4th Scientific International Conference of the Faculty of Science, Benha University

" Applied Sciences Conference for Future Challenges and Sustainable Development"

President of the Conference

Prof. Dr. Mohamed Heikal

Dean of the Faculty

Vice President of the Conference

Prof. Dr. Nehad El-Barkey

Vice Dean of the Faculty

for Environmental Affairs and Community Service

21-22 December (2024)

Conferences Hall, Benha University قاعة تحيا مصر

Benha, Egypt

المؤتمر العلمي الرابع

"العلوم التطبيقية لتحديات المستقبل والتنمية المستدامة"

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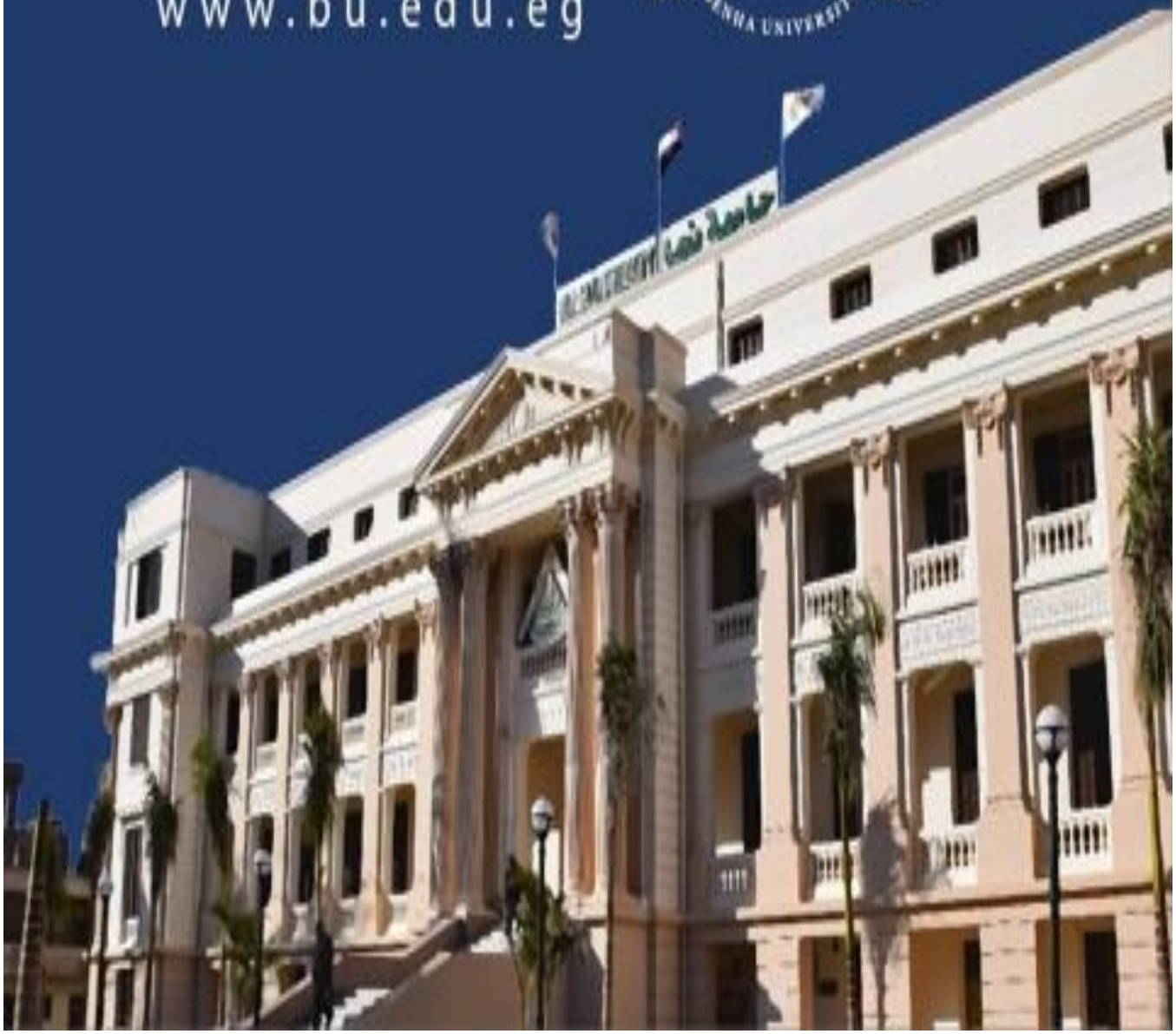

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كلية العلوم جامعة بنها

تحت رعاية

المهندس/ أيمن عطيه
محافظ القليوبية

أ.د/ ناصر الجيزاوى
رئيس جامعة بنها

أ.د/ السيد فودة
نائب رئيس الجامعة
لشئون البيئه و خدمه المجتمع

أ.د/ جيهان عبدالهادى
نائب رئيس الجامعة
للدراسات العليا و البحوث

الرؤية :

في ضوء مواكبة التطور العلمي والتكنولوجي في مجال العلوم التطبيقيه وتوظيفه لتحقيق أهداف التنمية المستدامة ، تعقد كليه العلوم بجامعة بنها مؤتمرها العلمي الرابع لمناقشة ما يستجد من بحوث متخصصه في المجالات العلمية المختلفة وما يمثله هذا المؤتمر من فرصة لالتقاء السادة العلماء والباحثيين من داخل مصر وخارجها لعرض ابحاثهم ولتبادل الاراء والخبرات ومناقشة القضايا البحثية ذات الصلة من أجل مستقبل أفضل.

الاهداف :

1- تطوير البحث العلمي و دعم الابتكار : تسليط الضوء على الدور الذي يمكن أن تلعبه الجامعات في تعزيز الابتكار والتكنولوجيا الخضراء من خلال الاستفاده من الابحاث العلميه التطبيقيه لتحقيق اهداف التنميه المستدامه.

2- تبادل المعرفة : بين الأكاديميين، الباحثين، والمهنيين من مختلف التخصصات حول كيفية مساهمة الجامعات في التنمية المستدامة.

3- تعزيز التعاون وبناء شراكات : مع القطاع الخاص، والجهات البحثية لدعم مبادرات التنمية المستدامة.

4- تحفيز الحوار البناء : حول كيفية مواجهة التحديات المعاصرة وتحقيق أهداف التنمية المستدامة من خلال النقاشات العلمية المتبادلة.

<u>محاور المؤتمر</u>

1. **الطاقة المتجددة والخضراء**
2. **تدوير المخلفات ودورها في حماية البيئة**
3. **الموارد المائية وطرق معالجتها**
4. **تطبيقات المواد النانومترية وتطبيقاتها**
5. **أثر التغيرات المناخية على الزراعة والأمن الغذائي**

كلمة عميد الكلية

أ.د/ محمد هيكل

يختص المؤتمر هذا العام بمناقشة قضايا العلوم التطبيقية لتحديات المستقبل والتنمية المستدامة في ضوء رؤية مصر ٢٠٣٠ والمبنية على الحلم والامل والعلم والعمل، تهتم كلية العلوم بجامعة بنها بالأبحاث العلمية التطبيقية لتحقيق تحديات المستقبل والتنمية المستدامة من خلال مخرجات البحث العلمي في جميع محاور المؤتمر وفى هذا الإطار يأتي المؤتمر الرابع لكلية العلوم برعاية الأستاذ الدكتور/ ناصر الجيزاوي - رئيس جامعة بنها والسادة نواب رئيس الجامعة. ومن خلال التغيرات المتلاحقة وفى ضوء رؤية الدولة ٢٠٣٠ التي تهتم بالبحوث التطبيقية، يختص المؤتمر بمناقشة ما يستجد من بحوث متخصصة في المجالات العلمية المختلفة لمواجهة التغيرات المناخية. تتمثل محاور المؤتمر في الطاقة المتجددة والخضراء وتدوير المخلفات ودورها في حماية البيئة والحلول المتاحة، الموارد المائية وطرق معالجتها، وتطبيقات النانو تكنولوجي، وأثر التغيرات المناخية على الزراعة والأمن الغذائي وتحقيق التنمية المستدامة، المؤتمر يأتي تفاعلاً مع الثورة الصناعية الرابعة وما ترتب عليها من ازدهار ونمو غير مسبوق في كافة مناحي الحياة الأمر الذي يتطلب مواكبة هذه التغيرات وما تقتضيه الحاجة إلى تطوير البحث العلمي وبخاصة التحديات الخاصة بالتغيرات المناخية

ويهدف هذا المؤتمر الى تبادل الخبرات البحثية بين الجامعات والمراكز البحثية مع المؤسسات الصناعية سعيا لتحقيق الحلول المناسبة لمجابهة أثار التغيرات المناخية. ويمثل المؤتمر فرصة اللقاء بين العلماء والباحثين في مختلف المجالات لعرض نتائج أبحاثهم وتبادل الآراء والخبرات لمناقشة القضايا البحثية ذات الصلة وزيادة المستوى المعرفي والخبرات المختلفة من خلال تبادل المعلومات والأفكار بين الجهات المشاركة في المؤتمر، والعمل على وجود شراكة بين الجامعة والمؤسسات الصناعية، بالإضافة إلى تعزيز دور الجامعة في خدمة المجتمع. حفظ الله مصرنا الحبيبة وسدد خطاها لتحقيق التقدم والرقى والازدهار، سائلين الله سبحانه وتعالى التوفيق والسداد.

كلمة وكيل الكلية لشئون البيئة وخدمة المجتمع

أ.د/نهاد البرقي

العلوم التطبيقية لتحديات المستقبل والنتمية المستدامة

تلعب العلوم التطبيقية دورا بالغ الأهمية حيث أنها العلم الذي يحول الأفكار والنظريات إلي حلول عملية تلبي احتياجات المجتمع وتساعد في بناء مستقبل اكثر استدامة .

ان العلوم التطبيقية ليست مجرد معرفه نظرية بل هي علم يتمحور حول التطبيق والممارسة مما يمكننا من مواجهة تحديات متنوعة مثل التغير المناخي وأمن الطاقة والصحة العامة وادارة الموارد الطبيعية .

انها السبيل لتطوير تقنيات جديدة للطاقة النظيفة وايجاد حلول لمشكلات المياة والزراعة.

وفي ظل السعي لتحقيق أهداف التنمية المستدامة التي وضعتها الأمم المتحدة نجد أن العلوم التطبيقية تمثل أساساً حيوياً لدفع هذا التقدم.

ان التزامنا بالعلوم التطبيقية لا يعزز فقط قدرتنا علي مواجهة التحديات بل يسهم في بناء عالم اكثر استدامة وعدالة ، عالم تكون فيه التكنولوجيا في خدمة الانسان والبيئة علي حد سواء.

كلمة وكيل الكلية للدرسات العليا والبحوث

أ.د/ علي عبد المعبود

يهدف مؤتمر العلوم التطبيقية لتحديات المستقبل والتنمية المستدامة إلى تسليط الضوء على أهمية استخدام العلوم التطبيقية في إيجاد حلول مستدامة للتحديات البيئية والاجتماعية، وتعزيز التعاون بين الباحثين والأكاديميين من مختلف التخصصات. كما يناقش المؤتمر التطبيقات الحديثة للتكنولوجيا في مجالات متنوعة مثل الطاقة المتجددة، والذكاء الاصطناعي، والهندسة البيئية، مما يساهم في تطوير حلول مبتكرة تواكب احتياجات المستقبل.

إن كلية العلوم تسعى من خلال هذا المؤتمر إلى تعزيز الروابط بين مختلف الجامعات والمؤسسات البحثية، وتوفير بيئة أكاديمية تفاعلية تشجع على التفكير النقدي وتبادل المعرفة بين العلماء والطلاب والباحثين.

إننا في كلية العلوم نؤمن بأن البحث العلمي هو الأساس الذي يبني عليه التقدم في جميع المجالات، ونسعى من خلال برامج الدراسات العليا إلى تمكين الطلاب من تطوير مهاراتهم البحثية وتعزيز مشاركتهم الفاعلة في تقديم حلول علمية مبتكرة تساهم في تحسين واقع المجتمع.

أود أن أشكر جميع القائمين على تنظيم هذا المؤتمر، وأتمنى أن يكون نقطة انطلاق جديدة للمزيد من الإنجازات العلمية التي تساهم في بناء مستقبل مشرق، مع التأكيد على دور الطلاب والباحثين في هذا المجال.

كلمة وكيل الكلية لشئون التعليم والطلاب

أ.د/ محمد عبد الرحمن أبو ريا

كلية العلوم هي إحدى المؤسسات البحثية التي تخدم المجتمع وتزوده بالمعرفة والتنمية المستدامة؛ وتمد جسور التعاون بين المجتمع والصناعات المختلفة والأكاديميين؛ من خلال الابحاث المنتجة وعقد المؤتمرات والندوات العلمية المتنوعة المصممة بشكل مثالي لحل مشاكل المجتمع وتنميته، وعلى أحدث الابتكارات في التخصصات التطبيقية المختلفة. وانطلاقاً من هذا وإيماناً بدور المؤتمرات في تنوع شخصية الباحث، بادرت كلية العلوم بجامعة بنها إلى عقد المؤتمر العلمي "مؤتمر العلوم التطبيقية لتحديات المستقبل والتنمية المستدامة"

الذي يعتبر فرصة عظيمة للباحثين لعرض أفكارهم وأبحاثهم الخاصة، وتجاربهم فيما بينهم خلال أيام المؤتمر، فضلاً عن إتاحة الفرصة لحضور هذا المؤتمر بشكل جيد لطلاب الدراسات العليا والطلاب الجامعيين من لممارسة الكتابة العلمية والاستفادة من تجاربهم في مجال البحث العلمي. ويشرفني أن أتقدم بخالص الشكر لجامعة بنها ممثلة في رئيس الجامعة الأستاذ الدكتور/ ناصر الجيزاوي، وعميد الكلية الأستاذ الدكتور/ محمد هيكل، والسادة وكلاء الكلية على دعمهم المتواصل لهذا المؤتمر العلمي، كما نتقدم بالشكر والامتنان إلى المشاركين، وإلى كافة اللجان المشرفة والمنظمة لهذا الملتقى العلمي، الذين بذلوا جهودهم لإنجاح هذا المؤتمر، كما نتقدم بالشكر إلى الجهات الداعمة والمعينة التي ساهمت في إنجاح هذا الحدث العلمي.

