lyophilization concept, stages, the factors influencing the process including controlled ice nucleation, and the modified and innovative FD technologies proposed in recent years to overcome the shortage of traditional FD. In addition, this work points out the quality by design (QbD), critical quality of attributes (CQAs), limitations, and drawbacks of lyophilization. HIGHLIGHTS
Lyophilization is a propitious drying technique for thermolabile materials. Optimizing the lyophilization cycle requires controlling the process parameters. Numerous approaches were developed to ameliorate the lyophilization performance.
Repurposing of Chronically Used Drugs in Cancer Therapy: A Chance to Grasp

Despite the advancement in drug discovery for cancer therapy, drug repurposing remains an exceptional opportunistic strategy. This approach offers many advantages (faster, safer, and cheaper drugs) typically needed to overcome increased challenges, i.e., side effects, resistance, and costs associated with cancer therapy. However, not all drug classes suit a patient’s condition or long-time use. For that, repurposing chronically used medications is more appealing. This review highlights the importance of repurposing anti-diabetic and anti-hypertensive drugs in the global fight against human malignancies. Extensive searches of all available evidence (up to 30 March 2023) on the anti-cancer activities of anti-diabetic and anti-hypertensive agents are obtained from multiple resources (PubMed, Google Scholar, ClinicalTrials.gov, Drug Bank database, ReDo database, and the National Institutes of Health). Interestingly, more than 92 clinical trials are evaluating the anti-cancer activity of 14 anti-diabetic and anti-hypertensive drugs against more than 15 cancer types. Moreover, some of these agents have reached Phase IV evaluations, suggesting promising official release as anti-cancer medications. This comprehensive review provides current updates on different anti-diabetic and anti-hypertensive classes possessing anti-cancer activities with the available evidence about their mechanism(s) and stage of development and evaluation. Hence, it serves researchers and clinicians interested in anti-cancer drug discovery and cancer management.

Review on Chemical Constituents and Biological Activities of Genus Rumex

Genus Rumex belongs to the family Polygonaceae that is distributed worldwide and used in the treatment of different illnesses. Different parts of this plant are employed in the treatment of a number of ailments such as diarrhea, jaundice, hypertension, dermatopathy and inflammation. It was reported that they possess anti-oxidative, antimicrobial, antiviral and anti-cancer activities due to the presence of several phenolic constituents, anthraquinones and flavonoids such as rutin, luteolin and apigenin. Flavonoids play an important role against cardiovascular diseases by reducing oxidation of low-density lipoproteins. This article covers most of constituents of plants of genus Rumex reported from 2001 up to 2022. Furthermore, the biological activities of plants of genus Rumex are presented.

siRNA Nanohybrid Systems: False Hope or Feasible Answer in Cancer Management

This review provides current updates on different anti-diabetic and anti-hypertensive classes possessing anti-cancer activities with the available evidence about their mechanism(s) and stage of development and evaluation. Hence, it serves researchers and clinicians interested in anti-cancer drug discovery and cancer management.
### Article 1

**Article Title:** Spray-dried Co-amorphous Tadalafil Ternary Mixtures: A Promising Platform Towards the Enhancement of Solubility and Bioavailability  
**Journal:** Brazilian Journal of Pharmaceutical Sciences  
**Year:** 2022  
**DOI:** 10.1590/s2175-97902022e20622  
**Theme/Subtheme:** Science and Technology/Drug Delivery and Development  
**Abstract:** Tadalafil (Tad) is a poorly water-soluble drug (BCS class II) that is used for the treatment of erectile dysfunction. An enhancement of aqueous solubility is vital to accelerate its onset of action and subsequently enhance its therapeutic effect. Binary and ternary mixtures of Tad with different amino acids (histidine, valine, alanine or arginine) and other excipients (mannitol and SLS) were prepared and then spray dried. The solubilizing efficiency and physicochemical characterization of all spray dried mixtures of Tad were studied. The optimum formulation was investigated in male rats to determine the onset of erection and the pharmacokinetic parameters of Tad. In general terms, the drug solubility of spray-dried formulae was enhanced compared to the crystalline form of the drug as a result of the formation of co-amorphous structures. The final result revealed that the Tad/alanine/mannitol spray-dried mixture (F10) showed the highest solubility and an improvement in its physicochemical characteristics. Moreover, F10 showed a significantly faster erection in rats with an improvement in Tad pharmacokinetic parameters when compared to the crystalline drug. Thus, F10 is selected as a promising formulation that successfully enhanced the bioavailability and the therapeutic efficacy of Tad.

**Author(s):** El-Maradny H., Saab M.

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### Article 2

**Article Title:** The Battle of Lipid-Based Nanocarriers Against Blood-Brain Barrier: A Critical Review  
**Journal:** Journal of Drug Targeting  
**Year:** 2023  
**Publication Info:** 31(8): 832-857  
**Theme/Subtheme:** Health and Wellbeing/Drug Discovery  
**Abstract:** Central nervous system integrity is the state of brain functioning across sensory, cognitive, emotional-social behaviors, and motor domains, allowing a person to realise his full potential. Thus, brain disorders seriously affect patients’ quality of life. Efficient drug delivery to treat brain disorders remains a crucial challenge due to numerous brain barriers, particularly the blood-brain barrier (BBB), which greatly impacts the ultimate drug therapeutic efficacy. Lately, nanocarrier technology has made huge progress in overcoming these barriers by improving drug solubility, ameliorating its retention, reducing its toxicity, and targeting the encapsulated agents to different brain tissues. The current review primarily offers an overview of the different components of BBB and the progress, strategies, and contemporary applications of the nanocarriers, specifically lipid-based nanocarriers (LBNs), in treating various brain disorders.

**Author(s):** Abla K., Mehanna M., Rahme D., Dabbous M., Malaeb D., Hallit S., Obeid S.
ARTICLE TITLE

The Prevalence of Carbapenem Resistance Gram Negative Pathogens in a Tertiary Teaching Hospital in Jordan

JOURNAL

BMC Infectious Diseases

YEAR

2023

PUBLICATION INFO

DOI: 10.1186/s12879-023-08610-4

THEME / SUBTHEME

Health and Wellbeing/ Therapies

ABSTRACT

Background

Muscle dysmorphia (MD) is a common psychological disorder present in Lebanese adolescents. Several disorders can be present concomitantly with MD such as bulimia nervosa and exercise addiction. This study aims to explore the mediating effect of body appreciation between Muscle dysmorphia and bulimia nervosa, and to validate the exercise addiction inventory scale in Lebanese adolescents.

Methods

This was a cross-sectional designed study, conducted between August-September 2022, and enrolling 403 adolescents currently residing in Lebanon (15 to 18 years old), from all Lebanese governorates (Beirut, Mount Lebanon, North, South, and Bekaa). Our sample was chosen using the snowball technique, a soft copy of the questionnaire was created using google forms software, and an online approach was conceived to proceed with the data collection.

Results

The mean age of the participants was 16.63 ± 1.46 years with 57.3% females. The factor analysis for the Exercise Addiction Inventory suggested one factor, which explained 62.58% of the common variance. The confirmatory factor analysis revealed an adequate fit to the model with satisfactory Maximum Likelihood Chi-Square/Degrees of Freedom ($\chi^2/df$), SRMR, CFI, TLI, and AVE. The mediation analysis showed that the direct relation between bulimia and MD was not significant after eliminating the effect of body appreciation ($r = .12$, $p < .001$). However, body appreciation was significantly associated with bulimia nervosa ($r = -1.06$, $p < .001$) and MD ($r = -.28$, $p < .001$).

Conclusion

Body appreciation was found to be a mediator between muscle dysmorphia and bulimia nervosa and thus it is the main factor leading to both disorders. Therefore, body appreciation should be addressed in the evaluation and management of Muscle Dysmorphia.

Background

With the absence of new antimicrobial drugs being developed to replace those facing resistance, bacterial resistance continues to grow. Despite previous studies conducted in various countries, there is a lack of comprehensive local reporting on the occurrence of carbapenem resistance among gram-negative bacteria.

Objective

This study aims to identify the prevalence of carbapenem-resistant gram-negative bacterial isolates.

Method

A retrospective cross-sectional study was conducted at an academic hospital in Jordan over an eight-month period, spanning from November 2021 to June 2022. The study involved screening electronic medical records to identify patients with clinical cultures showing the growth of Gram-negative bacteria. Antimicrobial susceptibility results of the Gram-negative isolates were recorded.

Results

A total of 1,043 isolated Gram-negative bacteria were analyzed for carbapenem susceptibility. Among the species tested, the most common carbapenem-resistant bacteria were Acinetobacter baumannii (153/164, 93.3%), followed by Klebsiella pneumonia (184/311, 59.2%), and Pseudomonas aeruginosa (67/160, 41.9%). The least commonly isolated species resistant to carbapenem were Escherichia coli (25/361, 6.9%) and Proteus mirabilis (1/30, 3.3%). None of Serratia marcescens or Proteus vulgaris isolates were resistant to carbapenem (0%). Overall, the prevalence of carbapenem-resistance gram-negative isolates was 41.2% (430 out of 1,043).

Conclusion

This study provides population-specific data that are crucial for guiding empirical antimicrobial treatment decisions not only within the participating hospital but also in other nearby healthcare facilities. The results underscore the urgent need for coordinated efforts to address antibiotic resistance in Jordan. Comprehensive measures such as strict infection control methods, annual nationwide surveillance programs, and effective antimicrobial stewardship programs at the national level are imperative to reduce the overuse of broad-spectrum antibiotics.

Author(S)

ARTICLE TITLE
Translation and Validation of the Medication Management Patient Satisfaction Survey: The Lebanese Arabic Version

JOURNAL
Frontiers in Pharmacology

YEAR
2023

PUBLICATION INFO
DOI: 10.3389/fphar.2023.997103

THEME / SUBTHEME
Health and Wellbeing/ Clinical Pharmacy and Practice

ABSTRACT
Background
No Arabic translation exists for the medication management patient satisfaction survey (MMPSS), a 10-item psychometrically valid patient satisfaction survey tool developed to assess patient satisfaction for comprehensive medication management. The objective of this study is to translate the medication management patient satisfaction survey into Lebanese Arabic while culturally adapting and assessing the psychometric properties of the translated survey in the outpatient setting.

Methods
Guidelines for translation, adaptation, and validation of instruments for cross-cultural healthcare research were followed. The process included forward translation, expert panel review, back-translation, pretesting, and cognitive interviewing. Participants were approached after picking up their medications from the pharmacy at a primary care facility. The medication management patient satisfaction survey was administered verbally by two trained data collectors. Instrument psychometric analyses included testing both for reliability using Cronbach’s alpha (α) and McDonald’s omega (ω) and for construct validity using exploratory factor analysis (EFA). Pearson correlations between items were calculated.

Results
During the translation process, the term “clinical pharmacist” was changed to “pharmacist today” for improved understanding. Four items were adapted through minor linguistic modifications. Data were collected from 143 patients. The mean age of participants was 72 years. Participants were mostly females (69%) and had an average of four comorbidities and eight daily medications. Findings from Cronbach’s alpha (α) and McDonald’s omega (ω) indicated that the internal consistency among items from one to nine was very strong (α = 0.90; ω = 0.90). Exploratory factor analysis indicated that all items are strongly influenced by one factor, except for item six, “My clinical pharmacist is working as a team member with my other healthcare providers” which was the least influenced (loading = 0.44) with the highest uniqueness (0.81). The latent factor captured over 50% of the variance originally observed between variables. Items four and five “My clinical pharmacist helped me find easier ways to take my medicines” and “My clinical pharmacist helped me understand the best ways to take my medicines”, had the strongest correlation (0.77), while the weakest correlation was seen between item six “My clinical pharmacist is working as a team member with my other healthcare providers” and other items.

Conclusion
The Lebanese Arabic version of the medication management patient satisfaction survey was produced as a brief tool to serve as a valid and reliable instrument for measuring patient satisfaction with comprehensive medication management services.

Author(S)
Alaa Eddine N., Schreiber J., Amin M.

