



Published Research Articles in International Journals 2012-2013



**Suez Canal University
Post-Graduate Studies
& Research Sector**

Published Research Articles in International Journals

**Suez Canal University
(Abstracts)**

2012-2013



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جامعة قناة السويس

قطاع الدراسات العليا والبحوث

ملخص الابحاث العلمية المنشورة بالدوريات العلمية العالمية

جامعة قناة السويس

2013-2012



كلمة السيد الاستاذ الدكتور رئيس جامعة قناة السويس

يعد البحث العلمى أداة للأمم للتقدم وصناعة الحضارة والارتقاء بالشعوب وتحقيق رفاهيتها ، ويعد ما تمتلكه أى أمة من أبحاث علمية متقدمة وما تمتلكه من تراث علمى دقيق أحد المعايير المهمة للحكم على تقدم الأمة ، ولذا يشهد العالم سباقا وتعاونا فى هذا المجال حتى يستطيع الانسان تسخير قوى الطبيعة وثرواتها لراحته وسعادته .

كما يعد البحث العلمى الدعامه الاساسية للاقتصاد والتطور وقناة مهمة لاثراء المعرفة الانسانية فى ميادينها كافة ، لذا فإن ما تمتلكه الأمة من علماء يعتبر ثروة تفوق كل الثروات الطبيعية .

ولذلك تحرص جامعة قناة السويس على تشجيع النشر الدولى الذى سيضع الجامعة فى موقع لائق ضمن التصنيف العالمى للجامعات ، والذى يعتمد من بين معاييرها على عدد الابحاث العلمية المنشورة بالدوريات العلمية العالمية ، وتنتهج الجامعة طريقا لتنمية الابداع والتفكير العلمى لدى الشباب حتى يمكن تحقيق التقدم وبناء مستقبل مشرق .

وفقتا الله لما فيه الخير لمصرنا الحبيبة

أ.د/ ممدوح مصطفى غراب

رئيس جامعة قناة السويس



أصبح البحث العلمى واحد من المجالات الهامة التى تجعل الدول تتطور بسرعة هائلة وتتغلب على المشكلات التى تواجهها بطرق علمية حيث ان البحث العلمى فى حياة الانسان ينبع من مصدرين هامين وهما :
المصدر الاول:- يتمثل فى الانتفاع بفوائد تطبيقية حيث تقوم الجهات المسؤولة بتطبيق هذه الفوائد التى نجمت عن الابحاث. المصدر الثانى:- يتمثل فى الاسلوب العلمى فى البحث الذى يبنى عليه جميع المكتشفات والاختراعات .
ويعتبر النشر الدولى منتج اساسى للبحث العلمى الجيد لما له من اهمية كبيرة لدى الجامعات والمراكز البحثية على مستوى العالم، والنشر الدولى هو نشر نتائج الابحاث العلمية فى الدوريات العلمية العالمية المحكمة من قبل اساتذة متخصصين فى فروع العلوم والآداب المختلفة بينما المدلول الفعلى والاكثر اهمية للنشر الدولى من وجه نظر الباحثين والعلماء على مستوى العالم هو وصول نتائج الابحاث لكافة المتخصصين والباحثين والعلماء فى ذلك الفرع من العلم .

كما اصبح تمويل المشروعات البحثية فى معظم انحاء العالم يعتمد ايضا على عدد الابحاث الدولية المنشورة للباحثين والمجموعات البحثية ولذلك اتجهت الجامعات المصرية فى الآونة الاخيرة الى تحفيز باحثيها وعلمائها للنشر الدولى بمنح جوائز مالية تعتمد على تصنيف الدوريات العلمية ومعامل تأثير Impact Factor لكل مجلة مما ادى الى زيادة واضحة فى معدل النشر الدولى للباحثين بالجامعات المصرية ، كذلك ومنذ عام 2009 اصبح النشر الدولى فى الدوريات العلمية المحكمة من اهم عوامل تقييم المتقدمين لجوائز الدولة المختلفة (تشجيعية – تفوق – تقديرية) .

ونظرا لموقع جامعة قناة السويس الذى يعتبر الركيزة العلمية الاساسية فى المنطقة والتى تعتبر من اهم المناطق التنموية فى الوقت الحالى ونظرا للخبرات المتعددة للسادة الاساتذة اعضاء هيئة التدريس بالجامعة فى الكثير من المجالات لذا تشجع الجامعة وخاصة قطاع الدراسات العليا والبحوث السادة الباحثين من الشباب على النشر بالطريقة السليمة وذلك من خلال عمل دورات متخصصة فى الموضوعات الاتية :

- طرق الكتابة العلمية المتخصصة
- كيفية النشر العلمى بالطريقة الصحيحة
- كيفية كتابة المشروعات
- اخلاقيات البحث العلمى

ولذا فان الهدف الاساسى للجامعة هو بناء مجتمع مبتكر يمتاز بالقدرات العلمية والتكنولوجية وتوجيه شباب الباحثين الى التطور والابتكار لتحقيق اعظم النتائج .

د. / ناهد محمد مصطفى على

نائب رئيس الجامعة للدراسات العليا والبحوث



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**A Word
by
Suez Canal University President**

Scientific Research is considered the tool for achieving progress, making civilization and elevating nations. For that reason, what each nation gains from advanced scientific research and scientific legacy is one of the important criteria to judge its progress. That is why the world today is witnessing a scientific race, as well as scientific cooperation, so that humans can employ the forces and wealth of nature for both comfort and happiness.

Scientific research is also considered the main pillar for economy and development and an important channel to enrich human knowledge in all its fields.

That is why the Suez Canal University is keen to encourage international publication to have a prestigious position at the international ranking of universities, based on the number of scientific Publications in international peer-reviewed journals, books and conferences, Suez Canal University is well on its way to promote creativity and scientific thinking in the youth, so they can achieve progress and build a bright future.

May Allah guide us to the welfare of our beloved Egypt

**Prof. [Mamdouh mostafa Ghourab](#)
Suez Canal University President**



The scientific research has become one of the main fields that make the countries develop rapidly and scientifically overcome problems that faces them. The scientific research in human life comes from two main resources: -

First resource: - is to benefit from the applied outcomes, and the responsible agencies to apply those resulted benefits.

Second resource: - is the scientific approach in research, upon which all discoveries and inventions are depending.

And the international publication is considered a main production of the good scientific research. Also for the great importance it holds at universities and the research centers all around the world. The international publication is to publish the scientific research in international scientific periodicals, which is being judged by special professors in different science and arts fields. But the main contribution for the international publication, from the scientists and researchers point of view, is to reach all the results of the latest researches for all the specialists, scientists, and researchers all around the globe.

Also the scientific projects finance, everywhere around the world, is depending on the number of published scientific researches for researchers and research groups. And so, recently, the Egyptian universities started to encourage their own researchers and scientists to internationally publish by giving financial awards depending on the periodicals rating and the Impact Factor for each one, which lead to a great increase to the international publication rate for the Egyptian universities researchers. Also since the year 2009, the international publication in judged scientific periodicals has become one of the main qualifications for candidates for different state awards (encouragement – excellence - discretionary).

And for the important position of the Suez Canal university, which is the main educational pillar for a whole region being considered one of the most important development regions in the present , and for the different experiences of the faculty's professors in all different fields, the university, and especially the researches and graduate studies sector, encourages the youth researchers to publish in the right way. And that will be through holding specialized courses in the following subjects: -

- specialized scientific writing methods
- how to correctly publish a scientific research
- how to write projects
- scientific research ethics

And so the main goal for the university is to build an innovative society with scientific and technological capabilities and to direct young researchers to develop and innovate to achieve the greatest results.

Prof. [Nahed Mohamed Mostafa Ali](#)

Vice-President for Postgraduate Studies and Research Suez Canal University



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Faculty of Medicine



Medical Teacher

2013

1:S68-73



Integrating interprofessional education in community-based learning activities: Case study

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Abstract

Faculty of Medicine/Suez Canal University (FOM/SCU) students are exposed to clinical practice in primary care settings within the community, in which they encounter patients and begin to work within interprofessional health teams. However, there is no planned curricular interaction with learners from other professions at the learning sites. As in other schools, FOM/SCU faces major challenges with the coordination of community-based education (CBE) program, which include the complexity of the design required for Interprofessional Education (IPE) as well as the attitudinal barriers between professions. The aim of the present review is to: (i) describe how far CBE activities match the requirements of IPE, (ii) explore opinions of graduates about the effectiveness of IPE activities, and (iii) present recommendations for improvement. Graduates find the overall outcome of their IPE satisfactory and believe that it produces physicians who are familiar with the roles of other professions and can work in synergy for the sake of better patient care. However, either a specific IPE complete module needs to be developed or more IPE specific objectives need to be added to current modules. Moreover, coordination with stakeholders from other health profession education institutes needs to be maximized to achieve more effective IPE.

Knee Surg Sports Traumatol Arthrosc
2013



The concept of three-dimensional hold of both circumferential and radial collagen fibres of the meniscus

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Abstract

Collagen fibres of the meniscus arrange into two main orientations: circumferential fibres parallel to the long axis of the meniscus and radial fibres perpendicular to the long axis of the meniscus. Meniscal sutures are placed either in vertical or in horizontal orientations. Vertical sutures better hold circumferential fibres because it encircles them like a rope holding a bunch of tree branches. In the same manner, horizontal sutures better hold radial fibres. The “Simplified Cruciate Suture” consists of two vertical oblique sutures. Placing two vertical sutures in an oblique orientation captures greater meniscal tissue volume, holds and grasps both circumferential and radial collagen fibres of the meniscus into a three-dimensional plane with eventual high fixation strength of the repaired meniscal tear. Simplified cruciate suture is indicated for the repair of long bucket handle tears where it is placed in the middle of the tear like an anchor, and additional vertical and horizontal sutures are placed anterior and posterior to it as needed.

Eur Arch Otorhinolaryngol

2013

(3):1055-66

The functional intraoral Glasgow scale in floor of mouth carcinoma: longitudinal assessment of 62 consecutive patients

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Abstract

The functional integrity of the floor of the mouth (FOM) is essential in maintaining tongue mobility, deglutition, and control and disposal of saliva. The present study focused on reporting oral function using functional intraoral Glasgow scale (FIGS) in patients who had surgical ablation and reconstruction of FOM carcinoma with or without chemo-radiotherapy. The study included patients who had surgical treatment of floor of mouth cancer in two regional head and neck units in Glasgow, UK between January 2006 and August 2007. Patients were assessed using FIGS before surgery, 2 months, 6 months and 1 year after surgery. It is a five-point scale self-questionnaire to allow patients to self-assess speech, chewing and swallowing. The maximum total score is 15 points. The influence of socio-demographic parameters, tumour characteristics and surgical parameters was addressed in the study. A total of 62 consecutive patients were included in the study; 41 (66.1 %) were males and 21 (33.9 %) were females. The patients' mean age at the time of diagnosis was 60.6 years. Fifty (80.6 %) patients had unilateral origin of FOM tumours and 10 (19.4 %) had bilateral origin. Peroral approach was the most common approach used in 35 (56.4 %) patients. The mean preoperative FIGS score was 14. Two months after surgery, it dropped to 9.4 then started to increase gradually thereafter and recorded 10.1 at 6 months and 11 at 1 year. Unilateral FOM resection recorded better score than bilateral and lateral FOM tumours than anterior at 1 year postoperatively. Furthermore, direct closure showed better functional outcome than loco-regional and free flaps. The FIGS is a simple and comprehensive way of assessing a patient's functional impairment following surgery in the FOM. Tumour site and size, surgical access, surgical resection and method of reconstruction showed significant influence on oral function following surgical resection. A well-designed rehabilitation programme is required to improve oral function after surgical resection of oral cancer.

Real-Time PCR of cytomegalovirus and Epstein–Barr virus in adult Egyptian patients with systemic lupus erythematosus

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Abstract

Objective: Infections may act as environmental triggers for induction of systemic lupus erythematosus (SLE). We sought to explore the relative frequencies of Epstein–Barr virus (EBV) and human cytomegalovirus (CMV) in adult Egyptian patients with SLE and their correlation with disease activity and damage. **Methods:** Thirty-three consecutive adult patients satisfying the 1997 American College of Rheumatology (ACR) Classification Criteria for SLE and 30 healthy controls were included in this case–control study. All patients were subjected to complete clinical and laboratory evaluation to determine the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) and the Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index (SLICC/ACR). Sera from both groups were analyzed for immunoglobulin M (IgM) and IgG antibodies against CMV and EBV. Qualitative real time polymerase chain reaction (PCR) for both viruses was performed for all SLE patients. **Results:** Almost all SLE patients 32/33 (96.9%) were positive for IgG anti-CMV antibodies versus 20/30 in the control group (66.6%) ($P = 0.002$). All SLE patients were positive for IgG anti-EBV antibodies compared to 25 in the control group (100% vs. 83.3%, $P = 0.02$). CMV and EBV DNA were detected by PCR in 30.3% and 51.5% of SLE patients, respectively. A statistically significant lower SLEDAI was found in PCR positive patients for EBV compared to negative patients (9.6 ± 5.2 vs. 13.1 ± 3.1 , respectively $P = 0.041$). **Conclusions:** Adult Egyptian patients with SLE had higher frequencies of anti-CMV and EBV IgG compared to healthy controls. Furthermore, our single point assessment of SLEDAI suggested that exposure to EBV infection might be associated with a lower disease activity

American Journal of Ophthalmology

2013

155:320–328



Three-Dimensional Tomographic Features of Dome-Shaped Macula by Swept-Source Optical Coherence Tomography

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Abstract

PURPOSE: To study the tomographic features and pathomorphology of dome-shaped maculas with swept-source optical coherence tomography (OCT).

DESIGN: Prospective cross sectional study.

METHODS: The macular area of 51 highly myopic eyes (35 patients) with dome-shaped macula was studied with swept-source OCT at 1,050 nm. Three-dimensional (3D) datasets were obtained with raster scanning covering a 12 x 8 mm² area; 3D images of the posterior pole were constructed by auto-segmentation of the retinal pigment epithelium (RPE).

RESULTS: In all reconstructed 3D images of the RPE, two outward concavities were seen within the posterior staphyloma and a horizontal ridge was formed between these two concavities. In 42 of these eyes, this horizontal ridge was band-shaped. The vertical OCT section through the fovea showed a convex configuration of RPE, but the horizontal section showed an almost flat RPE line. In nine eyes, 3D images showed a typical dome-shaped convexity within the staphyloma. OCT scans showed no outward protrusions in the external scleral surface, and marked scleral thinning was seen consistent with the two outward concavities of the RPE. The sclera of the fovea ($518.6 \pm 97.6 \mu\text{m}$) was significantly thicker than that in all four quadrants of the parafoveal area ($277.2 - 360.3 \mu\text{m}$, $P < .001$).

CONCLUSIONS: In highly myopic eyes with dome-shaped macula, a horizontal ridge is formed within the posterior staphyloma by uneven thinning of the sclera.

American Journal of Ophthalmology

2013

156(4):673-83



Focal Choroidal Excavation in Eyes with Central Serous Chorioretinopathy

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Abstract

Purpose: To study the prevalence and three-dimensional (3-D) tomographic features of focal choroidal excavations (FCE) in eyes with central serous chorioretinopathy (CSC) using swept-source optical coherence tomography (OCT).

Design: Prospective, cross-sectional study.

Methods: We examined 116 consecutive eyes with CSC with a prototype 3-D swept-source OCT. 3-D images of the shape of the macular area, covering 6 x 6 mm², were reconstructed by segmentation of the outer surface of the retinal pigment epithelium (RPE).

Results: The 3-D swept-source OCT detected FCE in 9 eyes (7.8%). The 3-D scanning protocol allowed for detection of small extrafoveal excavations and 3-D segmentation, coupled with *en-face* scans, allowed for clear visualization of the excavation morphology. In 5 eyes with FCE, unusual choroidal tissue was found beneath the FCE, bridging the bottom of the FCE and the outer choroidal boundary. Additionally, three of those five eyes showed a suprachoroidal space below the FCE, as if the outer choroidal boundary is pulled inward by this bridging tissue. The FCEs were located within fluorescein leakage points and areas of choroidal hyperpermeability. Eyes with FCE were more myopic (-4.42 ± 2.92 diopters) than eyes without FCE (-0.27 ± 1.80 , $P = .001$). Subfoveal choroidal thickness was significantly thinner (301.3 ± 60.1 μ m) in eyes with FCE than in eyes without FCE (376.6 ± 104.8 μ m, $P = .036$).

CONCLUSIONS: FCE is present in approximately 7.8% of eyes with CSC. In CSC eyes, FCEs may form from RPE retraction caused by focal scarring of choroidal connective tissue.

Arch Gynecol Obstet
2013

287:1023–1029



Effect of a gonadotropin-releasing hormone analogue on cyclophosphamide-induced ovarian toxicity in adult mice

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Abstract

Purpose to evaluate the possible protective effect of low and high dose of triptorelin, a GnRH analogue, on cyclophosphamide-induced ovarian toxicity in adult female mice.