المتحدثون

أ.د/ أحمد عبد المنعم
عميد معهد العلوم الأساسية والتطبيقية في الجامعة المصرية اليابانية

أ.د/ محمد مختار
عميد معهد العلوم الأساسية والتطبيقية في الجامعة المصرية اليابانية سابقا

أ.د/مصطفي الشيخ
عميد كلية علوم طنطا سابقا

أ.د/ أحمد يونس
وكيل كلية العلوم المصرية لشئون التعليم والطلاب - جامعة الإسكندرية سابقا

أ.د/ ايهاب الضبع
أستاذ ورئيس قسم الكيمياء الحيوية والبيولوجيا الجزيئية بمعهد تيودور بلهارس للأبحاث

د/ أحمد محمد الشناوي
المدير التنفيذي لمشروع النهج المستدام لإدارة المياه والتربة للأراضى الجافة بحوض البحر الأبيض المتوسط والباحث بمركز بحوث الصحراء

الرعـــاة

شركة بلازما للتدريب وتنمية المهارات العلمية

الشركة المصرية للمواد الكربونية

سمارت مصر للتحاليل الطبية

نقابة المهن العلمية

مجلة العلوم الإنسانية والبيئية

4th Scientific International Conference of the Faculty of Science, Benha University

"Applied Sciences Conference for Future Challenges and Sustainable Development"

Program of the conference

Day 1 – Saturday 21 December 2024

9.00-9.30 Registration

General assembly: Opening Ceremony	(Conferences Hall, Benha University) قاعة تحيا مصر
9:30-10:30	**Opening Session** (Session A) **Prof. Dr. Nehad El-Barkey** Vice President of the Conference **Prof. Dr. Mohamed Heikal** President of the Conference **Prof. Dr. Gehan Abdel Hady** Vice President of the University for Postgraduates and Research **Prof. Dr. Sayed Fouda** Vice President of the University for Environmental Affairs and Community Service **Prof. Dr. Nasser El-Gizawy** President of Benha University
	(Session A) **Prof. Dr. Nasser El-Gizawy** Chairman **Prof. Dr. Sayed Fouda** — Co-Chairman **Prof. Dr. Gehan Abdel Hady** — Co-Chairman
10:30-11:00	**"Biofuel from algae as a sustainable and Renewable Energy"** **Prof. Dr. Mustafa El-Sheikh** Prof. of Phycology, Faculty of Science, Former Vice President of Tanta University
11:00-11:30	**"Global CO_2 recycling to added values green fuels"** **Prof. Dr. Ahmed Abdel Moneim Abdel Hamid** Dean of the Faculty of Science at Japanese University
11:30-12:00	**Coffee Break**
	(Session A) **Prof. Dr. Mohamed Heikal** Chairman **Prof. Dr. Nehad El-Barkey** Co-Chairman
12:00-12:30	**"Water splitting for H_2 production: opportunities and challenges"** **Prof. Dr. Mohamed Mokhtar Mohamed** Prof. of Physical Chemistry, Faculty of Science, Benha University
12:30-13:00	**"Quantum computing technology and applications"** **Prof. Dr. Ahmed Younis** Vice Dean for Students Affairs, Faculty of Science, Alexandria University
13:00-13:30	**Guest Honors**

Sessions

Session A: Applied Chemistry	
Prof. Dr. Mahmoud Mousa **Chairman** **Prof. Dr. Ashraf Farouk** **Co-chairman** **Prof. Dr. Gamal Oweis** **Co-chairman**	
13:30-14:30	**Kinetic studies on the catalyzed and un-catalyzed pyrolysis of mixed HDPE and PP (75:25 wt %) plastic waste using a combination of model-fitting and model-free methods** D. M. Fathy, E. M. Kamar, M. Hanafy, M. A. Mousa
	Convenient green production of CeO_2 nanoparticles by the auto combustion method Omnia Abd El-Dayem, Mostafa Y. Nassar, Hossam S. Jahin, Wagdy El-Dougdoug and, Hesham H. El-Feky
	Green Synthesis of Pyrimidine Derivatives and Evaluation of Their Biological Activity Yasmen Mohamed, Mohamed S. Behalo, Iman A. Gad Elkarim, Amr Fetaha
	Removal of Mn(II), Cd(II) and Ni(II) cations from aqueous solutions using modified chitosan by simple method Noha T. Abo El-nassr, Abdou S. El-Tabl, Hossam S. Jahin, Mohammed H. H. Abu-Setta, Alaa. S. Amin, Islam. M.I. Mustafa
	Sonochemical and photocatalytic degradation of brilliant green in aqueous medium as an effective technique for water treatment Zeinab M. Badr, W. Abbas, Gamal O. El-Sayed, Islam M Shaheen

Session D: Applied Chemistry (Posters)
Prof. Dr. Wagdy El Dogdog **Chairman** **Prof. Dr. Wafaa Biomy** **Co-chairman** **Prof. Dr. Safenaz Mohamed** **Co-chairman**
Preparation and study of Magnesium oxide nanoparticles using combustion method F. A. Hosni, A. A. Ali, Sayed A. Shama
Effortless green synthesis of zero-valent copper nanoparticles Ahmed E. Mostafa, Hesham H. El-Feky, Mostafa Y. Nassar and Hisham Marawan Aly
Preparation and characterization of $ZnMn_2O_4$ via auto-combustion synthesis I. H. Ahmed, S. A. Shama, M. M. Elsayed, A. M. El-sharkwy, A. A. Ali
The study of antimicrobial activity and molecular docking simulation of treated cotton fabric with fire retardancy phosphorous-PMMA/modified MMT nano composites Osama A. Goda, Mohamed N. Ismail, Naglaa M. Mohamed, Ahmed A. Zaher and Moustafa E. Moustafa
Fundamental effective technique for water treatment by using sonochemical and photocatalytic degradation of methylene blue in aqueous medium Zeinab M. Badr, W. Abbas, Gamal O. El-Sayed, Islam M Shaheen

Session B: Microbiology	
Prof. Dr. Dina Baraka **Chairman** **Prof. Dr. Mohamed Osman** **Co-chairman** **Prof. Dr. Hamed El-Adel** **Co-chairman**	
13:30-14:30	**Wastewater Treatment by Biological Filtration Technique Improves Biochemical and Microbiological Parameters in Nile tilapia (*Oreochromis niloticus*)** Shireen Ashmawy, Mohamed O.Abdel-Monem, Elsayed E. Elsayed, Ghada E.Dawwam
	Myco-synthesis of silver and ZnO nanomaterials using endophytic fungi isolated from different locations in Egypt for sustainable development Mahmoud M. Fathy, Amal M. Omer, Rabaa Yaseen, Soheir S Abdel Salam, Ghada E. Dawwam
	Complete genome sequencing and probiotic characterization of promising lactic acid bacterial strains isolated from dairy products in Egyptian markets Mostafa Fetoh El-Hosseny, Mohammed Osman Abdel-Monem and Mervat Gameel Hassan
	Antimicrobial activity and MIC of microbial biosynthesized silver nanoparticles Hadeer Y. Abdel-Aziz, Amr A. El-Waseif, Mervat G. Hassan, Mahmoud M Amer, M. O. Abdel-Monem
	Response of Fungal L-glutaminase to Anhydrides and Chelating Agents Esraa A. Sobieh, Mervat G. Hassan, Mohamed O.Abdel-Monem, Sabah A. Abo ElMaaty, Hamed M El-Shora
	Antagonistic Activity of Probiotics against Gram Negative Bacteria Nada K. Galal, Amr A. El-Waseif, Mervat G. Hassan, Sabah A. Abo El-Maaty
	Immunomodulatory and Antioxidative Effects of Vanillin on Human Acute Monocytic Leukemia Cells: A Potential Therapeutic Approach for AMoL Shimaa Sobhy, Alaa Elmetwalli, Dina M. Baraka, Jihan Hassan, Mervat G. Hassan

Session D: Microbiology (Posters)	
Prof. Dr. Mahmoud Amer **Chairman** **Dr. Ahmed Esmail** **Co-chairman** **Dr. Ghada Eid** **Co-chairman**	
Occurrence of toxigenic fungi in sugarcane juice Rania Abd Elatif Goz, Sabah A. Abo-Elmaaty, El Sayed M. Embaby, Mervat G. Hassan	
Characterization of Probiotic Features Isolated From Fruits and Vegetables Mohamed R. Ragab, Amr A. El-Waseif, Mervat G. Hassan, Mohamed O. Abdel Monem, Mohamed H. Yassin	
Biomineralization of $CaCo_3$ by Bacillus sp. 8WNM for Application as Bio-Cement Doaa M. Abdel-Monem, Mohsen S. Asker, Esraa E. Ali, Rasha Y. Abd Elghaffar, Mohamed O. Abdel-Monem	
Harnessing Bacterial Metabolites for the Synthesis of Cu-silicate NPs: A Sustainable Route to Antimicrobial and Anticancer Application Hanaa S. Farouk, Alaa Elmetwalli, Gharieb S. El-Sayyad, Dina M. Baraka, Mervat G. Hassan	
The Bioactivity and Modulatory Properties of Functionalized Bacterial Glutaminase in Cancer Biology Mohamed Magdy, Mervat G. Hassan, Mohamed O. Abdel Monem, Mohamed H. Yassin, Alaa Elmetwalli	

Session C: Geology, Zoology, Physics and Entomology	
Prof. Dr. Lotfy Abo Salem **Chairman** **Prof. Dr. Nasr Allah Abdel Hamid** **Co-chairman** **Prof. Dr. Gamal El Kot** **Co-chairman** **Prof. Dr. Mona Fawzy** **Co-chairman**	
13:30-14:30	**Assessment of Reservoir potentiality for Abu Madi Formation, Southwest Disouq Field, Onshore Nile Delta, Egypt** Abdel Aziz M. Afife M., Abdelhady A., and Wafaa Elshahat
	The role of Fennel on bodyweight, metabolites and anemia in male albino rats injected with PHZ Dina, I, Nasr; Aziza, A. M. El-Shafey; Moshira, M. Ezzat.; Doaa, S. Ibrahim.; and Marwa, A.E. Abd El-Maksoud
	Assessment of Monosodium Glutamate-induced histological and osteological injury in rats embryo and amelioration with pomegranate juice. Vivian N. Shawky; Ragaa M. El-Balshy; Amal M. Abdel-Kareim; Mervat K.Iskandar
	Association between Some Reproductive Hormones and Breast Cancer Progression in Premenopausal Women Shereen S. Marwan, Nassr-Allah H. Abdel-Hameid, Moshira M. E. Seliem, Amr Abuzeid, Mohamed A. Abdelrazek
	The effect of isothermal annealing on the AC conductivity of Polyvinyl Alcohol-based polymer as an energy storage system S.Y. Ibrahim, E. Sheha, S Abouelhassan
	DC Conductivity and Tensile behavior Investigation on Fumed Silica–EPDM Nanocomposite for Electric Insulation Applications. S.A. Moselhy, R.Sobhy,N.A.M.Eid, S.I ELkalashy, M.K.El-mansy
	Insecticidal effect and biochemical studies of entomopathogenic nematode strains against fall armyworm, Spodoptera frugiperda (Lepidoptera: Noctuidae). Samar M. Galal, Mona A. Hussein, Rawhia H. Ramadan, Nancy M. El-shourbagy
	Efficacy of silica and tin doped silica nanoparticles on the fourth larval instar of Culex pipiens Aya H. El-Khawaga, Nehad M. El-Barkey, Mostafa Y. Nassar, Aida S. Kamel, Sarah L. Ibrahem & Mohamed M. Baz

Session D: Geology, Zoology, Physics and Entomology (Posters)
Prof. Dr. Mohamed El-Fakharany **Chairman** **Prof. Dr. Abla El-Desouky** — **Co-chairman** **Prof. Dr. Said Abdel Ghany** — **Co-chairman**
Evaluation of Groundwater Quality Using the Water Quality Index (WQI) in Delta Wadi Sudr, South Sinai, Egypt Eslam, A. Elghandour, Fardous, M. Zarif, Ahmed, M. Elshenawy, Wafaa, E. Afify and Nehad, M. Mansour
Groundwater Potential Assessment Using Analytic Hierarchy Process (AHP), Remote Sensing, and GIS: A Case Study from the Zaafarana Region, Western Coast of the Gulf of Suez, Egypt Ahmed M. Ketkat, Ahmed M. El Shenawy, Fardous M. Zarif, Wafaa E. Afify, Hesham M. El Kaliouby, Nehad M. Mansour
Radiobiological impact of calculation slice thickness on head and neck IMRT plans using MATLAB Alzahraa Ali, Ehab M. Attalla, and Samira M. Sallam
Ablation of Polyester Capillaries by Electrothermal Pulsed Plasma Discharge M. M. Abo El-Hadeed, M. E. Abdelkader, F. B. Diab, T. Y. Elrasasi, and M. A. Abd Al-Halim
Isolation and identification of some pathogenic bacteria from water samples in Qalubiya Governorate Sara A. Nasser, Hesham M. Abd El Halim, Mohamed A. Nasr-Eldin, Alsayed E. Mekky, Nehad M. El-Barkey

14:30 - 15:30 Lunch Break

General assembly: Closing Ceremony	
15:30-16:00	**Closing Session and Recommendations**

4th Scientific International Conference of the Faculty of Science, Benha University

Day 2 – Sunday 22 December 2024

General assembly: Opening Ceremony	(Conferences Hall, Benha University)قاعة تحيا مصر
9:00-9:30	**Opening Session** (Session A)
	Prof. Dr. Mohamed Heikal Dean of the Faculty **Prof. Dr. Aly Abdel Maaboud** Vice Dean for Postgraduates and Research **Prof. Dr. Mohamed Abo Riya** Vice Dean for Education and Students Affairs
9:30-10:00	**"Geophysical Contribution for Sustainable Agriculture and Environmental Management"** **Prof. Dr. Ahmed Mohamed Saad El Shenawy** Executive director of the Salam-med Program funded by the European Union and a researcher at the Desert Research Center
10:00-10:30	**"The lecture title Recombinant biopharmaceutical drugs R&D in TBR"** **Prof. Dr. Ihab El-Dabaa Sabry** Prof. and Head of the Department of Biochemistry and Molecular Biology Tudor Bellharses Research Institute
10:30-11:00	**Guest Honors**