ARTICLE TITLE
Validated Ion Exchange HPLC Method for the Quantification of Levothyroxine – A Narrow Therapeutic Index Drug – Used for the Treatment of Hypothyroidism

JOURNAL
Pharmacia

YEAR
2023

PUBLICATION INFO
70(2): 299-305

THEME / SUBTHEME
Science and Technology/ Drug Delivery and Development

ABSTRACT
Drugs with narrow therapeutic index (NTI-drugs) have been defined by the FDA as drugs with small differences between therapeutic and toxic doses that might lead to serious therapeutic failures or life-threatening adverse drug reactions. Levothyroxine sodium pentahydrate (LT4), a synthetic T4 hormone used for the treatment of hypothyroidism (a condition where there is a hormonal imbalance in the thyroid gland that is responsible for the regulation of several physiological, metabolic, cardiovascular, and neurological processes). LT4 is designated by the FDA as a narrow therapeutic index drug and is available in the market in the form of very low dose pharmaceutical formulations ranging from 25 mcg to 150 mcg. This requires that the pharmaceutical dosage form should contain the exact labeled amount of the active ingredient, LT4, such that safety and efficacy are maintained. Therefore, it is necessary to develop an a precise, accurate and sensitive analytical method for LT4 quantification considering the treatment doses being in micrograms. In the present work, an ion exchange HPLC method has been developed and validated for the determination of LT4 as per ICH guidelines. The developed method was found to be simple, specific, precise and accurate. The low LOD and LOQ values allowed the quantification of the active ingredient in different pharmaceutical products qualifying the method to be applied in quality control assays.

Author(S) Al Jamal M., Al Bathish M., Gazy A.
Faculty of MEDICINE

Research Report 2022 - 2023
**I. PUBLICATIONS**

**ARTICLES**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Shaarani I., Joublat M., Joublat H., Ghanem A., Mansour R., Taleb R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTICLE TITLE</td>
<td>Developing and Validating a Tool to Assess Telemedicine Acceptance Among Physicians During Pandemic Using a Technology Acceptance Model</td>
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<tr>
<td>JOURNAL</td>
<td>Telemedicine Journal and e-Health</td>
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<tr>
<td>YEAR</td>
<td>2022</td>
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<tr>
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</tr>
<tr>
<td>THEME / SUBTHEME</td>
<td>Science and Technology/ Digital Technology in Healthcare</td>
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</table>

**ABSTRACT**

**Background**

The World health organization declared the coronavirus outbreak a global pandemic on March 2020. Telemedicine was one of the effective tools that were implemented during this pandemic. Most Lebanese physicians have been using telemedicine to perform virtual medical services during the COVID19 pandemic. Therefore, it is important to assess the physicians' acceptability of telemedicine and willingness to use it in routine health care settings.

**Objective**

We developed and validated a tool based on technology acceptance model (TAM) to explore the acceptance of telemedicine use during the pandemic among Lebanese physicians.

**Theoretical Background**

Telemedicine Acceptance Model during Pandemic (TeAM) was developed based on TAM. The model was developed considering the associations between constructs affecting the physicians' attitudes about telemedicine use. TeAM is a tool assessing telemedicine acceptance based on the TAM. It has additional constructs tackling the perceived risks of telemedicine use, the perceived need for policies, the perceived need for training, and the perceived usefulness of telemedicine during a pandemic.

**Methods**

This cross-sectional study was conducted online through an email-based questionnaire sent to physicians enrolled in the Lebanese Order of Physicians.

**Results**

Three hundred ninety physicians (n = 390) completed the survey. The tool was structured to test 10 hypotheses, out of which 9 were supported. The Cronbach’s alpha score of each construct ranged between 0.745 and 0.905, all greater than 0.7 indicating an acceptable to excellent internal consistency.

**Conclusion**

This study was able to validate TeAM as a reliable tool that can assess the acceptance of telemedicine among physicians. Accordingly, several determinants influencing this acceptance were identified. Practice implications include hospitals, primary health care centers, and national health care systems willing to adopt telemedicine can use TeAM to assess the physicians' willingness to accept the implementation of telemedicine in their practice.
**Future Healthcare Providers and Professionalism on Social Media: A Cross-Sectional Study**

**Author(s)**: Soubra R., Hasan I., Ftouni L., Saab A., Shaarani I.

**Journal**: BMC Medical Ethics

**Year**: 2022

**DOI**: 10.1186/s12910-022-00742-7

**ABSTRACT**

**Background**

Nowadays, social media have become central in the daily lives of people, including healthcare professionals. Fears arise that the accelerated growth of these social platforms was not accompanied by the appropriate training of the healthcare students and workers on the professional use of social media. This study primarily aimed to assess the awareness of the healthcare students at Beirut Arab University, Lebanon on the professional standards of social media. It also aimed to assess the presence of differences in the practices and attitudes of healthcare students according to gender and major.

**Methods**

A cross-sectional study was designed, and a paper-based questionnaire was distributed to healthcare students. Chi-Square test was used to analyse certain findings.

**Results**

Out of 1800 students approached, 496 participated in the questionnaire. All participants used social media. Only 19.5% (96/496) of them had received a structured education on the professional use of social media during their university study. The majority of students (349/488, 71.5%) thought that the professional standards on social media are distinct from those established in face-to-face interactions. Female students were more likely to get adequate answers in accordance with international guidelines. There were statistically significant differences in the practices and attitudes of students belonging to different majors (p value <0.05).

**Conclusion**

The line between what is professional on social media, and what is not, remains blurred for healthcare students. This study uncovered the need for clear and updated evidence-based guidelines assisting students in making the most appropriate decisions in the various online scenarios faced in healthcare practice.

**Infraclavicular Lymphadenopathy After COVID-19 Vaccine in a Young Patient**

**Author(s)**: Taleb R., Oueidat H., Mahmoud F., Khawandi J., Oueidat Y.

**Journal**: Infectious Diseases in Clinical Practice

**Year**: 2023

**DOI**: 10.1097/IPC.0000000000001170

**ABSTRACT**

At the end of 2019, the first cases of COVID-19 were identified in Wuhan, China in the form of cluster pneumonia cases, causing an epidemic at the level of the country. Due to the rapid spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), COVID-19 shortly turned into a worldwide pandemic. A wide range of multisystem complications have arisen from this novel virus, including thromboembolic, cardiac, neurological and gastrointestinal events, contributing to a high rate of morbidity and mortality, and jeopardizing the societies at the medical, social and economic levels. This global crisis has prompted researchers and pharmaceutical companies to put unremitting efforts in developing safe and effective vaccines in record time. Messenger RNA vaccines (Pfizer-BioNTech and Moderna) were the first to be approved by the United States Food and Drug Administration. However, there are ongoing emerging side effects of these vaccines, with the most common reported ones being headache, fever, pain at the injection site, and myalgia. Lymphadenopathy, however, was not as commonly mentioned in the literature. We report a case of a 21-year-old woman who presented to the family medicine outpatient clinic for infraclavicular lymphadenopathy, which she noticed 11 days after taking the first dose of the Pfizer-BioNTech vaccine.
Knowledge and Attitude Towards Dysmenorrhea Among Health Professions Students: A Cross-sectional Study from Lebanon

Universal Journal of Public Health

2023

11(4): 430-440

Health and Wellbeing/ Women and Health

Dysmenorrhea is a prevalent condition that has physical, psychological, and social impacts on females. Although it is mostly perceived as a healthy part of a well-functioning reproductive system, it may indicate underlying pathologies. Nevertheless, dysmenorrhea's acknowledgement and discussion are culturally frowned upon, particularly among men in different communities. This study aims to assess the knowledge and attitude of health professions students, both males and females, at Beirut Arab University (BAU) regarding dysmenorrhea. Using a cross-sectional study, 493 students in the health professions faculties at BAU participated in the survey. The health professions faculties included medicine, dentistry, pharmacy, and health sciences (nursing, medical laboratory, physical therapy, nutrition). It was conducted during the period extending from September 2019 till February 2021. Results show 84% of participants were females and 16% were males. Females had a mean score of knowledge (14.31 +/-3.13) out of 24 that was significantly higher than males (12.75 +/- 4.54). The most chosen sources of knowledge about dysmenorrhea were the Internet (57.4%), mothers (47.9%), and schools (47.3%). The correlation between age and knowledge showed that as age increases, knowledge increases (r=0.244). All Participants had a negative attitude towards discussing menstrual symptoms with strangers or friends publicly. Our study also revealed that the majority of participants would discuss menstruation and menstrual pain with their future daughters. Unfortunately, the perception of dysmenorrhea as a topic that should not be discussed openly has led to poor knowledge regarding dysmenorrhea and even caused misconceptions. This is even more seen in males especially in Middle Eastern countries that tend to be more conservative.
I. PUBLICATIONS

ARTICLES

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Hussein S., Aboelsaad N., Hussein N., Ghanem L., Fouad M.</th>
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<tr>
<th>ARTICLE TITLE</th>
<th>Clinical and Radiographic Evaluation of Crown Margin Shifting Concept: A New Technique for Re-establishing the Biological Width</th>
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<tr>
<td>JOURNAL</td>
<td>Egyptian Dental Journal</td>
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<td>YEAR</td>
<td>2023</td>
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<td>PUBLICATION INFO</td>
<td>69(1): 697-704</td>
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<td>THEME / SUBTHEME</td>
<td>Health and Wellbeing/ Esthetics and Oral Rehabilitation</td>
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</table>

**ABSTRACT**

**Objective**
To evaluate an innovative approach, Crown Margin Shifting (CMS), for its ability to re-establish the biological width (BW) or supracrestal tissue attachment.

**Clinical Considerations**
Seven patients aged between 25-45 years old, presented with bilateral maxillary premolars with deep interproximal caries violating the BW were recruited for this study. Both study sites received monolithic zirconia crowns with heavy chamfer finish line. The heavy chamfer is thicker and with bevel on the deepest part of experiment site. Clinical parameters were evaluated at baseline, 6 and 12 months after. Radiographic evaluation using CBCT was done to measure marginal bone loss (MBL) and the established BW at the deep proximal finish line.

**Results**
Results revealed significant improvement in Modified Plaque Index (MBI) and Gingival Index (GI) parameters in both sites at the end of the study. The Periodontal Probing Depth (PPD) increased significantly in the first 6 months only for both. The marginal bone loss (MBL) was present in control site throughout the 12 months, whereas in CMS site, it took place only in the first 6 months.

**Conclusions**
The results support that CMS approach had less radiographic marginal bone loss without a negative influence on the clinical parameters up to one year follow-up.
Clinical, Radiographic, and Histological Evaluation of the Mineralized Plasmatic Matrix/Xenograft Mixture in Maxillary Sinus Floor Augmentation (A Randomized Controlled Clinical Trial)

European Journal of Dental and Oral Health

2023

4(2): 7-13

Health and Wellbeing/ Oral Health Related Quality of Life

Introduction
Maxillary sinus pneumatization and alveolar ridge resorption following the extraction of posterior teeth make the installation of dental implants in the maxillary posterior region challenging. The direct sinus lift procedure proved to be a viable treatment option for such conditions. Aim of the study: to evaluate the mineralized plasmatic matrix/xenograft mixture in sinus elevation surgery.

Materials and Methods
Eighteen patients were selected and randomly allocated into two groups; study group received a mineralized plasmatic matrix/xenograft mixture, while the control group received xenograft alone following sinus lifting.

Results
The early wound healing index score showed a non-significant difference between both groups. Also, bone height was evaluated at the 6-month follow-up period, and there was a non-statistically significant difference. Core biopsies were taken for histological examination by H&E from both groups, revealing the presence of a more mature bone matrix in relation to the test group.

Conclusion
The addition of mineralized plasmatic matrix to xenograft can speed up bone formation, thus reducing treatment duration.

Effectiveness of Platelet-Rich Fibrin with Beta Tri-calcium Phosphate Plus Calcium Sulfate on Periodontal Intrabony Defect Management (Randomized Controlled Clinical Study)

BAU Journal-Creative Sustainable Development

2022

4(1): 1-11

Creative Sustainable Development/ Sustainable Development Dentistry

The purpose of this study is to evaluate the effectiveness of beta tri-calcium phosphate plus calcium sulfate mix, with or without platelet rich fibrin in reducing probing periodontal pockets clinically and defect depths radiographically, while increasing clinical attachment levels to reconstruct intrabony defects in human clinical trials. Materials and Methods: Sixteen participants with periodontal intrabony defects ≥ 5 mm were divided into two equal groups. The first eight intrabony defects in study group received platelet rich fibrin mixed with EthOss®; while the eight remaining intrabony defects in control group were reconstructed only with EthOss® synthetic bone substitute. Friedman ANOVA and Mann-Whitney tests were chosen for intra-group and inter-group comparisons, respectively. Results: Final outcomes revealed statistically significant decrease in periodontal pocket depth and defect depth values (P < 0.05) with a statistically significant clinical attachment level gain in study and control groups. Precisely, mean values of all measured categories were greater in study rather than control group participants, as confirmed clinically by William’s probe and radiographically by cone-beam computed tomography at 6 months after surgery. Conclusion: Adding PRF to β-TCP plus CS is highly effective in inducing new periodontal soft and hard tissue synthesis resulting in better clinical and radiographic outcomes when surgically incorporated in periodontal intrabony defect(s).
Evaluation of Implant Site Preparation with Piezosurgery Versus Conventional Drills in Terms of Operation Time, Implant Stability and Bone Density (Randomized Controlled Clinical Trial- Split Mouth Design)

BMC Oral Health

2022

DOI: 10.1186/s12903-022-02613-4

Health and Wellbeing/ Oral Health Related Quality of Life

Background
The preparation of the implant bed has a major influence on the success rate and long-term survival of dental implants. Piezoelectric devices and special implant drilling inserts are now emerging to replace conventional drills showing improved bone response and healing around implants. The purpose of this study is to compare the piezoelectric inserts versus the traditional drills for implant site preparation.