Methods Thirty-six sexually mature, virgin, female mice were divided randomly into six groups of six each: control group, low-dose triptorelin (TL) group, high-dose triptorelin (TH) group, cyclophosphamide (CPA) group, low-dose triptorelin plus cyclophosphamide (TL+CPA) group and high-dose triptorelin plus cyclophosphamide (TH+CPA) group. Mice in both the TL + CPA and the TH + CPA groups were injected with 3.8 and 38 mg/kg of triptorelin subcutaneously, respectively. Four weeks later, mice in the CPA, TL + CPA and TH + CPA groups were injected with cyclophosphamide, intraperitoneally, at a dose of 50 mg/kg. Ovaries were removed 4 weeks later and processed for light microscopic examinations.

Results Obvious destruction of ovarian structure and significant depletion of primordial, primary, secondary and antral follicles were demonstrated in the CPA group and compared with the control group, the difference was statistically highly significant ($p < 0.001$), affirming the ovarian toxicity of cyclophosphamide. In the TL + CPA group, there was a significant increase in primordial, primary, secondary and antral follicles compared with the CPA group ($p < 0.05$), showing the effect of triptorelin on ovarian protection. Regarding the high-dose GnRH agonist the difference was statistically highly significant for primordial and primary follicles ($p < 0.001$).

Conclusions This study has showed a dose-dependent protective effect of GnRH analogue on ovarian reserve against ovarian toxic chemotherapy, thus demonstrating an important role of GnRH analogues in fertility preservation.

Clin Imaging
2013
(4):649-56



Efficacy of Therapeutic Fluoroscopy-Guided Lumbar Spine Interventional Procedures,

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Abstract

Purpose: To evaluate the benefit of fluoroscopy-guided lumbar spine interventional procedures in treatment of low back pain.

Methods: This prospective descriptive study was performed on 60 patients with back/radicular pain after showing no improvement with conservative treatment.

Results: One hundred and two injection sessions were done (average 1.7 injection per patient). Caudal and lumbar transforaminal injections were effective in 55.9% and 78.5%, respectively. Facet and sacroiliac interventions were effective in 28.3% and 10%, respectively. Complications occurred in 20% of the procedures.

Conclusion: Lumbar injections improved pain/disability related to discogenic lumbar spinal diseases. Efficacy of facet and sacroiliac injections is limited.

European Review for Medical and
Pharmacological Sciences
2012
16: 600-609



Renoprotective activity of telmisartan versus pioglitazone on ischemia/reperfusion induced renal damage in diabetic rats

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Abstract

Diabetes mellitus (DM) causes organ dysfunction and increases the sensitivity of organs to damages. To test this hypothesis, we used renal ischemia/reperfusion (I/R) experiment to evaluate the renoprotective activity of telmisartan versus pioglitazone on I/R induced renal damage in diabetic rats.

Renal I/R was performed in both normal and diabetic rats. The protocol comprised ischemia for 45 minutes followed by the reperfusion for 24 hours and a treatment period of two weeks before induction of ischemia.

Renal I/R in both control and diabetic rats induced marked renal dysfunction associated with a significant increase in the arterial pressure, tumor necrosis factor alpha (TNF- α) levels, and the malondialdehyde formation (MDA). The activities of the anti-oxidant enzymes such as reduced glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT) were found to be decreased significantly compared to control rats. Diabetic animals that underwent renal I/R exhibited a significant increase in all the studied

parameters with a reduction in the anti-oxidant enzymes as compared to non-diabetic rats. Histo- pathological studies confirm these results. Treatment with pioglitazone or telmisartan demonstrated a significant improvement in the reperfusion- induced renal injury in comparison with diabetic I/R group, without difference between the two treated groups. Therefore, the treatments with pioglitazone or telmisartan have the same corrective effect.

Type 2 diabetes had exaggerated renal I/R injury in STZ-NAD induced diabetes. Telmisartan treatment is equieffective as pioglitazone in attenuating acute I/R-induced renal injury in diabetic rats by a modification in the oxidative stress and the inflammation.

European Journal of Pharmacology
2012
689: 186–193



Evaluation of the antifibrotic effect of fenofibrate and rosiglitazone on bleomycin-induced pulmonary fibrosis in rats

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Abstract

Idiopathic pulmonary fibrosis is the most prevalent chronic fibrosing lung disease. Peroxisome proliferator-activated receptors-gamma agonists provide potential therapy for fibrotic diseases of the lung. Peroxisome proliferator-activated receptors-alpha agonists may be helpful in the treatment of lung inflammatory diseases, however their therapeutic potential on the “fibro-proliferative” process and extracellular matrix accumulation in idiopathic pulmonary fibrosis has been less well studied. So, the present study was conducted to evaluate the anti-fibrotic effects of fenofibrate (peroxisome proliferator-activated receptors-alpha agonist) alone and in combination with rosiglitazone (peroxisome proliferator-activated receptors-gamma agonist) on lung injury induced by bleomycin administration.

Oral administration of either rosiglitazone (5 mg/kg/d) or fenofibrate (100 mg/kg/d) for 14 days, attenuated the severity of bleomycin-induced lung injury and fibrosis through decreasing lung water contents, lung fibrotic grading, lung hydroxyproline contents and lung transforming growth factor beta-1

Levels; with no significant difference between them. Combined low doses of rosiglitazone (1 mg/ kg/d) and fenofibrate (30 mg/kg/d) provided more benefits than full separate doses of each on the deleterious effects accompanied bleomycin administration.

These findings suggested the potential use of peroxisome proliferator-activated receptors-alpha ligands as anti-fibrotic agents in lung fibrosis. Additionally, the concurrent administration of fenofibrate and rosiglitazone in low doses has synergistic effect and enhanced the beneficial effects afforded by either fenofibrate or rosiglitazone.

Pharmacological reports journal
2012
64: 1223-1233



Effect of mononuclear cells versus pioglitazone on streptozotocin-induced diabetic nephropathy in rats

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Abstract

Diabetic nephropathy is a serious diabetic complication that leads to end stage renal disease. Cell therapies with human embryonic and specific adult stem cells have emerged as an alternative management for various diseases. To test this hypothesis, the present study was conducted to compare effect of MNCs treatment (I.V. injection once in the tail vein for diabetic rats in a dose of 150×10^6 MNCs cells/rat) versus pioglitazone (10 mg/kg, for eight weeks) on improving the renal structure and function changes and reducing laminin deposition associated with STZ- induced diabetic nephropathy in rats.

Treatment with pioglitazone or MNCs, demonstrated a significant improvement in the STZ-induced renal functional and structural changes in comparison with diabetic control group. Additionally, our histo-pathological and immuno- histochemical studies confirm these results. Meanwhile, MNCs treated group exhibited more improvement in all studied parameters as compared to pioglitazone treated group. These data indicate that, MNCs treatment was superior to pioglitazone in controlling hyperglycemia, improving the renal structure and function changes and reducing renal laminin expression associated with STZ-induced diabetic nephropathy in rats.

The Journal of Ethnopharmacology
2013
145: 269-277



Antioxidant and anti-inflammatory effects of *Urtica pilulifera* extracts in type2 diabetic rats

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Abstract

Ethnopharmacological relevance: "*Urtica pilulifera* has been traditionally used in Egyptian system as an herbal remedy to be a diuretic, antiasthmatic, anti inflammatory, hypoglycemic, hemostatic, antidandruff and astringent"

Aim of the study: To evaluate the potential effects of ethyl acetate (EA), chloroform (CHLOR) and hexane (HEXA) extracts of *Urtica pilulifera* as oral anti-diabetic agents as well as to evaluate their possible antioxidant and anti-inflammatory effects in type2 diabetic rat model.

Material and methods: Type2 diabetes was induced by a high fat diet and low dose streptozotocin (STZ). Diabetic adult male albino rats were allocated into groups and treated according to the following schedule; Pioglitazone HCL (PIO), EA, CHLOR and HEXA extracts of *Urtica pilulifera* at two doses of 250 and 500 mg/kg were used. In addition, a normal control group and a diabetic control one were used for comparison. Blood glucose, insulin resistance, antioxidant enzymes, 8-hydroxy-2-deoxyguanosine (8-OHdG) as well as C-reactive protein and tumor necrosis factor- α levels were evaluated.

Results: EA and CHLOR extracts of *Urtica pilulifera* exhibited a significant hypoglycemia associated with antioxidant and anti-inflammatory effects in diabetic rats; however, HEXA extract showed no beneficial effect. These activities are responsible, at least partly, for improvements that have been seen in hyperglycemia and insulin resistance of diabetic rats.

Conclusion: Our results encourage the traditional use of *Urtica pilulifera* extract as an antioxidant and anti-inflammatory agent as an additional therapy of diabetes.

European Review for Medical and
Pharmacological Sciences

2013

17: 1857-1863



Role of adenosine receptors in the anti-nociceptive effects of allopurinol in mice

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Abstract

BACKGROUND: Inhibition of xanthine oxidase by allopurinol increases hypoxanthine and xanthine, which are converted to purines, including the inhibitory neuromodulator adenosine.

AIM: We aimed to investigate the antinociceptive effects of allopurinol in thermal and chemical pain models in mice and to evaluate its possible antinociceptive mechanism by using selective adenosine receptors A1, A2A antagonists in mice.

MATERIALS AND METHODS: Sixty four adult male mice were used. Mice received an intraperitoneal injection of vehicle or allopurinol (50-200 mg/kg). Assessment of antinociceptive effects and locomotor activity were performed in three models of acute pain; a thermal model and two chemical model.

RESULTS: Allopurinol presented dose-dependent antinociceptive effects in all models with no obvious motor deficits. The opioid antagonist naloxone did not reverse these effects. The selective A1 antagonist, DPCPX, and the selective A2A antagonist, ZM241385, completely prevented allopurinol-induced antinociception.

CONCLUSIONS: Allopurinol-induced antinociception may be related to adenosine accumulation. Allopurinol seems to be well tolerated with no locomotor side effects at high doses and it may be useful to treat pain syndromes.

Int J Rheum Dis.
2013
16(3):284-90



Patterns of angiotensin converting enzyme insertion/deletion gene polymorphism among an Egyptian cohort of patients with rheumatoid arthritis.

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Abstract

Aim: This case control study was designed to determine the patterns of angiotensin converting enzyme insertion/deletion (ACE I/D) gene polymorphism in rheumatoid arthritis (RA) patients and healthy controls.

METHODS:

The study population was divided into two groups: the study group included 66 RA patients diagnosed according to the American College of Rheumatology (ACR) classification criteria for RA, and the control group included 66 healthy adults who were age-and sex-matched to the RA group. All RA patients were assessed by Disease Activity Score (DAS28), ACR Classification of Global Functional Disability Status and Sharp's score as outcome measures. Gene investigations for ACE I/D polymorphism were performed by polymerase chain reaction (PCR) in both groups.

RESULTS:

The ACE I/D polymorphism was the (D/D) genotype in 60.6% (n = 40) of RA patients, the (I/D) genotype in 31.8% (n = 21) and the (I/I) genotype in 7.6% (n = 5). The frequency of (D) carriage was significantly higher in the RA cases than in the control group (76.5% vs. 53.8%, respectively, P = 0.0002). ACE D allele carriers were at higher risk of RA, 2.8 times higher than (I) carriers and those who had the homozygote (DD) genotype had 5.6 times the possibility of having RA. No correlations were observed between the homozygote (DD) genotype and disease activity or severity in RA patients.

CONCLUSIONS:

Our study suggests that high frequency of the ACE D allele contributes to the heritability of RA susceptibility compared to other ACE alleles. On the other hand, no association was detected between ACE I/D polymorphism and the severity of RA.

J Drug Target.
2013
(7):675-83



Curcumin-derivative nanomicelles for the treatment of triple negative breast cancer

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Abstract

BACKGROUND: Triple negative breast cancer (TNBC) is a subtype of breast cancer characterized by its poor outcome and a lack of targeted therapies. Recently, our laboratory has developed a second generation curcumin derivative, 3,5-bis(3,4,5-trimethoxybenzylidene)-1-methylpiperidine-4-one (RL71) that shows potent in vitro cytotoxicity. RL71 is hydrophobic with poor bioavailability which limits its clinical development.

PURPOSE: We have designed styrene-co-maleic acid (SMA) micelles encapsulating 5, 10 or 15% RL71 by weight/weight ratio to improve its solubility and pharmacokinetic profile.

METHODS: The micelles charge, size and release rate were characterized. We evaluated their cytotoxicity against TNBC cell lines. The internalization of the drug inside the cells was measured by HPLC and the efficiency of the micelles was tested using a tumor spheroid model.

RESULTS: The micelles exhibited mean diameters of 125-185 nm and had a neutral charge. SMA-RL71 micelles have a cytotoxicity profile comparable to the free drug against several TNBC cell lines. Moreover, the 15% loaded micelles increased the stability of RL71 and demonstrated higher activity in a tumor spheroid model.

CONCLUSION: The current study demonstrates the efficiency of SMA for drug delivery, the influence of physicochemical characteristics on cytotoxicity, and provides the basis for preclinical testing in vivo.



Published Research Articles in International Journals 2012-2013

Faculty of Vet.Medicine

Life Sci J
2013
(3): 1605-1609]



Gut digeneaiasis in African catfish *Clarias gariepinus* with estimating the efficacy of some antihelmintics

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Abstract

A total number of 200 fish (50 fish in each season) were collected randomly and examined for presence of digenea. Two species were recovered and identified as *Eumaseinia aegypticus* and *Orientocreadium bacotrachoid* with infestation rate of 13 % (26 out of 200) and 19.5 % (39 out of 200) respectively. Seasonally, the highest prevalence of digenea occurred in autumn, spring, winter and the lowest prevalence in summer. The histopathological alterations were manifested by presence of degenerative changes, sloughing and atrophy of gastric villi of glandular stomach and presence of degenerative changes in the lining intestinal mucosa with goblet cell proliferation. Besides, our results indicated the in vitro efficacy of both praziquantel and triclabendazole against *O. bacotrachoid*.

Life Sci J
2013
(3): 2520-2528]



Iron in water and some marine fishes in relation to vibriosis at Lake Tamsah

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Abstract

This study have been applied on 300 marine fishes of three different species represented as *Sparus auratus*, *Siganus rivulatus*, and *Tilapia zillii* (each 100). They were collected randomly and seasonally from LakeTamsah in Ismailia governorate from May 2012 to April 2013. The clinical picture revealed the signs and lesions of septicemia. Isolation and identification of yellow pigmented colonies on TCBS and creamy coloured on TSA media with different NaCl concentration (1.5-8 %), resistant to vibriostat O/129-10 µg and sensitive to vibriostat O/129-150 µg. The causative agent was identified as *Vibrio*. The results revealed that the highest prevalence of vibriosis was recorded in *Sparus auratus* (46 %), *Tilapia zillii* (34%) then *Siganus rivulatus* (25.9 %) while the total prevalence was 36%. The highest seasonal prevalence was recorded in summer (56 %) followed by spring (48%) then autumn (26.67%) and winter (13.33%). The highest seasonal prevalence of vibriosis in all examined fishes was in summer followed by spring. The highest prevalence of was in liver, kidney then spleen and gills. The results of iron estimation in tissues revealed that its concentration in musculature was the lowest and it was less than the permissible limits while it was the highest in liver followed by kidneys and spleen. The highest iron concentration in water of Lake Tamsah in two different locations was in summer, autumn, spring and the lowest in winter. The histopathological studies of the examined marine fishes showed hyperactivation of the melanomacrophage centers, hemosiderosis, necrosis and mononuclear cell aggregates in the liver, kidneys and spleen.

Clin Exp Nephrol
2013
(3): 327–337



Profiling of kidney vascular endothelial cell plasma membrane proteins by liquid chromatography-tandem mass spectrometry

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Abstract

Background Vascular endothelial cells (VECs) play crucial roles in physiological and pathologic conditions in tissues and organs. Most of these roles are related to VEC plasma membrane proteins. In the kidney, VECs are closely associated with structures and functions; however, plasma membrane proteins in kidney VECs remain to be fully elucidated.

Methods Rat kidneys were perfused with cationic colloidal silica nanoparticles (CCSN) to label the VEC plasma membrane. The CCSN-labeled plasma membrane fraction was collected by gradient ultracentrifugation. The VEC plasma membrane or whole-kidney lysate proteins were separated by sodium dodecyl sulfate polyacrylamide gel electrophoresis and digested with trypsin in gels for liquid chromatography–tandem mass spectrometry. Enrichment analysis was then performed.

Results The VEC plasma membrane proteins were purified by the CCSN method with high yield (approximately 20 µg from 1 g of rat kidney). By Mascot search, 582 proteins were identified in the VEC plasma membrane fraction, and 1,205 proteins were identified in the kidney lysate. In addition to 16 VEC marker proteins such as integrin beta-1 and intercellular adhesion molecule-2 (ICAM-2), 8 novel proteins such as Deltex 3-like protein and phosphatidylinositol binding clathrin assembly protein (PICALM) were identified. As expected, many key functions of plasma membranes in general and of endothelial cells in particular (i.e., leukocyte adhesion) were significantly overrepresented in the proteome of CCSN-labeled kidney VEC fraction.

Conclusions the CCSN method is a reliable technique for isolation of VEC plasma membrane from the kidney, and proteomic analysis followed by bioinformatics revealed the characteristics of in vivo VECs in the kidney.