11:00 - 11:30 Coffee break

Sessions

Session A: Applied Chemistry	
Prof. Dr. Alaa Amin **Chairman** **Prof. Dr. Sayed Abdel Aziz** **Co-chairman** **Prof. Dr. Aly Abdel Maaboud** **Co-chairman**	
11:30-12:30	**Synthesis and Evaluation of Cationic Surfactants** Amira Mahmoud, Wagdy I. El-Dougdoug, Mohamed A. Abo-Ryia, Hany I. Mohamed
	Studying the effect of adding thiourea to HFE on Mg-S battery behavior and its properties Engy El-Dek; Eslam sheha; Alaa S Amin
	Synthesis and characterization of zinc oxide nanoparticles using hydrothermal method M. M. Abdel Fattah, A. A. Ali and I. S. Ahmed
	Synthesis and characterization of cerium oxide nanoparticles using combustion method E. M. Qansowa, A. A. Ali, I. S. Ahmed
	Impact of some environmental conditions on the degradation of some pendimethalin formulations currently applied in Egypt. Basma A. Nasser, Hesham H. El-Feky, Ismail I. Ismail, Alaa S. Amin

Session C: Applied Chemistry (Posters)	
Prof. Dr. Mohamed Behalo **Chairman** **Prof. Dr. Ahmed Tantawy** **Co-chairman** **Dr. Ayman Awad** **Co-chairman**	
	Non-ionic Surfactants as Enhancement Oil Recovery based on Oleic Acid as Commercial Raw Material. Gamal M. El-Sayed, Mohamed A. Abo-Riya and Wagdy I. El-Dougdoug
	Utility of solid-phase extraction coupled with spectrophotometry for the determination of silver using 6-(2-(4-(dimethylamino)benzylidene)hydrazinyl)-N2,N4-di-p-tolyl-1,3,5-triazine-2,4-diamine Fatma Magdy, Hesham H. El-Feky, Kamal A. Soliman, Hany I. Mohammed and Alaa S. Amin
	Utilization of solid-phase extraction for colorimetric determination of trace amounts of Sn(II) in real samples Ekhlass M. Araby, Hesham H. El-Feky, Kamal A. Soliman, Hany I. Mohamed and Alaa S. Amina
	Electrochemical investigation of lead alloy corrosion and passivation in acidic environments Moataz S.Borham, Elsayed M Mabrouk, Reham Helmy Tammam, Tomader El-Essawi, and Asmaa AI Ali
	Tomato peels extract as a green corrosion inhibitor for carbon steel in acetic acid solution Sally M. Refaat, Hanan B. Newigy, Aly Y. El-Etre, Elsayed M. Mabrouk

Session B: Microbiology	
Prof. Dr. Mahmoud Amer **Chairman** **Prof. Dr. Radwan Khalil** **Co-chairman** **Dr. Mervat Gamil** **Co-chairman**	
11:30-12:30	**Numerical taxonomic study on some plant species of family Geraniaceae collected from Egypt desert** Rabab Rashad, Ahmed Moubarak and Hala Nosier
	Eco-Friendly Fabrication of Metal Nanoparticles with Enhanced Antimicrobial and Anticancer Properties Abdulhalim Eldfrawy, Alaa Elmetwalli, Gharieb Al-Sayyad, Mohamed Nasr-Eldin, Mervat G. Hassan
	Isolation of Polyhydroxybutyrate Microbial Producer from Local Egyptian Soil Reem H. Abd El gawad, Neveen M. El-Metwally, Mervat G. Hassan, Dina M. Baraka
	Antibacterial activity of ethanolic extracts of thymus vulgaris and Cinnamomum camphora on human pathogenic bacteria. Yasmin M. Elsayed, Mervat G. Hassan, Amr A.El-Waseif, Hamed M.El-Shora, Mohamed O. Abdel-Monem
	Impact of Sulfur Compounds on the Activity of Bacterial L- methioninase Samah A. Ismail, Mervat G. Hassan, Sabah A. Abo El maaty and Hamed M El-Shora
	Screening and Optimization of Polyhydroxybutyrate Production by Streptomyces sp. 3MGH Isolated from the Egyptian Soil Ghada E. Mohamed, Mervat G. Hassan, Mohamed E. El Awady, Fatma N. El-Shall, and Mohamed O. Abdel-Monem
	Biosynthesis, extraction, purification of postbiotic from probiotic isolate Nada E. Taha, Amr A. El-Waseif, Mervat G. Hassan, Sabah A. Abo El-Maaty

Session C: Microbiology (Posters)
Prof. Dr. Mohamed Hesham **Chairman** **Dr. Sabah Abo El Maaty** — **Co-chairman** **Dr. Mohamed Atef** — **Co-chairman**
Biosynthesis and Characterization of Silver-Selenium Nanoparticles from Endophytic Fungi and Their Biological Activity Mohamed Salah Elsayed, Alaa Elmetwalli, Gharieb Al-Sayyad, Attia A.Attia, Mervat G. Hassan
Copper-Zinc Nanoparticles: Synthesis, Physicochemical Properties, and Biological Efficacy Against Bacteria and Cancer Cells Mohamed Gamal, Gharieb Al-Sayyad, Alaa Elmetwalli, Sabah A. Abo-ElMaaty, Mervat G. Hassan
Modification of Fungal L-arginase by Some Modifiers of the active Enzyme Residues Nayra E. Radwan, Mervat G. Hassan, Mohamed O. Abdel Monem, Attia A. Attia, Hamed M El-Shora
Isolation and Biosensitivity Assessment of Carbapenem- resistant Escherichia coli Strains Aya Ahmed, Sabah Abo-Elmaaty, Ramy Karam, Ahmed Aabdelaziz, Mervat G. Hassan
Molecular Characterization of Hepatitis B Virus: Correlation of Cytokine Profiles with Clinical Severity Mohamed F. Eltayeb, Mohamed Nasr-Eldin, Rania Rizk, Ayman Hassan, Mahmoud M. Amer, Alaa Elmetwalli

12:30 – 13:30 Student Research Session

Session A: Students' Posters
Prof. Dr. Mohamed Abo Riya **Chairman** **Prof. Dr. Nasr Allah Abdel Hamid** — **Co-chairman** **Prof. Dr. Mohamed Osman** — **Co-chairman** **Prof. Dr. Mona Fawzy** — **Co-chairman** **Prof. Dr. Kamal Amal** — **Co-chairman** **Dr. Ayman Awad** — **Co-chairman** **Dr. Hesham El Feky** — **Co-chairman**

13:30 - 14:30 Lunch

General assembly: Closing Ceremony	
14:30 – 15:30	**Distribution of Certificates**
15:30 -16:00	**Closing Session and Recommendations**

Chemistry Abstracts

4th Scientific International Conference of the Faculty of Science, Benha University

Kinetic studies on the catalyzed and un-catalyzed pyrolysis of mixed HDPE and PP (75:25 wt%) plastic waste using a combination of model-fitting and model-free methods

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Abstract

This study investigates the catalyzed and un-catalyzed pyrolysis kinetics of waste samples composed of a commercial mixture of high-density polyethylene (HDPE) and polypropylene (75:25 wt%). The reaction mechanism and kinetic compensation effects were examined. Thermal analysis was conducted at various heating rates (β = 2–20°C/min) in an inert atmosphere using thermogravimetric analysis (TGA). Four methods—Friedman (FR), Ozawa-Flynn-Wall (OFW), Kissinger-Akahira-Sunose (KAS), and Starink (ST)—were employed to evaluate the kinetic parameters, including the pre-exponential factor and activation energy. Additionally, five model-fitting methods (Coats-Redfern, master plots, and iteration methods) were used to establish the kinetic model. The conversion function for random scission processes, f(R), is proposed to accommodate degradation mechanisms. The addition of a 10 wt% Zeolite A catalyst significantly reduced the activation energy required for the degradation of the waste mixture.

Keywords: Mixed Plastic, Kinetic model, Random Scission, Pyrolysis, catalysis**.**

4th Scientific International Conference of the Faculty of Science, Benha University

The study of antimicrobial activity and molecular docking simulation of treated cotton fabric with fire retardancy phosphorous-PMMA/modified MMT nanocomposites

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Abstract

In this study, the morphology of untrerated and treated CF was investigated using Scanning Electron Microscope (SEM), SEM-EDX and mapping to prove the presence of phosphate in treated cotton fabric CF. We investigated the antimicrobial activity of the untreated and treated CF with fire retardancy phosphorous-PMMA/modified MMT nanocomposites with diffferent concentrations on unicellular fungi (C. albicans), two types of bacteria (L. monocytogenes and S. aureus) as Gram-positive and on another two types of bacteria (Salmonella sp. and E. coli) as Gram-negative. by measuring the inhibition zone diameter. Antimicrobial effect of treated and untreated CF were applied through disc diffusion method. The results showed a good efficiency of treated CF samples with the most of microorganisms than untreated CF. Also, the molecular docking simulation was investigated to treated CF which showed that the treated CF had high efficiency than pencelien g against positive bacteria and methicillin against negative bacteria**.** On the other hand, the treated CF showed high efficiency than fluconazole against candida alibicans.

Keywords: Antimicrobial activity, molecular docking, untreated and treated cotton fabric.

4th Scientific International Conference of the Faculty of Science, Benha University

Synthesis and Evaluation of Cationic Surfactants

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Dr. Hany I. Mohamed **Email: hany.ibrahim@fsc.bu.edu.eg**

Abstract

Gemini cationic surfactant was prepared by the quaternization of 2-(dimethylamino)ethyl dodecanoate with 1,3-phenylene bis(2-chloroacetate). Gemini surfactants possess a distinctive chemical structure that sets them apart from traditional surfactants. They contain two hydrophilic heads, and two hydrophobic tails that are connected together by a spacer group as methylene or stilbene. If the properties of the prepared Gemini surfactants are compared with conventional, these surfactants have a higher performance efficiency at lower concentrations so; small amounts are needed. They are more effective at reducing the surface and interfacial tension giving lower values of CMC, also have better aggregation structures which lead to the more economically favored in industrial field. The prepared compound shows good surface properties as suitable emulsifying agent in cosmetics applications.

***Keywords*:** Gemini cationic surfactants, quaternization, surface properties.

4th Scientific International Conference of the Faculty of Science, Benha University

Removal of Mn(II), Cd(II) and Ni(II) cations from aqueous solutions using modified chitosan by simple method

Noha T. Abo El-nassr [a], Abdou S. El-Tabl [b], Hossam S. Jahin [c], Mohammed H. H. Abu-Setta [b], Alaa.S. Amin [d], Islam.M.I. Mustafa [d]

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Abstract

More attention has recently been paid by the scientific community to different adsorbents for the purification of wastewater. In this work, the adsorption capacities of modified chitosan towards Mn(II), Cd(II) and Ni(II) ions removal from aqueous solutions were examined. To verify the development of new groups, the modified chitosan was characterized by X-ray, thermogravimetric analysis, field-emission scanning electron microscopy, and Fourier transform infrared spectroscopy. Inductively Coupled Plasma spectroscopy was used to determine the metal ion concentration of the solution before and after adsorption. Variables including the impacts of the metal ion's initial concentration, contact time, solution pH, adsorbent dosage, and the temperature were used to examine the adsorption and kinetics studies of the process. The pseudo-second-order kinetic mode made good sense in the kinetic data. Removal effectiveness was found to rise with increasing time, temperature, and pH from 3 to 8 but decrease with increasing initial ions concentration and dose. Of these, the highest percentages of Mn (II), Cd(II), and Ni(II) removal were 70.44, 67.15, and 74.02%, respectively. An analysis of the isothermal properties was highly consistent with Langmuir's isotherm. By using the Langmuir Dubinin-Radushkevich and Freundlich isotherms, the maximum uptake yields and isotherm parameter values were determined. Physical adsorption method was demonstrated by the low mean adsorption energy values (1.48–2.26 kJ/mol). It was established that the thermodynamic parameters were endothermic (positive $\Delta H°$) and spontaneous (negative $\Delta G°$).

***Keywords*:** Heavy metals; modified chitosan; physico-chemical studies; Langmuir.

4th Scientific International Conference of the Faculty of Science, Benha University

Preparation and characterization of $ZnMn_2O_4$ via auto-combustion synthesis

I. H. Ahmed, S. A. Shama, M. M. Elsayed, A. M. El-sharkwy, A. A. Ali

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Abstract

$ZnMn_2O_4$ nanoparticles were synthesized by combustion method using urea and glycine fuels. $ZnMn_2O_4$ nanoparticles studied using XRD, FTIR, and DRS tools. The crystal size determined by XRD to be 16 nm. The direct band gap determined by using the extracted data from DRS. The obtained $ZnMn_2O_4$ nanoparticles were used for removal conge red dye from aqueous media.

Keywords: $ZnMn_2O_4$ nanoparticles, Combustion method, Band gap, Conge red.

4th Scientific International Conference of the Faculty of Science, Benha University

Studying the effect of adding thiourea to HFE on Mg-S battery behavior and its properties

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Abstract

The prolonged longevity of magnesium-sulfur batteries (Mg-S) with high energy density is still impeded by the slow kinetics of sulfur reduction and evolution and the severe polysulfide (PS) shuttling. Herein, improve of the Mg-S battery was tried by using thiourea (TU) as an additive to the halogen free electrolyte (HFE) which based on dissolving $Mg(NO_3)_2.6H_2O$ to acetonitrile and ethylene glycol dimethyl ether (ACN: G4). The erosion of the magnesium layer and the inability of magnesium ions to reach the cathode in significant quantities during the charging and discharging process are two frequent battery problems. Consequently, thiourea was applied as a corrosion inhibitor, allowing magnesium ions to pass through while also creating a protective layer on the anode's surface. From the electrochemical tests, Mg||Mg symmetric cells it can be observed that the most plating|stripping ratio of TU in HFE is HFE-$TU_{0.05}$ in 100 h. cycling. Mg|HFE-TU0.05|MoS2 cells were analyzed during the discharge/charge process. It was observed that HFE-$TU_{0.05}$ improve the cycling capacitance and coulombic efficiency (CE%) . The post-mortem analysis applied for the analysis of cathodes in the discharge and charge cells.

Keywords: Battery, electrochemical, capacitance**,** coulombic efficiency.