Methods
Twelve male patients who received a total of twenty-four dental implants have been selected to participate in this split-mouth clinical trial. Each patient received two implants; one installed after piezosurgery assisted osteotomy, while the contralateral side received the implant with the original drilling protocol. The timing of surgery, implant stability, and bone density around the installed dental implants have been evaluated during a follow-up period extended to 4 months.

Results
A significant difference in terms of time of surgery (p < 0.005) and in implant stability at 4 months (p = 0.024) on the study side, while a non-statistical significance in terms of bone density was detected (p = 0.468).

Conclusion
The piezoelectric implant site drilling protocol seemed to be a reliable and repeatable technique. Despite the limited sample size and lengthier operative time, the piezoelectric inserts enhanced bone quality and implant stability.
### I. PUBLICATIONS

#### ARTICLES

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<tr>
<th>ARTICLE TITLE</th>
<th>Abdominal Fat Characteristics and Mortality in Rectal Cancer: A Retrospective Study</th>
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<tr>
<td>JOURNAL</td>
<td>Nutrients</td>
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<td>YEAR</td>
<td>2023</td>
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<td>PUBLICATION INFO</td>
<td>15(2): 374-386</td>
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<td>THEME / SUBTHEME</td>
<td>Health and Wellbeing/ Prevention and Health Promotion</td>
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<td>ABSTRACT</td>
<td>The aim of this study was to evaluate the association of adipose tissue characteristics with survival in rectal cancer patients. All consecutive patients, diagnosed with stage II-IV rectal cancer between 2010-2016 using baseline unenhanced Computed Tomography (CT), were included. Baseline total, subcutaneous and visceral adipose tissue areas (TAT, SAT, VAT) and densities (TATd, SATd, VATd) at third lumbar vertebra (L3) were retrospectively measured. The association of these tissues with cancer-specific and progression-free survival (CCS, PFS) was assessed by using competitive risk models adjusted by age, sex and stage. Among the 274 included patients (median age 70 years, 41.2% females), the protective effect of increasing adipose tissue area on survival could be due to random fluctuations (e.g., sub-distribution hazard ratio-SHR for one cm² increase in SAT = 0.997, 95% confidence interval-CI = 0.994-1.000; p = 0.057, for CSS), while increasing density was associated with poorer survival (e.g., SHR for one Hounsfield Unit-HU increase in SATd = 1.03, 95% CI = 1.01-1.05, p = 0.002, for CSS). In models considering each adipose tissue area and respective density, the association with CSS tended to disappear for areas, while it did not change for TATd and SATd. No association was found with PFS. In conclusion, adipose tissue density influenced survival in rectal cancer patients, raising awareness on a routinely measurable variable that requires more research efforts.</td>
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</table>

* Names in Bold Indicate BAU Authors
**Approaching Sarcopenic Obesity in Young and Middle-Aged Female Adults in Weight Management Settings: A Narrative Review**

**Healthcare (Switzerland)**

**2022**

**DOI: 10.3390/healthcare10102042**

**Health and Wellbeing/ Prevention and Health Promotion**

This paper presents a review of the available literature on sarcopenic obesity (SO) in young and middle-aged female adults with obesity in weight management settings. A literature review using the PubMed/Medline and Science Direct databases was conducted, and the data were summarized through a narrative approach. Firstly, some physical performance tests and questionnaires are available for screening young and middle-aged female adults with a high risk of SO. Secondly, these patients can undergo instrumental measurements such as dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA) to confirm or reject a diagnosis of SO, applying definitions that account for body mass. Thirdly, SO is a prevalent phenotype in females seeking weight management treatment, as well as being strongly associated (vs. non-SO) with obesity-related comorbidities that need to be promptly managed, initially with nutritional programs or/and in combination with medications. Finally, patients with SO have a reduced baseline resting energy expenditure and more sedentary behaviors, which seem to account for the relationship between SO and poorer weight management outcomes, such as a higher early dropout rate and major later difficulties in weight loss maintenance. Therefore, specific strategies for personalized weight management programs for patients with SO should be incorporated to determine a successful management of this phenotype.

**Autoantibodies, Clinical Phenotypes and Quality of Life in Lebanese Patients with Myasthenia Gravis**

**Intractable and Rare Diseases Research**

**2023**

**12(2): 122-125**

**Health and Wellbeing/ Illness and Therapy**

Myasthenia gravis (MG) is a rare autoimmune disease that affects the neuromuscular junction. It is characterized by the production of heterogeneous autoantibodies that bind to the neuromuscular junction and alter neural transmission. Recently, more attention was given to MG-related antibodies and their clinical influence. In Lebanon, studies about MG are very rare. To date, there is still no research on the different autoantibodies developed by Lebanese MG patients. We conducted a study aimed at detecting the prevalence of different antibodies in a group of seventeen Lebanese patients with MG, and exploring their associations with clinical phenotypes and quality of life (QoL). MG antibody test in Lebanon is restricted only to two antibodies: acetylcholine receptor (anti-AChR) and muscle-specific kinase (anti-MUSK) antibodies. Results showed that 70.6% of patients were anti-AChR positive and all of them were anti-MUSK negative. Association between MG serological profiles, clinical outcomes and QoL was not significant. Together, current findings suggest that anti-MUSK antibody is not common and difference in antibody profile may not change the clinical phenotypes and QoL of MG Lebanese patients. In the future, it is recommended to check also for autoantibodies other than anti-AChR and anti-MUSK, which may reveal new antibody profiles and possible associations with clinical outcomes.
COVID-19 and Fungal Infections: A Double Debacle

**ARTICLE TITLE**
COVID-19 and Fungal Infections: A Double Debacle

**JOURNAL**
Microbes and Infection

**YEAR**
2022

**PUBLICATION INFO**
DOI: 10.1016/j.micinf.2022.105039

**THEME / SUBTHEME**
Health and Wellbeing/ Illness and Therapy

**ABSTRACT**
Fungal infections remain hardly treatable because of unstandardized diagnostic tests, limited antifungal armamentarium, and more specifically, potential toxic interactions between antifungals and immunosuppressants used during anti-inflammatory therapies, such as those set up in critically ill COVID-19 patients. Taking into account pre-existing difficulties in treating vulnerable COVID-19 patients, any co-occurrence of infectious diseases like fungal infections constitutes a double debacle for patients, healthcare experts, and the public economy. Since the first appearance of SARS-CoV-2, a significant rise in threatening fungal co-infections in COVID-19 patients has been testified in the scientific literature. Better management of fungal infections in COVID-19 patients is, therefore, a priority and requires highlighting common risk factors, relationships with immunosuppression, as well as challenges in fungal diagnosis and treatment. The present review attempts to highlight these aspects in the three most identified causative agents of fungal co-infections in COVID-19 patients: Aspergillus, Candida, and Mucorales species.

COVID-19 Quarantine Stressors and Management Among Lebanese Students: A Qualitative Study

**ARTICLE TITLE**
COVID-19 Quarantine Stressors and Management Among Lebanese Students: A Qualitative Study

**JOURNAL**
Current Psychology

**YEAR**
2022

**PUBLICATION INFO**
41(11): 7628-7635

**THEME / SUBTHEME**
Health and Wellbeing/ Prevention and Health Promotion

**ABSTRACT**
The aim of this research paper is to examine the current situation, emotional reactions of university students and their coping mechanisms during and after the COVID-19 quarantine. The study was undertaken in a major higher education institution in Lebanon. An exploratory qualitative research design was adopted. A phenomenological qualitative method was employed where, semi-structured interviews were carried out among 20 university students during and 3 months after release from quarantine. The qualitative analysis have revealed 5 themes during quarantine period namely "Concerns regarding learning and evaluation methods", "Overwhelming load", "Dealing with technical difficulties", "Confinement", and "Coping with problems", in addition to 3 themes after the quarantine period namely "Relief of academic stress", "Fear of becoming infected and jeopardizing family health", "Stigma of being infected". The quarantine has inflicted multiple psychological challenges among university students, which should be highlighted and mediated by higher education institution in order to support the students' learning and their academic achievement.

Detection and Risk Associated with Organochlorine, Organophosphorus, Pyrethroid and Carbamate Pesticide Residues in Chicken Muscle and Organ Meats in Jordan

**ARTICLE TITLE**
Detection and Risk Associated with Organochlorine, Organophosphorus, Pyrethroid and Carbamate Pesticide Residues in Chicken Muscle and Organ Meats in Jordan

**JOURNAL**
Food Control

**YEAR**
2023

**PUBLICATION INFO**
DOI: 10.1016/j.foodcont.2022.109355

**THEME / SUBTHEME**
Health and Wellbeing/ Illness and Therapy
The aims of this study were to: i) analyze the prevalence and concentration of pesticides belonging to 4 major classes, namely organochlorines, organophosphates, carbamates and pyrethroids in chicken meat, liver and kidney; ii) evaluate the impact of boiling, frying and freezing on pesticide levels in chicken meat, and iii) estimate the dietary exposure to pesticide residues in chicken meat and conduct a risk assessment. Liquid chromatography-mass spectrophotometry (LC – MS/MS) was used to determine the concentrations of pesticide residues in samples. A total of 300 domestic (local) and imported samples were collected from the marketplace in Jordan. About 2.3%, 48.3%, 83%, and 44.3% of the samples exceeded MRLs for the organochlorine, organophosphorus, carbamate and pyrethroid pesticide groups, respectively. About 90% of the local and imported muscle samples and almost all the local and imported liver samples contained one or more pesticide above the MRL. Among all the samples tested, two pesticides, namely deltamethrin and fenoxycarb, occurred in high concentrations. Domestic samples were observed to have higher concentrations of pesticides compared to their imported counterparts. The pesticides concentrations decreased by about 50, 75 and 15% after boiling, frying and freezing, respectively. Risk assessment has shown that there is no potential risk from consuming chicken meat, however, local chicken meat is of more concern than is imported product. This study will help food control authorities develop appropriate regulations regarding the use of pesticides in Jordan.

Objective
This study was conducted in order to investigate in depth the association between components of the Mediterranean diet (MD) and health-related quality of life (HRQoL), along with its different subscales, among Lebanese adolescent students attending schools in Tripoli, North Lebanon.

Methods
A cross-sectional survey was undertaken among 798 teenagers aged 11 to 18. All responded to a questionnaire that evaluated their HRQoL, sociodemographic characteristics and adherence to the Mediterranean diet.

Conclusion
Our results suggest a strong correlation between MD adherence and HRQoL in Lebanese adolescents. However, future studies are warranted in order to strengthen the evidence of this association.

Author(S)  Guglielmi V., El Ghoch M., Bettini S., Holly J.

ABSTRACT

The COVID-19 pandemic is reaching its third year and at the time of writing, approximately 641,900,000 people have been infected and over 6,622,000 deaths have been registered. Importantly, approximately 50% of deaths related to COVID-19 have been in people with co-existing vascular and metabolic disorders [1]. Among these, in addition to advancing age, a significant contributor to poorer outcomes is the coexistence of the SARS-CoV-2 infection with obesity. Thanks to the development of vaccines and improved therapeutic approaches, daily global deaths have been markedly reduced. However, further pandemic spikes may be expected as virus mutation occurs, as shown by the rapid spread of the more recent SARS-CoV-2 variants, the waning of vaccine effectiveness, vaccination hesitancy and impaired immune responses. From this perspective, it remains crucial to continue to identify and understand the susceptibility of at-risk populations. The present Research Topic, including eight review articles (three systematic reviews and metanalyses), five original papers, one brief research report and one opinion article, revisits some of the most important aspects of COVID-19 in people living with obesity, and summarizes the main insights into the field, collected during the early and more aggressive phases of the pandemic. By analysing data relating to the hospitalizations of 176,137 patients throughout Germany, with a confirmed COVID-19 infection in 2020, Keller et al. found that patients with obesity were at increased risk of major adverse cardio- and cerebrovascular events, acute respiratory distress syndrome (ARDS), venous thromboembolism, intensive care unit (ICU) admission, mechanical ventilation and extracorporeal membrane oxygenation.