Proteome Science
2013
11(1):13



Profiling and annotation of human kidney glomerulus proteome

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Abstract

Background The comprehensive analysis of human kidney glomerulus we previously performed using highly purified glomeruli, provided a dataset of 6,686 unique proteins representing 2,966 distinct genes. This dataset, however, contained considerable redundancy resulting from identification criteria under which all the proteins matched with the same set of peptides and its subset were reported as identified proteins. In this study we reanalyzed the raw data using the Mascot search engine and highly stringent criteria in order to select proteins with the highest scores matching peptides with scores exceeding the "Identity Threshold" and one or more unique peptides. This enabled us to exclude proteins with lower scores which only matched the same set of peptides or its subset. This approach provided a high-confidence, non-redundant dataset of identified proteins for extensive profiling, annotation, and comparison with other proteome datasets that can provide biologically relevant knowledge of glomerulus proteome.

Results Protein identification using the Mascot search engine under highly stringent, computational strategy generated a non-redundant dataset of 1,817 proteins representing 1,478 genes. These proteins were represented by 2-D protein array specifying observed molecular weight and isoelectric point range of identified proteins to demonstrate differences in the observed and calculated physicochemical properties. Characteristics of glomerulus proteome could be illustrated by GO analysis and protein classification. The depth of proteomic analysis was well documented via comparison of the dynamic range of identified proteins with other proteomic analyses of human glomerulus, as well as a high coverage of biologically important pathways. Comparison of glomerulus proteome with human plasma and urine proteomes, provided by comprehensive analysis, suggested the extent and characteristics of proteins contaminated from plasma and excreted into urine, respectively. Among the latter proteins, several were demonstrated to be highly or specifically localized in the glomerulus by cross-reference analysis with the Human Protein Atlas database, and could be biomarker candidates for glomerular injury. Furthermore, comparison of ortholog proteins identified in human and mouse glomeruli suggest some biologically significant differences in glomerulus proteomes between the two species.

Conclusions A high-confidence, non-redundant dataset of proteins created by comprehensive proteomic analysis could provide a more extensive understanding of human glomerulus proteome and could be useful as a resource for the discovery of biomarkers and disease-relevant proteins.



Anesthetic Induction with Propofol versus Ketamine Pre and Post Lower Pole Nephrectomy in Dogs

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Abstract

This study was performed on fourteen Mongrel dogs to compare anesthetic induction in healthy, as well as, partially nephrectomized dogs using bolus intravenous administration of either propofol 4 mg/kg b.wt. in group I (before nephrectomy) and group II (one month after lower pole nephrectomy) or ketamine 10 mg/kg b.wt. in group III (before nephrectomy) and group IV (one month after lower pole nephrectomy). The quality of induction and recovery, the occurrence of cardiovascular and respiratory side effects and serum biochemical parameters were investigated. The results revealed that, anesthetic induction time did not change significantly in dogs before and after nephrectomy under the effect of either propofol or ketamine. Meanwhile, ketamine induced significantly longer weak time and down time than did propofol in corresponding groups. RRF was significantly longer in nephrectomized than non nephrectomized dogs under the effect of both agents while, recovery time was significantly longer in nephrectomized than non nephrectomized dogs under the effect of propofol. Ketamine caused significantly longer recovery time than did propofol in corresponding groups. There were no significant differences in induction and recovery scores before and after nephrectomy in dogs anesthetized with either propofol or ketamine. However, propofol caused significantly better induction and recovery than did ketamine in corresponding groups. Propofol caused significant decrease but ketamine caused significant increase in heart rate and respiratory rate in both nephrectomized and non nephrectomized dogs. Meanwhile, they did not significantly alter rectal temperature. ECG tracings showed only change in heart rate without arrhythmias. Significant increases in AST, LDH, CPK, urea and creatinine were observed in all groups with minor disparity from one to another group. It could be concluded that ketamine had better cardiopulmonary effect than propofol but the later was superior in the quality of induction and recovery. Lower pole nephrectomy in dogs had minimal impact on the modality of the effect of either agent.

Veterinary Parasitology
2013
(198) 214–218



Molecular and parasitological detection of *Trypanosoma Evansi* in Camels in Ismailia, Egypt

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Abstract

Trypanosoma evansi (T. evansi) is an endemic disease of camels and other domestic animals in Egypt. This study aimed to determine the prevalence of clinical and sub-clinical T. evansi infection among camels in Ismailia, Egypt, as well as survey their owners for T. evansi infection. The diagnostic sensitivity of three different PCR assays for detection of T. evansi in blood samples was evaluated. Blood samples were collected from 100 camels and 20 of their owners in the Ismailia governorate. Results revealed that the percentage of infected of camels with T. evansi vary with the detection method, ranging from 10% to 46% by PCR compared to 12% by microscopic examination of stained blood smears. Targeting the highly repeated sequence of mini-chromosome satellite DNA (TBR1/2 primer set) was more often seen in the PCR method (46% positive) compared to targeting ITS 1 (16% positive) or RoTat 1.2 VSG (10% positive) sequences. A partial sequence of RoTat 1.2 VSG gene was identical to the T. evansi sequences reported from India and Kenya, but varied similarity was seen when aligned with Egyptian T. evansi sequences. None of the camel owners were positive for T. evansi by microscopic examination of stained blood smears or PCR assays. PCR assay based on TBR sets is useful in the diagnosis and control disease and reducing economic losses.

Jökull Journal
2013
(63)208-216



Polymerase chain reaction and Dot blots hybridization techniques for diagnosis of lumpy skin disease in cattle in Egypt

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Abstract

Lumpy skin disease (LSD) is one of the major threats of cattle stock industry in Egypt. There is much confusion in laboratory diagnosis of lumpy skin disease. Specific lumpy skin disease virus (LSDV) primers were used in polymerase chain reaction assay (PCR) on field samples of skin biopsies and EDTA blood from clinically infected cattle located in Ismailia, Egypt to assess their efficiency for LSD diagnosis. The specificity of the primers was confirmed by using other Capripox viruses (CaPVs) such as vaccinal strain of sheep poxvirus (SPPV) and local adapted tissue culture LSDV (Ismailia 88). Specific LSDV primers were successfully and specifically detected the LSDV in 100% of skin biopsies and 40% of EDTA blood samples and did not able to detect SPPV. Therefore, specific PCR is a valuable technique for accurate diagnosis of LSD without any confusion with other related viruses and differentiate LSDV from SPPV and must be used as routine diagnostic test for LSD. Detection of LSDV in field samples by using PCR and Dot blot hybridization (DBH) were compared. The results revealed that both PCR and DBH detected LSDV in 100% skin biopsies while detection rates in EDTA blood were 40% and 30% using PCR and DBH respectively. Keywords: LSDV, SPPV, diagnosis, PCR, DBH

Animal Science Papers and Reports
2013
(4)291-302



Direct detection of *Mycobacterium avium* subsp. *Paratuberculosis* in bovine milk by multiplex Real-time PCR

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Abstract

The study aimed at direct detection of *Mycobacterium avium* subsp. *Paratuberculosis* (MAP) in milk by evaluating a multiplex real-time PCR assay targeting IS900 and ISMAV2 sequences including the amplification of PUC19-plasmid as internal control. The sensitivity of the assays was evaluated by testing MAP isolates in broad linear range of DNA (50 ng – 5 fg/μl). For the validation of the specificity, 6 MAP isolates and 22 isolates of genus *Mycobacteriaceae* were tested. Results revealed that reproducible detection limit for real-time PCR targeting IS900 and ISMAV2 was 5 fg/μl and 50 fg/μl respectively. By targeting ISMAV2 sequence, 100% specificity was detected. However, a cross reaction with 5 ng/μl of genome of 3 *M. avium* subspecies *avium* strains was detected by targeting IS900 and negative in lower genome quantity (5pg/μl). To maximize the assay's detection sensitivity, an efficient strategy for MAP-DNA extraction from spiked milk was assessed. Targeting of IS900 was sensitive and targeting ISMAV2 was very specific. Therefore, a multiplex real-time PCR assay targeting IS900 and ISMAV2 in combination with two commercial DNA extraction kits could be an ideal sensitive and specific protocol for routine large-scale analysis of milk samples and other clinical specimens from man and animals.

Aquatic Toxicology
2012
(109)17-24



Cytochrome P450 1C1 complementary DNA cloning, sequence analysis and constitutive expression induced by benzo-a-pyrene in Nile tilapia (*Oreochromis niloticus*)

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Abstract

CYP1C is the newest member of the *CYP1* family of P450s; however, its physiological significance, inducers, and metabolic functions are unknown. In this study, a new complementary DNA of the *CYP1C* subfamily encoding *CYP1C1* was isolated from Nile tilapia (*Oreochromis niloticus*) liver after intraperitoneal injection with benzo-a-pyrene (BaP). The full-length cDNA was 2223 bp long and contained an open reading frame of 1581 bp encoding a protein of 526 amino acids and a stop codon. The sequence exhibited 3' noncoding regions of 642 bp, respectively. The deduced amino acid sequence of *O. niloticus* CYP1C1 shows similarities of 86, 82.5, 79.7, 78.7, 77.8, 75.5, 69.6 and 61.3 % with scup CYP1C1, killifish CYP1C1,1C2, Japanese eel CYP1C1, zebra fish CYP1C1, common carp CYP1C1, scup CYP1C2, common carp CYP1C2 and zebra fish CYP1C2 respectively. The phylogenetic tree based on the amino acid sequences clearly shows tilapia CYP1C1 and scup CYP1C1 to be more closely related to each other than to the other CYP1C subfamilies. Furthermore, for measuring benzo-a-pyrene (BaP) induction of CYP1C1 mRNA in different organs of tilapia (*Oreochromis niloticus*), β -actin gene as internal control was selected based on previous studies to assess their expression variability. Real time RCR results revealed that there was a large increase in CYP1C1 mRNA in liver (43.1), intestine (5.1) and muscles (2.4).

Peptides
2013
(43)56-61



Expression of NPR-B in neurons of the dorsal root ganglia of the rat

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Abstract

C-type natriuretic peptide (CNP) is an abundant neuropeptide in the central nervous system, which exerts its physiological effects through natriuretic peptide receptor B (NPR-B). Recently, the CNP/NPR-B system has been recognized as an important regulator for the development of sensory axons. The dorsal root ganglion (DRG) contains neurons transmitting several kinds of spinal sensory stimuli to the central nervous system. In this study, we characterized NPR-B receptor expression in the rat DRG, using reverse transcription-polymerase chain reaction, Western blotting and immunohistochemistry. Immunostaining revealed that NPR-B was expressed in neuronal cell bodies and processes of the DRG, with NPR-B immunoreactivity mainly prominent in small and medium-sized DRG neurons. Double-immunolabeling showed that NPR-B was expressed in calcitonin gene-related peptide- and isolectin B4-positive neurons. Furthermore, NPR-B expression was co-localized with calcitonin gene-related peptide in the dorsal horn of the spinal cord. Together, our data suggest that the natriuretic peptides may perform several biological actions on sensory neurons via their binding to NPR-B in the DRG



Published Research Articles in International Journals 2012-2013

**Stem Cell Reviews and Reports
2013
(9)764-773**



Molecular mechanisms controlling the cell cycle in embryonic stem cells.

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Abstract

Embryonic stem (ES) cells are originated from the inner cell mass of a blastocyst stage embryo. They can proliferate indefinitely, maintain an undifferentiated state (self-renewal), and differentiate into any cell type (pluripotency). ES cells have an unusual cell cycle structure, consists mainly of S phase cells, a short G1 phase and absence of G1/S checkpoint. Cell division and cell cycle progression are controlled by mechanisms ensuring the accurate transmission of genetic information from generation to generation. Therefore, control of cell cycle is a complicated process, involving several signaling pathways. Although great progress has been made on the molecular mechanisms involved in the regulation of ES cell cycle, many regulatory mechanisms remain unknown. This review summarizes the current knowledge about the molecular mechanisms regulating the cell cycle of ES cells and describes the relationship existing between cell cycle progression and the self-renewal.

Oncology letters
2013
(5):1482-1486



β 4-integrin-mediated cytotoxic activity of AexU in human prostate cancer PC3 cells

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Abstract

The present study aimed to characterize the cytotoxic activity of AexU, an effector-mediating type three secretion system (TTSS) of gram-negative bacteria, in human prostate cancer cells, focusing on the association with β 4-integrin expression. The cytotoxic effects of AexU either alone or in combination with chemotherapeutic agents were evaluated using several human prostate cancer cell lines. Human prostate cancer PC3 cells, in which an expression vector containing siRNA targeting β 4-integrin had been introduced, were established (PC3/sh-In), and the cytotoxic effects of AexU on the PC3/sh-In cells were compared with the PC3 cells that were transfected with a control vector (PC3/C). The expression levels of β 4-integrin in the PC3 cells were markedly higher compared with those in the LNCaP or DU145 cells, and the cytotoxic effects of AexU in the PC3 cells were more pronounced compared with those in the LNCaP or DU145 cells. The sensitivity of the PC3 cells to docetaxel and cisplatin was significantly enhanced following treatment with AexU, resulting in a decrease in the IC₅₀ of the two agents by ~90%. The cytotoxic effect of AexU in the PC3/C cells was more marked compared with that in the PC3/sh-In cells, and the phosphorylation of Akt in the PC3/C cells appeared to be significantly more inhibited by the treatment with AexU compared with the PC3/sh-In cells. In conclusion, treatment with AexU may be a useful therapeutic option for prostate cancer when β 4-integrin is overexpressed. The treatment appears to exert its effects through growth inhibition and by enhancing the sensitivity of the cancer cells to chemotherapeutic agents.

Curr Microbiol
2013
(1):91-9.



Suicide plasmid-dependent IS1-element untargeted integration into *Aeromonas veronii* bv. *sobria* generates brown pigment-producing and spontaneous pelleting mutant

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Abstract

Foodborne Gram-negative pathogens belonging to the genus *Aeromonas* are variable in harboring insertion sequence (IS) elements that play an important role in the generation of dysfunctional relatives of known genes. Using suicide plasmids carrying an IS1-element, untargeted integration is a common problem during experimental trials to generate specific mutations by homologous recombination. In this work, different strains of *Aeromonas veronii* bv. *sobria* (AeG1 and ATCC 9071T), *A. hydrophila* ATCC 19570, and *A. sobria* ATCC 43979T are examined for acquisition of IS1-element from pYAK1 suicide plasmid. It was found that untargeted integration of IS1-element is encountered only in ATCC 9071T strain. Such untargeted integration generates a novel brown pigment-producing and spontaneous pelleting (BP(+)/SP(+)) mutant. Furthermore, BP(+)/SP(+) mutant strain secretes significantly higher quantity of PilF homologous protein than the wild-type strain and displays an enhanced protein tyrosine phosphorylation activity. Thus, current work shows that *Aeromonas* spp. strains are variable in their susceptibility for suicide plasmid-dependent IS1-element untargeted integration as well as the susceptible strain is changed to mimic pigment-producing and spontaneous pelleting strains that are naturally occurring among heterogeneous group of foodborne aeromonads.

Medicinal Chemistry Research
2013
(22): 4269-4277



Phytochemical, cytotoxic, hepatoprotective and antioxidant properties of *Delonix regia* leaves extract

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Abstract

Hepatocellular carcinoma is considered the third most common cause of cancer-related death worldwide. Thus, the present study was designed to test for the first time the putative cytotoxic effect of *Delonix regia* extract, besides its hepatoprotective activity. In this context, this study targets four specific aims; first, the phytochemical investigation of *D. regia* extract which led to the isolation of seven flavonoid glycosides; Kaempferol 3-rhamnoside 1, Quercetin 3-rhamnoside 2, Kaempferol 3-glucoside 3, Kaempferol 3-rutinoside 4, Kaempferol 3-neohesperidoside 5, Quercetin 3-rutinoside 6 and Quercetin 3-glucoside 7. Second, the evaluation of in vitro cytotoxic activity of the extract, where the extract exhibited a potent cytotoxic effect against HepG2 cell line. Third, the hepatoprotective activity was investigated using carbon tetrachloride (CCl₄)-induced liver injury. The plant extract at dose of 50, 100 and 200 mg/kg body weight reduced serum aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase as well as total and direct bilirubin in a dose dependent manner. The fourth aim was the investigation of the antioxidant activity of the extract as the treatment of rats with the extract at different doses significantly increased the liver tissue level of superoxide dismutase, catalase, reduced glutathione and total antioxidant capacity and decreased the level of malondialdehyde as compared to CCl₄ treated group. The current findings concluded that the extract of *D. regia* possessed not only a significant anticancer effect against HepG2 cells, but also an effective and a dose dependent hepatoprotective and antioxidant activities due to the presence of flavonoids content.

PLOS One
2013
(8):e72991



Protective Role of *Spirulina platensis* against Acute Deltamethrin-Induced Toxicity in Rats

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Abstract

Deltamethrin is a broad-spectrum synthetic pyrethroid insecticide and acaricide widely used for agricultural and veterinary purposes. However, its human and animal exposure leads to hepatonephrotoxicity. Therefore, the present study was undertaken to examine the hepatonephroprotective and antioxidant potential of *Spirulina platensis* against deltamethrin toxicity in male Wistar albino rats. Deltamethrin treated animals revealed a significant increase in serum biochemical parameters as well as hepatic and renal lipid peroxidation but caused an inhibition in antioxidant biomarkers. *Spirulina* normalized the elevated serum levels of AST, ALT, APL, uric acid, urea and creatinine. Furthermore, it reduced deltamethrin-induced lipid peroxidation and oxidative stress in a dose dependent manner. Therefore, it could be concluded that spirulina administration able to minimize the toxic effects of deltamethrin by its free radical-scavenging and potent antioxidant activity.