4th Scientific International Conference of the Faculty of Science, Benha University

Synthesis and characterization of cerium oxide nanoparticles using combustion method

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Abstract

Cerium oxide nanoparticles were prepared by combustion method using citric acid as a fuel. The obtained cerium oxide nanoparticles characterized using XRD, FTIR, and DRS tools. The crystal size is determined by XRD tool. The direct and indirect band gaps are calculated by using the extracted data from DRS. The obtained cerium oxide nanoparticles are used as photocatalytic for degradation of amaranth (AM) and orange G (OG) dyes. The photodegradation efficiency of CeO_2 nanoparticles was 83% and 84% within 120 min for AM and OG, respectively.

Keywords: Cerium oxide nanoparticles, Combustion method, Band gap, photodegradation.

4th Scientific International Conference of the Faculty of Science, Benha University

Synthesis and characterization of zinc oxide nanoparticles using hydrothermal method

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Abstract

Zinc oxide nanoparticles were synthesized by hydrothermal method using zinc acetate dihydrate as a metal precursor and NaOH at pH 9 using different temperatures: 100, 120 and 135 ºC for 1 hour, separately. The synthesized zinc oxide nanoparticles were characterized by X-ray diffraction (XRD), UV-Visible spectroscopy (UV-Vis), Fourier Transform Infrared spectroscopy (FT-IR) and diffuse reflectance spectroscopy. Crystal sizes, band gap and color axes of the synthesized nanoparticles samples were determined using XRD and DRS spectroscopy.

Keywords: Zinc oxide nanoparticles, hydrothermal method, XRD, FT-IR.

4th Scientific International Conference of the Faculty of Science, Benha University

Preparation and study of Magnesium oxide nanoparticles using combustion method

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Abstract

Magnesium oxide nanoparticles were prepared by combustion method using magnesium nitrate as oxidizer and urea, tartaric acid and citric acid as fuels. The synthesized magnesium oxide nanoparticles were characterized by X-ray Diffraction (XRD), UV-Visible spectroscopy (UV-Vis), Fourier Transform Infrared Spectroscopy (FT-IR) and Diffuse reflectance spectroscopy. Crystal sizes of the synthesized samples were determined from XRD. Band gap and color axes were determined from DRS tool.

Keywords: Magnesium oxide nanoparticles, XRD, band gap, DRS.

4th Scientific International Conference of the Faculty of Science, Benha University

Sonochemical and photocatalytic degradation of brilliant green in aqueous medium as an effective technique for water treatment

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Abstract

The sonolysis of Brilliant Green dye in aqueous solution was performed. The effect of H_2O_2 addition in different concentrations was studied. The TiO_2 and ZnO were used as adsorbents and photocatalysts under the effect of sonolysis in the presence and absence of H_2O_2. The degradation of the Green Brilliant dye was also studied by Fenton and photo-Fenton reaction under ultrasonic radiation. Kinetic studies of the decolorization of the dye in sono- photo-Fenton reaction revealed that the degradation process followed the first order mechanism with the correlation coefficient (R^2) of 0.9852 and 0.9918 for two different hydrogen peroxide concentrations under experimental conditions. The results showed that the AOP methods applied for Brilliant Green dye degradation are power methods for dye removal. The most effective technique is the photo-Fenton under ultrasound effect. AOPs applied in this work can be used as an appropriate tool for degradation of azo dyes to non-toxic end products.

Keywords: Brilliant Green, sonolysis, photo-Fenton, sonocatalytic, sono-photo-Fenton.

4th Scientific International Conference of the Faculty of Science, Benha University

Fundamental effective technique for water treatment by using sonochemical and photocatalytic degradation of methylene blue in aqueous medium

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[2] Faculty of Science, Benha University, Benha, Egypt

Abstract

Methylene blue (MB) is a carcinogenic contaminant known for its harmful effects on humans and marine life. This study focuses on the basics and variables of kinetic studies involved in the degradation of MB. It has been seen that TiO2 and ZnO were used as adsorbents and photocatalysts under the effect of sonolysis in the absence and presence of H_2O_2. Fenton and photo-Fenton reactions under ultrasonic radiation were also used to investigate the degradation of MB dye. These methods successfully degraded the investigated dye by (89.2, 98.2, 87.8, 95.2, 64.5, 97.2, 87.5 and 98 % respectively). The most effective approach is photo-Fenton with ultrasound. The AOPs employed in this study can be used as an acceptable tool for degrading hazardous dyes into non-toxic end products.

Keywords: Methylene blue, sonolysis, photo-Fenton, sonocatalytic, sono-photo-Fenton.

4th Scientific International Conference of the Faculty of Science, Benha University

Effortless green synthesis of zero-valent copper nanoparticles

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Abstract

We present a direct, environmentally friendly approach for synthesizing porous zero-valent copper nanoparticles utilizing green tea as both a reducing and stabilizing agent. The synthesis procedure was efficient, economical, and eco-friendly. The impact of the reactants' mixing ratio was examined. Optimal yield, around 70%, was attained at 158°F with stirring for 2 hours at 1000 revolutions per minute. The resulting pellet was rinsed three times with distilled water and ethanol. The nanoparticles were dehydrated in a hot air oven at 122 °F. Nanoparticle formation was confirmed via visible color change, UV-visible spectroscopy (UV-Vis), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), zeta potential measurement, scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDX), and transmission electron microscopy (TEM). The XRD analysis revealed that the particles exhibited an average crystallite size of around 25 nm. SEM scans validate its oval morphology.

Keywords: Green Tea; Copper; Zero-valent; Nanoparticles.

4th Scientific International Conference of the Faculty of Science, Benha University

Non-ionic Surfactants as Enhancement Oil Recovery based on Oleic Acid as Commercial Raw Material.

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Abstract

Crude oil is limited and non-renewable. But despite this, the quantity of crude oil on hand must meet the increasing global requirements. Reduction of oil production has caused serious oil crises followed by a rise in oil prices. All these causes prompted the oil industry to extract oil from more challenging locations, where access is more difficult, and recovery methods are continually being improved. This has led to the advancement of enhanced oil recovery (EOR) techniques. The oleic acid as the model to prepared non-ionic surfactant by reacting with glycols derivatives to produce Alkoxy ethylated oleate used for enhanced oil recovery which showed higher efficiency.

Keywords: Enhanced oil recovery (EOR), Non-ionic, Surface properties.

4th Scientific International Conference of the Faculty of Science, Benha University

Green Synthesis of Pyrimidine Derivatives and Evaluation of Their Biological Activity

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Abstract

The present paper describes synthesis of pyrimidine derivatives 1a,b in accordance with green chemistry techniques including water and free solvents. Aldehydes namely. (dimethylamine)benzaldehyde or bimethoxibenzaldahyde, were allowed to react with thiureaa and benzoylacetopheophenone. The spectral data (MS, IR, 1H NMR, 13C NMR) and elemental studies were employed to clarify the structural formula of the products. The synthesized compounds were assessed for their biological efficacy against a panel of bacterial species, which included Candida albicans, Salmonella typhimurium, Escherichia coli, Shigella sonnie, and Staphylococcus aureus. The products showed good results compared with Ciprfloxacin.

Keywords: Pyrimidine, water, free solvent, spectroscopy, biological activity.

4th Scientific International Conference of the Faculty of Science, Benha University

Convenient green production of CeO_2 nanoparticles by the auto combustion method

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Abstract

Synthesis of cerium oxide (CeO_2) nanoparticles was studied by new and simple combustion method. The cerium oxide nanoparticles were synthesized using $Ce(NO_3)_3.6H_2O$ precursor by combustion technique using different concentration of jojoba oil as a fuel agent. Characterization of the synthesized nanoparticles was performed using X-ray diffraction (XRD) and Fourier-transform infrared spectroscopy (FTIR). XRD pattern showed the cubic structure of the cerium oxide nanoparticles. The average particle size of CeO_2 was around 38.97 nm with (3 mL from oil) and 75.56 nm with (5mL from oil) as estimated by XRD technique, indicating good crystallinity. The FT-IR spectrum clearly indicated the strong presence of cerium oxide nanoparticles. The results indicate that the combustion method is a highly effective and cost-efficient technique for producing highquality cerium oxide nanoparticles.

Keywords: CeO_2; JoJoba; Nanotechnology; nanoparticles.

4th Scientific International Conference of the Faculty of Science, Benha University

Tomato peels extract as a green corrosion inhibitor for carbon steel in acetic acid solution

Sally M. Refaat*, Hanan B. Newigy*, Aly Y. El-Etre*, Elsayed M. Mabrouk*

***Chemistry Department, Faculty of Science, Benha University, Egypt**

Abstract

The active components in tomato peels were extracted using alcohol, and FTIR was obtained to clarify the structure. Electrochemical impedance spectroscopy (EIS), potentiodynamic polarization (PP), and weight loss (WL) measurements were used to investigate the corrosion inhibition of carbon steel in acetic acid solution. The corrosion rate decreased as the extract content increased. Additionally explained were the rise in charge transfer resistance and the fall in polarization current densities; an indication for the inhibitory effect. The findings demonstrated that the inhibitory effect was caused by the physical adsorption of molecules on the carbon steel surface majorly at the cathodic locations, forming a barrier that protected the steel from the corrosive medium. This adsorption followed Langmuir isotherm. Also, the temperature effect showed a tendency of tomato peels extract to inhibit the corrosion, cathodically.

Keywords: Corrosion, adsorption, carbon steel, *Tomato peels*, acetic acid.

4th Scientific International Conference of the Faculty of Science, Benha University

Utilization of solid-phase extraction for colorimetric determination of trace amounts of Sn(II) in real samples

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Abstract

The method for determining Sn(II) is rapid, sensitive, and selective. It involves the rapid reaction of Sn(II) with 2-(2-(4-chloro-6-((4-methoxyphenyl)amino)-1,3,5-triazin-2yl)hydrazono)methyl)-5(diethylamino)phenol(CMTHP), followed by the solid phase extraction of the Sn(II)-CMTHP complex. Some of the factors that were tested to make the proposed method more sensitive and effective for extraction were the acetate buffer solution with a pH of 4.6, the concentration of the reagent (5×10^{-4} M), the reversed-phase XAD-7, the equilibrating temperature, and the centrifuging time. CMTHP reacts with Sn(II) to form a light red-colored complex, with a molar ratio of 1:1 (Sn(II) to CMTHP), obtained by eluting the complex from the resin using a minimal amount of dimethylformamide (0.5 mL). Solid-phase extraction (SPE) enriched this complex. An enrichment factor of 100 was obtained by elution of the complex with the minimal amount of acetone. The molar absorptivity of the complex was $5.1X\ 10^4$ L mol^{-1} cm-1 at 463 nm in the measured solution. Beer's law was obeyed in the range of $2.5\ X\ 10^{-6}$ M to $5.0\ X\ 10^{-5}$ M. The detection and quantification limits were calculated and found to be $8.0\ X\ 10^{-7}$ M and $2.64X\ 10^{-6}$ M. The proposed method was applied to the determination of Sn(II) in water, food, and soil samples with good results.

Keywords: Solid-phase, acetate buffer, complex, dimethylformamide.

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Electrochemical synthesis of polyaniline coating on Pb alloy for high corrosion protection performance

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Abstract

Polyaniline (PANI) coating was electropolymerized on Pb alloy surface using cyclic voltammetry technique in a sulfuric acid solution containing aniline monomers. The corrosion performance of PANI coatings in 1M H_2SO_4 solutions was investigated by an electrochemical method such as potentiodynamic polarization technique. The influence of parameters such as aniline concentration, cycle number as well as scan rate on the anticorrosion properties of PANI film was investigated. The polyaniline coating exhibited a strong decrease of corrosion current in the acidic medium compared to the bare substrate and corrosion potential increased from −0.543 V vs SCE for uncoated alloy to 0.425 V for polyaniline coated lead alloy electrode. The results indicated that Polyaniline coating effectively protected Pb alloy from corrosion in acidic solutions, suggesting its potential as a coating material for corrosion protection of lead alloy in aqueous corrosive environments.

Keywords: Pb alloys, Polyaniline, Electrochemical polymerization, Cyclic voltammetry, Corrosion protection.

Impact of some environmental conditions on degradation of some pendimethalin formulations currently applied in Egypt

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Abstract

Three commercial pendimethalin capsule suspension (CS) formulations were collected from the Egyptian market (manufactured by three different companies) to examine the impact of storage at room temperature and sunlight exposure for six months, as storage at 54 ±2 °C for 70 days, on the stability of pendimethalin, furthermore employing GC-MS to identify some breakdown products following exposure to sunlight. According to the results, pendimethalin was stable after storage at room temperature and 54 ±2 °C for 14 days, and the degradation rate was not affected even with increasing the storage period for all sources. pendimethalin was less stable after being exposed to sunlight than storage at 54 ±2 °C and there was no difference in the degradation rate for all pendimethalin formulations. Pendimethalin photodecomposes by oxidative dealkylation and nitro reduction. Four degradation products were found using GC-MS analysis of samples exposed to the sunlight as follows: *N*-(1-ethylpropyl)-3-methyl-2,6-dinitroaniline, *N*-propyl-3,4-dimethyl-2,6-dinitroaniline, 4,5-dimethyl-3-nitro-N^2-(pentan-3-yl)benzene-1,2-diamine and 2,6-dinitro-3,4-dimethyalaniline.

Keywords: Pendimethalin, Sunlight, Degradation products, GC-MS.

Utility of solid-phase extraction coupled with spectrophotometry for the determination of silver using 6-(2-(4-(dimethylamino)benzylidene)hydrazinyl)-N^2,N^4-di-p-tolyl-1,3,5-triazine-2,4-diamine

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Abstract

A highly sensitive, selective, and precise extraction method has been developed for the determination of Ag(I) spectrophotometrically after solid-phase extraction. DBHTTD, which stands for 6-(2-(4-(dimethylamino)benzylidene)hydrazinyl)-N2,N4-di-p-tolyl-1,3,5-triazine-2,4-diamine, was used to find Ag(I) at λmax 392 nm. It formed a deep yellow complex at pH 7.14 in a universal buffer solution. Beer's law was obeyed from 3.42 × 105 M to 5.2 × 107 M of Ag(I). The detection and quantification limits were calculated and found to be 1.07 × 105 M and 3.35 × 105 M, respectively. The proposed methods have been successfully applied for the determination of trace amounts of Ag(I) in a variety of environmental (water, food, and soil) samples with a recovery range of 98.78–101.45%.