Author(S)  Mitri R., Khalife S., Ziade F.

ARTICLE TITLE  Determinants of Health-Related Quality of Life Among Adolescents: The Role of the Mediterranean Diet

JOURNAL  Revue d’Epidemiologie et de Sante Publique

YEAR  2023

PUBLICATION INFO  DOI: 10.1016/j.respe.2023.102148

THEME / SUBTHEME  Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT
The aims of this study were to: i) analyze the prevalence and concentration of pesticides belonging to 4 major classes, namely organochlorines, organophosphates, carbamates and pyrethroids in chicken meat, liver and kidney; ii) evaluate the impact of boiling, frying and freezing on pesticide levels in chicken meat, and iii) estimate the dietary exposure to pesticide residues in chicken meat and conduct a risk assessment. Liquid chromatography-mass spectrophotometry (LC – MS/MS) was used to determine the concentrations of pesticide residues in samples. A total of 300 domestic (local) and imported samples were collected from the marketplace in Jordan. About 2.3%, 48.3%, 83%, and 44.3% of the samples exceeded MRLs for the organochlorine, organophosphorus, carbamate and pyrethroid pesticide groups, respectively. About 90% of the local and imported muscle samples and almost all the local and imported liver samples contained one or more pesticide above the MRL. Among all the samples tested, two pesticides, namely deltamethrin and fenoxycarb, occurred in high concentrations. Domestic samples were observed to have higher concentrations of pesticides compared to their imported counterparts. The pesticides concentrations decreased by about 50, 75 and 15% after boiling, frying and freezing, respectively. Risk assessment has shown that there is no potential risk from consuming chicken meat, however, local chicken meat is of more concern than is imported product. This study will help food control authorities develop appropriate regulations regarding the use of pesticides in Jordan.
### Editorial: Risk Assessment of Mycotoxins in Food

**Author(s):** El Darra N., Grim N., Watson I., El Khoury A.

**Article Title:** Editorial: Risk Assessment of Mycotoxins in Food

**Journal:** Frontiers in Nutrition

**Year:** 2023

**Publication Info:** DOI: 10.3389/fnut.2023.1145998

**Theme/Subtheme:** Science and Technology/ Food Technology and Processing

**Abstract:**
Mycotoxins are natural food and feed contaminants produced as secondary metabolites of filamentous fungi with known toxic and carcinogenic effects. Food crops are prone to fungal contamination in the pre-harvest and at storage, especially during poor agricultural and storage practices. Therefore, the risk of contamination with mycotoxins can occur during cultivation, processing, transportation, or storage.

### Editorial: The Genetics of Inherited Retinal Diseases in Understudied Ethnic Groups: Novel Associations, Challenges, and Perspectives

**Author(s):** Desouki M., Balbaa A., Gobba M., El Melhat A., Abdelsalam M.

**Article Title:** Editorial: The Genetics of Inherited Retinal Diseases in Understudied Ethnic Groups: Novel Associations, Challenges, and Perspectives

**Journal:** Frontiers in Genetics

**Year:** 2022

**Publication Info:** DOI: 10.3389/fgene.2022.990782

**Theme/Subtheme:** Health and Wellbeing/ Illness and Therapy

**Abstract:**
Inherited retinal diseases (IRDs) are a heterogeneous group of diseases affecting millions of individuals worldwide and causing the retina to degenerate, leading to blindness. These genetic anomalies are inherited in a rare Mendelian fashion and classified based on whether they affect the retina alone (non-syndromic RD) or in conjunction with other systemic disorders (syndromic RD). Among the non-syndromic forms, retinitis pigmentosa (RP), Leber congenital amaurosis (LCA), and bestrophinopathies can be distinguished. On the other hand, the most common type of syndromic IRDs are Usher and Bardet-Biedl Syndromes. The emergence of next-generation sequencing (NGS) has revolutionized the field of rare diseases.

### Effect of Lumbar Repositioning Feedback Training on Pain and Joint Position Sense in Participants with Chronic Mechanical Low Back Pain

**Author(s):** Maltese P.

**Article Title:** Effect of Lumbar Repositioning Feedback Training on Pain and Joint Position Sense in Participants with Chronic Mechanical Low Back Pain

**Journal:** Fizjoterapia Polska

**Year:** 2022

**Publication Info:** 22(4); 106-111

**Theme/Subtheme:** Health and Wellbeing/ Illness and Therapy

**Abstract:**
Objective
The aim of this study was to investigate the effect of lumbar repositioning feedback training (LRFT) on pain and joint position sense (JPS) in patients with chronic mechanical low back pain (CMLBP).

Materials and Methods
Twenty-four patients, from both genders, suffering from CMLBP were assigned randomly into 2 equal groups. The lumbar repositioning feedback training (LRFT) group received lumbar repositioning feedback training and conventional proprioception exercises on Swiss ball, and control group who received conventional proprioception exercises on Swiss ball only. Pain was assessed using visual analogue scale (VAS), and joint position sense was assessed using absolute repositioning error (ARE). All patients received treatment twice per week for 6 weeks. Assessments were carried out pre and post experimentally.

Results
Pre- post treatment evaluations comparisons showed improvement of pain and joint position sense post- treatment compared to pre-treatment within both groups. However, pre-treatment between groups comparisons were non-significant, with significant post-treatment improvements of pain and joint position sense in favor of LRFT compared to control group.

Conclusion
Patients in LRFT group showed significant pain reduction and improvement in joint position sense in patients with CMLBP.

Specifically, whole-exome sequencing (WES) has been a game-changer, revealing a sizable amount of novel genotype-phenotype association. Despite that over 260 genes have been identified so far, a sizable fraction (30%) remains missing. In addition, most genetic associations and gene prevalence data were reported in Western European, North American, and East Asian populations, with no evidence of replication in other ethnicities. Furthermore, a substantial difference in the genetic causes of IRDs exists across the different patients’ cohorts. Therefore, to draw a broader conclusion, there is a need to investigate the genetics of IRDs in the understudied ethnicities and analyze their research output and productivity.
ARTICLE TITLE | Factors Associated With Sleep Quality And Duration Among Beirut Arab University Students
---|---
JOURNAL | BAU Journal-Health and Wellbeing
YEAR | 2022
PUBLICATION INFO | 5(1): 1-18
THEME / SUBTHEME | Health and Wellbeing/ Prevention and Health Promotion
ABSTRACT | Sleep is part of the everyday physiological rhythm that is vital for enhancing wellness and appropriate body functions. University students are vulnerable to sleep disturbance due to many factors that affect their sleep–wake behaviour. No study has so far evaluated the association between sleep quality and duration and the health and nutritional status of Lebanese college students. Thus, the present study was designed to evaluate the sleep quality and duration of Beirut Arab University (BAU) students in North Lebanon and to examine associations with their nutritional status, sociodemographic, eating behaviors, lifestyles and health characteristics. To do so, a cross-sectional study was conducted among a sample of 288 students (148 males and 120 females) aged between 17 and 25 years who were registered in the Fall of 2018–2019 in Tripoli Campus, and randomly selected from the different faculties. Students completed a multi-component questionnaire. According to this study, more than half of BAU students had poor sleep quality (64.2%) and short sleep duration (71.5%). The multiple regression analysis revealed that employed students were 82% less likely to have poor sleep quality (ORadj: 0.181; 95% CI: 0.062–0.528) compared with their unemployed peers. In addition, students who consumed fast food were 50 % less likely to enjoy normal sleep duration (ORadj: 0.490; 95% CI: 0.250–0.959). Finally, male students with a higher waist circumference (≥94cm) were 4% less likely to experience normal sleep duration (ORadj: 0.961; 95% CI: 0.927–0.997).

ARTICLE TITLE | Epidemiology and Resistance Profiles of Enterobacterales in a Tertiary Care Hospital in Lebanon: A 4-year Retrospective Study
---|---
JOURNAL | Journal of Infection in Developing Countries
YEAR | 2023
PUBLICATION INFO | 17(7): 986-993
THEME / SUBTHEME | Health and Wellbeing/ Medical Education in Health Sciences
ABSTRACT | Introduction
Antimicrobial resistance (AMR) is a worldwide problem that threatens treatment effectiveness against the most serious bacterial infections. AMR in Enterobacterales is highly prevalent in Lebanon. However, recent reports regarding the distribution of Enterobacterales and related antimicrobial susceptibility are scarce.

Methodology
In this retrospective study at the Lebanese Hospital Geitaoui Medical Center in Lebanon, all data regarding culture specimens from urine, blood, sputum, deep tracheal aspirate, broncho-alveolar lavage, wounds, surgical sites, tissue, body fluids, and central venous catheter that were positive for at least one of the 4 bacterial isolates (Escherichia coli, Klebsiella pneumoniae, Enterobacter cloacae and Proteus mirabilis) were collected. All susceptibility testing was performed according to the Clinical and Laboratory Standards Institute guidelines.

Results
A total of 4283 non-duplicate Enterobacterales were isolated during the study period (January 2017 to December 2020). Urine was the most common site of infection. E. coli was the most detected isolate as well as the leading pathogen in urine, wounds and surgical sites, and blood. Regarding antimicrobial susceptibility, the mean susceptibility to third generation cephalosporins was 55.53% and a mean extended-spectrum β-lactamases production of 31.2% was measured in E. coli. Mean carbapenem susceptibility was the lowest in K. pneumoniae and E. cloacae. The lowest mean susceptibility to fluoroquinolones was detected in E. coli isolates.

Conclusions
This study identified the predominance of E. coli among Enterobacterales in Lebanese patients, with the urinary tract being the most common site of infection and underlined the high rates of AMR in Enterobacterales in Lebanon.
### Food Safety Practices Among Food Carts in North Lebanon

**ARTICLE TITLE**  
Food Safety Practices Among Food Carts in North Lebanon

**JOURNAL**  
BAU Journal-Health and Wellbeing

**YEAR**  
2022

**PUBLICATION INFO**  
4(2): 1-15

**THEME / SUBTHEME**  
Health and Wellbeing/ Illness and Therapy

**ABSTRACT**  
Street food carts serve different types of popular and traditional foods; it is a common economic sector worldwide. In North Lebanon, food carts are mobile or centered in specific places serving common and well-known RTE meals. In addition, the increasing incidence of foodborne illnesses associated with street foods sheds light on the importance of inspecting the practices of street vendors. Therefore, the aim of this study is to assess the food safety in 30 food carts using an observational checklist and to perform microbiological analysis for the detection of foodborne pathogens namely; yeast, mold, Listeria monocytogenes, Salmonella, Enterohemorrhagic E.coli, B-glucuronidase E.coli, Enterobacteriaceae and Clostridium perfringens in 10 samples of orange juice, 10 samples of cheese cake and 10 samples of meat shawarma; moreover to investigate the prevalence of Methicillin-resistant Staphylococcus aureus in RTE foods and street vendor’s hands. Out of 30 vendors, 100% were males, 80% with an age between 25-44, 80% of them had less than high school level and 66.7% had fixed stalls. When vendors were observed for food safety practices, 70% and 86.7% of them did not store raw materials separately nor in suitable form respectively, 43.5% cleaned their carts monthly, 96% shared utensils between many types of food, 70% did not clean the counter top surface before starting food preparation; moreover 96%, 76 % and 83% of vendors were not wearing net, gloves nor an appropriate uniform, respectively. Results showed that all tested samples were contaminated with at least one of the tested foodborne pathogens, unsatisfactory levels of yeast and mold were recorded in 10 and 9 orange juice samples, respectively. On the other hand, B-glucuronides E.coli exceeded standard limit in two samples of RTE food, one shawarma sample did not meet standard with respect to C. perfringens. Remarkably, unsatisfactory levels of S. aureus were detected in 55 % of RTE samples and in 30 % of vendor’s hands. S. aureus strains were susceptible to at least one of the used antibiotics, accordingly one isolated from vendor’s hand is considered as MRSA. Therefore, the unsatisfactory levels of yeast, mold and S. aureus in tested samples were induced by vendor’s violation of food safety practices. Consequently, the current proposes to improve the legislation needs to provide safe food for the end consumer.