IndianJ Pharm Sc
2013
(75):642-648



Hepatoprotective and antioxidant activity of *dunaliella salina* in paracetamol-induced acute toxicity in rats

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Abstract

Paracetamol has a reasonable safety profile when taken in therapeutic doses. However, it could induce hepatotoxicity and even more severe fatal acute hepatic damage when taken in an overdose. The green alga, *Dunaliella salina* was investigated for hepatoprotective and antioxidant activity against paracetamol-induced liver damage in rats. Male albino Wistar rats overdosed with paracetamol showed liver damage and oxidative stress as indicated by significantly ($P<0.05$) increased serum levels of aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total and direct bilirubin, malondialdehyde, cholesterol and nitric oxide. At the same time, there were decreased activities of serum superoxide dismutase and total antioxidant capacity compared with the control group. Treatment with *D. salina* methanol extract at doses of 500 and 1000 mg/kg body weight or silymarin could significantly ($P<0.05$) decrease the liver damage marker enzymes, total and direct bilirubin, malondialdehyde, cholesterol and nitric oxide levels and increase the activities of superoxide dismutase and total antioxidant capacity in serum when compared with paracetamol intoxicated group. Liver histopathology also showed that *D. salina* reduced the centrilobular necrosis, congestion and inflammatory cell infiltration evoked by paracetamol overdose. These results suggest that *D. salina* exhibits a potent hepatoprotective effect on paracetamol-induced liver damage in rats, which may be due to both the increase of antioxidant enzymes activity and inhibition of lipid peroxidation.

Theriogenology
2013
(1):180-5



Mycoplasma infection in the uterus of early postpartum dairy cows and its relation to dystocia and endometritis

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Abstract

This study investigated the incidence of mycoplasma infection in the uterus of postpartum Holstein dairy cows and its relationship to the occurrence of endometritis. The genital tracts of 209 cows from three dairy farms in the Iwate Prefecture, Japan, were examined at Weeks 5 and 7 postpartum. The condition of the cervicovaginal mucus was assessed using a Metrichheck device and assigned a score from 0 (clear mucus) to 4 (purulent material with fetid odor). Intrauterine samples (N = 418) were collected at Weeks 5 and 7 postpartum using a cytobrush. After its withdrawal, swab samples were placed in mycoplasma culture broth at 37 °C for 72 hours. A novel and rapid polymerase chain reaction was used to detect seven mycoplasma species (*Mycoplasma bovis*, *M. arginini*, *M. bovis genitalium*, *M. californicum*, *M. bovis rhinis*, *M. alkalescens*, and *M. canadense*). The cytobrush was also rolled gently along the length of a glass slide for subsequent polymorphonuclear neutrophil count. The diagnostic criteria for cytological endometritis were 6% or more and 4% or more polymorphonuclear neutrophils at Weeks 5 and 7, respectively. From a subset of cows, additional swabs were rolled against the cytobrush and then placed in transport medium. These samples were then plated on specific agar plates and cultured under aerobic and anaerobic conditions to identify other bacteria present. The incidence of dystocia at the last calving was compared in mycoplasma positive and negative cows. Of the seven mycoplasma species, only *M. bovis genitalium* was detected; it was detected in 31 of the 418 uterine swabs (7.4%). Twenty-four cows were positive for *M. bovis genitalium* (eight cows at Week 5, nine cows at Week 7, and seven cows at both Weeks 5 and 7). The incidence of dystocia was higher ($P < 0.0001$) in mycoplasma positive (7/24; 29.2%) compared with mycoplasma negative (4/185; 2.2%) cows. However, there was no significant association between dystocia at last calving and subsequent uterine infection with other bacteria. In addition, the incidence of cytologic endometritis was higher ($P < 0.05$) in mycoplasma positive (8/16; 50%) than in mycoplasma negative (47/193; 24.4%) cows at Week 7. Therefore, we concluded that *M. bovis genitalium* infection in the uterus might be associated with recent dystocia and with cytologic endometritis in postpartum dairy cows.



Iranian Journal of Veterinary
Research
2013
(3) 237-240

Effects of bisphenol A and DDT on mRNA expression of vitellogenin II in liver of quail embryos

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Abstract

This study was conducted to reveal the estrogenic effects of bisphenol A and o, p'-DDT on quail embryos. Thirteen fertilized eggs were used as control (injected with 20 µl corn oil), 15 eggs were injected with estradiol 17β (0.04 mg dissolved in 20 µl corn oil), 20 eggs were injected with BPA (2 mg dissolved in 20µl corn oil) and 20 eggs were injected with o, p'-DDT (2 mg dissolved in 20 µl corn oil) at day 13 of incubation. Two days later the livers of the embryos were collected. The DNA was extracted from the liver for molecular sexing, while total RNA was extracted for vitellogenin II (VTGII) mRNA expression in embryos. In female embryos, BPA and o, p'-DDT induced variable levels of VTGII mRNA expression while in male embryos, o, p'-DDT induced a slightly VTGII mRNA expression. In contrast, there was no expression of VTGII after BPA injection. In conclusion, the estrogenicity of BPA was lower than o, p'-DDT and both of them were lower than the estradiol 17β.



Published Research Articles in International Journals 2012-2013

Faculty of Pharmacy

Archiv der Pharmazie
2013
(346):688-698

Synthesis and Biological Evaluation of Some *N*-Arylpyrazoles and Pyrazolo[3, 4-*d*] pyridazines as Anti-Inflammatory Agents

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7. The Regional Center for Mycology and Biotechnology, Al-Azhar University, Cairo, Egypt

Abstract

A series of 3, 4-bis-chalcone-*N*-arylpyrazoles 3a-k was prepared from diacetyl pyrazoles 2a-e. The reaction of 2d and 2e with hydrazine hydrate gave pyrazolo[3,4-*d*]pyridazine derivatives 4a-b. Furthermore, the reaction of 2a-e with thiosemicarbazide afforded pyrazolo[3,4-*d*]pyridazine thiocyanate salts 5a-e. The synthesized compounds were subjected to *in vivo* anti-inflammatory and ulcerogenic activity measurements, in addition to determination of their *in vitro* COX selectivity, to give a full profile about their anti-inflammatory activities. Compounds 3c, 3f, 3i, and 3e showed significant anti-inflammatory activity among the synthesized compounds. Moreover, docking studies were performed to give an explanation for their anti-inflammatory activity through COX selectivity.

European Review for Medical
and Pharmacological Sciences
2013
(17):179-188

Sildenafil citrate protects against gastric mucosal damage induced by indomethacin in rats

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Abstract

– BACKGROUND AND OBJECTIVES:

The present study was conducted to investigate the possible gastroprotective effect of sildenafil citrate, a selective inhibitor of cyclic guanosine monophosphate-specific phosphodiesterase, against indomethacin-induced gastric damage in rats. Further, the study was extended to investigate some possible mechanisms underlying this effect.

MATERIALS AND METHODS: Forty rats were assigned to vehicle (saline), control (indomethacin, 30 mg/kg, p.o.), ranitidine (50 mg/kg, p.o.), sildenafil (5 mg/kg, p.o.) and sildenafil (10 mg/kg, p.o.); the drugs were administered 30 minutes prior to indomethacin. Four hours after indomethacin administration, all rats were sacrificed and the gastric juices were collected. Then, each stomach was opened and macroscopically examined for gastric lesions and longitudinal sections were used for biochemical and histopathological analysis.

RESULTS: Our results indicated that indomethacin induced marked ulceration in the gastric mucosa, in addition to an increase in gastric acidity as compared to saline group ($p \leq 0.05$). Furthermore, indomethacin group showed lower concentration of mucin and reduced glutathione, whereas, lipid peroxides and tumor necrosis factor- α (TNF- α) were elevated in the stomach homogenate. Pretreatment with sildenafil (5 mg/kg) significantly reduced gastric acid secretion, ulcer score and lipid peroxides production without effect on mucin, TNF- α , or nitric oxide (NO). The higher dose of sildenafil (10 mg/kg) provided similar results with the exception of increasing tissue NO ($p \leq 0.05$).

CONCLUSIONS: We concluded that sildenafil can protect the gastric mucosa against the aggressive effect of indomethacin via increasing NO and inhibiting lipid peroxidation. Therefore, sildenafil might be helpful in preventing the gastric adverse effects of non-steroidal anti-inflammatory drugs in a clinical setting.

Chem. Pharm. Bull
2013
(9) 933–940



Synthesis of New Nicotinic Acid Derivatives and Their Evaluation as Analgesic and Anti-inflammatory Agents

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Abstract

A series of 2-substituted phenyl derivatives of nicotinic acid 4a–I were synthesized and evaluated for their analgesic and anti-inflammatory activities. Compounds including 2-bromophenyl substituent, 4a, c, and d, proved to display distinctive analgesic and anti-inflammatory activities in comparison to mefenamic acid as a reference drug. Compound 4c could be identified as the most biologically active member within this study with an interesting dual anti-inflammatory analgesic profile. Effect of the compounds 4a–I on the serum level of certain inflammatory cytokines such as tumor necrosis factor (TNF)- α and interleukin (IL)-6 was also determined.

Pharmacol Rep
2013
(5):1213-26



The antioxidant potential of melatonin enhances the response to l-dopa in 1-methyl 4-phenyl 1,2,3,6-tetrahydropyridine-parkinsonian mice

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Abstract

Parkinson's disease is a neurodegenerative disorder of uncertain pathogenesis characterized by a loss of dopaminergic neurons in substantia nigra pars compacta, and can be modeled by the neurotoxin 1-methyl-4-phenyl-1, 2, 3, 6-tetrahydropyridine (MPTP). The current research was directed to investigate the role of melatonin in preventing the gradual decrease in the response to l-dopa in MPTP-induced parkinsonism in mice.

Eighty four male Swiss mice were divided into seven groups. Group I is the saline group. The other six groups were injected with MPTP (20 mg/kg/2h). Group II is the MPTP control group. Group III was treated with l-dopa/carbidopa (100/10 mg/kg, *po*). Group IV and V were treated with melatonin (5 or 10 mg/kg, *po*); respectively. Group VI and VII received l-dopa/carbidopa in combination with melatonin in the same above-mentioned doses; respectively.

Results showed that MPTP-treated mice exhibited low striatal dopamine level accompanied by motor impairment and increased oxidative stress. Treatment with l-dopa improved the motor performance of the mice. Addition of melatonin to l-dopa therapy improved the motor response to l-dopa and increased striatal dopamine level. This combination reduced lipid peroxidation, ameliorated reduced glutathione and improved antioxidant enzyme activities ($P \leq 0.05$). Overall, our study suggests that the antioxidant effect of melatonin makes it a promising candidate to l-dopa in the current model of Parkinson's disease.

Journal of Chromatographic
Science
2013
(10): 855–861



HPLC and Chemometric Methods for the Simultaneous Determination of Miconazole Nitrate and Nystatin

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Abstract

High-performance liquid chromatography (HPLC) and chemometric methods were applied to the simultaneous determination of the two nonsteroidal antifungal drugs, miconazole (MIC) and nystatin (NYS). The applied chemometric techniques are multivariate methods including classical least squares, principal component regression and partial least squares methods. The ultraviolet (UV) absorption spectra of the standard solutions of the training and validation sets in methanol are recorded in the range of 280–320 nm at 0.2-nm intervals. The HPLC method depends on reversed-phase separation using a C18 column. The mobile phase consists of a mixture of methanol–acetonitrile– ammonium acetate buffer (pH 6; 50 mM) (60:30:10 v/v/v). The UV detector was set at 230 nm. The developed methods were validated and successfully applied to the simultaneous determination of MIC and NYS in their tablets. The assay results obtained using the chemometric methods were statistically compared to those of the HPLC method and good agreement was observed.

Medicinal Chemistry
2012
(3): 372–383



CoMFA and CoMSIA Studies of 1, 2-dihydropyridine Derivatives as Anticancer Agents

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Abstract

Taking advantage of our in-house experimental data on 3-cyano-2-imino-1, 2-dihydropyridine and 3-cyano-2-oxo-1, 2-dihydropyridine derivatives as inhibitors of the growth of the human HT-29 colon adenocarcinoma tumor cell line, we have established a highly significant CoMFA and CoMSIA models ($q^2_{cv} = 0.70/0.639$). The models were investigated to assure their stability and predictivity ($r^2_{pred} = 0.65/0.61$) and successfully applied to design a new potential cell growth inhibitory agent with IC_{50} s in the submicromolar range.

Clinical Biochemistry

2013

46: 45–48



Relaxin-3 is associated with metabolic syndrome and its component traits in women

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Abstract

Objectives: Relaxin-3 was found to play a role in appetite regulation, increasing food intake and body weight. We aimed to investigate the relation of relaxin-3 with metabolic syndrome and its component traits in women.

Design and Methods: The study was conducted on 300 females, 150 healthy subjects and 150 patients with metabolic syndrome. The component traits of metabolic syndrome were determined for all participants.

Results: Serum relaxin-3 level was significantly higher in the metabolic syndrome patients than in the healthy control group. It was also significantly correlated with all the component traits of metabolic syndrome.

Conclusion: The results suggest that metabolic syndrome is associated with increased serum relaxin-3 levels in women. Relaxin-3 might be considered as a potential biomarker of metabolic syndrome.

Metabolism: clinical and experimental

2013

(10):1437-42



Association of estrogen receptor alpha gene polymorphisms with metabolic syndrome in Egyptian women.

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Abstract

OBJECTIVE:

Metabolic syndrome is a risk factor for coronary heart diseases as well as diabetes, fatty liver and several cancers. The prevalence of metabolic syndrome in women appears to be increasing, particularly in women of childbearing age. In the present study, we assessed the association of estrogen receptor-alpha gene polymorphisms (XbaI and PvuII) with metabolic syndrome and its related phenotypes.

MATERIALS/METHODS:

One hundred and fifty Egyptian female patients with metabolic syndrome (mean age 35.52 ± 6.86) were compared with one hundred and fifty age matched healthy Egyptian women (controls). The component traits of metabolic syndrome were determined, and the XbaI and PvuII genotypes were assessed with the PCR-RFLP method.

RESULTS:

Our data indicated a significant difference in the allele frequencies of XbaI, but not PvuII, between the metabolic syndrome and control groups ($P=0.0003$ and $P=0.164$). Carriers of the minor alleles of XbaI and PvuII gene polymorphisms, in either the homozygous or heterozygous form, were associated with high diastolic blood pressure, high total cholesterol and LDL-c levels, increased HOMA-IR values and decreased QUICKI values compared to carriers of the major allele. However, only the minor G allele of XbaI was associated with measures of adiposity, specifically, BMI and waist circumference.

CONCLUSIONS:

The XbaI polymorphism of the estrogen receptor alpha gene is associated with metabolic syndrome. On the other hand, PvuII gene polymorphism is not associated with the occurrence of the disease in this sample of Egyptian women.

Planta Med
2013
(18):1756-61



Secondary metabolites from *Eupenicillium parvum* and their in vitro binding affinity for human opioid and cannabinoid receptors.

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Abstract

Phytochemical investigation of the soil microfungus *Eupenicillium parvum* led to the isolation of two new compounds: a chromone derivative euparvione (1) and a new mycophenolic derivative euparvilactone (2), as well as thirteen known compounds. The structures of the two new compounds were elucidated by means of extensive IR, NMR, and MS data and by comparison of data reported in the literature. The structure of the known compound 6 was confirmed by X-ray crystallography. Several isolated compounds were evaluated for in vitro binding assays using opioid receptors (subtypes δ , κ , and μ) and cannabinoid receptors (CB1 and CB2). Compound 10 displayed the best selective μ -opioid receptor and CB1 receptor binding affinities showing values of 47% and 52% at 10 μ M concentration, respectively. These findings provide insight into the potential utility of this class of compounds.

Molecular Biology Reports
2013



DNA methylation status of the methylenetetrahydrofolate reductase gene promoter in peripheral blood of end-stage renal disease patients

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Abstract

End-stage renal disease (ESRD) is one of the main causes of morbidity and mortality worldwide. DNA methylation is a major epigenetic modification of the genome that has the potential to silence gene expression.

Methylenetetrahydrofolate reductase (MTHFR) gene inactivation was recognized as a predisposing factor of hyperhomocysteinemia in renal patients. The current study aimed to determine the methylation status within the MTHFR promoter region in DNA isolated from peripheral blood of ESRD patients and controls and the correlation of this methylation with the clinical and biochemical characteristics in ESRD patients. Ninety-six ESRD patients and 96 healthy ethnically, age and gender matched controls were included within the study. MTHFR promoter methylation was assessed using methylation specific polymerase chain reaction. The frequency of MTHFR methylation was significantly higher in ESRD patients than in controls ($P = 0.003$), additionally, MTHFR methylation was associated to a decrease in estimated glomerular filtration rate, serum high-density lipoprotein cholesterol level and an increase in both serum total cholesterol and low-density lipoprotein cholesterol levels. Data generated from this study suggest the possible involvement of MTHFR promoter methylation in the pathogenesis of ESRD and support a new dimension of MTHFR inactivation.