Keywords: solid phase, silver, spectrophotometry and DBHTTD**.**

Biology Abstracts

Wastewater Treatment by Biological Filtration Technique Improves Biochemical and Microbiological Parameters in Nile tilapia (*Oreochromis niloticus*)

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Abstract

Polluted water from drains outfalls in fish farms has a dangerous environmental effect. This study assesses the impact of the quality of treated wastewater by sand filter system in three different types of water as drainage water (DW), treated water (TWW), and River Nile at El-Kanater El-Khyria (RNW) as control. The suitability of water quality for reuse in Nile tilapia farming has been examined. Based on bacteriological results, treated water has significantly reduced pathogenic bacterial diversity. The results of the fish examination indicated that changes in water quality variables have a significant impact on the blood profile of fish. The obtained data showed poor water quality in DW compared with TWW and RNW. Fish from DW had high levels of amino-aspartate activity transferase (AST) and alanine aminotransferase (ALT), increased values of creatine and urea, and decreased antioxidant enzyme activity compared to control. Thus, it could be concluded that the treatment of drainage water using a sand filter is efficient in producing high water quality for fish farming.

***Keywords*:** Nile tilapia (*Oreochromis niloticus)*; Sand filter, microbiological parameters, biochemical parameters.

Antagonistic Activity of Probiotics against Gram Negative Bacteria

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Abstract

Probiotics are live cells with various beneficial properties that have been thoroughly researched and investigated for use in a wide range of products on the global market. Numerous scientific researchers have demonstrated their benefits for both human and animal health. The current study set out to isolate probiotic bacteria that could be hostile from a variety of curd samples in order to isolate them. After a preliminary screening process, 39 bacterial strains were identified as promising probiotics from the samples. The probiotic qualities and antagonistic activity of each of the chosen isolates against clinical stool samples obtained from patients and utilized for the isolation of bacterial pathogens were then assessed in vitro. Pathogens and aggregation tests using automated identification systems (VITEK) were used to identify the pure bacterial isolates. The results demonstrated that the most efficient strains for preventing the growth of all test pathogens, including Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumonia, Proteous vulgaris, and Enterobacter sp., were the prospective probiotic isolates Lact, S2, M3, F1, Y1, Y3, and Y4. The isolates were identified as excellent, promising in vitro antibacterial probiotic isolates against pathogens based on the data obtained; further in vivo evaluation and human health benefits in their actual environments are required.

Keywords: Probiotics, Antagonistic Activity, Gram Negative Bacteria, pathogens

Occurrence of toxigenic fungi in sugarcane juice

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Abstract

Sugarcane juice is considered the most popular fresh juice in Egypt, with cane juice shops spreading through all the Egyptian cities. Sugarcane juice contains 75 - 85% water and 10 - 21% sucrose. Sugarcane is a suitable host for many saprophytic fungi. No or little information has been reported on fungal flora and their toxins associated sugarcane juice in Egypt so, this study aimed to investigate the natural occurrence of toxigenic fungi associated sugarcane juice. Randomized seven sugarcane juice samples were collected from seven different localities (Places) in Kalubya Governorate (Banh, Tukh and Shibin El Quanater). Fungal flora were isolated by serial dilution technique. The obtained data resulted that, isolation from seven different sugarcane juice localities yielded 322 fungal isolates. Higher total fungal count was recorded with location 6 sample. Identification indicated that, five fungal genera belonging to eight species were identified. These are *Alternaria alternata*, *Aspergillus* spp., (*Aspergillus niger*, *A. flavus* & *A. parasiticus*), *Fusarium* spp. (*Fusarium solani* & *F. oxysporum*), *Penicillium* sp. and *Rhizopus stolonifer*. *Aspergillus* species were the highest frequently present in sugarcane juice and *Aspergillus niger* was higher fungal frequency occurred. According to HPLC data, tested of mycotoxins production presented, Four isolates of *Aspergillus parasiticus* and two isolates of *A. flavus* were aflatoxins (Afs) producers. Higher aflatoxin quantity (2.91ng/mL) was produced by *A. parasiticus* (isolate No. 20) from location two of sugarcane juice samples. Whereas, four isolates of *Aspergillus niger* isolates were positive producer of Ochratoxin A (OTA). Higher Ochratoxin A (OTA) production was recorded with *A. niger*, isolate No. 25 isolated from location one which gave 2.03 ng/ml of Ochratoxin A (OTA). All *Fusarium* spp. isolates were negative producer any toxins.

***Keywords*:** Sugarcane juice, Fungi, Aflatoxin (AFs), Ochratoxin A (OTA), HPLC.

Characterization of Probiotic Features Isolated From Fruits and Vegetables

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Abstract

The most beneficial bacteria to society are probiotics, which are utilized in the manufacturing of numerous fermented foods that improve immunity and digestion. In order to identify the possible probiotic qualities of certain fruits and vegetables, the objective study set out to separate and describe the probiotics' members. Probiotic strains were isolated and chosen for this investigation based on their morphology and biochemistry. The next step is to ascertain their probiotic characteristics, which include coagulase action, hemolytic activity, antibiotic sensitivity, bile-salt tolerance, and acid resistance. After 16 bacterial isolates were separated and purified from fruits and vegetables, they all demonstrated the highest levels of bile tolerance and resistance to acidic pH 2.0. All isolates were sensitive to tetracycline, and the majority of probiotics shown sensitivity to the investigated antimicrobial drugs. Every isolate was thought to be streptomycin resistant. According to our findings, isolates show promise as probiotics that could be used further in the production of probiotic products.

Keywords: Probiotics, features, Fruits, vegetables, biochemical characterization, safety.

Isolation of Polyhydroxybutyrate Microbial Producer from Local Egyptian Soil

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Abstract

Synthetic plastics' slow breakdown poses a serious risk to the environment; hence it is imperative that eco-friendly alternatives be used in their place. Because of their characteristics as biodegradable thermoplastics, biodegradable polymers like polyhydroxyalkanoate (PHAs) have lately been identified as polyesters. The biodegradable biopolymer polyhydroxybutyrate (PHB) has a number of uses in industry, agriculture, and medicine. This study's primary goal was to identify and classify an effective producer of PHB from soil samples taken from several locations in Egypt. The viable colony method of screening with Nile red dye was used to qualitatively assess all of the bacterial isolates for PHB synthesis. An effective PHB-producing bacterium was isolated from soil in the current investigation. Based on the viable colony staining method of screening using Nile red dye, 19 of the 52 distinct species of bacteria that were extracted were determined to be PHB positive. The 17 pinkish colonies that tested positive for Nile red staining under a microscope were bacilli-shaped, Gram-positive bacteria. The other two colonies were yeast as well. The findings showed that the majority of PHB in soil is produced by bacteria (89.5%), followed by yeast (10.5%).

Keywords: Polyhydroxybutyrate, Nile red Dye, Bacillus sp., Egyptian Soil.

Harnessing Bacterial Metabolites for the Synthesis of Cu-silicate NPs: A Sustainable Route to Antimicrobial and Anticancer Application

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Abstract

Background: Copper Silicate Nanoparticles (Cu-silicate NPs) have gained attention for their unique physical, chemical, and biological properties, making them promising candidates for antimicrobial and anticancer applications. Traditional chemical synthesis methods often involve hazardous substances, prompting the need for greener, more sustainable approaches. This study explores the synthesis of Cu-silicate NPs using *Pseudomonas aeruginosa*, a bacterium known for its metabolic capabilities, and evaluates their characterization, antimicrobial, and anticancer properties.

Methods: Cu-silicate NPs were synthesized by incubating *Pseudomonas aeruginosa* with copper sulfate under controlled conditions. The resulting nanoparticles were purified and characterized using UV-Vis, TEM, XRD, DLS, and FTIR. Antimicrobial activity was assessed against bacterial pathogens, while anticancer activity was evaluated using cancer cell lines.

Results: UV-Vis spectroscopy confirmed Cu-silicate NPs formation with a Surface Plasmon Resonance peak at 580 nm. TEM images revealed an average size of 35 ± 10 nm. XRD analysis indicated a Face-Centered Cubic (FCC) structure with characteristic peaks, while DLS measurements showed a dynamic diameter of 40 ± 5 nm and a zeta potential of -25 mV, indicating good stability. FTIR spectra identified functional groups associated with bacterial metabolites on the nanoparticle surface. The synthesized Cu-silicate NPs exhibited significant antimicrobial activity against various pathogens and demonstrated promising anticancer effects by inducing oxidative stress and apoptosis in cancer cell lines.

Conclusion: The study successfully demonstrated a green synthesis approach for Cu-silicate NPs using *Pseudomonas aeruginosa*. The characterized nanoparticles showed potential for antimicrobial and anticancer applications, offering a sustainable alternative to conventional synthesis methods. Further research is needed to explore their full therapeutic potential and mechanisms of action.

Keywords: Cu-silicate NPs, UV-Vis spectroscopy, *Pseudomonas aeruginosa*

Immunomodulatory and Antioxidative Effects of Vanillin on Human Acute Monocytic Leukemia Cells: A Potential Therapeutic Approach for AMoL

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Abstract

Background: Acute monocytic leukemia (AMoL) is an aggressive hematologic malignancy characterized by the uncontrolled proliferation of monocytes. Conventional therapies often fall short, necessitating the exploration of novel therapeutic approaches. Vanillin, a natural phenolic compound, has demonstrated various bioactivities, including antioxidant, anti-inflammatory, and anticancer effects. This study investigates the immunomodulatory and antioxidative properties of vanillin in the human acute monocytic leukemia cell line, THP-1.

Methods: THP-1 cells were treated with varying concentrations of vanillin (50 µM, 100 µM, 200 µM). The production of pro-inflammatory cytokines (TNF-α, IL-6) and anti-inflammatory cytokine (IL-10) was quantified using ELISA. Oxidative stress was assessed by measuring ROS levels, malondialdehyde (MDA) content, and the activities of antioxidant enzymes such as glutathione (GSH), catalase, and superoxide dismutase (SOD). Cellular and molecular characterization was performed using zeta potential analysis, atomic force microscopy (AFM), and Fourier-transform infrared spectroscopy (FTIR).

Results: Vanillin treatment resulted in a significant reduction in TNF-α and IL-6 levels, coupled with an increase in IL-10 production in THP-1 cells. These effects were dose-dependent, with higher concentrations of vanillin exerting more pronounced immunomodulatory effects. Vanillin also effectively reduced ROS levels and MDA content, while enhancing GSH levels, catalase activity, and SOD activity, indicating a robust antioxidative response. Physical and biochemical analyses revealed alterations in cell morphology and surface properties, suggesting that vanillin may induce apoptosis or other forms of cell death in leukemic cells.

Conclusion: Vanillin exhibits significant immunomodulatory and antioxidative effects in THP-1 cells, highlighting its potential as a therapeutic agent for AMoL. By reducing pro-inflammatory cytokines, enhancing antioxidant defenses, and inducing cellular changes, vanillin may contribute to the suppression of leukemia cell proliferation and survival. These findings warrant further investigation into vanillin's mechanisms of action and its potential application in leukemia therapy.

***Keywords*:** Acute monocytic leukemia, vanillin, oxidative stress, cytokines, antioxidants, THP-1 cells.

Antibacterial activity of ethanolic extracts of *Thymus vulgaris* and *Cinnamomum camphora* on human pathogenic bacteria.

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Abstract

Medicinal Various chemical compounds produced by herbs have primary medicinal uses, particularly in treating bacterial diseases, such as nosocomial infections. *Thymus Vulgaris Cinnamomum camphora* ethanolic extracts were investigated for their antibacterial activity against three hazardous bacteria: *Staphylococcus aureus, Acinetobacter baumannii complex*, and *Klebsiella pneumoniae*. The three dangerous bacteria—*Staphylococcus aureus*, *Acinetobacter baumannii complex*, and *Klebsiella pneumo*niae—were detected utilizing the 16rRNA gene extracted from clinical specimens (pneumonia, sputum, urine). Two Egyptian plant extracts, ethanolic (*Thymus vulgaris*) and the other *Cinnamomum camphora*, were tested in vitro for antibacterial activity. The *Thymus Vulgaris* extract showed main inhibition diameters of 27, 30.3, and 20.6 mm against three human pathogenic bacteria, while the *Cinnamomum camphora* extract showed main inhibition diameters of 25, 27.6, and 18.3 mm. The gas chromatography-mass spectrometry (GC-MS) examination of the *Thymus Vulgaris Cinnamomum camphora* extracts indicated the presence of several terpene compounds. The main ingredient (in this order: cis-vaccenic acid, otadecanoic acid, cis-13-eicosenoic acid, erucic acid, oleic acid, 13-docosenoic acid, isochlapin B, thymol, epiplobol).

***Keywords*:** *Acinetobacter baumannii complex, Staphylococcus aureus, Cinnamomum camphora, Klebsiella pneumoniae, Thymus vulgaris.*

Isolation and Biosensitivity Assessment of Carbapenem-resistant *Escherichia coli* Strains

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Abstract

The escalating global challenge of antimicrobial resistance (AMR) has become particularly pronounced with the rise of Carbapenem-resistant *Escherichia coli* (CREC), a formidable multidrug-resistant pathogen. This paper delves into the multifaceted impact of CREC, exploring its role in AMR, the severity of bloodstream infections it causes, and the crucial significance of antimicrobial screening. With CREC limiting treatment options, especially in bloodstream infections, the urgency of addressing this public health threat is evident. Antimicrobial screening emerges as a vital tool for early detection, guiding therapeutic decisions and mitigating further spread. The study's material and methods detail the isolation of CREC strains, antimicrobial susceptibility testing, and a comprehensive statistical analysis. Results illustrate complex resistance and sensitivity patterns, emphasizing the need for tailored therapeutic approaches guided by local resistance profiles. The findings contribute valuable insights for antimicrobial stewardship, infection control, and evidence-based therapeutic strategies in addressing the pressing global health concern of CREC and AMR.

Keywords: Carbapenem-resistant *Escherichia coli*, antimicrobial resistance, antibiotic resistance, bloodstream infections, antimicrobial screening, multidrug-resistant bacteria.