### Global Impacts of COVID-19 on Lifestyles and Health and Preparation Preferences: An International Survey of 30 Countries

**ARTICLE TITLE**  

**JOURNAL**  
Journal of Global Health

**YEAR**  
2023

**PUBLICATION INFO**  
DOI: 10.7189/jogh.13.06031

**THEME / SUBTHEME**  
Health and Wellbeing/ Illness and Therapy

**ABSTRACT**  
Background  
The health area being greatest impacted by coronavirus disease 2019 (COVID-19) and residents’ perspective to better prepare for future pandemic remain unknown. We aimed to assess and make cross-country and cross-region comparisons of the global impacts of COVID-19 and preparation preferences of pandemic.  

**Methods**  
We recruited adults in 30 countries covering all World Health Organization (WHO) regions from July 2020 to August 2021. 5 Likert-point scales were used to measure their perceived change in 32 aspects due to COVID-19 (-2 = substantially reduced to 2 = substantially increased) and perceived importance of 13 preparations (1 = not important to 5 = extremely important). Samples were stratified by age and gender in the corresponding countries. Multidimensional preference analysis displays disparities between 30 countries, WHO regions, economic development levels, and COVID-19 severity levels.
ABSTRACT

Heart Failure in Lebanon: A Review of the Literature

Author(s) Deek H., Massouh A., Davidson P.

ARTICLE TITLE High Frequency and Molecular Characterization of ESBL-Producing Enterobacteriaceae Isolated from Wound Infections in North Lebanon

Author(S) Hamwi A., Salem-Sokhn E.

ARTICLE TITLE Heart Failure in Lebanon: A Review of the Literature

JOURNAL Jurnal Keperawatan Indonesia

YEAR 2022

PUBLICATION INFO 25[1]: 17-31

THEME / SUBTHEME Health and Wellbeing/ Illness and Therapy

ABSTRACT

This research aimed to provide a comprehensive overview of the current literature on heart failure (HF) management in Lebanon and identify the implications for policy, practice, education, and research. The design of this research was a systematic review following preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Databases were searched using the search terms “heart failure” and “Lebanon” and associated MeSH terms. The abstracts of the selected articles were examined independently by two researchers; the sample characteristics, HF indices, and results of the included studies were extracted. Key findings and trends were synthesized. Eleven papers were reviewed with 2,774 participants (mean age = 57.98, SD = 13.09 years, and the majority (n = 1,494, 53.85%) were male). Over one-third reported having coronary artery disease, and half had hypertension.

RESULTS

Sixty-five papers were reviewed with 2,774 participants (mean age = 57.98, SD = 13.09 years, and the majority (n = 1,494, 53.85%) were male). Over one-third reported having coronary artery disease, and half had hypertension.

ABSTRACT

The mean ejection fraction was 47.28% (SD = 10.44), and the mean length of hospital stay was 7.97 days (SD = 10.28). Self-care was a common theme showing varying but low scores, especially in the self-management subscale. The findings of this study outline the unique characteristics of the population with HF in a Middle Eastern country. These characteristics should be considered when planning interventions in countries facing geopolitical instability in the context of population aging and the rise of noncommunicable diseases.

Conclusions

Global increasing sitting and screen time and limiting social activities deserve as much attention as mental health. Besides, the pandemic has ushered in a notable enhancement in lifestyle of home cooking and eating, while simultaneously reducing the consumption of tobacco and alcohol. A health care system and technological infrastructure that facilitate medicine delivery, medicine prescription, and online shopping are priorities for coping with future pandemics.

ABSTRACT

Enterobacteriaceae Isolated from Wound Infections in North Lebanon

Background

Extended-spectrum beta-lactamases producing Enterobacteriaceae (ESBL-PE) represent a major problem in wound infections. Here, we investigated the prevalence and molecular characterization of ESBL-PE associated with wound infections in North Lebanon.

Research Design and Methods

A total of 103 non-duplicated E. coli and K. pneumoniae strains isolated from 103 patients with wound infections, were collected from seven hospitals in North Lebanon. ESBL-producing isolates were detected using a double-disk synergy test. In addition, multiplex polymerase chain reaction (PCR) was used for the molecular detection of ESBLs genes.

RESULTS

E. coli was the predominant bacteria (77.6%), followed by K. pneumoniae (22.3%). The overall prevalence of ESBL-PE was 49%, with a significantly higher rate among females and elderly patients. K. pneumoniae was the common MDR and ESBL-producer bacteria (86.95% and 52.17%) compared to E. coli (77.5% and 47.5%). Most of the isolated ESBL producers harbored multiple resistant genes (88%), where blaCTX-M was the most predominant gene (92%), followed by blaTEM (86%), blaSHV (64%), and blaOXA genes (28%).

Conclusions

This is the first data on the ESBL-PE prevalence associated with wound infections in Lebanon, showing the emergence of multidrug-resistant ESBL-PE, the dominance of multiple gene producers, and the widespread dissemination of blaCTX-M and blaTEM genes.

Conclusions

Eleven papers were reviewed with 2,774 participants (mean age = 57.98, SD = 13.09 years, and the majority (n = 1,494, 53.85%) were male). Over one-third reported having coronary artery disease, and half had hypertension.

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# High Seroprevalence of SARS-CoV-2 Antibodies in Household Cats and Dogs of Lebanon

**Author(s):** Khalife S., Abdallah M.

**ARTICLE TITLE:** High Seroprevalence of SARS-CoV-2 Antibodies in Household Cats and Dogs of Lebanon

**JOURNAL:** Research in Veterinary Science

**YEAR:** 2023

**PUBLICATION INFO:** 157: 13-16

**THEME / SUBTHEME:** Health and Wellbeing/ Prevention and Health Promotion

**ABSTRACT:** The COVID-19 pandemic has been declared in late 2019. It is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Flu-like symptoms and acute respiratory illnesses are the main manifestations of the disease. Recent studies have confirmed the susceptibility of domestic animals to SARS-CoV-2 infection. However, the seroprevalence of SARS-CoV-2 in household pets and the importance of pets in the epidemiology of this infection remain unknown. In Lebanon, there is no epidemiological data regarding SARS-CoV-2 infection in companion animals. Thus, this investigation aimed to determine the seroprevalence of SARS-CoV-2 antibodies in household pets of Lebanon during the COVID-19 pandemic. A cross-sectional study was carried out between April 2020 and February 2021. Blood samples from 145 cats and 180 dogs were collected from 12 veterinary clinics located in the North, Mount, and Beirut governorates. A validated ELISA assay was used to detect the anti-SARS-CoV-2 in the sera of the tested animals. An overall seroprevalence of 16.92% (55/325) was reported; 13.79% seroprevalence was found in cats (20/145) and 19.44% (35/180) in dogs. The young age and the cold season were significantly associated with an increased seropositivity rate to SARS-CoV-2 infection ($P < 0.01$). These results confirm the circulation of SARS-CoV-2 in household pets, in various geographical regions in Lebanon. Although, there is a lack of evidence to suggest that naturally infected pets could transmit the SARS-CoV-2 infection. Yet, owners diagnosed with COVID-19 should limit their contact with their animals during the course of the disease to curb the risk of transmission.

# Immediate Neurophysiological Effect of Electrical Stimulation via Dry Needling on H-reflex in Post Stroke Spasticity

**Author(s):** Al Amin R., Ali A., Saab I., Abbas R.

**ARTICLE TITLE:** Immediate Neurophysiological Effect of Electrical Stimulation via Dry Needling on H-reflex in Post Stroke Spasticity

**JOURNAL:** Physiotherapy Theory and Practice

**YEAR:** 2023

**PUBLICATION INFO:** DOI: 10.1080/09593985.2023.2182655

**THEME / SUBTHEME:** Health and Wellbeing/ Illness and Therapy

**ABSTRACT:** Background Many non-pharmacological interventions have been proposed for spasticity modulation in spastic stroke subjects. Objective To investigate the immediate effect of dry needling (DN), electrical stimulation (ES), and dry needling with intramuscular electrical stimulation (DN+IMES) on H-reflex in post-stroke spasticity. Methods Spastic subjects with stroke (N = 90) (55-85 years) were evaluated after 1 month of stroke onset using Modified Ashworth Scale (MAS) score $\geq 1$. Subjects were randomly allocated to receive one session of DN - Soleus (N = 30), ES - posterior lateral side of the leg with 100 Hz and 250 µs pulse width (N = 30), or DN+IMES - Soleus (N = 30). MAS, H-reflex, maximum latency, H-amplitude, M-amplitude and H/M ratio, were recorded before and after one session of intervention. Relationships for each variable within group or the difference among groups were calculated by effect size. Results Significant decrease in H/M ratio in Gastrocnemius and Soleus at post-treatment within DN group (P = .024 and P = .029, respectively), large effect size (d = 0.07 and 0.62, respectively), and DN+IMES group (P = .042 and P = .001, respectively), large effect size (d = 0.69 and 0.71, respectively). No significant differences in all variables at pre-treatment and post-treatment was recorded among ES, DN, and DN+IMES groups. Significant decrease in MAS was recorded at post-treatment compared to pre-treatment within ES group (P = .002), DN group (P = .001), and DN+IMES group (P = .001), but not significant (P > .05) among three groups at pre-treatment (P = .194) and post-treatment (P = .485). Conclusions Single session of DN, ES, and the DN+IMES can significantly modulate post-stroke spasticity by possible bottom-up regulation mechanisms.
### Inhibition of Spoilage Bacteria on Marinated Chicken by Essential Oils Under Aerobic and Vacuum Packaging

**ARTICLE TITLE**
Inhibition of Spoilage Bacteria on Marinated Chicken by Essential Oils Under Aerobic and Vacuum Packaging

**JOURNAL**
Journal of Food Science

**YEAR**
2023

**PUBLICATION INFO**
88(1): 381-390

**THEME / SUBTHEME**
Science and Technology/ Food Technology and Processing

**ABSTRACT**
"Chicken tawook" is a marinated boneless chicken entrée consumed in the Middle East. The aim of this study was to determine whether bioactive essential oil (EO) components carvacrol (CA), cinnamaldehyde (CI), and thymol (TH) would delay the growth of microorganisms causing tawook spoilage during aerobic (AP) or vacuum (VP) packed storage. The EOs at 1% and 2% were mixed individually with the marinade. The samples (10 g of chicken cubes with 1.2 g of marinade - with or without EOs) were stored in bags under AP and VP (Geryon® ) for 7 days at 4 ± 1°C and abusive conditions (10 ± 1°C). Two control samples consisting of meat chunks and tawook without EO were used. The microflora numbers were greater at 10°C than at 4°C, and the marinade worked additively with AP against anaerobes, yeast and mold (Y & M) and lactic acid bacteria. It also worked additively with VP against aerobic bacteria recovered as Pseudomonas and the total plate count. EO components were observed to decrease microbial populations by a maximum of 4 to 6 log colony-forming unit (CFU)/g depending on the type of microorganism. The combined mixture of marinade and 2% EO (CA, CI, and TH) resulted in the greatest reductions of all spoilage microorganisms at 10°C under AP on the last day of storage. Overall, VP was more effective (p < 0.05) than AP in controlling microorganisms at both 4 and 10°C. This study provides an affordable and natural alternative for extending product life.

**Practical Application**
The use of EOs in marinated chicken (tawook) is expected to help producers reduce spoilage and extend shelf-life of the product when stored at refrigeration temperatures. EOs provide a cheaper alternative and are naturally sourced. Vacuum packaging will increase the shelf-life of marinated chicken tawook and facilitate its storage and transportation.

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### In Vivo Effects of Conditioned Medium from Human Uterine Cervical Stem Cells in an Ovarian Cancer Xenograft Mouse Model

**ARTICLE TITLE**
In Vivo Effects of Conditioned Medium from Human Uterine Cervical Stem Cells in an Ovarian Cancer Xenograft Mouse Model

**JOURNAL**
Cancer Genomics and Proteomics

**YEAR**
2022

**PUBLICATION INFO**
19(5): 570-575

**THEME / SUBTHEME**
Health and Wellbeing/ Illness and Therapy

**ABSTRACT**
Background/Aim
Ovarian cancer is the most lethal of all gynecological cancers, despite advances in surgical techniques and medical treatments. During the last years, therapies based on mesenchymal stem cells and particularly their secretome (conditioned medium, CM) have emerged as promising treatments for various types of tumors.