Toxicology and Industrial Health

2013

001-16



Therapeutic and protective effects of *Caesalpinia gilliesii* and *Cajanus Cajan* proteins against acetaminophen overdose-induced renal damage

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Abstract

The present work aims to evaluate the protective and ameliorative effects of two plant-derived proteins obtained from the seeds of *Cajanus cajan* and *Caesalpinia gilliesii* (Leguminosae) against the toxic effects of acetaminophen in kidney after chronic dose through determination of certain biochemical markers including total urea, creatinine, and kidney marker enzyme, that is, glyceraldehyde-3-phosphate dehydrogenase (GAPDH). In addition histopathological examination of intoxicated and treated kidney with both proteins was performed. The present results show a significant increase in serum total urea and creatinine, while significant decrease in GAPDH. Improvement in all biochemical parameters studied was demonstrated, which was documented by the amelioration signs in rats kidney architecture. Thus, both plant protein extracts can counteract the nephrotoxic process, minimize damage to the kidney, delay disease progression, and reduce its complications.

Journal of Applied
Pharmaceutical Science
2013
(06), pp. 213-217



Therapeutic Role of Coenzyme Q10 in Brain Injury during Experimental Diabetes

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Abstract

Diabetes mellitus is a complex disease associated with peripheral and central complications; these complications include retinopathy, nephropathy and neuropathy. Antioxidant therapies may be useful in decreasing the risk of diabetic complications. This study carried out to investigate the role of coenzyme Q10 (CoQ10) in decreasing oxidative stress as well as attenuating brain injury in diabetic rats. Sixty male albino rats were used in this study and classified into four groups (fifteen rats in each group) including; control, CoQ10, diabetic and treated groups.

Fasting blood sugar was determined. Brain malondialdehyde (MDA), advanced oxidation protein products (AOPP), nitric oxide (NO) and superoxide dismutase (SOD) were estimated by colorimetric methods. In addition brain CoQ10 was estimated by HPLC method using C18 column and UV detector at 275 nm. Brain oxidant parameters were significantly increased in diabetic group concomitant with a reduction in brain antioxidants, while CoQ10 supplementation in treated group attenuated them. We concluded that oral CoQ10 may be a viable antioxidant strategy for neurodegenerative disease in diabetes mellitus.

International Journal of Pharmacy
and Pharmaceutical Sciences
2013
(5), 146-151



ROLE OF CELL MEMBRANE FATTY ACIDS IN INSULIN SENSITIVITY IN DIABETIC RATS TREATED WITH FLAXSEED OIL

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Abstract

Introduction: The cell functions involved in the action of insulin receptor binding enzyme and transporter activities are controlled by membrane properties, and the amount of dietary fat as well as the nature of fatty acids regulates various steps in the biosynthesis of membrane phospholipids.

Objective: To investigate the effect of flaxseed oil on improving erythrocyte membrane components and insulin sensitivity in diabetic rats.

Methods: Thirty two adult male albino rats were used in this study and classified into four groups control, flaxseed oil, diabetic and treated groups. Fasting blood glucose and plasma insulin were estimated. Total lipids in the red blood cells membrane were extracted with chloroform/methanol method. Erythrocyte membrane total lipids, total cholesterol and triglycerides were determined. Fatty acids and phospholipids fractions were measured by HPLC.

Results: Flaxseed oil administration effectively improved cell membrane components.

Conclusion: Flaxseed oil has an important role in enhancing insulin sensitivity and decreasing blood glucose in diabetic rats.

PLoS One.

2013

(1):e54692



Diabetes and overexpression of proNGF cause retinal neurodegeneration via activation of RhoA pathway.

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Abstract

Our previous studies showed positive correlation between accumulation of proNGF, activation of RhoA and neuronal death in diabetic models. Here, we examined the neuroprotective effects of selective inhibition of RhoA kinase in the diabetic rat retina and in a model that stably overexpressed the cleavage-resistance proNGF plasmid in the retina. Male Sprague-Dawley rats were rendered diabetic using streptozotocin or stably express cleavage-resistant proNGF plasmid. The neuroprotective effects of the intravitreal injection of RhoA kinase inhibitor Y27632 were examined in vivo. Effects of proNGF were examined in freshly isolated primary retinal ganglion cell (RGC) cultures and RGC-5 cell line. Retinal neurodegeneration was assessed by counting TUNEL-positive and Brn-3a positive retinal ganglion cells. Expression of proNGF, p75(NTR), cleaved-PARP, caspase-3 and p38MAPK/JNK were examined by Western-blot. Activation of RhoA was assessed by pull-down assay and G-LISA. Diabetes and overexpression of proNGF resulted in retinal neurodegeneration as indicated by 9- and 6-fold increase in TUNEL-positive cells, respectively. In vitro, proNGF induced 5-fold cell death in RGC-5 cell line, and it induced >10-fold cell death in primary RGC cultures. These effects were associated with significant upregulation of p75(NTR) and activation of RhoA. While proNGF induced TNF- α expression in vivo, it selectively activated RhoA in primary RGC cultures and RGC-5 cell line. Inhibiting RhoA kinase with Y27632 significantly reduced diabetes- and proNGF-induced activation of proapoptotic p38MAPK/JNK, expression of cleaved-PARP and caspase-3 and prevented retinal neurodegeneration in vivo and in vitro. Taken together, these results provide compelling evidence for a causal role of proNGF in diabetes-induced retinal neurodegeneration through enhancing p75(NTR) expression and direct activation of RhoA and p38MAPK/JNK apoptotic pathways.

Eur Rev Med Pharmacol Sci
2013
(15):2000-9



15-PGDH inhibitors: the antiulcer effects of carbenoxolone, pioglitazone and verapamil in indomethacin induced peptic ulcer rats

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Abstract

BACKGROUND AND AIM:15-hydroxyprostaglandin dehydrogenase (15-PGDH) is the enzyme responsible for prostaglandins (PGs) metabolism. PGs have an important role in the protection of stomach mucosa against destructive stimuli. The aim of the present study is to investigate the inhibitory effect of carbenoxolone, pioglitazone and verapamil on 15-PGDH enzyme.

MATERIALS AND METHODS:The experiments were carried out in the Faculty of Pharmacy, Suez Canal University, Ismailia, Egypt from May 2011 to August 2011. Adult male albino rats were fasted for 18 hours before administration of high dose of indomethacin (30 mg/kg, p.o.), except for the negative control group which received saline only, followed by pyloric ligation to induce acute gastric ulcers. The rats were pretreated orally with saline, pioglitazone (20 mg/kg), verapamil (25 mg/kg), carbenoxolone (30 mg/kg) or their combinations 30 minutes before indomethacin. The rats were sacrificed after four hours of pyloric ligation. The effects of the previous treatments on the ulcer index (Ui), the microscopic appearance of gastric mucosa, the gastric acid output, the gastric barrier mucus content, and 15-PGDH enzyme activity were determined.

RESULTS:Indomethacin resulted in severe ulceration and increased gastric acid output ($p < 0.05$) compared to negative control. The rats pretreated with carbenoxolone, pioglitazone, verapamil had reduced ulcer index, gastric acid output and 15-PGDH activity ($p < 0.05$) compared to either indomethacin group or the negative control group. Individual treatments with carbenoxolone, pioglitazone or verapamil increased gastric barrier mucus ($p < 0.05$) compared to either indomethacin group or the negative control group. The combinations of verapamil with either carbenoxolone or pioglitazone caused further reduction in ulcer index, gastric acid output and 15-PGDH activity ($p < 0.05$), while causing further increase in gastric barrier mucus ($p < 0.05$) compared to their respective individual treatment group.

CONCLUSIONS:The antiulcer properties of pioglitazone and verapamil are, in part, consequences of their inhibitory effect on the enzyme 15-PGDH, responsible for PGs degradation, and the resultant prolongation of PGE2 biological activity in rat stomach mucosa.

Diabetologia
2013
(10):2329-39



Modulation of p75 (NTR) prevents diabetes- and proNGF-induced retinal inflammation and blood-retina barrier breakdown in mice and rats

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Abstract

AIMS/HYPOTHESIS: Diabetic retinopathy is characterised by early blood-retina barrier (BRB) breakdown and neurodegeneration. Diabetes causes imbalance of nerve growth factor (NGF), leading to accumulation of the NGF precursor (proNGF), as well as the NGF receptor, p75 neurotrophin receptor (p75(NTR)), suggesting a possible pathological role of the proNGF-p75(NTR) axis in the diabetic retina. To date, the role of this axis in diabetes-induced retinal inflammation and BRB breakdown has not been explored. We hypothesised that modulating p75(NTR) would prevent diabetes- and proNGF-induced retinal inflammation and BRB breakdown.

METHODS: Diabetes was induced by streptozotocin in wild-type and p75(NTR) knockout (p75KO) mice. After 5 weeks, the expression of inflammatory mediators, ganglion cell loss and BRB breakdown were determined. Cleavage-resistant proNGF was overexpressed in rodent retinas with and without p75(NTR) short hairpin RNA or with pharmacological inhibitors. In vitro, the effects of proNGF were investigated in retinal Müller glial cell line (rMC-1) and primary Müller cells.

RESULTS: Deletion of p75(NTR) blunted the diabetes-induced decrease in retinal NGF expression and increases in proNGF, nuclear factor κ B (NF κ B), p-NF κ B and TNF- α . Deletion of p75(NTR) also abrogated diabetes-induced glial fibrillary acidic protein expression, ganglion cell loss and vascular permeability. Inhibited expression or cleavage of p75(NTR) blunted proNGF-induced retinal inflammation and vascular permeability. In vitro, proNGF induced p75(NTR)-dependent production of inflammatory mediators in primary wild-type Müller and rMC-1 cultures, but not in p75KO Müller cells.

CONCLUSIONS/INTERPRETATION: The proNGF-p75(NTR) axis contributes to retinal inflammation and vascular dysfunction in the rodent diabetic retina. These findings underscore the importance of p75(NTR) as a novel regulator of inflammation and potential therapeutic target in diabetic retinopathy.

Journal of Chemical Information
and Modeling
2013
53, 2369–2375



Differential Binding of Latrunculins to G- Actin: A Molecular Dynamics Study

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Abstract

Latrunculins are unique macrolides containing a thiazolidinone moiety. Latrunculin A (1), latrunculin B (2), 16- epi-latrunculin B (3), and latrunculin T (4) were isolated from the Red Sea sponge *Negombata magnifica*. In the present study, after testing compounds 2–4 for cytotoxic activity, they were docked into the crystal structure of G-actin and subjected to binding energy calculation and a 20 ns MD simulation. The modeling study shows that latrunculins binding depends on both hydrophobic interaction of the macrocycle as well as H bonding of the thiazolidinone ring with Asp157 and Thr186. It was noticed that epimerization at C16 of latrunculin B was well tolerated as it could form an alternative H bonding network.

However, opening of the macrocyclic ring deteriorates the actin binding due to reduced hydrophobicity. MD simulation showed that latrunculin B (2) possesses a more significant stabilizing effect on G-actin than latrunculin T (4) and could efficiently hinder the flattening transition of G-actin into F-actin. These findings could explain, at the molecular level, the impact of epimerization and macrolide ring-opening on latrunculins activity, an issue that has not been addressed before. Also, the study gives insights into the mechanism of cytotoxicity of diverse latrunculins and provides direction for future lead optimization studies.



Natural Product Research
2013
8, 691–696



New terpenoids from *Menthapulegium* L. and their antimicrobial activity

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Abstract

In addition to one previously reported compound: two new terpenoidal compounds 1_, 6 β dimethyl-5 β -hydroxy-4 β -(prop-1-en-2-yl)-decahydronaphthalen- 2-one (1) and 1-(O- β -D-glucopyranosyl)-2,7-dimethyloct-5-en-3-one (2) were isolated from the chloroformic extract of *Menthapulegium* L. The structure elucidation of these compounds was based primarily on 1D and 2D-nuclear magnetic resonance analyses. Compound 1 displayed moderate anti-MRSa (IC₅₀ 8.5 mgmL⁻¹).

Journal of Chromatographic
Science
2013
(51):258-65



Validated HPLC and HPTLC Methods for Simultaneous Determination of Colchicine and Khellin in Pharmaceutical Formulations

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Abstract

The present work describes validated high-performance liquid chromatography (HPLC) and high-performance thin-layer chromatography (HPTLC) methods for the simultaneous determination of colchicines and khellin. The isocratic reversed-phase HPLC separation was performed on a 5 mm C18 column (Luna, Phenomenex, Torrance, CA).

Good resolution between colchicine and khellin was achieved using a mixture of acetonitrile–10 mM NaH₂PO₄ (pH 3.0, 35:65 v/v) as a mobile phase. Quantitation was achieved with ultraviolet detection at 245 nm based on peak area. The HPTLC separation was conducted on Merck HPTLC aluminum sheets of silica gel 60 F254 as stationary phase using methylene chloride–methanol (95:5 v/v) as a mobile phase. Quantification was also achieved using densitometric measurements at 245 nm. Both methods revealed reasonable validation parameters concerning selectivity, linearity, accuracy, precision and limits of detection and quantitation.

Journal of Natural Products
2013
(6): 156-167



Phytochemical and pharmacological studies of *Solanum elaeagnifolium* growing in Egypt.

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Abstract

The aim of this study is the phytochemical investigation and the biological assay of *Solanum elaeagnifolium* Cav. The chemical investigation of the ethyl acetate and 25% methanol/ethyl acetate fractions of *Solanum elaeagnifolium* Cav led to the isolation of two compounds β -sitosterol-3-O- β -D-glucoside (4) and Quercetin-3-O- β -D-glucopyranoside (5) for the first time from the species as well as three known compounds, β -sitosterol (1), stigmasterol (2) and kaempferol (3). Structure elucidation was achieved using spectroscopic techniques, including 1D, 2D NMR and MS. Concerning the lipid fraction, linoleic acid (6.27%) and oleic acid (5.66%) are the major unsaturated fatty acids where palmitic acid (5.16%) represented the major saturated one. The total phytosterols was amounted 11.34%. The biological assay revealed that the alcoholic extract exhibited significant analgesic, anti-inflammatory, hepatoprotective and anti-oxidant activities.

Natural Product Communications
2013
(2):153 - 154



Chemopreventive Effect of Sarcophine-diol on NOR-1-Induced TPA Promoted Skin Carcinogenesis in Female HOS: HR-1 Mice

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Abstract

The cancer chemopreventive potential of sarcophine-diol in a chemical carcinogen initiation–promotion experimental tumor model in mice was evaluated. Sarcophine-diol, when given orally, afforded significant protection in the mouse skin cancer model initiated by the topical administration of (±)-(E)-4-methyl-2-[(E)-hydroxyamino]-5-nitro-6-methoxy-3-hexanamide (NOR-1) and promoted by 12-O-tetradecanoylphorbol-13-acetate (TPA). These findings, along with our initial reports, suggest that sarcophine-diol is an effective cancer chemopreventive agent, even when administered orally and at a very low dose and thus indicating possible potential human applications in the control of malignancy.

Tetrahedron Letters
2013
(54):989–992



Bioactive Cembranoids from the Red Sea Soft Coral *Sarcophytonglaucum*

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Abstract

A chemical investigation of the Red Sea soft coral *Sarcophytonglaucum* led to the isolation of one new cembranoidditerpene, namely (1S,2E,4R,6E,8S,11R,12S)- 8,11-epoxy-4,12-epoxy-2,6- cembradiene(2), two cembranoidditerpenesisolated from nature for the first time, (1S,2E,4R,6E,8R,11S,12R)-8,12-epoxy-2,6-cembradiene-4,11-diol (3) and (1S,4R,13S)-cembra-2(E),7(E),11(E)-trien-4,13-diol (6) as well as three known compounds, Sarcophine(1), (+)-7 α ,8 β -dihydroxydeepoxysarcophine(4) and Sarcophytolide(5). Structure elucidation was achieved using spectroscopic techniques, including 1D and 2D NMR and HRMS. The MTT Elisa-type viability assay revealed that all the tested compounds when applied to melanoma B₁₆F₁₀ cells at 500 μ M concentrations and incubated for 48 hrs are capable of maximally inhibiting viability of mouse melanoma B₁₆F₁₀ cells (100% inhibition, as compared to identical control untreated cells). However, only compounds 1, 3 and 4 did not display cytotoxicity against monkey kidney CV-1 cells at the same concentration, suggesting that these compounds have a potential as candidates for further studies for their antitumor effect against melanoma. The antimicrobial activities of the isolated compounds were also tested. Compound 1 displayed moderate antifungal activity against *Cryptococcus neoformans* with an IC₅₀ value of 20 μ g/ml.