Myco-synthesis of silver and ZnO nanomaterials using endophytic fungi isolated from different locations in Egypt for sustainable development

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Abstract

The approach of biosynthesis of nanoparticles utilizing endophytic fungus is very promising due to its efficacy, environmental friendliness, cost-effectiveness, and straightforward procedures. In this work, we examined six endophytic fungal isolates derived from various plants to determine their ability to produce four types of nanoparticles: AgNPs, CuNPs, SiONPs, and ZnONPs. Preliminary identification of nanoparticle synthesis using UV-Visible spectrophotometer and particle size analyzer revealed the presence of two distinct types of nanoparticles: ZnONPs and AgNPs. The isolated fungus TRA2 produced silver nanoparticles (AgNPs) and zinc oxide nanoparticles (ZnONPs) with average diameters of 18 and 28.7 nm, respectively. Comparatively, the fungus TRC1 produced silver nanoparticles (AgNPs) with average diameters of 22.8 nm and zinc oxide nanoparticles (ZnONPs) with average diameters of 73.8 nm. Morphological identification of the two isolates (TRA2 and TRC1) revealed their respective species as *Talaromyces sp*. and *Chaetomium sp*. The identified isolates show great potential as viable options for the production of bionanomaterials aimed to achieve sustainable development

***Keywords*:** Nanomaterial, Silver-nanoparticle, Zincoxide-nanoparticle, *Talaromyces sp., Chaetomium sp.*

Response of Fungal L-glutaminase to Anhydrides and Chelating Agents

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Abstract

Specific activity of L-glutaminase (E.C 3.5.1.2) was determined by isolating and partially purifying it from Penicillium chrysogenum using ammonium sulfate (85%). Upon addition of maleic anhydride (MA) and succinic anhydride (SA) to the reaction media at different concentrations (0.2, 0.4, 0.6, 0.8, and 1.0 mM), the enzyme was shown to be inhibited. The activity of the enzyme was reduced at a concentration of 10 mM by the four chelating agents ethylene glycol tetraacetate (EGTA), ethylenediaminetetraacetate (EDTA), phenannthroline, and dipyridyl, suggesting that the enzyme is a metalloenzyme. Metal cations such as $CoCl_2$, $CuCl_2$, $FeCl_3$, and $MgCl_2$ in the reaction media at a concentration of 10 mM shown to be inhibitory to the enzyme. Nevertheless, calcium chloride enhanced the enzyme activity at an equivalent concentration.

Keywords: L-glutaminase, Fungi, Anhydrides, Chelating agents, Metal Cations.

Modification of Fungal L-arginase by Some Modifiers of the active Enzyme Residues

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Abstract

Arginase, also known as L-arginine urea hydrolase or amidinohydrolase (EC 3.5.3.1), is an essential hydrolytic enzyme involved in the urea cycle catalyzing urea synthesis in the liver of mammals. Enzyme was extracted and partly purified from Penicillium chrysogenum, with a specific activity of 15.8 units per milligram of protein. Investigation was conducted on the impact of specific reagents, namely phenyl glyoxal (PGO), Woodward's reagent K (WRK), N bromosuccinimide (NBS), and trinitromethane (TNM), on the active groups of L-arginase. The aforementioned chemicals exhibited a concentration-dependent inhibition of L-arginase activity at different tested concentrations (1, 2, 3, 4, and 5 M). The inhibitory effect of PGO on L-arginase at 1 M was 82.3%, whereas WRK exerted an inhibitory effect of 90.0%. Both TNM and NBS exhibited enzyme inhibition rates of 70.2% and 81.0%, respectively. The observed inhibition highlights the crucial involvement of arginyl, carboxyl, tyrosyl, and tryptophenyl residues in the process of enzyme catalysis.

Keywords: Enzymes, L-arginase, Penicillium chrysogenum.

Biosynthesis, extraction, purification of postbiotic from probiotic isolate

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Abstract

The most effective microbes for society are probiotics. Exopolysaccharide (EPS) from probiotics, which has a range of biological activities, has enormous promise in the areas of health, chemical material production, and cosmetics. Examine the process of producing, extracting, and purifying postbiotic (probiotic EPS) after identifying probiotic isolates that are capable of producing EPS. Using MRS, 32 bacterial isolates were examined. Nine isolates lacked EPS production in the liquid MRS, while 23 isolates demonstrated EPS production. The broth culture's ultimate pH changed from 6.5 to 4.0–5.0. Two volumes of 100% ethanol were used to precipitate the EPS. Deionized water was used to dissolve the EPS, which was then dialyzed against deionized water and freeze-dried. The purification phase involves the removal of proteins using 10% (w/v) trichloroacetic acid at a final pH of 6.8, the purified freeze-dried was measured at 470 mg/L. The culture measured the dry weight of the cells and the dry weight of the EPS before calculating the yield coefficient, or YP/X (0.39 g / g). Our findings indicate that the isolates are a promising source of probiotics that could be used in the future to produce probiotic products.

Keywords: Probiotics, postbiotic, exopolysaccharide, precipitation, purification.

Numerical taxonomic study on some plant species of family Geraniaceae collected from Egypt desert

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Abstract

The current study involves the systematic relationship between the eight species belonging to family Geraniaceae in the Egyptioan flora reexamined based on the whole plant morphology were collected from different localities in Egypt during the period from February 2022 to May 2023 for systematic studies. Morphologically, identification and classification of collected plants species of family Geraniaceae occurred by utilizing the light microscope, regarding the taxonomic revisions of the reference collected specimens in other Egyptian Herbaria. The results obtained show annual habit in five species *Erodium ciconium, Erodium cicutarium*, *Erodium laciniatum*, *Erodium malacoides* and *Erodium texanum* but *Erodium crassifolium*, *Erodium glaucophyllum* and *Monsonia nivea* found as perennial, all species have hairy surface. Stem ranged from erect in *Erodium crassifolium*, *Erodium glaucophyllum, Erodium malacoides and Monsonia nivea* and prostrate in *Erodium ciconium, Erodium cicutarium*, *Erodium laciniatum*, *Erodium texanum.* The relationship between the examined species expressed as UPGMA tree based on the coefficient of similarity using the NTSYS program. In tree, all species clearly distinguished into two clusters reflect the morphological resemblances between them.

Keywords: Geraniaceae, morphology, *Erodium*, *Monsonia*.

The Bioactivity and Modulatory Properties of Functionalized Bacterial Glutaminase in Cancer Biology

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Abstract

Background: Breast cancer remains one of the leading causes of cancer-related mortality among women worldwide. The metabolic dependency of breast cancer cells on glutamine, a phenomenon known as "glutamine addiction," provides a potential therapeutic target. Glutaminase, an enzyme responsible for converting glutamine to glutamate, plays a crucial role in this metabolic pathway.

Objective: This study aims to explore the therapeutic potential of functionalized bacterial glutaminase in breast cancer treatment. By conjugating the enzyme with breast cancer-specific targeting ligands, we hypothesize that the selective disruption of glutamine metabolism in cancer cells can be achieved, thereby inhibiting cell proliferation and survival.

Methods: Functionalized bacterial glutaminase was synthesized by conjugating bacterial glutaminase with breast cancer-specific ligands. MCF-7 and MDA-MB-231 breast cancer cell lines were treated with varying concentrations of the functionalized enzyme. Cell viability was assessed using the MTT assay. Metabolic effects were evaluated by measuring glutamine uptake, glutamate production, and the activities of key metabolic enzymes (GLS1 and GDH). mTOR phosphorylation, a marker of cell growth signaling, was also analyzed.

Results: Functionalized bacterial glutaminase exhibited dose-dependent and time-dependent cytotoxicity in both MCF-7 and MDA-MB-231 cells. Treatment significantly reduced GLS1 and GDH activities, as well as mTOR phosphorylation levels, indicating effective disruption of cancer cell metabolism and signaling pathways. Notably, MDA-MB-231 cells showed higher sensitivity to the treatment.

Conclusion: Functionalized bacterial glutaminase demonstrates significant anti-cancer activity against breast cancer cells by selectively targeting glutamine metabolism. Its dual impact on metabolic and signaling pathways suggests a promising therapeutic strategy for breast cancer. Further in vivo studies and the exploration of combination therapies are warranted to realize its clinical potential fully.

***Keywords*:** Bacterial glutaminase, Breast cancer, GDH activities, MDA-MB-231

Screening and Optimization of Polyhydroxybutyrate Production by *Streptomyces* sp. 3MGH Isolated from the Egyptian Soil

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Abstract

The increasing dependence on non-biodegradable plastics poses significant environmental challenges, driving the need for sustainable alternatives like polyhydroxybutyrate (PHB). This study aimed to isolate and optimize PHB production from *Streptomyces* sp. 3MGH, a bacterium isolated from Egyptian soil. Soil samples were collected from various locations, leading to the isolation of 25 *Streptomyces* species. Qualitative screening using Sudan Black B staining identified 14 PHB-producing isolates. Among these, *Streptomyces* sp. 3MGH demonstrated the highest PHB yield of 3.34 g/L. Molecular identification via 16S rRNA sequencing confirmed its close phylogenetic relationship to known *Streptomyces* strains. Optimization experiments evaluated the effects of carbon and nitrogen sources, incubation temperature, time, and shaking speed on PHB production. The results indicated that optimal conditions for PHB accumulation were achieved at an incubation temperature of 30 °C, with 150 rpm agitation, and a 7-day incubation period using fructose as carbon source and yeast extract as nitrogen source. These findings suggest that *Streptomyces* sp. 3MGH presents significant potential for industrial-scale PHB production, contributing to the development of biodegradable plastics.

Keywords: PHB, Sudan Black B, *Streptomyces*, polymer, bioplastic

Molecular Characterization of Hepatitis B Virus: Correlation of Cytokine Profiles with Clinical Severity

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Abstract

Background: About 290 million people worldwide suffer with hepatitis B virus (HBV) infections, making them a serious global health concern. Serious liver-related problems, such as cirrhosis and hepatocellular cancer, may result from a persistent HBV infection. With an emphasis on cytokine expression patterns and genetic pathways linked to HBV infection, this work explores the molecular characterisation of HBV strains in infected cell lines.

Methods: This research comprised 50 individuals who had a persistent HBV infection. Liver function tests were performed, and clinical and demographic data were recorded. PCR amplification and sequencing were used to characterize HBV strains and find mutations. Cytokine expression levels were measured using quantitative PCR (qPCR), and the diagnostic capability of the selected genes was assessed using ROC curve analysis. Furthermore, bioinformatics analysis was conducted to elucidate the enriched pathways associated with HBV infection.

Results: The average age of the patient group was 45.3 years, and the fibrosis scores and raised liver enzymes (ALT: 68.2 U/L, AST: 65.4 U/L) showed different levels of liver damage. The S, C, and X genes were among the specific alterations found in the HBV genome. TNF-α (Fold Change: 32.0), IL-6 (Fold Change: 16.0), and other important cytokines were significantly upregulated in HBV-infected cell lines as compared to controls, according to cytokine expression analysis. With AUC values of 0.82 and 0.80, respectively, ROC curve analysis showed that TNF-α and CXCL10 had good diagnostic potential. Immune response-related pathways showed significant enrichment, according to pathway analysis.

Conclusions: This research shows that the clinical severity of infection is correlated with certain cytokine profiles and genetic alterations in HBV. Pro-inflammatory cytokine levels that are elevated might be used as therapeutic targets and indicators for the course of the illness. Comprehending these associations is essential for expanding therapeutic alternatives and enhancing patient results in cases of HBV infection.

***Keywords*:** HBV, HBV genome, cytokine, Pro-inflammatory

Biosynthesis and Characterization of Silver-Selenium Nanoparticles from Endophytic Fungi and Their Biological Activity

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Abstract

Background: Silver (Ag) and selenium (Se) nanoparticles are known for their unique antimicrobial properties. This study aims to synthesize Silver-Selenium (Ag-Se) nanoparticles using endophytic fungi and evaluate their antibacterial and anti-biofilm activities against clinically relevant bacterial strains.

Methods: Endophytic fungi were isolated from various plant samples, and Ag-Se nanoparticles were synthesized through a green synthesis method involving the reduction of silver nitrate ($AgNO_3$) and sodium selenite (Na_2SeO_3) using fungal extracts. The synthesized nanoparticles were characterized using techniques such as SEM, TEM, DLS, FTIR, and XRD. Antibacterial activity was assessed via the agar well diffusion method and Minimum Inhibitory Concentration (MIC) determination. Anti-biofilm activity was evaluated using a microtiter plate assay to quantify biofilm inhibition.

Results: The Ag-Se nanoparticles were characterized as spherical with an average size of 20-50 nm and exhibited a zeta potential of -27.3 mV, indicating good stability. The nanoparticles demonstrated significant antibacterial activity, with zones of inhibition of 16.1 mm against *Escherichia coli*, 21.0 mm against *Staphylococcus aureus*, and 14.8 mm against *Pseudomonas aeruginosa*. MIC values for Ag-Se nanoparticles were 25 µg/mL for *E. coli*, 30 µg/mL for *S. aureus*, and 40 µg/mL for *P. aeruginosa*, significantly lower than those for individual Ag (50, 60, and 70 µg/mL, respectively) and Se nanoparticles. Biofilm inhibition percentages were 65% for *E. coli*, 70% for *S. aureus*, and 58% for *P. aeruginosa*, with statistical significance confirmed by ANOVA and Tukey's post hoc test ($p < 0.01$).

Conclusion: The study demonstrates that Ag-Se nanoparticles synthesized from endophytic fungi exhibit superior antibacterial and anti-biofilm properties compared to their counterparts. These findings suggest the potential of Ag-Se nanoparticles as effective agents in combating bacterial infections and biofilm-related challenges, paving the way for their application in medical and industrial settings.

***Keywords*:** Silver-Selenium nanoparticles, Endophytic fungi, Antibacterial activity, Anti-biofilm

Copper-Zinc Nanoparticles: Synthesis, Physicochemical Properties, and Biological Efficacy Against Bacteria and Cancer Cells

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Abstract

Background: Copper-zinc nanoparticles (Cu-Zn NPs) have gained attention for their promising applications in antimicrobial and anticancer therapies. This study investigates the biosynthesis, characterization, antimicrobial activity, and cytotoxicity of Cu-Zn NPs synthesized using *Shewanella oneidensis*.