**Materials and Methods**
In the present study, we evaluated the in vivo antitumor effect of human uterine cervical stem cell conditioned medium (hUCESC-CM) after intraperitoneal administration in an ovarian cancer mouse model.

**Results**
We found that intraperitoneal injection of hUCESC-CM in immunodeficient mice, injected fifty days previously with the human ovarian adenocarcinoma SKOV-3 cell line, significantly reduced abdominal tumor growth, and significantly increased overall survival, compared to control mice.

**Conclusion**
hUCESC-CM could be an alternative approach to intraperitoneal treatment of ovarian cancer, either administered alone and/or with conventional chemotherapy.

**ARTICLE TITLE**

**JOURNAL**

Sport TK

**YEAR**

2022

**PUBLICATION INFO**

DOI: 10.6018/sportk.537601

**THEME / SUBTHEME**

Health and Wellbeing/ Illness and Therapy

**ABSTRACT**

There is a growing interest concerning the understanding of measurements of spinal and leg alignment in patients with patellofemoral pain syndrome (PFPS). However, evaluating spinopelvic alignment in the sagittal plane with pain level, functional disability and frontal plane projection angle in women with PFPS has not been adequately addressed. The aim of the study was to identify the correlation of spinopelvic parameters with pain level, functional disability and frontal plane projection angle in women with PFPS. This was a cross-sectional study involving sixty female patients diagnosed with PFPS, with a mean age of 32±6.47. The measurements used in the study included: radiographic parameters (X-Ray), the numeric pain rating scale (NPRS), the Arabic anterior knee pain scale (AAKP/Kujala) and the 2D-FPPA. Spearman correlation analysis was conducted to evaluate the relationship between these parameters. The results of our study demonstrated a strong positive correlation of lumbar lordosis (LL) with pain level and FPPA (r=0.825, r=0.812, p=0.0001). Also, a strong positive correlation of sacral slope (SS) with pain level (r = 0.820) and FPPA (r = 0.783). Pelvic tilt (PT) showed a moderate correlation with pain level (r = 0.614) and FPPA (r = 0.605), while a weak negative correlation was found between LL, SS and PT and functional disability score (r=-0.397, r=-0.385 and, r=-0.215 p=0.002).

It was concluded that LL, SS and PT were significantly related to the pain level, functional disability and frontal plane projection angle in women with PFPS. These spinal alignments should be considered in clinical evaluation of knee-related disorders associated with PFPS.
ARTICLE TITLE: New BMI Cut-Off Points for Obesity in Middle-Aged and Older Adults in Clinical Nutrition Settings in Italy: A Cross-Sectional Study

JOURNAL: Nutrients

YEAR: 2022

PUBLICATION INFO: DOI: 10.3390/nu14224848

THEME / SUBTHEME: Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT: Obesity is a major health problem defined as an excess accumulation of body fat (BF). The World Health Organization (WHO) usually relies on a body mass index (BMI) ≥ 30 kg/m² as an indicator of obesity. Due to changes in body composition that occur across the lifespan, with an increase in BF and a decrease in lean mass, we aimed to test the validity of this BMI cut-off point for adiposity in middle-aged and older adults. This cross-sectional study, composed of 4800 adults of mixed gender aged between 40 and 80 years, included (according to the WHO BMI classification) 1087 normal-weight, 1826 overweight, and 1887 obese individuals who were referred to the Department of Biomedicine and Prevention, University of Rome “Tor Vergata”, Italy. The sample was then categorized by adiposity status based on the total BF% as measured by dual-energy X-ray absorptiometry (DXA), and the best sensitivity and specificity were attained for predicting obesity according to the receiver operating characteristic curve (ROC) analysis. In a real-world clinical setting, a new BMI cut-off point (BMI = 27.27 kg/m²) has been identified for predicting obesity in middle-aged and older adults. Obesity guidelines in Italy therefore need to be revised accordingly.

ARTICLE TITLE: Novel Dual-Function GC/MS Aided Ultrasound-Assisted Hydrodistillation for the Valorization of Citrus Sinensis By-products: Phytochemical Analysis and Anti-bacterial Activities

JOURNAL: Scientific Reports

YEAR: 2023

PUBLICATION INFO: DOI: 10.1038/s41598-023-38130-9

THEME / SUBTHEME: Science and Technology/ Food Technology and Processing

ABSTRACT: A huge-amount of citrus by-products is being wasted every-year. There is a high-need to utilize these by-products with high-efficiency. This study focuses on the essential oil (EO) isolation from the zest of Citrus sinensis (CS) by-products, using a novel dual-function gas-chromatography mass-spectrometry optimized ultrasound-assisted hydrodistillation-prototype (DF-GC/MS-HUS). The CS-EO was GC-analyzed by MS-detector (GC/MS) and optimized by flame-ionization detector (GC/FID). Ultrasound-assisted hydrodistillation (HUS) had a dual-function in CS-EO isolation by utilizing an adequate-energy to break-open the oil-containing glands, and by functioning-as a dispersing-agent to emulsify the organic-phase. The most effective DF-GC/MS-HUS optimized-conditions were isolation under 38 °C and 10 min of 28.9 Hz sonication. The main-components of CS-EO were limonene, β-myrcene, and α-pinene (81.32%, 7.55%, and 4.20%) in prototype, compared to (60.23%, 5.33%, and 2.10%) in the conventional-method, respectively. The prototype CS-EO showed natural antibacterial-potentials, and inhibited the bio-film formation by Staphylococcus aureus, Listeria monocytogenes, and E. coli more-potent than the conventional-method. Compared to conventional-method, the prototype-method decreased the isolation-time by 83.3%, lowered energy-consumption, without carbon-dioxide production, by reducing isolation-temperatures by more-than half, which protected the thermolabile-components, and increased the quantity by 2514-folds, and improved the quality of CE-EO composition and its antibacterial-potentials. Therefore, the DF-GC/MS-HUS prototype method is considered a novel green-technique that minimized the energy-utilization with higher-efficiency.
Occurrence and Risk Factors of Feline Immunodeficiency Virus (FIV) and Feline Leukaemia Virus (FeLV) in Cats of Lebanon

**ARTICLE TITLE**

A cross-sectional study was carried out between April 2020 and August 2021. Blood samples were collected from 260 household cats recruited in different clinics in North and Mount Lebanon, with the aim of determining the seroprevalence of feline immunodeficiency virus (FIV) and feline leukaemia virus (FeLV). The seroprevalence reported reached 18.84% (95% CI 0.14-0.24) and 13.84% (95% CI 0.09-0.18) for FIV and FeLV, respectively. FIV seropositivity was associated with a younger age, health and neuter status, lymphoma, lethargy, and vomiting. Furthermore, male sex, neuter status, lymphoma, anaemia, lethargy, and vomiting were significantly associated with FeLV seropositivity. This first data from Lebanon emphasizes the need for implementing preventive programmes to cope with FIV- and FeLV-associated morbidity and mortality among cats.

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Occurrence of Aflatoxins in Nuts and Peanut Butter Imported to UAE

**ARTICLE TITLE**

Nuts are an important food group that contributes to maintaining health, however, they can be a source of exposure to aflatoxins. This study was conducted from 2017 to 2021 to assess the incidence of aflatoxins in nuts and nut products imported to the UAE from 57 countries. Associations between container type and processing technique and aflatoxin levels were also analyzed. A total of 5401 samples of pistachios, peanuts, peanut butter, and mixed nuts were examined using HPLC-FLD analysis in conjunction with immunoaffinity cleanup. In nuts, non-conformity was detected in samples imported from 32 different countries. Mean aflatoxin values for the non-compliant samples ranged from 81.0 to 92.7 µg/kg in pistachios, peanuts, and mixed nuts. A significant difference (p < 0.05) was found between mean aflatoxin levels in samples of peanut butter (29.3 µg/kg) compared to the other types of nuts. Nuts packed in containers made of fabric material had the highest mean aflatoxin levels of 108.1 µg/kg, while 29.7 µg/kg was the lowest mean level and was detected in nuts packed in glass. Ground samples had the highest aflatoxin levels (158.9 µg/kg) among processed products. This report will be valuable as a reference document in developing approaches to control nut importation and for establishing procedures that prevent food safety risks due to aflatoxin exposure. A need was underlined for the regulating authority to audit companies importing nuts, ensure safe practices are in place, and establish standards to minimize contamination and prevent the need for product rejection at the border.
**ARTICLE TITLE**
Parasitic Contamination of Fresh Leafy Green Vegetables Sold in Northern Lebanon

**JOURNAL**
Pathogens

**YEAR**
2023

**PUBLICATION INFO**
12(8): 10-14

**THEME / SUBTHEME**
Health and Wellbeing/ Prevention and Health Promotion

**ABSTRACT**
Contaminated, raw or undercooked vegetables can transmit parasitic infections. Here, we investigated parasitic contamination of leafy green vegetables sold in local markets in the Tripoli district, Lebanon, during two consecutive autumn seasons (2020–2021). The study involved the microscopic examination of 300 samples of five different types of vegetables (60 samples per type) and used standardized qualitative parasitological techniques for some protozoa and helminths. The results showed that 16.7% (95% interval for p: 12.6%, 21.4%) (50/300) of the vegetable samples were contaminated with at least one parasite. The most frequently detected parasite was Blastocystis spp. (8.7%; 26/300); this was followed in frequency by Ascaris spp. (3.7%; 11/300). Among the different vegetable types, lettuce (23.3%; 14/60) was the most contaminated, while arugula was the least contaminated (11.7%; 7/60). The statistical analysis did not reveal any significant association between the prevalence of parasitic contamination and the investigated risk factors, which included collection date, vegetable type, market storage status, and wetness of vegetables at the time of purchase (p > 0.05). The high prevalence of parasitic contamination also suggested the potential presence of other microbial pathogens. These findings are important because leafy green vegetables are preferentially and heavily consumed raw in Lebanon. Thus, implementing effective measures that target the farm-to-fork continuum is recommended in order to reduce the spread of intestinal pathogens.

**ARTICLE TITLE**
Phenotypic and Molecular Characterization of ESBL Producing Escherichia coli and Klebsiella pneumoniae Among Lebanese Patients

**JOURNAL**
JAC-Antimicrobial Resistance

**YEAR**
2023

**PUBLICATION INFO**
DOI: 10.1093/jacamr/dlad074

**THEME / SUBTHEME**
Health and Wellbeing/ Medical Education in Health Sciences

**ABSTRACT**
Introduction
Antimicrobial resistance is a major public health issue worldwide and became one of the principal international healthcare crises of the 21st century. The production of ESBLs is one of the resistance mechanisms in Enterobacteriaceae, and they are increasingly detected in Escherichia coli and Klebsiella pneumoniae globally. Therefore, the aim of this study was to determine the phenotypic and molecular characteristics of ESBL-producing E. coli and K. pneumoniae among Lebanese patients.

**Methods**
A total of 152 ESBL-producing E. coli and K. pneumoniae were obtained from Geitaoui Hospital in Beirut between September 2019 and October 2020 from various clinical samples. The phenotype of ESBL producers was confirmed by a double-disc synergy test and antibiotic susceptibility was determined using the disc diffusion method. Genotypically, multiplex PCR was used to detect the ESBL genes (blaTEM, blaCTX-M and blaSHV).

**Results**
All strains were confirmed to be ESBL producers (121 isolates were E. coli and 31 isolates were K. pneumoniae). All isolates showed resistance to cefotaxime, cefuroxime, ampicillin and piperacillin. On the other hand, they showed a low susceptibility rate to trimethoprim/sulfamethoxazole and ciprofloxacin. Almost all the isolates were susceptible to ertapenem, imipenem and amikacin. In our study, ESBL genes were detected among 48 (39.67%) E. coli isolates and 8 (50.00%) K. pneumoniae isolates, and the most prevalent gene was blaTEM (25%), followed by blaCTX-M (19.08%) and blaSHV (16.45%).