Tetrahedron Letters
2013
(54):2377–2381



Anti-H5N1 virus metabolites from the Red Sea soft coral, *Sinulariacandidula*

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Abstract

A novel polyhydroxylated sterol, 3 β -25-dihydroxy-4-methyl-5 α ,8 α -epidioxy-2-ketoergost-9-ene (1) along with three new ceramides *N*-[(2*S*,3*R*,*E*)-1,3-dihydroxyhexacos-4-en-2-yl] icosanamide (2), *N*-[(2*S*,3*S*,4*R*)-1,3,4-trihydroxyhexacosan-2-yl] icosanamide (3) and (*R*)-2'-hydroxy-*N*-[(2*S*,3*S*,4*R*)-1,3,4-trihydroxypentacosan-2-yl] nonadecanamide (4) were isolated from the Red Sea soft coral, *Sinulariacandidula*. Complete structure elucidation was achieved through extensive spectroscopic analysis including one- and two-dimensional nuclear magnetic resonance spectroscopy. *Sinulariacandidula* extracts of different polarities as well as the isolated pure compounds were screened against the highly pathogenic avian influenza strain H5N1 using the Plaque Inhibition Assay in MDCK. The results indicated that the extracts of the Red Sea soft coral *Sinulariacandidula* possessed potent antiviral activity (100% inhibition at a concentration of 1 μ g/ml). The isolates 1, 2, 3 and 4 showed reduction of virus titer by 55.16%, 48.81%, 10.43% and 15.76% inhibition at a concentration of 1 ng/ml, respectively.

Natural Product Research
2013
22, 2149-2153



Anti- H5N1 virus flavonoids from *Capparis* *Veill*

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Abstract

Methanolic extract of *Capparis* *Veill* was tested for its *in vitro* antiviral activity against highly pathogenic avian influenza strain H5N1 using Plaque inhibition assay in Madin–Darby canine kidney. The results indicated that the extract possessed potent antiviral activity (100% inhibition at the concentration of 1µgmL⁻¹). Based on this result *Capparis* *Veill* was selected for further study by applying bioactivity-guided fractionation to isolate its antiviral principles. The fractions eluted with EtOAc and 25%MeOH in EtOAc were found to hold the antiviral activity. Further chromatographic separation of the fractions holding the antiviral activity led to the isolation of quercetin (1), isoquercetin (2) and rutin (3) for the first time from this species. The isolates showed reduction of the virus titre by 68.13 %, 79.66 % and 73.22 % inhibition at concentration of 1 ngmL⁻¹, respectively.

Physiol Mol Biol Plants
2013
(1):127–136



Improved silymarin content in elicited multiple shoot cultures of *Silybummarianum* L.

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Abstract

Silybummarianum L. extracts are being used as antihepatotoxic therapy for liver diseases. Silymarin is a polyphenolic flavonoid mixture isolated from milk thistle which is believed to be responsible for the plant's hepatoprotective action. Regeneration of *Silybummarianum* plants from shoot tip explants and assessment of their morphogenic potential, silymarin total concentration and its major constituents upon exposure to medium composition alteration and different elicitors' application was targeted. Different concentrations of NaCl, quercetin, gamma irradiation and dried fungal extracts were used to elicit silymarin production in the cultures. The chemical composition of silymarin and its total concentration was investigated through HPLC at all the experiment stages. MS medium containing various concentrations of BA or BA. IAA was more effective than NAA and IBA in inducing robust roots in shoot cultures. The flowering plants recorded 20% and 40% of the total plants number in the multiplication and rooting stages respectively. The highest total silymarin concentration reached its peak with (10) Gray gamma-irradiation to be 6.598% dry weight in the *in vitro* regenerated shoot tip explants. The *in vitro* grown flowers showed 1.7 times more silymarin productivity as compared to that of the wild grown congruent.

Arch. Pharm. Res.
2013
36:671–683



Novel 4-substituted-2(1H)-phthalazinone derivatives: synthesis, molecular modeling study and their effects on α -receptors

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Abstract

Novel 4-(4-bromophenyl)phthalazine derivatives connected via an alkyl spacer to amine or N-substituted piperazine were designed and synthesized as promising α -adrenoceptor antagonists. The structures of the phthalazine derivatives were established using elemental and spectral analyses. Twelve of the tested compounds displayed significant α -blocking activity. Molecular modeling studies were performed to rationalize the biological results. Among the tested compounds, 7j displayed the best-fitting score and the highest in vitro activity.

Med Chem Res
2013
11:3327–3928



Molecular modeling studies and synthesis of novel quinoxaline derivatives with potential anti-cancer activity as inhibitors of methionine synthase

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Abstract

Methionine synthase (MetS) catalyses the transfer of a methyl group from the methyltetrahydrofolate (MTHF) to homocysteine to produce methionine and tetrahydrofolate. MetS is over-expressed in the cytosol of certain breast and prostate tumor cells. In this article, we designed, synthesized, and evaluated the biological activity of a series of substituted quinoxaline derivatives that mimic the MTHF in the structure. The main aim was to develop inhibitors that could inhibit the enzyme reaction by blocking the binding of MTHF. These inhibitors were docked into the MTHF binding domain in such the same way as MTHF in its binding domain. Compound 4-((6-nitro-quinoxalin- 2 yl)methylamino)methylbenzoic acid showed the lowest free energy of the binding (-152.62 kJ/mol) and showed the lowest IC₅₀ values of 45 ± 9 and 53 ± 9 IM against two types of cancer cell lines PC-3 and MCF-7, respectively.

Journal of Chromatographic Science
2013
(6):566-76



RP-HPLC/pre-column derivatization for analysis of omeprazole, tinidazole, doxycycline and clarithromycin

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Abstract

A validated, reliable and accurate reversed-phase high performance liquid chromatographic method using pre-column derivatization was adopted for the simultaneous determination of two ternary mixtures containing omeprazole, tinidazole and doxycycline hyclate or clarithromycin. Separation was achieved on a C18 column, through a gradient elution system using acetonitrile–methanol–water adjusted to pH 5.60. Drugs were detected at 277 nm over concentration ranges of 1–112, 5–125, 2.5–550 and 2.5–100 mg/mL for omeprazole, tinidazole, doxycycline hyclate and clarithromycin, respectively. This is the first method that has isolated and identified clarithromycin derivative by infrared and mass spectroscopy. This method is the first study for the simultaneous determination of omeprazole, tinidazole, doxycycline hyclate and clarithromycin in combined mixtures and pharmaceutical formulations.

CLEAN – Soil, Air, Water.
2013
9, 907-916



Simultaneous determination of 11 sulfonamides by HPLC–UV and application for fast screening of their aerobic elimination and biodegradation in a simple test

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Abstract

Sulfonamides (SAs) are one of the most frequently used antibiotics. SAs have been found in various environmental compartments. If SAs are not degraded in the environment, they can affect bacteria by their antibiotic properties and contribute to bacterial antibiotic resistance. Therefore, the biodegradability of 11 SAs (sulfanilamide, sulfaguanidine monohydrate, sulfadiazine, sulfathiazole, sulfapyridine, sulfamerazine, sulfamethoxypyridazine, sulfachloropyridazine, sulfamethazine, sulfamethoxazole, and sulfadimethoxine) was studied. For this purpose, the Closed Bottle Test (CBT, OECD 301D) was performed, which includes a toxicity control. In order to monitor the environmental fate of the parent compound and to check for transformation products, a simple, efficient, and reliable HPLC–UV method for the simultaneous determination of these SAs has been developed. Acetonitrile and water (with 0.1% formic acid) were used as mobile phase solvents for gradient elution. The method was validated in terms of precision, detection and quantitation limits, selectivity, and analytical solution stability. In the CBT, none of these SAs was readily biodegradable. The HPLC–UV analysis confirmed that no degradation of any SA took place. In the toxicity control, these SAs showed no toxic effect in the used concentration of environmental bacteria applied in the test.

Science of the Total Environment
2013
453, 137–147



Oxidation–coagulation of β -blockers by $K_2Fe^{VI}O_4$ in hospital wastewater: Assessment of degradation products and biodegradability

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Abstract

This study investigated the degradation of atenolol, metoprolol and propranolol beta-blockers by ferrate (K_2FeO_4) in hospital wastewater and in aqueous solution. In the case of hospital wastewater, the effect of the independent variables pH and $[Fe(VI)]$ was evaluated by means of response surface methodology. The results showed that $Fe(VI)$ plays an important role in the oxidation–coagulation process, and the treatment of the hospital wastewater led to degradations above 90% for all the three β -blockers, and to reductions of aromaticity that were close to 60%. In addition, only 17% of the organic load was removed. In aqueous solution, the degradation of the β -blockers atenolol, metoprolol and propranolol was 71.7%, 24.7% and 96.5%, respectively, when a ratio of 1:10 [β -blocker]: $[Fe(VI)]$ was used. No mineralization was achieved, which suggests that there was a conversion of the β -blockers to degradation products identified by liquid chromatography/mass spectrometry tandem. Degradation pathways were proposed, which took account of the role of $Fe(VI)$. Furthermore, the ready biodegradability of the post-process samples was evaluated by using the closed bottle test, and showed an increase in biodegradability. The use of the ferrate advanced oxidation technology seems to be a useful means of ensuring the remediation of hospital and similar wastewater.

Science of the Total Environment
2013
(464) 140–150



Aquatic photochemistry, abiotic and aerobic biodegradability of thalidomide: identification of stable transformation products by LC-UV-MSⁿ

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Abstract

Thalidomide (TD), besides being notorious for its teratogenicity, was shown to have immunomodulating and anti-inflammatory activities. This is why recently TD became a promising drug for the treatment of different cancers and inflammatory diseases. Yet nothing is known about the environmental fate of TD, which therefore was assessed experimentally and by in silico prediction programs (quantitative structure activity relationship (QSAR) models) within this study. Photolytic degradation was tested with two different light sources (medium-pressure mercury lamp; xenon lamp) and aerobic biodegradability was investigated with two OECD tests (Closed Bottle test (CBT), Manometric Respirometry test (MRT)). An additional CBT was performed for TD samples after 16 min of UV-photolysis. The primary elimination of TD was monitored and the structures of its photo-, abiotic and biodegradation products were elucidated by HPLC–UV–Fluorescence–MSⁿ. Furthermore, elimination of dissolved organic carbon was monitored in the photolysis experiment. LC–MS revealed that new photolytic transformation products (TPs) were identified, among them two isomers of TD with the same molecular mass. These TPs were different to the products formed by biodegradation. The experimental findings were compared with the results obtained from the in silico prediction programs where e.g. a good correlation for TD biodegradation in the CBT was confirmed. Moreover, some of the identified TPs were also structurally predicted by the MetaPC software. These results demonstrate that TD and its TPs are not readily biodegradable and not fully mineralized by photochemical treatment. They may therefore pose a risk to the aquatic environment due to the pharmacological activity of TD and unknown properties of its TPs. The applied techniques within this study emphasize the importance of QSAR models as a tool for estimating environmental risk assessments.

Journal of Hazardous Materials
2013
(245) 654– 661



Photolysis of sulfamethoxypyridazine in various aqueous media: Aerobic biodegradation and photoproducts identification by LC-UV-MS/MS

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Abstract

Sulfonamides are one of the most frequently used antibiotics worldwide. Therefore, mitigation processes such as abiotic or biotic degradation are of interest. Photodegradation and biodegradation are the potentially significant removal mechanisms for pharmaceuticals in aquatic environments. The photolysis of sulfamethoxypyridazine (SMP) using a medium pressure Hg-lamp was evaluated in three different media: Millipore water pH 6.1 (MW), effluent from sewage treatment plant pH 7.6 (STP), and buffered demineralized water pH 7.4 (BDW). Identification of transformation products (TPs) was performed by LC-UV-MS/MS. The biodegradation of SMP using two tests from the OECD series was studied: Closed Bottle test (OECD 301 D), and Manometric Respirometry test (OECD 301 F). In biodegradation tests, it was found that SMP was not readily biodegradable so it may pose a risk to the environment. The results showed that SMP was removed completely within 128 min of irradiation in the three media, and the degradation rate was different for each investigated type of water. However, dissolved organic carbon (DOC) was not removed in BDW and only little DOC removal was observed in MW and STP, thus indicating the formation of TPs. Analysis by LC-UV-MS/MS revealed new TPs formed. The hydroxylation of SMP represents the main photodegradation pathway.

Journal of Liquid Chromatography
& Related Technologies
2013
(10) 1297-1311



A RAPID, SENSITIVE, AND ENVIRONMENTALLY FRIENDLY ON-LINE SOLID PHASE EXTRACTION USING PROTEIN-COATED μ -BONDAPAK CYANIDE SILICA PRECOLUMN FOR CHROMATOGRAPHIC DETERMINATION OF PARACETAMOL IN HUMAN SERUM

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Abstract

A simple, rapid, and sensitive green high-performance liquid chromatographic (HPLC) method with automated precolumn extraction has been developed and evaluated for analysis of paracetamol (PC) in human serum. The method is performed by direct injection of serum samples onto a homemade protein-coated μ -Bondapak CN silica precolumn, where PC is preconcentrated and retained while proteins and very polar components are washed to waste using a phosphate buffer saline, pH 7.4. The trapped drug is then back-flushed from the precolumn by column-switching followed by separation on a Thermo Scientific Hypersil ODS analytical column with an environmentally friendly mobile phase consisting of ethanol and phosphate buffer (0.01 M, pH 3.5) in the ratio of 5:95 (v/v). Detection is performed at 254 nm. The chromatographic procedure yields precise results and is able to run one sample in only 6 min. The calibration curve is linear over the concentration range of 10–10000 ng mL⁻¹ PC. The applicability of the method was successfully evaluated by monitoring the concentration of PC in human serum after an oral administration of 500 mg.

Journal of Liquid Chromatography
& Related Technologies
2013
(18) 2568-2579



QUANTITATIVE DETERMINATION OF LEVETIRACETAM IN HUMAN URINE USING HPLC-UV AND ITS IDENTIFICATION BY LC-ESI-MS

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Abstract

A rapid method for the quantification of levetiracetam (LV) in human urine using high-performance liquid chromatography combined with UV detection (HPLC–UV) was developed and validated for linearity, repeatability, limit of detection, and limit of quantitation. In addition, a high-performance liquid chromatography combined with electrospray ionization mass spectrometry was described for its identification in human urine. Chromatographic separation was achieved on 250 × 4.6 mm (i.d.) Discovery® (5 µm particle size) reversed-phase C₁₈ analytical column using 0.1% formic acid in water–acetonitrile, in ratio of 85:15, v/v as mobile phase and UV detection at 210 nm for the HPLC–UV method and using 0.1% formic acid in water–acetonitrile, in ratio of 75:25, v/v as mobile phase for LC-ESI-MS method. The HPLC–UV method was successfully applied for establishment of the urinary excretion pattern of LV after oral dose.

Proc Natl Acad Sci U S A
2013
(4):E295-304



Boronated tartrolon antibiotic produced by symbiotic cellulose-degrading bacteria in shipworm gills

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Abstract

Shipworms are marine wood-boring bivalve mollusks (family Teredinidae) that harbor a community of closely related Gammaproteobacteria as intracellular endosymbionts in their gills. These symbionts have been proposed to assist the shipworm host in cellulose digestion and have been shown to play a role in nitrogen fixation. The genome of one strain of *Teredinibacter turnerae*, the first shipworm symbiont to be cultivated, was sequenced, revealing potential as a rich source of polyketides and nonribosomal peptides. Bioassay-guided fractionation led to the isolation and identification of two macrodiolide polyketides belonging to the tartrolon class. Both compounds were found to possess antibacterial properties, and the major compound was found to inhibit other shipworm symbiont strains and various pathogenic bacteria. The gene cluster responsible for the synthesis of these compounds was identified and characterized, and the ketosynthase domains were analyzed phylogenetically. Reverse-transcription PCR in addition to liquid chromatography and high-resolution mass spectrometry and tandem mass spectrometry revealed the transcription of these genes and the presence of the compounds in the shipworm, suggesting that the gene cluster is expressed in vivo and that the compounds may fulfill a specific function for the shipworm host. This study reports tartrolon polyketides from a shipworm symbiont and unveils the biosynthetic gene cluster of a member of this class of compounds, which might reveal the mechanism by which these bioactive metabolites are biosynthesized.

Journal of Liquid Chromatography
& Related Technologies

2013

(3):384-405



SIMULTANEOUS DETERMINATION OF TWO MULTICOMPONENT MIXTURES CONTAINING PHENOBARBITONE AND EPHEDRINE HYDROCHLORIDE USING HPLC AND CHEMOMETRIC ASSISTED SPECTROPHOTOMETRIC METHODS

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Abstract

Three methods for the simultaneous determination of two multicomponent mixtures containing phenobarbitone and ephedrine hydrochloride with theophylline, and postafene hydrochloride [mix 1]; or dihydroxypropyltheophylline and chlorpheniramine maleate [mix 2] were proposed.

The HPLC method depended on the use of gradient mobile phase system consisting of (A) acetonitrile and (B) 12 mM ammonium acetate; pH 4.5 with cyanopropyl column at a flow rate of 1.5 mL min⁻¹. Quantitation was achieved with UV detection at 215 nm, based on peak area. The two other methods were multivariate spectrophotometric calibration methods: partial least squares (PLS-1) and principal component regression (PCR). These approaches were successfully applied to quantify each component in the mixture. Analytical figures of merit (FOM) were calculated for both PLS-1 and PCR. The proposed methods were successfully applied for the analysis of pharmaceutical formulations containing the two multicomponent combinations and the results were compared.