Methods: Cu-Zn NPs were biosynthesized using copper sulfate and zinc nitrate as precursors. The nanoparticles were characterized through physicochemical analyses, including size, morphology, UV-Vis absorbance, zeta potential, and crystallinity. Antimicrobial activity was assessed using standard zone of inhibition and minimum inhibitory concentration (MIC) assays against various pathogens. The cytotoxic effects on cancer cell lines were evaluated using IC50 determination and mechanistic studies.

Results: The synthesized Cu-Zn NPs exhibited an average size of 20-30 nm with a UV-Vis absorbance peak at 470 nm and a zeta potential of -24.0 mV. Significant antimicrobial activity was observed, with low MIC values of 6 µg/mL for *Staphylococcus aureus* and 8 µg/mL for *Escherichia coli*. The nanoparticles demonstrated cytotoxic effects with IC50 values ranging from 9 to 12 µg/mL across various cancer cell lines, showing mechanisms such as enhanced apoptosis and ROS generation. The optimization of synthesis parameters confirmed that a 1:1 metal ion ratio and neutral pH were essential for stable nanoparticle formation.

Conclusions: This study highlights the potential of Cu-Zn NPs as effective antimicrobial and anticancer agents, supported by their physicochemical properties and biological activities. Future research should focus on enhancing nanoparticle stability and exploring their therapeutic efficacy in vivo.

Keywords: nanoparticles, antimicrobial, anticancer therapies, copper sulfate.

Eco-Friendly Fabrication of Metal Nanoparticles with Enhanced Antimicrobial and Anticancer Properties

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Abstract

The rise of multidrug-resistant bacteria and the growing prevalence of cancer need the creation of novel treatment approaches. This work aims to do a green synthesis, characteriszation, and assessment of silver (Ag), zinc (Zn), and silver-zinc (Ag-Zn) nanoparticles using Gum Arabic as plant extract. The objective is to assess the antibacterial and anticancer properties of these nanoparticles. Nanoparticles were produced by using an aqueous extract derived from plant leaves, which had dual properties as both a reducing and stabilizing agent. To investigate the structural, optical, and morphological features of the produced nanoparticles, UV-Vis spectroscopy, Fourier-transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), and transmission electron microscopy (TEM) were used. The agar well diffusion and broth microdilution techniques were used to evaluate the antibacterial activity of the nanoparticles against Staphylococcus aureus and Escherichia coli. The antineoplastic effects were assessed in MCF-7 (breast cancer) and HepG2 (hepatic cancer) cell lines by MTT assay. To clarify the mechanism of action, the production of reactive oxygen species (ROS) was also quantified. Ag, Zn, and Ag-Zn nanoparticles were successfully synthesized, with UV-Vis spectroscopy confirming the formation of nanoparticles at characteristic peaks (Ag NPs ~410 nm, Zn NPs ~370 nm, Ag-Zn NPs ~390 nm). XRD analysis indicated crystalline structures, and TEM revealed spherical shapes with sizes ranging from 12 to 20 nm. The Ag-Zn nanoparticles exhibited the highest antimicrobial activity, with the largest zones of inhibition (up to 20 mm) and the lowest MIC values. In vitro anticancer assays showed that Ag-Zn nanoparticles significantly reduced cell viability (down to 20%) and induced apoptosis (up to 60%) in MCF-7 and HepG2 cells. ROS generation assays revealed that Ag-Zn nanoparticles caused the highest levels of ROS, correlating with increased cytotoxicity and apoptosis. The study demonstrates the successful green synthesis and characterization of Ag, Zn, and Ag-Zn nanoparticles, with Ag-Zn nanoparticles showing superior antimicrobial and anticancer activities. These findings suggest that Ag-Zn nanoparticles synthesized via plant-mediated methods could serve as promising candidates for developing new antimicrobial agents and cancer therapies. Further studies should explore in vivo efficacy and safety to facilitate clinical applications.

Keywords: Multidrug-resistant, transmission electron microscopy, nanoparticles, silver.

Antimicrobial activity and MIC of microbial biosynthesized silver nanoparticles

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Abstract

Since silver nanoparticles (AgNPs) have antiplasmodial, antibacterial, and antifungal properties, they offer promise as a therapeutic tool for the treatment of various illnesses and parasites. $AgNO_3$ solution was employed in conjunction with cell-free supernatant from *Levilactobacillus brevis* cultivated on MRS medium to synthesize AgNPs. Using the well diffusion method, samples' antimicrobial activity was evaluated in vitro against a variety of pathogens, such as filamentous fungi *Aspergillus brasiliensis* ATCC 16404, unicellular fungi *Candida albicans* ATCC 10231, and Gram-positive bacteria *Bacillus spizizenii* ATCC 6633, *Staphylococcus aureus* ATCC 6538, and Gram negative bacteria *Pseudomonas aeruginosa* ATCC 9027 and *Escherichia coli* ATCC 8739. Furthermore, the minimum inhibitory concentration (MIC) of AgNPs against *Staphylococcus aureus* ATCC 6538 was determined using a range of concentrations (0, 5, 10, 15, 20, 25, 50, 75, and 100 µg). The growth of both Gram positive and Gram negative bacteria was inhibited by 100 µg AgNPs. It has been observed that filamentous and unicellular fungi are resistant to AgNPs. The MIC for 20 µg of AgNPs was found from the results. Given these encouraging therapeutic properties, the use of AgNPs in the control of infectious diseases is warranted.

Keywords: Silver nanoparticles, antiplasmodial, antibacterial, and antifungal properties.

Complete genome sequencing and probiotic characterization of promising lactic acid bacterial strains isolated from dairy products in Egyptian markets

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Abstract

Background: Probiotics refer to live bacteria that, when administered in a sufficient quantity, exert a beneficial influence on human health. Due to the beneficial health advantages of probiotics, especially, dietary supplements are expanding rapidly as a self-care interest worldwide. It may be beneficial to administer probiotic strains resistant to antibiotics concurrently with an antibiotic treatment. Our study investigates nineteen dairy products collected from Egyptian markets, isolated, identified and underwent a characterizing for probiotic features under demanding circumstances as NaCl, acid and bile salt environments. The antibiotic sensitivity test was performed later to the antimicrobial assessment against widespread both negative and positive gram-stained bacteria infecting human, along with the antiviral evaluation against (SARS-CoV-2), the virus that has disturbed the world recently.

Results: Out of nineteen investigated isolates, five potential probiotic isolates were examined for the probiotic characteristics. Our tested samples were of dairy origin (yogurt and sour milk) in Egypt, was identified as *L. delbrueckii* subsp. bulgaricus, *Streptococcus thermophilus* and *Pediococcus acidilactici*. These promising isolates had Withstood stressful factors, as NaCl, acid, bile salts, and the antimicrobial advance. The genomes were characterized for the physiology, safety, and efficacy of these isolates for probiotic qualities plus the presence of mobile genetic components and prophages that influence the genome's flexibility. They lack the virulence factors and pathogenicity, rather than the lack of antibiotic resistance genes.

Conclusion: Three promising isolates underwent complete genome sequencing with high-throughput second generation technology and the resulting data was subjected for full analysis bioinformatically. The results showed how effectively our isolates had advanced to withstand both the antimicrobial impacts and stress factors that might cause problems in the human gut. Several trustworthy genomic analysis methods were used to confirm and provide detailed illustrations of all these brilliant traits. Our strains were proved to have stable genome due to including mobile genetic components such as phages and CRISPR clusters, which validate their quality and safe usage for human health.

Keywords: Probiotics, Dairy products, Complete genome sequencing, Human health, CRISPR.

Impact of Sulfur Compounds on the Activity of Bacterial L-methioninase

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Abstract

The enzyme L-methioninase (EC 4.4.1.11) is present in all microbial species, while completely absent from mammals. This enzyme mainly catalyzes the α,γ-elimination of L-methionine, resulting in the production of α-ketobutyrate, methanethiol, and ammonia. The objective of this work was to achieve partly purification of L-methioninase from *Staphylococcus sciuri*. The enzyme was isolated and partially purified by the use of 80% ammonium sulfate precipitation. A range of concentrations (0.2, 0.4, 0.6, 0.8, and 1.0 mM) of four thiol compounds, namely cysteine, N-acetyl cysteine, thioglycolate, and glutathione, were examined in the reaction mixture to assess their impact on L-methioninase. Although all the substances examined exhibited enzyme activation at lower concentrations, higher concentrations functioned as inhibitors. Given that this enzyme is therapeutic, the results indicate that including the tested chemicals with its lower concentrations into the purified enzyme will improve its activity.

Keywords: Enzymes, L-methioninase, *Staphylococcus sciuri,* Sulfur Compounds.

Biomineralization of $CaCO_3$ by *Bacillus* sp. 8WNM for Application as Bio-Cement

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Abstract

Globally, cement is the most often used building material, but its traditional manufacture comes with significant environmental impacts along with restrictions on cost and quality. Calcium carbonate ($CaCO_3$) is a commonly used substance in this context. To overcome these obstacles, biological building materials are becoming sustainable technology. Recently, the production of $CaCO_3$ by bacteria has garnered attention due to its environmentally friendly and health-conscious approach. In this study, *Bacillus sp.* 8WNM was isolated from Wadi El Natrun lake, Egypt and evaluated for its ability to precipitate $CaCO_3$ through biomineralization using different calcium compounds, including calcium nitrate ($Ca(NO_3)_2$), calcium acetate ($Ca(CH_3COO)_2$), and calcium chloride ($CaCl_2$). The precipitated $CaCO_3$ was characterized using Fourier Transform Infrared Spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM), and energy-dispersive X-ray (EDX) analyses. Among the tested sources, calcium acetate was the most effective, yielding the highest amount of precipitate. XRD analysis confirmed that the obtained $CaCO_3$ exhibited a single-phase structure, while FTIR analysis identified peaks corresponding to $CaCO_3$. The precipitated particles were mainly cubic, consisting of Ca (15.38±1.34%), C (23.21±1.08%), and O (61.41±3.84%). Optimal conditions for $CaCO_3$ precipitation were achieved with a calcium source concentration of 2.5 g/L, an inoculum size of 1.5 mL, and an incubation period of 8 days, resulting in a production yield of 0.236 g/100 mL. The promising results obtained by precipitating $CaCO_3$ using *Bacillus* sp. 8WNM recommend its usage in the bioconstruction materials production that are both financially sustainable and socially and environmentally beneficial.

Keywords: *Bacillus sp.*,

Geology, Zoology, Physics and Entomology Abstracts

Ablation of Polyester Capillaries by Electrothermal Pulsed Plasma Discharge

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Abstract

Plasma propulsion systems have become the most attractive systems for satellite engines due to their simplicity and reliability. This research was carried out in the plasma and nuclear fusion department, NRC, EAEA, to manufacture an electrothermal pulsed plasma thruster system using a polyester capillary. This study includes a measurement of ablated mass with different input voltage values and an increase in the number of shots. It was found that by increasing the input voltage from 1.5 kV to 4 kV, the ablated mass increases from 120.6 µg to 432.6 µg. The experimental results were compared to the calculated data obtained from the ETFLOW model; the calculated ablated mass increased from 136 µg to 447 µg, which is in good agreement with the measured results. Also, the model was used to study the behavior of some physical parameters with discharge time, such as plasma density, velocity, and temperature. Finally, the exit velocity was calculated as a function of peak current.

Keywords: PPT, electrothermal discharge, ablated mass, thrust, impulse, specific impulse.

The effect of isothermal annealing on the AC conductivity of Polyvinyl Alcohol-based polymer as an energy storage system

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Abstract

Polyvinyl Alcohol-based polymer has been prepared by using a casting technique. It has been examined by X-ray diffraction (XRD), and Diffraction scanning calorimetry (DSC) techniques, where the amorphous nature and the glass transition temperature (Tg) of the sample were recorded. Impedance spectroscopy has been used to study the effect of isothermal heat treatment on the Ac conductivity of doped polyvinyl alcohol (PVA) with silicon dioxide (SiO2), magnesium triflate (MgTIF), and 2-Ethylhexylamine (EHA). The frequency dependence of the Ac conductivity for the investigated samples has been studied according to Jonscher's power law at different annealing temperatures and annealing times. The exponent (S) of Jonscher's law has been estimated by fitting the experimental data with this law. It has been found that S increases and then decreases with both annealing time and temperature which could be interpreted in terms of CHB and NSPT models. The temperature dependence of the AC and DC conductivity at different annealing temperatures and different annealing times for the investigated samples according to the Arrhenius equation were studied, where the activation energies are Eg and Ea for the Dc and the Ac conductivity respectively were derived. It has been found that Ea increases and then decreases, while Eg increases with the time of annealing which is interpreted in terms of the density of state principle.

Keywords: Conductivity, Annealing time, Energy storage, Isothermal.

Radiobiological impact of calculation slice thickness on head and neck IMRT plans using MATALB

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Abstract

In radiotherapy there are many evaluation tools available to achieve the best treatment plan. One of them is equivalent uniform dose (EUD) based model. It use to estimate the tumor control probability (TCP) and normal tissue complication probability (NTCP). While the current generation of radiobiological models has low predictive power that prevents it from being used as a primary evaluation tool, projections from radiobiological model may still be a helpful supplement to clinical experience. The perfect treatment plan provides the highest tumor control and lowest normal tissue complications. The purpose of this study is to use different grid sizes (2, 3, 4, 5) and different algorithms (Monte Carlo and Pencil Beam) when calculating TCP and NTCP. Eleven patients with head and neck (H&N) cancer cases were included in this study. Comparison achieved for each patient with the variation of grid size and algorithm. A total of 88 plans were generated in MONACO treatment planning system (TPS). Treatment plans were designed using Intensity modulated radiation therapy (IMRT) technique. Dose and volume parameters were derived from the dose volume histograms (DVHs) for target and critical structures. The average value of TCP was 94.13 ±12.80% for the 2 mm grid size and 95.16 ±10.05% for 5 mm with Monte Carlo (MC) algorithm. Statistically there was significance difference between two plans ($p < 0.05$). For Pencil Beam (PB) algorithm, the average TCP value was 91.78 ±19.54% and 93.04 ±17.13% for 2 mm and 5 mm respectively with $p < 0.05$. In comparison between MC and PB plans, the NTCP of PB algorithm plans were greater for brainstem, spinal cord, and chiasm compared to MC algorithm plans. It could be concluded that the smallest available grid size (2 or 3 mm) is the favorable. The MC algorithm is recommended for improved plan accuracy.