**Conclusion**
Imipenem and ertapenem are the most effective drugs to treat ESBL producers. However, antibiotic stewardship programs must be implemented immediately to combat antibiotic resistance.
**ARTICLE TITLE**

Posterior Tibial Nerve Stimulation as a Neuromodulation Therapy in Treatment of Neurogenic Overactive Bladder in Multiple Sclerosis: A Prospective Randomized Controlled Study

**JOURNAL**

Multiple Sclerosis and Related Disorders

**YEAR**

2022

**PUBLICATION INFO**

DOI: 10.1016/j.msard.2022.104252

**THEME / SUBTHEME**

Health and Wellbeing/ Illness and Therapy

**ABSTRACT**

One of the major annoying disorders occurring in people with multiple sclerosis is lower urinary tract disorders (LUT). Urgency is considered the main one seriously influencing the quality of life. Neurogenic detrusor over activity (DOAB) is characterized by a hyperreflexic, overactive detrusor that responds quickly to low-intensity sensory input from general visceral afferent fibers. Overactivity has been claimed to induce random, uncontrolled contractions of the detrusor muscle, leading to intravesicular pressure rise, producing urgency, frequency, and consequently incontinence

**Aim**

To demonstrate the therapeutic efficacy for posterior tibial nerve stimulation (PTNS) in neurogenic over active bladder (NOAB) in people with multiple sclerosis

**Methods**

The current trial is a prospective, randomized controlled study. Forty remitting relapsing males with MS with moderate NOAB symptoms were randomly assigned into two equal groups; control group (C) treated by selected therapeutic exercises program for strengthening pelvic floor muscles and an intervention group (ES) receiving an additional posterior tibial nerve electrical stimulation. Each session ranged from 45- 50 minutes, three days weekly for a month. Outcome measures were recorded before starting the treatment and after termination of the study intervention and included over active bladder symptoms score (OVBS) score, urodynamic parameters (uroflow, filling and voiding cystometry), and post voiding residual volume by abdominal ultrasound

**Results**

There was a significant improvement of all voiding parameters compared to baseline and the group C except frequency of urgency incontinence. A significant decrease was detected in post-treatment mean episodes number of nighttime frequency, urgency, urgency incontinence (1.65 ± 0.93, 1.2 ± 0.52 and 1.5 ± 0.76) respectively of the ES group compared to that of group C (3.05 ± 1.09, 2.25 ± 0.71 and 2.25 ± 1.06) (P < 0.01). There was a significant decrease in median post-treatment OVBS score 3 (3-1) compared to group C median score 5 (6-4). A statistically significant improvement was observed of all urodynamic parameters (bladder capacity and compliance, Detrusor overactivity (DO), maximum flow rate and post voidal residual volume in the ES group compared to the group C

**Conclusion**

PTNS is a promising and potentially beneficial treatment option for NOAB symptoms in males with MS and superior to pelvic floor muscle training alone.

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**ARTICLE TITLE**

Quality of Honey Imported into the United Arab Emirates

**JOURNAL**

Foods

**YEAR**

2023

**PUBLICATION INFO**

DOI: 10.3390/foods12040729

**THEME / SUBTHEME**

Science and Technology/ Food Technology and Processing

**ABSTRACT**

This study was performed to assess the physicochemical quality characteristics of honey imported by the United Arab Emirates (UAE) via Dubai ports between 2017 and 2021. There were 1330 samples analyzed for sugar components, moisture, hydroxymethylfurfural (HMF) content, free acidity, and diastase number. Of the honey tested, 1054 samples complied with the Emirates honey standard, but 276 (20.8%) did not; this was due to non-compliance with one or more quality parameters, thus suggesting some level of adulteration, improper storage or inappropriate heat treatment. For the non-compliant samples, the average values of sucrose content ranged from 5.1 to 33.4%; the sum of glucose and fructose ranged from 19.6 to 88.1%; the moisture content varied from 17.2 to 24.6%; the HMF occurred in a range from 83.2 to 663.0 mg/kg, and the acidity varied from 52 to 85 meq/kg. The non-compliant honey samples were grouped according to their country of origin. India was shown to be the country having the highest percentage of non-compliant samples at 32.5% and Germany had the lowest at 4.5%. This study emphasized that the inspection of honey samples traded internationally should involve physicochemical analysis. A comprehensive inspection of honey at the Dubai ports should reduce incidents of adulterated products being imported.
Randomized Feasibility Pilot Trial of Adding a New Three-Dimensional Adjustable Posture-Corrective Orthotic to a Multi-Modal Program for the Treatment of Nonspecific Neck Pain

ARTICLE TITLE
Journal of Clinical Medicine

YEAR
2022

PUBLICATION INFO
DOI: 10.3390/jcm11237028

THEME / SUBTHEME
Health and Wellbeing/ Illness and Therapy

ABSTRACT
The aim of this study was to investigate the feasibility and effect of a multimodal program for the management of chronic nonspecific neck pain CNSNP with the addition of a 3D adjustable posture corrective orthotic (PCO), with a focus on patient recruitment and retention. This report describes a prospective, randomized controlled pilot study with twenty-four participants with CNSNP and definite 3D postural deviations who were randomly assigned to control and study groups. Both groups received the same multimodal program; additionally, the study group received a 3D PCO to perform mirror image® therapy for 20–30 min while the patient was walking on a treadmill 2–3 times per week for 10 weeks. Primary outcomes included feasibility, recruitment, adherence, safety, and sample size calculation. Secondary outcomes included neck pain intensity by numeric pain rating scale (NPRS), neck disability index (NDI), active cervical ROM, and 3D posture parameters of the head in relation to the thoracic region. Measures were assessed at baseline and after 10 weeks of intervention. Overall, 54 participants were screened for eligibility, and 24 (100%) were enrolled for study participation. Three participants (12.5%) were lost to reassessment before finishing 10 weeks of treatment. The between-group mean differences in change scores indicated greater improvements in the study group receiving the new PCO intervention. Using an effect size of 0.797, α > 0.05, β = 80% between-group improvements for NDI identified that 42 participants were required for a full-scale RCT. This pilot study demonstrated the feasibility of recruitment, compliance, and safety for the treatment of CNSNP using a 3D PCO to a multimodal program to positively affect CNSNP management.

Sero-epidemiology and Risk Assessment of Hepatitis E Virus Among Blood Donors in North Lebanon

ARTICLE TITLE
Archives of Clinical Infectious Diseases

YEAR
2023

PUBLICATION INFO
DOI: 10.5812/archcid-129115

THEME / SUBTHEME
Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT
Background
Hepatitis E virus (HEV) is the causative agent of over 50% of acute viral hepatitis cases. The blood transfusion route has emerged as a possible route of transmission of HEV.

Objectives
This study aimed to determine the seroprevalence of IgM and IgG anti-HEV among blood donors in North Lebanon and to assess the risk factors associated with its occurrence.

Methods
A cross-sectional study was conducted from November to December 2020. Blood samples were collected from 78 healthy blood donors. A standardized questionnaire containing sociodemographic, food consumption, lifestyle, and health-related characteristics, was filled out to assess the risk factors of HEV exposure. Serum samples were tested for IgM and IgG anti-HEV by an enzyme-linked immunosorbent assay (ELISA).

Results
The seroprevalence of IgM and IgG anti-HEV antibodies was reported in our study, and it reached 1.09% (1/78) and 12.82% (10/78), respectively. The use of private wells as a drinking source and the travel history to endemic countries have been identified as risk factors for HEV infections [P <0.05].

Conclusions
Our data, support the implementation of HEV antigen screening before blood donation, to reduce the risk of HEV transmission via blood transfusion.
**Article Title**: Seroprevalence and Risk Assessment of *Toxoplasma gondii* Infection in Sheep and Goats in North and Beqaa Governorates of Lebanon

**Journal**: Veterinary World

**Year**: 2022

**Publication Info**: 5(9): 2180-2185

**Theme/Subtheme**: Health and Wellbeing/Prevention and Health Promotion

**Abstract**

**Background and Aim**

Toxoplasmosis is a disease caused by the protozoan parasite *Toxoplasma gondii* that affects both humans and animals, leading to abortions and significant clinical manifestations in pregnant and immunocompromised hosts, in addition to massive economic losses in animal industries. Data from Lebanon are scarce regarding the seroprevalence of *T. gondii* infection in livestock. This study aimed to estimate the seroprevalence and assess the associated risk factors of *T. gondii* infection in sheep and goats in Lebanon.

**Materials and Methods**

A cross-sectional study was carried out from May 2020 to April 2021. Blood samples from 150 sheep and 145 goats (total 295) destined for human consumption were obtained from 20 Lebanese farms located in the North and Beqaa governorates. The anti-*T. gondii* immunoglobulin G antibodies were assayed through means of a modified agglutination test with a cutoff titer of 20.

**Results**

An overall seroprevalence of 48.5% (143/295) was reported. About 56.6% seroprevalence was found in sheep (85/150) and 40% (58/145) in goats. Adult age, female gender, and the wet season were significantly associated with an increased seropositivity rate of *T. gondii* infection (p < 0.001, p = 0.001, and p = 0.043, respectively).

**Conclusion**

These results confirm the spread of *T. gondii* in sheep and goats destined for human consumption in various geographical regions in Lebanon. Therefore, continuous monitoring of *T. gondii* infection in livestock is warranted to control the spread of the infection and limit its potential transmission to humans through the consumption of raw or undercooked meat.

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**Article Title**: The Genetic Landscape of Inherited Retinal Dystrophies in Arabs

**Journal**: BMC Medical Genomics

**Year**: 2023

**Publication Info**: DOI: 10.1186/s12920-023-01518-7

**Theme/Subtheme**: Health and Wellbeing/Illness and Therapy

**Abstract**

Inherited retinal dystrophies (IRDs) are a major cause of vision loss. Altogether are highly heterogeneous genotypically and phenotypically, exhibiting substantial differences worldwide. To shed more light on these conditions, we investigated the genetic and phenotypic landscape of IRDs in the Arabs globally and per country.

We analyzed 1,621 affected individuals from 16 Arabic countries reported in 198 articles. At the phenotypic level, rod-cone dystrophy (RCD) and Usher syndrome were the most prevalent conditions among non-syndromic and syndromic IRDs. At the gene level, *TULP1*, *ABCA4*, *RP1*, *CRB1*, *MYO7A*, *RPE65*, *KCNV2*, and *IMPG2* were the most mutated genes. Interestingly, all except *CRB1* were highly prevalent because they harbored founder mutations, implying that consanguinity is a major determinant in Arab countries. Of note, ~93% of the investigated individuals carried homozygous mutations. The country analysis for the IRDs conditions and their associated genotypes revealed that whereas Leber Congenital Amaurosis, RCD, and Usher syndrome were widely distributed, bestrophinopathies and non-syndromic hearing loss were restricted to specific countries (still now).

This study could be a starting point for initiating suitable health policies towards IRDs in the Arab world. The high degree of homozygosity urges the need for genetic counsellors to provide personalized information and support the affected individuals.
The Impact of Vaccination on the Burden of Invasive Pneumococcal Disease from a Nationwide Surveillance Program in Lebanon: An Unexpected Increase in Mortality Driven by Non-vaccine Serotypes

**Background**

The impact of pneumococcal conjugate vaccines (PCVs) on the burden of invasive pneumococcal disease (IPD) and serotype distribution was examined across age groups from data collected by the Lebanese Inter-Hospital Pneumococcal Surveillance Program.

**Methods**

Between 2005 and 2020, 593 invasive Streptococcus pneumoniae isolates were collected from 79 hospitals throughout Lebanon. Serotypes and antimicrobial resistance (AMR) profiles were identified, and trends compared over 3 eras: PCV7, post-PCV7/pre-PCV13, and PCV13 eras.

**Results**

The prevalence of PCV7 serotypes decreased significantly from 43.6% in the PCV7 era to 17.8% during the PCV13 era (p < 0.001). PCV13-only serotypes remained stable in the PCV13 compared to the post-PCV7 eras, especially serotypes 1 and 3, whereas non-vaccine types (NVT) increased throughout the study period, especially 24 and 16F. The mortality rate increased substantially from 12.5% (PCV7 era) to 24.8% (PCV13 era). A significant decrease in AMR was observed across the three study eras.

**Conclusion**

PCVs substantially impacted IPD and AMR in vaccinated and unvaccinated populations despite an increase in mortality driven by NVT. Broadening the recommendation of vaccination to include older age groups, using higher valency vaccines, and implementing stringent antimicrobial stewardship are likely to further impact the burden of IPD.

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The Impact of Virtual Reality Training with a Cognitive Load on Falling in Stroke Cases

**Background**

One of the most frequent factors in long-term impairment is stroke. The most prominent, recurrent medical side effect after a stroke is falling, with a prevalence of 14% to 73%. Hip fractures, soft tissue injuries, fear of falling, increased immobility, and disability are all possible outcomes of falling as common medical complications.

**Aim of the Study**

The current academic work seeks to trace and highlight how cognitively demanding virtual reality training decrease the chance of falling in severe stroke cases.