Analyst
2012
(137):4802-8

Microplate analytical method for quinones by pulse photo-irradiation and chemiluminescence detection

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Abstract

Quinones are widely distributed in nature and have various bioactivities. Besides, quinones are also considered as toxicological intermediates which cause severe dangerous effects. Hereby, a sensitive, simple, and rapid method is reported for quinones determination. The proposed method employed time resolved fluorescence (TRF) microplate reader based chemiluminescent (CL) detection for the first time as a novel approach for measurement. Under pulse photo-irradiation, the unique photochemical characteristic of quinones is exploited to liberate reactive oxygen species (ROS) which reacted with photosensitized CL reagent. L-012, luminol analogue, was selected for its high sensitivity. Under our investigation, para-quinones showed high CL response when compared to ortho-quinones. A linear response was obtained for studied quinone concentrations in the range of 0.05-50 μM for 1,4-naphthquinone and of 0.05-150 μM for 2-methyl-1,4-naphthoquinone (menadione) and 9,10-anthraquinone with detection limit (blank + 3SD) of 0.01 μM . The proposed method allowed the rapid determination of large number of samples in very short time (96 sample/125 s). The proposed method was successfully applied for determination of menadione in spiked human serum.

Chem. Res. Toxicol.
2013
(9), 1409–1417

Development and Validation of the First Assay Method Coupling Liquid Chromatography with Chemiluminescence for the Simultaneous Determination of Menadione and Its Thioether Conjugates in Rat Plasma

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Abstract

Menadione (2-methyl-1,4-naphthoquinone, MQ), a component of multivitamin drugs with antihemorrhagic, antineoplastic, and antimalarial activity, is frequently used to investigate quinone-induced cytotoxicity. The formation of MQ conjugates with glutathione (GSH) by Michael addition and subsequent biotransformation to yield *N*-acetyl-L-cysteine conjugates is believed to be an important detoxification process. However, the resulting conjugates, 2-methyl-3-(glutathione-*S*-yl)-1,4-naphthoquinone (MQ-GS) and 2-methyl-3-(*N*-acetyl-L-cysteine-*S*-yl)-1,4-naphthoquinone (MQ-NAC), retain the ability to redox cycle and to arylate cellular nucleophiles. Although the nephrotoxicity and hepatotoxicity of MQ-thiol conjugates have been reported *in vitro*, methods for their determination *in vivo* have yet to be published. Herein, a highly sensitive, simple, and selective HPLC-chemiluminescence (HPLC-CL) coupled method is reported, allowing for the first time the simultaneous determination of MQ, MQ-GS, and MQ-NAC in rat plasma after MQ administration. Our method exploits the unique redox characteristics of MQ, MQ-GS, and MQ-NAC to react with dithiothreitol (DTT) to liberate reactive oxygen species (ROS) which are detected by a CL assay using luminol as a CL probe. To verify the proposed mechanism, MQ-GS and MQ-NAC were synthetically prepared. Specimen preparation involved solid-phase extraction on an Oasis HLB cartridge followed by isocratic elution on an ODS column. No interference from endogenous substances was detected. Linearity was observed in the range of 5–120 nM for MQ-GS and MQ-NAC and 10–240 nM for MQ, with detection limits (S/N of 3) of 1.4, 0.8, and 128 fmol for MQ-GS, MQ-NAC, and MQ, respectively. The application of our method reported here is the first to extensively study the stability and reversibility of thiol-quinones.

Adv Drug Deliv Rev
2012
(6):531-9



Oral biodrug delivery using cell-penetrating peptide

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Abstract

During the past few decades, the novel biotherapeutic agents such as peptides and proteins have been contributed to the treatment of several diseases. However, their oral absorption is significantly limited due to their poor delivery through the intestinal mucosa. Therefore, the feasible approaches are needed for improving the oral bioavailability of biodrugs. Recently, cell-penetrating peptides (CPPs) such as HIV-1 Tat, penetratin and oligoarginine are considered as a useful tool for the intracellular delivery of therapeutic macromolecules. Hence, it was expected that the ability of CPPs may be applicable to enhance the absorption of biodrugs through intestinal epithelial membrane. CPPs are likely to become powerful tools for overcoming the low permeability of therapeutic peptides and proteins through the intestinal membrane, the major barrier to their oral delivery. Further advantage of this promising strategy is that this successful intestinal absorption could be achieved by more convenient methodology, coadministration of CPP with drugs via intermolecular interaction among them. Hereafter, the further establishment of delivery system based on CPPs is required to realize the development of the oral forms of therapeutic peptides and proteins. The aim here is to introduce our vision focusing on oral biodrug delivery by the use of CPPs as potential peptide carrier in order to provide new information in the design and development of new oral delivery systems for novel biotherapeutics.

Journal of Experimental & Clinical Medicine
2012
(4):198–202



Cell-penetrating Peptide-biodrug Strategy for Oral and Nasal Delivery: Review of Recent Findings

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Abstract

Despite remarkable revolutionary progress in therapeutic biodrugs, such as peptides and proteins, the effective and convenient noninvasive delivery of this therapeutics remains a major challenge. Oral delivery of peptides and proteins remains an attractive alternative to parenteral delivery, and this has challenged various attempts at delivery development. Incorporation of new tools into the delivery systems to raise membrane permeability of biodrugs is essential to attain high oral bioavailability that is acceptable in clinical applications. In developing oral protein delivery systems with high bioavailability, three practical approaches might be most helpful: structural modification of biodrugs, conjugation of biofunctional moiety to biodrugs, or use of improved particulate delivery carriers. Therefore, we have currently developed feasible approach to improve the oral and nasal bioavailability of biodrugs with cell-penetrating peptides (CPPs) through the intestinal and nasal epithelial membranes. Further advantage of this promising strategy is that this successful noninvasive absorption could be achieved by more convenient methodology, coadministration of CPPs with biodrugs through intermolecular interaction among them. At the end of this review, we intend to show the absorption mechanism and pharmacokinetics of biodrugs, coadministered with the applicability of CPPs for noninvasive biodrugs delivery through the epithelial membrane.



Published Research Articles in International Journals 2012-2013

Faculty of Education - El Arish

Asian Journal of chemistry
2013
(25):4288–4284



Adsorption of Lead, Cadmium and Zinc Ions from Industrial Wastewater by Using Raw Clay and Broken Clay-Brick Waste

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Abstract

This work studies the adsorption process of lead, cadmium and zinc on clay and clay-brick powders. The adsorption process was affected by various parameters, such as contact time, pH value of metal ions in solutions, the adsorbent mass and metal concentration. The kinetics and the maximum capacity depend on the type of the material ions (atomic weight, atomic radius and electronegativity). The uptake percentage reaches equilibrium state after 160 min for lead and cadmium and 120 min for zinc on clay-brick powder, while it reaches the equilibrium state after 140 min for lead, 160 min for cadmium and 120 min for zinc on clay powder. The uptake percentages of Pb, Cd and Zn increase with the increase in pH-value. The sequence of adsorption capacities for lead, cadmium and zinc at constant pH is recorded in the order: lead > cadmium > zinc. The lead, cadmium and zinc removal percentages are, respectively 69, 22.7 and 12.9 %, by using clay powder at pH = 6; while they are, respectively 77.3, 29.48 and 13.5 %, by using clay-brick powder at the same pH.

Geological Society, London, Special Publications
2012



Integration of outcrop and subsurface data during the development of a naturally fractured Eocene carbonate reservoir at the East Ras Budran concession, Gulf of Suez, Egypt

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Abstract

The East Ras Budran Concession is located in the eastern rift shoulder of the Gulf of Suez. Syn- and pre-rift rocks are exposed in the north and east of the concession, and the Markha alluvial plain covers the SW. The Markha plain occupies the hanging wall of a large extensional fault which preserves most of the pre-rift stratigraphic sequence and .3500 m of syn-rift strata. Vertical wells drilled in 1999 indicated the presence of a.200 moil column in low-porosity naturally fractured limestone beds of the Eocene Darat and Thebes formations. Outcrop, borehole image and core data define NW, WNW, N, NE, and ENE steeply dipping fracture sets. Borehole breakouts and drilling-induced fractures show that the minimum horizontal stress is aligned NNE to NE, so the NW and WNW fractures should be open in the subsurface. Using this structural picture, a near-horizontal well of 300 m length was drilled into the Darat in a NE direction. During testing, the well flowed at a rate of 1900 barrels of oil per day with no water. Future development of the field includes drilling similarly oriented wells with longer horizontal sections.



Sinai hinge belt: a major crustal boundary in NE Africa

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Abstract

The Sinai hinge belt is a major crustal boundary in northern Sinai separating different tectonic terranes. This boundary started as a number of ENE–WSW-oriented faults of Precambrian or Palaeozoic age and played a major role in the Mesozoic and Cenozoic tectonic evolution of NE Africa. The Sinai hinge belt was reactivated by normal faulting during Early Mesozoic opening of Neotethys and was later reactivated by dextral transpression during Late Cretaceous–Early Tertiary closure of Neotethys and dextral transtension in the Miocene. This study highlights the structural characteristics of the hinge belt and the nature of deformation of its fault segments. It also highlights the role of this basement structure as a crustal boundary between terranes of different tectonic settings as well as its relationship to the structural development of the nearby areas in NE Africa.

Ionics
2013
(19) 361-369



DC conductivity and dielectric properties of maize starch methylcellulose blend films

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Abstract

The transient current, electrical conductivity, dielectric constant (ϵ'), and dielectric loss factor (ϵ'') of starch and methylcellulose (MC) homopolymers and their blends with various compositions were studied under different conditions. X-Ray Diffraction (XRD) pattern was carried out on individual polymers and 50/50 wt/wt% blend sample to identify both the structure and degree of crystallinity. From transient current, the ionic and electronic transfer number as well as charge carrier density and drift mobility were determined. The values of activation energy in the temperature range (30-90°C) indicate that the conduction mechanism is due to combined electronic and ionic processes while in the temperature range (100-160°C) electronic contribution is predominant. The complex dielectric data of the present samples in an extended frequency and temperature range appear different relaxation processes, which are connected with polymer dynamics.



Communications in Nonlinear
Science and Numerical Simulation
2013
(18) 42-55



The fractional q -differential transformation and its application

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Abstract

In this paper, the definitions and operations of the one-dimensional and two-dimensional fractional q -differential transform is proposed. A distinctive feature of the fractional q -differential transform is its ability to solve linear and nonlinear ordinary/partial fractional q -differential equations



Mathematical Problems in Engineering
2012
22 pages



Influence of Initial Stress and Gravity Field on Propagation of Rayleigh and Stoneley Waves in a Thermoelastic Orthotropic Granular Medium

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Abstract

The propagation of Rayleigh and Stoneley waves in a thermoelastic orthotropic granular half-space supporting a different layer under the influence of initial stress and gravity field is studied. The frequency equation of Rayleigh waves in the form of twelfth-order determinantal expression and the frequency equation of Stoneley waves in the form of eighth-order determinantal expression are obtained. The standard equation of dispersion is discussed to obtain Rayleigh and Stoneley waves that have complex roots; the real part gives the velocity of Rayleigh or Stoneley waves but the imaginary part gives the attenuation coefficient. Finally, the numerical results have been given and illustrated graphically, and their physical meaning has been explained.

Turkish Journal of Agriculture
and Forestry
2013
37: 352-360



Tolerance and avoidance responses to salinity and water stresses in *Calotropis procera* and *Suaeda aegyptiaca*

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Abstract

This study was designed to evaluate the response of 2 wild shrubs, *Calotropis procera* and *Suaeda aegyptiaca*, to salinity (100%seawater), drought, and waterlogging stresses. The 90-day-old plants were subjected to the stress treatments for 3 weeks, and growth and some physiological parameters were evaluated. The total plant dry mass of *C. procera* plants was reduced by 40%, whereas *S. aegyptiaca* was not significantly affected by salinity stress. Water deficit and waterlogging stresses significantly reduced the total dry mass of both species. Under all conditions, the root/shoot ratio in *C. procera* was 3-fold higher than in *S. aegyptiaca*. All applied stresses markedly increased leaf shedding in *C. procera* plants only. These plants appeared to have a higher salinity and waterlogging stress intensity index as manifested by chlorophyll levels lower than those in *S. aegyptiaca*. Under all conditions, Na^+ levels of *S. aegyptiaca* were twice those of *C. procera* plants. All stresses reduced the K^+/Na^+ ratio in *C. procera* leaves. On the other hand, *S. aegyptiaca* plants were able to maintain this ratio near control levels under salinity and drought stresses. Consequently, *S. aegyptiaca* leaves had higher partial osmotic pressure than *C. procera*. The proline and total free amino acids levels in *C. procera* were between 1.3- and 2-fold higher than in *S. aegyptiaca*. Among all amino acids, the common change in both species under all stresses was an accumulation of free proline and a decrease in methionine levels. The results revealed that the response of both species to salinity and water stresses included avoidance and tolerance mechanisms with some differences between them.

Unraveling landscapes with phytogenic mounds (nebkhas): An exploration of spatial pattern

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Abstract

Phytogenic mounds (nebkhas) often are symptoms of desertification in arid regions. Interactions among nebkhas and between nebkhas and their environment are however poorly examined. To this end, three main hypotheses of nebkha pattern formation were evaluated in this study. These state that nebkha patterns are either shaped by: (i) biologically induced recruitment inhibiting zones, (ii) biologically induced recruitment encouraging zones, or (iii) by the spatial distribution of abiotic factors which are not biologically driven. Contrasting nebkha landscapes were examined: a highly dense New Mexican mesquite (*Prosopis glandulosa*) and snakeweed (*Gutierrezia sarothrae* and *Gutierrezia microcephala*) ecosystem, and a low-density mixed *Tamarix aphylla* and *Calligonum comosum* field in central Libya. Spatial second-order statistics of strategically chosen nebkha subpatterns were compared with those of null models in which observed patches were spatially randomized without overlap. Null model deviations were assessed with goodness-of-fit tests, and interpreted in terms of hypothesized mechanisms of nebkha pattern formation. Our results suggest that biologically induced recruitment inhibiting zones surround adult mesquite nebkhas. The configuration of *Calligonum* and *Tamarix* nebkhas may be driven by spatial dynamics of abiotic microsites which are not caused by nebkha interactions. Hence we conclude that both biotic and abiotic drivers can shape nebkha spatial patterns.



Published Research Articles in International Journals 2012-2013

Faculty of Computing and Information



A Multi-objective Virtual Machine Migration Policy in Cloud Systems

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Abstract

In a Cloud computing environment, the workload fluctuates dynamically producing undesirable situations such as load imbalance, lower utilization or workload hotspots. In such cases, virtual machine migration is a potential solution. However, an algorithm based on a single objective (e.g. service-level agreement) is usually used to direct the migration process. On the contrary, there exist unconsidered conflicting factors impacting the migration process such as load volume, power consumption and resource wastage. In this paper, we consider the migration process as a multi-objective problem where the objectives are typically non-commensurable. Therefore, we propose a novel migration policy consolidated by a new elastic multi-objective optimization strategy to evaluate different objectives (including migration cost) simultaneously, and to provide the flexibility for manipulating different cases. We have tested the proposed policy through an extensive set of simulation experiments using CloudSim, and the results ensure the efficiency of our policy to control the system performance by adjusting themigration objectives to suit various workload situations.



Applied Mathematics and
Computation
2013
(219) 11110–11118



Complex dynamics and chaos control of heterogeneous quadropoly game

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Abstract

The dynamical system of four heterogeneous firms is derived. Existence and stability conditions of the fixed points are investigated and also complex dynamics is studied. Numerical simulations are used to illustrate the complex behaviors of the proposed dynamic game. The chaotic behavior of the game has been controlled by using feedback control method.

Numerical Heat Transfer,
Part A: Applications
2013
(63) 713-733



A Three-Dimensional Generalized Magneto-Thermo-Viscoelastic Problem of a Rotating Functionally Graded Anisotropic Solids with and Without Energy Dissipation

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Abstract

A numerical model based on the dual reciprocity boundary element method (DRBEM) is extended to study the generalized magneto-thermo-viscoelastic problem in a rotating solid of functionally graded material (FGM) in the context of the Green and Naghdi theory of type III. The material properties of the solid have a gradient in the thickness direction and are anisotropic in the plane of the solid. An implicit-implicit staggered strategy was developed and implemented for use with the DRBEM to obtain a solution for the displacement and temperature fields. The accuracy of the proposed method was examined and confirmed by comparing the obtained results with those known previously. In the case of three-dimensional, a numerical scheme for the implementation of the method is presented and the numerical computations are presented graphically to show the effect of the energy dissipation on the temperature and displacement components.



Engineering Analysis with
Boundary Elements
2013
(37) 107–115



Implicit–explicit time integration DRBEM for generalized magneto-thermoelasticity problems of rotating anisotropic viscoelastic functionally graded solids

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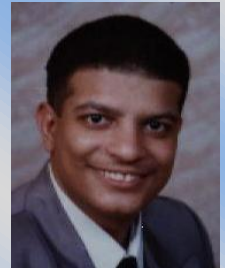
Abstract

A numerical computer model based on the dual reciprocity boundary element method (DRBEM) is extended to study the generalized theories of magneto-thermoelasticity problems in a rotating anisotropic viscoelastic functionally graded solid placed in a constant primary magnetic field acting in the direction of the z-axis and rotating about this axis with a constant angular velocity. In the case of plane deformation, a predictor–corrector implicit–explicit time integration algorithm was developed and implemented for use with the DRBEM to obtain the solution for the displacement and temperature fields in the context of the Green and Naghdi theory of type III. A comparison of the results is presented graphically in the absence and presence of magnetic field. Numerical results that demonstrate the validity of the proposed method are also presented graphically.