Keywords: grid size, Monte Carlo, Pencil Beam, radiobiological evaluation.

DC Conductivity and Tensile behavior Investigation on Fumed Silica -EPDM Nanocomposite for Electric Insulation Applications

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Abstract

Nano composites of fumed silica/EPDM have been prepared by the convenient technique, using an open mill mixer. The obtained vulcanized fumed silica/EPDM composites have been subjected to FTIR investigation to confirm the molecular structure in the composite's matrix. In addition the dc conductivity investigation was carried out, for fumed silica/EPDM nano composites from room temperature up to 453 °K , which illustrates thermal activation with activation energy in the range 0.026 and 0.036 eV and increases with increasing fumed silica concentration . The values of conductivity at room temperature do not show remarkable variation with fumed silica indicating the conservation of nano composites insulation. The stress-strain of fumed silica/EPDM nanocomposites was studied at room temperature for different concentrations of fumed silica 5 -25 phr. In addition, the tensile study for silica /EPDM illustrates yield transition for the different silica concentrations. A significant values of modulus; resilience; stress and strain at fracture are discussed on the basis of silica particle - silica particle ; silica - EPDM cohesions as well as composite matrix free volume .

Keywords: EPDM, Fumed silica, Nano composite.

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Assessment of Reservoir Potentiality for Abu Madi Formation, Southwest Disouq Field, Onshore Nile Delta, Egypt

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Abstract

Disouq area is located on the onshore western part of the Nile Delta (N.D.); which is one of the most important gas provinces, as its sedimentary succession hides high gas potentiality. The study area is divided into five fields that is: Disouq, Sidi Salem Southeast, South Sidi Ghazy, North Sidi Ghazy, and Northwest Sidi Ghazy. The main reservoir in Disouq field is Abu Madi Formation, a significant reservoir made up of Miocene rock. Through advanced petrophysical techniques and well logging data from specific wells like Disouq-1X, Disouq-2X, Disouq-1-3, Disouq-1-4, Disouq-1-5 and Disouq-1-6 in addition to core data of SSSE-1X well for calibration. Lithologically Abu Madi Formation is composed of sandstone, shale, limestone, and anhydrite layers.

Lithology and reservoir deriving mechanisms of Abu Madi reservoir is determined by using the available well-log and pressure data to construct many types of cross plots to reveal the different conditions that control the behavior of fluids within Abu Madi Formation. The evaluation of the reservoir's potential is determined by integrating geological and petrophysical studies, revealing the Abu Madi reservoir's classification into two cycles: each of which represents one phase of reservoir development in the Disouq field tentatively related to Lower and Upper Abu Madi reservoirs. The lower reservoir boundary separates Lower Abu Madi sand from the underlying Qawasim Formation. The hydrocarbon potential is distributed through the higher part of the Upper Abu Madi reservoir in Disouq field. Results of petrophysical analysis are represented vertically in the form of Litho-saturation cross plots and horizontally as Iso-Parametric maps, (hydrocarbon, water saturation, effective porosity, clay volume, net pay thickness), aiding in locating optimal areas for hydrocarbon accumulation and understanding the basin's characteristics.

Keywords: Disouq, Abu Madi, Petrophysics, Lith-saturation, cross plot, Reservoir potentiality.

Evaluation of Groundwater Quality Using the Water Quality Index (WQI) in Delta Wadi Sudr, South Sinai, Egypt

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Abstract

Arid countries like Egypt need a lot of clean water for drinking, irrigation, and domestic usage. Given the increasing rate of population growth and urban development, it is crucial to assess the quality of groundwater to ensure its suitability for different purposes. This study evaluates the quality of groundwater in the Quaternary aquifer in Wadi Sudr using the WQI index and several irrigation quality parameters. The study area's water quality index and irrigation water parameters, such as Na%, SAR, RSC, KR, MH, and PI, were calculated to determine the suitability of the groundwater for irrigation. Additionally, spatial variation maps of major ions and WQI for the Quaternary aquifer were created and interpreted. The results indicate that the groundwater is unsuitable for human consumption because TDS levels exceed 1000 mg/l, and the groundwater samples are classified as unfit water (WQI <100). However, the concentrations of trace elements (Cu, Zn, Mn, and Ba) in the groundwater are within acceptable limits for drinking. The areal distributions of EC, TDS, SO4-2, and Cl- as well as Kelly's ratios, PI, and MH reveal that the groundwater of the Quaternary aquifer can be categorized as good to permissible for irrigation. However, the samples were plotted on the Wilcox and USSl Staffs. Salinity diagrams and show that the Quaternary aquifer samples are unsuitable for the same purpose.

Keywords: Wadi Sudr; Water Quality index; Irrigation; Quaternary aquifer.

Groundwater Potential Assessment Using Analytic Hierarchy Process (AHP), Remote Sensing, and GIS: A Case Study from the Zaafarana Region, Western Coast of the Gulf of Suez, Egypt

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Abstract

This study investigates the groundwater potential in the Zaafarana region through an integrated approach combining morphometric analysis, Analytic Hierarchy Process (AHP) modeling, remote sensing, and GIS techniques. A comprehensive morphometric analysis was conducted on the drainage basins, and seven key parameters (drainage density, basin relief, relief ratio, stream frequency, elongation ratio, length of overland flow, and ruggedness number) were selected for integration into an AHP model. Seven thematic layers (geology, slope, drainage density, LULC, lineament density, soil, and precipitation) derived from remote sensing and GIS data were also incorporated into the AHP model. Due to the lack of existing well data for direct validation, sensitivity analysis was performed by adjusting the weights of all seven parameters of the AHP Model of Thematic Maps by ±5% and ±10% to assess the model's robustness. The results revealed significant variations in morphometric characteristics across the drainage basins, influencing groundwater recharge and flow. The AHP model identified areas with high, moderate, and low groundwater potential, providing valuable insights for targeted exploration and management efforts. Sensitivity analysis demonstrated the model's robustness, with minor changes in criterion weights limiting the overall groundwater potential zones. This integrated approach effectively assessed groundwater potential in a data-scarce arid region, offering a valuable, sustainable water resource management tool in the Zaafarana region and similar environments.

Keywords: Groundwater potential, Zaafarana, Remote sensing, Geographic Information Systems (GIS), Morphometric analysis, Analytical Hierarchy Process (AHP), Hyper-arid regions, Water resource management.

Assessment of Monosodium Glutamate-induced histological and osteological injury in rats embryo and amelioration with pomegranate juice.

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Abstract

Monosodium glutamate (MSG) is a flavor enhancer that appears as a small, white to off-white, odorless crystal powder. It can cause serious health problems as its metabolites can be hazardous to several organs. The current study aimed to determine the toxicity of MSG on fetal *Rattus norvigecus domestica* and the ameliorating role of pomegranate juice (Pg. J) against it. *Punica granatum L.* (Pg) is a long-lived and drought-tolerant plant. It has been used in the traditional medicine of various civilisations as a “curative food”. The Pg tree offers several medicinal components, including seeds, juice, peel, leaves, flowers, and root bark. Each part is linked to various health benefits, such as cancer prevention, reducing arteriosclerosis, and lowering high cholesterol levels. Forty-two pregnant females were randomly divided into 6 groups (n=7): the control group "C " received orally distilled water; "G1" received orally/daily 10ml (Pg. J) /kg b.w(dissolved in distilled water; "G2" received orally/daily 0.55 g MSG /kg b.w; "G3" received orally/daily 0.55 g MSG /kg b.w with 10 ml (Pg. J) /kg b.w; "G4" received orally/daily 1.6 g MSG /kg b.w; and "G5" received orally/daily 1.6 gMSG / kg b.w with 10 ml (Pg. J) /kg b.w. All groups were treated on the 1st – 20th days of pregnancy. The fetal length decreased significantly in groups "2,3,4,5". Major skeletal abnormalities in the fetuses included incomplete ossification of the skull, vertebrae, and pectoral and pelvic girdles with their fore and hind limbs in groups 2,3,4,5. MSG has been shown to histopathologically alter the lungs and liver of fetuses. The high doses had the most chronic effect than the low doses.

keywords: Monosodium Glutamate, Pomegranate juice, Skeletal development, Rat fetuses, Lungs, Liver.

The role of Fennel on body and organ weights and metabolites in male albino rats injected with PHZ.

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Abstract

Fennel (*Foeniculum vulgare*) is a medical plant with a high content of polyphenol, it has many antioxidant properties, also it has different therapeutic effects. The aim of the present study is to evaluate the efficacy of the fennel essential oil (FEO) on some different physiological parameters in rats injected with Phenyl-hydrazine (PHZ). Rats were divided into five groups (six rats each); control group (normal rats), FEO group (administrated daily by an oral dose of FEO, 0.5mL/kg b.w. for 14 days), PHZ group (injected intraperitoneally with a daily dose of 60 mg/kg b.w. PHZ, for 3 consecutive days), protective group (administrated daily by FEO for 11 days then injected with PHZ for 3 days) and treated group (injected with PHZ for 3 days then administered by FEO for 11 days). At the end of the experiment, blood samples were collected for determination of physiological and biochemical parameters. The results showed that the PHZ induced significant decreases in rats body weight, body organ weights, serum proteins (total protein, albumin and globulin), blood glucose level and HDL –cholesterol. Administration of FEO improved body weight, body organ weights, serum proteins, blood glucose level and lipid profile in rats injected with PHZ. In conclusion, the results of the present study revealed that the FEO has improving effects on body and organ weights and metabolites in rats injected with PHZ.

Keywords: Phenylhydrazine, Fennel essential oil, body weight and metabolites.

Wastewater Treatment by Biological Filtration Technique Improves Biochemical and Microbiological Parameters in Nile tilapia (*Oreochromis niloticus*)

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Abstract

Polluted water from drains outfalls in fish farms has a dangerous environmental effect. This study assesses the impact of the quality of treated wastewater by sand filter system in three different types of water as drainage water (DW), treated water (TWW), and River Nile at El-Kanater El-Khyria (RNW) as control. The suitability of water quality for reuse in Nile tilapia farming has been examined. Based on bacteriological results, treated water has significantly reduced pathogenic bacterial diversity. The results of the fish examination indicated that changes in water quality variables have a significant impact on the blood profile of fish. The obtained data showed poor water quality in DW compared with TWW and RNW. Fish from DW had high levels of amino-aspartate activity transferase (AST) and alanine aminotransferase (ALT), increased values of creatine and urea, and decreased antioxidant enzyme activity compared to control. Thus, it could be concluded that the treatment of drainage water using a sand filter is efficient in producing high water quality for fish farming.

Keywords: Nile tilapia (*Oreochromis niloticus)*; Sand filter, microbiological parameters, biochemical parameters.

Insecticidal effect and biochemical studies of entomopathogenic nematode strains against fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae)

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Abstract

The fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae), is a significant inhasive pest that has recently expanded to many countries worldwide. It is a polyphagous pest, destroying almost all vegetables and numerous commercial agricultural crops worldwide. The purpose of the current study was to compare between the efficacy of a newly isolated local strain of entomopathogenic nematodes (EPNs) coded as *Steinernema* 15 and the foreign strain *(S. carpocapae* (All)) against 3rd larval instar of *S. frugiperda* under laboratory conditions with four concentrations (40, 20, 10, and 5 IJs/ml). Our results revealed that the newly local strain recorded the maximum larval mortality, reaching 100%, while the foreign strain caused 91.67% larval mortality at concentration 40 IJs/ml after 72 hr of treatment. Our results showed that the relative potency of the newly local strain was 1.98 more potent than the foreign strain. By studying the effect of LC_{50} (4.4778 IJs/ml) of a newly isolated local strain of EPN on biochemical aspects of larval hemolymph such as total protein. The most serious results showed that the treated larvae had lower protein content compared to control. Also, the activity of enzymes (phenoloxidase (PO) and carboxylesterase (CarE)) was affected by newly local strain treatment. In other way, (PO) and (CarE) enzymes activity was increased significantly in treated larvae compared to control.

***Keywords*:** *Spodoptera frugiperda*, entomopathogenic nematodes, total protein, carboxylesterase (CarE), phenoloxidase (PO).

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Efficacy of silica and tin doped silica nanoparticles on the fourth larval instar of *Culex pipiens*

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Abstract

Mosquito-borne diseases represent a growing health challenge over time. Therefore, silicon oxide (SnO_2) and tin-doped silica ($Sn\text{-}SiO_2$) R1, R2, and R3 nanoparticles synthesized via sol-gel/combustion and hydrothermal methods, respectively, were evaluated against the 4th larval instar of *Culex pipiens* at different concentrations (25, 50, 100, 200, 400, and 800 ppm). The as prepared nanoformulations were characterized by XRD and FTIR. The crystal size of silicon oxide and tin-doped silicon oxide increases from 1.1 to 9.3 nm by increasing the dopant concentration. It's worth mentioning that the nanostructures were applied in the sunlight, artificial light, and dark for 6 h post-treatments. After 6 hours of exposure to sunlight and artificial light at 800 ppm, the results indicated that $Sn\text{-}SiO_2$ R1 induces 100% mortality in the 4th larval instar of *Culex pipiens* compared to 17.6% mortality in darkness. As a result, it is possible to draw the conclusion that the doped nanostructures show high potential larvicidal action in sunlight and may serve as effective alternatives for chemical pesticides.

Keywords: Sunlight; artificial light; Darkness; XRD; Doped nanoparticles; *Culex pipiens.*

Isolation and identification of some pathogenic bacteria from water samples in Qalubiya Governorate

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Abstract

Microbial activity in water can cause a range of problems, including contamination of drinking water, deterioration of water quality, and the growth of harmful pathogens. In Egypt, microbial activity in water is a significant concern. The country relies heavily on the Nile River for water, which is maybe contaminated with bacteria, parasites, and other pollutants. In the current study thirty-five bacterial isolates were isolated from different water stations (El-Filal station, El-Haras station, Bata station and Qalyub station). Different colonies that appear from different specimens were selected for the primary identification which is based on morphological and biochemical parameters. Four bacterial isolates were resistant to 100% of the tested antibiotics and were consequently recognized as multi-drug resistant (MDR). According to Vitek 2 compact system; isolates were identified as, *Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus* and *Enterobacter aerogenes*.

Keywords: Water stations, Pathogenic bacteria, Bacterial identification, water quality.