**Procedures**

The study encompassed a sample of thirty stroke cases, males and females, with recurrent falls and a MoCA score higher than 26. The ages of the cases covered a range between 40 to 65 years old, with a medical issue that persisted for more than six months. The control group (CG) and the study group (SG) were randomly sub-categorized into two equal study domains. A typical regime of therapeutic workouts for cases who were at risk of falling was administered to the individuals in the control domain. Cases in the study domain underwent the same treatment plan as those in the control domain, in addition to VR balance training and dual-task training utilizing the Nintendo Wii Fit system. Three sessions each week were held during the course of the four-week program. All falling variables were pre- and post-assessed for each case. Both Berg Balance Scale and the 16-item Fall scale were taken into account in the current research. The disparity in Gaming Scores for the Study domain on the International Efficacy Scale (FES-I) was calculated carefully.
The Need for COVID-19 Clinical Trials in LMICs

**ARTICLE TITLE**
The Need for COVID-19 Clinical Trials in LMICs

**JOURNAL**
Frontiers in Public Health

**YEAR**
2022

**PUBLICATION INFO**
DOI: 10.3389/fpubh.2022.1038840

**THEME / SUBTHEME**
Health and Wellbeing/ Prevention and Health Promotion

**ABSTRACT**
Since the outbreak of the COVID-19 pandemic, the disease has spread worldwide with more than 603 million confirmed cases and with a death toll surpassing 648 million as of 6 September, 2022.1 Now in its third year, the pandemic is far from finished as the virus continues to claim victims and seize lives. Despite vaccine development and success, potential emergence of SARS-CoV-2 vaccine-resistant variants as well as waning of vaccine-induced immunity, may compromise the impact of vaccines and thus necessitate the need for therapeutics that can control the disease and save lives alongside vaccines. Early in the pandemic, dexamethasone was proposed as a potential treatment for patients with severe and critical COVID-19 as it suppresses the “cytokine storm” induced by SARS-CoV-2. Given the large number of clinical studies supporting the use of dexamethasone in COVID-19 patients, the most robust evidence came from the Randomized Evaluation of COVID-19 Therapy (RECOVERY) trial conducted by researchers at Oxford University. Low dose dexamethasone (6 mg once daily) has been proven to reduce the 28-day mortality rate for COVID-19 patients on either invasive mechanical ventilation or oxygen therapy (1). On April 8, 2021, the UK National Institute for Health and Care Excellence (NICE) recommended oral or intravenous administration of low dose of dexamethasone to severe or critically ill COVID-19 patients needing supplementary oxygen.2 Similarly, dexamethasone use has also been recommended by the Infectious Diseases Society of America (IDSA) (2), the US National Institutes of Health (NIH)3 and the WHO4 for hospitalized patients with COVID-19 requiring oxygen therapy. It is worth noting that these therapeutic recommendations were based on evidence acquired from clinical trials conducted in high-income countries and subsequently extrapolated to treatment of COVID-19 patients in low- and middle-income countries (LMIC) (1, 3). Despite the large number of trials for effective treatment for COVID-19, only a very small portion has been conducted in LMICs (4), which is very essential as outcomes from patients in LMICs could differ due to genetic variations among SARS-CoV-2 strains and other host and healthcare system factors specific to the LMIC settings. The inter-individual variability in dexamethasone response has been reported at the genomic and transcriptomic levels. At the DNA level, SNPs in genes such as NR3C1, NR3C2, and ABCB1 have been linked to an altered dexamethasone metabolism (5). Moreover, dexamethasone induces significant changes in the transcriptome of treated individuals. Therefore, there is a need to conduct dexamethasone clinical trials on different populations, especially those residing in LMICs. For COVID-19 patients in LMICs such as Lebanon, cost and availability of treatment is very essential. Lebanon is a country facing unprecedented economic crisis that is pushing the country’s healthcare system to the brink and creating disastrous medicine shortages. Therefore, for Lebanon, having an effective treatment such as dexamethasone, which is at the same time inexpensive, is highly significant.

The Relationship Between Work Readiness and Perceived Clinical Competence Among Graduates Transitioning into Professional Practice

**ARTICLE TITLE**
The Relationship Between Work Readiness and Perceived Clinical Competence Among Graduates Transitioning into Professional Practice

**JOURNAL**
International Journal of Africa Nursing Sciences

**YEAR**
2023

**PUBLICATION INFO**
DOI: 10.1016/j.ijans.2023.100555

**THEME / SUBTHEME**
Health and Wellbeing/ Medical Education in Health Sciences

**ABSTRACT**
Nursing Residency Programs (NRPs) reportedly help close the disparities in job-related knowledge, expertise, and attitudes that affect new nurses, healthcare organizations, and care quality by offering instructions and resources for new graduate nurses.

**Background**
Nursing Residency Programs (NRPs) reportedly help close the disparities in job-related knowledge, expertise, and attitudes that affect new nurses, healthcare organizations, and care quality by offering instructions and resources for new graduate nurses.

**Aim**
This study aims to explore the relationship between work readiness and perceived clinical competence among graduates attending the NRP as compared to nurse interns at one university hospital.

**Methods**
This study employed a quantitative cross-sectional research design, recruiting 203 graduate nurses through a purposive sampling technique via electronic invitations.

**Results**
The results of this study showed that graduates attending the NRP had higher scores at all levels of work readiness and clinical competence, with work readiness being found as a predictor of clinical competence.

**Conclusions**
Healthcare organizations are responsible for exploring the transition to practice programs and their effectiveness in enhancing work readiness to increase the quality of care offered to patients and to prepare skillful new graduates for professional and safe practice.
ARTICLE TITLE
The Risk of Sarcopenia Among Adults with Normal-Weight Obesity in a Nutritional Management Setting

JOURNAL
Nutrients

YEAR
2022

PUBLICATION INFO
DOI: 10.3390/nu14245295

THEME / SUBTHEME
Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT
Normal-weight obesity (NWO) is a phenotype characterized by excessive body fat (BF) despite normal body weight. We aimed to assess the association between NWO and the risk of sarcopenia. Two groups of patients with a normal body mass index (BMI [20-24.9 kg/m²]) were selected from a large cohort of participants. Body composition was measured using dual-energy X-ray absorptiometry (DXA), and 748 participants were categorized as NWO or normal-weight without obesity (NWNO) and were classed according to whether or not they were at risk of sarcopenia. The “NWO group” included 374 participants (cases), compared to 374 participants (controls) in the “NWNO group”, all of a similar BMI, age and gender. The participants in the “NWO group” displayed a higher prevalence of the risk of sarcopenia than the control group across both genders (0.6% vs. 14.1% in males; 1.4% vs. 36.5% in females). Regression analysis showed that being in the NWO category increased the risk of sarcopenia 22-fold in males (RR = 22.27; 95%CI: 3.35-147.98) and 25-fold in females (RR = 25.22; 95%CI: 8.12-78.36), compared to those in the NWNO category. In a “real-world” nutritional setting, the assessment of body composition to identify NWO syndrome is vital since it is also associated with a higher risk of sarcopenia.

ARTICLE TITLE
Understanding Sarcopenic Obesity in Young Adults in Clinical Practice: A Review of Three Unsolved Questions

JOURNAL
Panminerva Medica

YEAR
2022

PUBLICATION INFO
64(4): 537-547

THEME / SUBTHEME
Health and Wellbeing/ Prevention and Health Promotion

ABSTRACT
Introduction
Our aim was to summarize the available literature on three yet unsolved questions, namely: 1) the dilemma surrounding definition of sarcopenic obesity (SO), especially in young adults; 2) the potential impact of this phenotype on weight-loss programme outcomes; and 3) the strategies for optimum management (prevention/treatment) of SO in clinical practice.

Evidence Acquisition
A literature review using the PubMed/Medline database was conducted, and data were summarized based on a narrative approach.

Evidence Synthesis
Firstly, SO can be screened by the 30-sec sit-to-stand test, ≤25 and ≤21; and confirmed by the ratio of (appendicual lean mass/Body Mass Index) ≤0.789 and 0.512 in males and females, respectively. Secondly, SO is associated with impaired physical fitness, reduced resting energy expenditure and an inactive lifestyle, that seems to negatively impact on weight-management outcomes, namely increasing early dropout and difficulty in maintaining weight loss in the long term. Finally, prevention/treatment of SO in young adults must be realized through tailored lifestyle intervention [diet+exercise] to preserve and improve strength and muscle mass, even where weight loss is necessary.

Conclusions
Our findings have clinical implications since they may help in screening, managing and improving the weight-loss outcomes of patients with SO in clinical settings.

ARTICLE TITLE
Updates on the Status of Carbapenem-Resistant Enterobacterales in Lebanon

JOURNAL
International Journal of Microbiology

YEAR
2023

PUBLICATION INFO
DOI: 10.1155/2023/8831804

THEME / SUBTHEME
Health and Wellbeing/ Illness and Therapy

ABSTRACT
Carbapenem-resistant Enterobacterales (CRE) pathogens have been increasingly isolated and reported in Lebanon. Several studies have been published over the last two decades about the CRE situation in the country. However, compared to the worldwide data, those studies are scarce and mostly restricted to single center studies. In this review, we aim to present a comprehensive and reliable report illustrating the current situation regarding CRE in Lebanon. Variable studies have shown an increasing pattern of carbapenem resistance in Enterobacterales since the first reports of CRE isolates in 2007 and 2008. Escherichia coli and Klebsiella pneumoniae were the most detected ones. The OXA-48 class D carbapenemases were the most prevalent carbapenemases among CRE isolates. Moreover, the emergence of other carbapenemases like the NDM class B carbapenemase has been noticed.
Validation of the Arabic Version of the Food Safety and Hygiene Questionnaire Among Nutrition Students

**ABSTRACT**

There is shortage of data on food safety knowledge and practices among Lebanese food handlers due to the lack of a reliable tool. The aim of the current study is to determine the reliability as well as the validity of an adopted Arabic version of the Osaili et al (2013) food safety questionnaire. Translation and back translation and testing equivalence were done using standard accepted procedures. A total of 110 undergraduate Nutrition and Dietetics students completed the questionnaire consisting of five subscales that covers major food safety concepts including personal hygiene, safe storage, cross contamination prevention, knowledge of health problems affecting food safety and symptoms of foodborne diseases. Construct validity was tested using knowledgeable group analysis; internal consistency was determined using Cronbach’s $\alpha$ and item-to-total correlation. Temporal stability was evaluated by test-retest reliability in a subgroup of 67 students. The results showed non-significant difference between scores of English and Arabic versions revealing equivalence. For the psychometric analysis, the significant statistical difference for most of food safety knowledge scores between lower and higher years of study indicates satisfactory construct validity. The test-retest reliability of the Arabic questionnaire showed a good temporal stability (ICC > 0.8), while the Cronbach’s $\alpha$ for the total scales ranged between 0.611 and 0.736 revealing an acceptable and satisfactory level of internal consistency for the items retained in the questionnaire. The translated Arabic version of the food safety questionnaire can be considered as a consistent and reliable tool, to be used as food safety knowledge assessment among food handlers.

**ARTICLE TITLE**

BAU Journal-Health and Wellbeing

**YEAR**

2023

**PUBLICATION INFO**

5(2): 1-10

**THEME / SUBTHEME**

Health and Wellbeing/ Medical Education in Health Sciences

**ABSTRACT**

Strict infection control measures in hospitals, including the identification of CRE carriers, are needed in Lebanese hospitals since carriage is a potential risk for the spread of CRE in healthcare settings. The dissemination of CRE in the community is noticed and attributed to multiple causes, such as the refugee crisis, water contamination, and antimicrobial misuse. In conclusion, strict infection control measures in healthcare settings, in addition to accurate antimicrobial stewardship program implementation, are urgently needed.
Body Mass Index and Body Fat in Anorexia Nervosa

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<td>ABSTRACT</td>
<td>Anthropometry is considered one of the main methods of nutritional assessment in individuals with anorexia nervosa (AN). In this chapter, we will focus on body mass index (BMI) and total body fat (BF). We introduce the reliable and validated techniques for their assessment during underweight, weight gain and after complete weight restoration, and their changes during the course of the disease. The chapter also discusses the association/relationship between BMI and BF and the most important treatment clinical outcomes in this population: (i) relapse, remission, and/or recovery; (ii) reduction and normalization in bone mineral density (BMD); and (iii) amenorrhea, resumption of menstrual cycle, and reproductive function.</td>
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