Published Research Articles in International Journals 2012-2013

Journal of Thermal Stresses
2013
(36) 284-303



Generalized Magneto-Thermo-Viscoelastic Problems of Rotating Functionally Graded Anisotropic Plates by the Dual Reciprocity Boundary Element Method

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Abstract

A numerical model based on the dual reciprocity boundary element method (DRBEM) is extended to study the generalized theories of magneto-thermo-viscoelasticity in a rotating plate of functionally graded material (FGM). The material properties of the FGM plate have a gradient in the thickness direction. and are anisotropic in the plane of the plate. In the case of plane deformation, an implicit-implicit staggered scheme was proposed and implemented for use with the DRBEM to obtain the solution for the displacement and temperature fields. A comparison of the results for different theories of magneto-thermo-viscoelasticity is presented graphically. Numerical results that demonstrate the validity of the proposed method are also presented graphically.

Annals of Nuclear Energy
2013
(55) 184–193



Confirmation of Accuracy of Generalized Power Series Method on Point Kinetics Equations with Feedback

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Abstract

In this paper, power series method has been developed to obtain approximate analytical solutions to point kinetics equations with feedback using generalized power series method (GPWS). The stiffness of the kinetics equations restricts the time interval to a small increment, which in turn restricts the traditional power series method (PWS) within a very small constant step size especially when the generation times are very small. The GPWS method has introduced time intervals that are much longer than time intervals used in the conventional numerical integrations like Generalized Runge- Kutta or power series methods, and it is thus useful in reducing computing time. Convergence of both the power series and the partial sums are discussed and the time step has been restricted within a circle of convergence by using the convergence conditions. Local truncation errors and some other constraints are used to produce the largest step size allowable at each step while keeping the error within a specific tolerance. The accuracy of the method is examined using five different cases of temperature reactivity feedback for step and ramp impressive reactivities with one and six groups of delayed neutrons. Supercritical (prompt and delayed) processes of a nuclear reactor with temperature feedback are discussed while inserting large and small reactivities. Results obtained by GPWS method attest the effectiveness the theoretical analysis, they demonstrate that the convergence of the iteration scheme can be controllable. The proposed method is very accurate when compared to the analytical and numerical methods.



Mathematical Problems in Engineering
2013
10 pages

The Effects of Variable Viscosity, Viscous Dissipation and Chemical Reaction on Heat and Mass Transfer Flow of MHD Micropolar Fluid along a Permeable Stretching Sheet in a Non-Darcian Porous Medium

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Abstract

A numerical model is developed to study the effects of temperature-dependent viscosity on heat and mass transfer flow of magnetohydrodynamic(MHD) micropolar fluids with medium molecular weight along a permeable stretching surface embedded in a non-Darcian porous medium in the presence of viscous dissipation and chemical reaction. The governing boundary equations for momentum, angular momentum (microrotation), and energy and mass transfer are transformed to a set of nonlinear ordinary differential equations by using similarity solutions which are then solved numerically by shooting technique. A comparison between the analytical and the numerical solutions has been included. The effects of the various physical parameters entering into the problem on velocity, microrotation, temperature and concentration profiles are presented graphically. Finally, the effects of pertinent parameters on local skin-friction coefficient, local Nusselt number and local Sherwood number are also presented graphically. One important observation is that for some kinds of mixtures (e.g., H_2 , air) with light and medium molecular weight, the magnetic field and temperature-dependent viscosity effects play a significant role and should be taken into consideration as well.



Journal of Applied Mathematics
2013
1–18

Entropy generation for magnetohydrodynamic heat transfer over a non-isothermal stretching sheet with variable viscosity

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Abstract

An analysis has been presented to analyse the entropy generation in an electrically conducting fluid under the influence of a constant transfer magnetic field over a linearly stretching non-isothermal flat sheet with suction and blowing at the sheet, in the presence of temperature-dependent viscosity. The governing equations for the problem were changed to dimensionless ordinary differential equations using a similarity transformation. The transformed governing equations in the present study were solved numerically using the Runge–Kutta method with the shooting technique. A comparison between the analytical and the numerical solutions is included. The velocity and temperature are obtained and used to compute the entropy generation and the Bejan number in the flow field. The influences of the variable viscosity, group parameter, Hartmann number Ha and Reynolds number Re_L on the velocity, temperature, entropy generation and Bejan number are studied and discussed.



Computers and Electrical Engineering
2013
(39) 2173–2182



Regular gridding and segmentation for microarray images q

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Abstract

In this paper, we propose a new regular gridding and segmentation approach for microarray image. Initially, the microarray images are preprocessed using Stationary Wavelet Transform (SWT), followed by a hard thresholding filtering technique to get a de-noised microarray image. Then, we use autocorrelation to enhance the self-similarity of the image profile to get a regular gridding.

Fuzzy Gaussian Mixture Model (FGMM) is used for spot segmentation. This approach has the capabilities of fitting data as generalized GMM but it can reduce about half of their computational time. Comparing probability based GMM with distance based FGMM, the latter outperforms the former in terms of computational efficiency, Due to the nature of the fast computation and nonlinear fitting of the FGMM approach.

The proposed approach was evaluated using images from the Stanford Microarray Database (SMD), proved more accurate in intensity computation and more reliable means for estimating gene expression than conventional methods.



The Institution of Engineering and
Technology
2013
(7) 407–414



Image fusion scheme based on modified dual pulse coupled neural network

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Abstract

Image fusion combines information from multiple images of the same scene to obtain a composite image which is more suitable for further image processing tasks. This study presented an image fusion scheme based on the modified dual pulse coupled neural network (PCNN) in non-subsampled contourlet transform (NSCT) domain. NSCT can overcome the lack of shift invariance in contourlet transform. Original images were decomposed to obtain the coefficients of low-frequency subbands and high-frequency subbands. In this fusion scheme, a new sum-modified Laplacian of the low-frequency subband image, which represents the edge-feature of the low-frequency subband image in NSCT domain, is presented and input to motivate modified dual PCNN. For fusion of high-frequency subband coefficients, spatial frequency will be used as the gradient features of images to motivate dual channel PCNN and to overcome Gibbs phenomena. Experimental results show that the proposed scheme can significantly improve image fusion performance, performs very well in fusion and outperforms conventional methods such as traditional discrete wavelet transform, dual tree complex wavelet and PCNN in terms of objective criteria and visual appearance.



Published Research Articles in International Journals 2012-2013

Faculty of Science

Journal of Industrial and
Engineering Chemistry
2013
(5) 3342–3348



Synthesis, characterization and surface properties of amino-glycopolysiloxane

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Abstract

Three series of amino-grafted polysiloxane surfactants with well-defined amphiphilic structures, were successfully synthesized and characterized by FT-IR and ¹H NMR. Their surface activities and aggregation behavior in aqueous solution were investigated by surface tension measurements for different concentrations at 25 °C. Various surface properties of the synthesized surfactants, particularly interfacial tension, foaming power, emulsification power and surface parameters like, critical micelle concentration (CMC), effectiveness (pCMC), efficiency (PC₂₀) as well as maximum surface excess (G_{max}) and minimum surface area (A_{min}) were evaluated. Micellization and adsorption in liquid/air interfaces thermodynamics were investigated. All compounds prepared showed good surface properties, surface parameters and thermodynamic parameters.



The optical and mechanical properties of PVA-Ag nanocomposite films

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Abstract

Poly (vinyl alcohol) (PVA) loaded silver (Ag) nanoparticles were successfully prepared by chemical reduction methods. The synthesized nanoparticles are characterized using UV–visible spectrophotometer, X-ray diffractometer (XRD) and Transmission electron microscope (TEM). The contents of the inorganic phase in the nanocomposites were determined by using atomic absorption spectroscopy (AA) for silver, and were found to be 0.2, 0.4, 0.8 and 1.5 wt.%. Optical absorption studies in the wavelength range 190–900 nm showed additional peak at 420 nm for differently doped films, in addition to the peak at 200 nm for undoped PVA film. There is observable change in the absorbed intensity at 420 nm with filling levels. This is due to the link between the Ag metal ion and the polymer OH- groups. The indirect energy gaps were calculated. It was found that Young's modulus and the strength at the break increase, while the energy gaps and the strain decrease as the concentration of Ag content is increased. The XRD results showed that the Ag nanoparticles entering the polymer PVA matrix and the crystallinity was strongly influenced by the amount of Ag nanoparticles. The electron diffraction image for the highest concentration sample shows the crystalline nature of the silver metal nanoparticles. TEM of the nanocomposite films revealed the presence of Ag particles with average diameter of 12 nm.



Near Surface Geophysics
2013
(4) 465 - 472



Application of alternative seismic-stacking techniques to ringing noise removal from GPR data

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Abstract

Ringings are a common type of coherent noise that degrades the quality of ground-penetrating radar data. Conventional ringing attenuation or a background removal algorithm works by generating an average ensemble that is then subtracted from all traces in a GPR section. This study presents four alternative algorithms, usually used in stacking-seismic reflection data, for generating such an ensemble. These algorithms include median stack, diversity stack, alpha-trimmed stack and smart stack. The traditional algorithm and the four alternative algorithms are tested using two real GPR data sets. The outcomes of the five background removal methods are compared to each other and to the original data using statistical analyses and visual inspection. The results show that all the four alternative techniques are more efficient in background removal than the conventional technique, with the smart ensemble yielding the best results followed by the alpha-trimmed ensemble.

Arabian Journal of Geosciences
2013
6:3505–3511



On the application of GPR for locating underground utilities in urban areas

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M. A. Rashed

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Abstract

With the rapid growth of complex network of different types of underground utility under large cities, the need of a noninvasive technique capable of swiftly and precisely detecting these utilities in such a noisy urban environment increases. Ground-penetrating radar (GPR) is considered one of the most promising techniques in this field. This study presents the experience of GPR data acquisition, processing, and interpretation in three cities located along the coast of the Red Sea. These cities are Jeddah in Saudi Arabia and Sharm El-Sheikh and Qusier in Egypt. Data acquisition parameters varied in the three cities based on site conditions, target characteristics, and equipment availability. The processing flows were kept simple to avoid introducing artifacts to the collected data. The results show that despite the difference in site conditions and survey parameters among the three cities, with the exception of fiber optic cable, GPR technique is capable of detecting different kinds of underground utilities and precisely determine the extension, diameter, and depth of burial of these utilities.



Journal of Applied Geophysics
2013
8:131–138

Integrated magnetic, gravity, and GPR surveys to locate the probable source of hydrocarbon contamination in Sharm El-Sheikh area, south Sinai, Egypt

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Abstract

Sharm El-Sheikh waters were suddenly hit by hydrocarbon spills which created a serious threat to the prosperous tourism industry in and around the city. Analysis of soil samples, water samples, and seabed samples collected in and around the contaminated bay area showed anomalous levels of hydrocarbons. An integrated geophysical investigation, using magnetic, gravity, and ground penetrating radar geophysical tools, was conducted in the headland overlooking the contaminated bay in order to delineate the possible subsurface source of contamination. The results of the geophysical investigations revealed three underground manmade reinforced concrete tanks and a complicated network of buried steel pipes in addition to other unidentified buried objects. The depths and dimensions of the discovered objects were determined. Geophysical investigations also revealed the presence of a north–south oblique slip fault running through the eastern part of the studied area. Excavations, conducted later on, confirmed the presence of one of the tanks delineated by the geophysical surveys.



Surveys in Geophysics
2013
35:415-430

Geophysical Constraints on the Hydrogeologic and Structural Settings of the Gulf of Suez Rift-Related Basins: Case Study from the El Qaa Plain, Sinai, Egypt

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Abstract

Groundwater has been identified as one of the major freshwater sources that can potentially meet the growing demands of Egypt's population. Gravity data (from 381 ground gravity stations) were collected, processed, and analyzed together with the available aeromagnetic (800 line-km) data to investigate the hydrogeologic and structural settings, areal distribution, geometry, and water storage of the aquifers in El Qaa coastal plain in the southwest Sinai Peninsula, and to assess their longevity given projected extraction rates. Findings include (1) complete Bouguer anomaly and total magnetic intensity maps show two connected sub-basins separated by a narrow saddle with an average basin length of 43 km and an average width of 12 km; (2) two-dimensional modeling of both gravity and magnetic data indicates basin fill with a maximum thickness of 3.5 km; (3) using anomalous residual gravity, the volume of water in storage was estimated at 40–56 km³; and (4) progressive increases in extraction rates over time will deplete up to 40 % of the aquifers' volume in 200–230 years and will cause the water quality to deteriorate due to seawater intrusion in 45 years. Similar geophysical exploration campaigns, if conducted over the entire coastal plains of the Red Sea and the Gulfs of Suez and Aqaba, could assist in the development of sound and sustainable management schemes for the freshwater resources in these areas. The adopted techniques could pave the way toward the establishment of sustainable utilization schemes for a much larger suite of similar aquifers worldwide.



Integrated solutions for hydrologic investigations in arid lands

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Abstract

Hydrological assessment studies across vast regions of the arid world are often hindered by the inaccessibility of these areas and the paucity of data sets, as well as the high expenses and difficulties entailed in acquiring these data sets, their unpublished nature, and their varying scales, projections, and datum. Using the Eastern Desert (ED) of Egypt (225,000 km²) and the Sinai Peninsula (61,000 km²) as test sites, we demonstrate practical and cost-effective integrated (geochemistry, geophysics, and modeling) solutions that utilize web-based geographic information system (GIS) (<http://www.esrs.wmich.edu/webmap>) technologies and take advantage of readily available global remote sensing data sets. Adopted methodologies allowed: (1) development of conceptual models for hydrogeologic settings conducive to groundwater entrapment and augmentation, including groundwater in fractured basement aquifers, groundwater impounded by dike swarms crosscutting alluvial aquifers, and groundwater residing in alluvial aquifers associated with ascending deep-seated fossil waters; (2) selection of criteria to identify and validate the preferred distribution of each of these aquifer types and usage of the selected criteria and observations from the GIS data sets to identify, test, and refine potential well locations; and (3) construction and calibration of hydrologic models to estimate average annual recharge over the major watersheds in the Sinai (463 Å— 106 m³/yr) and ED (171 Å— 106 m³/yr) and the average modern contributions to Nubian fossil aquifers (Sinai: 13 Å— 106 m³/yr), and to model the partitioning of precipitation as a function of precipitation amounts. The successful application of the integrated and cost-effective methodologies developed for the study areas should invite similar applications in arid regions elsewhere.

Quaternary Research
2013
(1)158–167

Paleoclimate record in the Nubian Sandstone Aquifer, Sinai Peninsula, Egypt

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Abstract

Sixteen groundwater samples collected from production wells tapping Lower Cretaceous Nubian Sandstone and fractured basement aquifers in Sinai were analyzed for their stable isotopic compositions, dissolved noble gas concentrations (recharge temperatures), tritium activities, and ^{14}C abundances. Results define two groups of samples: Group I has older ages, lower recharge temperatures, and depleted isotopic compositions (adjusted ^{14}C model age: 24,000–31,000 yr BP; $\delta^{18}\text{O}$: -9.59‰ to -6.53‰ ; $\delta^2\text{H}$: -72.9‰ to -42.9‰ ; < 1 TU; and recharge T: $17.5\text{--}22.0^\circ\text{C}$) compared to Group II (adjusted ^{14}C model age: 700–4700 yr BP; $\delta^{18}\text{O}$: -5.89‰ to -4.84‰ ; $\delta^2\text{H}$: -34.5‰ to -24.1‰ ; < 1 to 2.78 TU; and recharge T: $20.6\text{--}26.2^\circ\text{C}$). Group II samples have isotopic compositions similar to those of average modern rainfall, with larger d-excess values than Group I waters, and locally measurable tritium activity (up to 2.8 TU). These observations are consistent with (1) the Nubian Aquifer being largely recharged prior to and/or during the Last Glacial Maximum (represented by Group I), possibly through the intensification of paleowesterlies; and (2) continued sporadic recharge during the relatively dry and warmer interglacial period (represented by Group II) under conditions similar to those of the present.

Journal of Earth Science &
Climatic Change
2013
(4)1-5



Environmental factors controlling the distribution patterns and abundance of sclerobionts on the shells of *Tridacna maxima* from the Egyptian Red Sea coast

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Abstract

The living *Tridacna maxima* shell provides an example of a good substrate for many colonizing marine organisms (sclerobionts). Many factors affect the colonization choices of these organisms, such as morphology and size of the host shell, water depth (related to light penetration), suspended particulate load, and turbidity, among others. In addition to these factors, contamination plays an important role in the colonization choice along the coast of the Red Sea in Egypt. In the present study, 25 specimens of *T. maxima* shells of different sizes were collected at different depths from eight sites along the Egyptian Red Sea coast. There are two types of contamination at these sites. The first type results from anthropogenic activities, such as tourism, fishing, landfilling, shipping, renewal of ship operations, shipyards, dredging, and petroleum production; this type is represented by the El-Esh area, Hurghada Harbor, Safaga Harbor, and Quseir Harbor. The second type results from the natural inputs from wadis and is represented by the El-Esh area, Quseir Harbour, and Wadi El-Gemal, while the Abu Galawa Lagoon, the Abu Ghusun, and the Hamata Reefs represent uncontaminated areas (control areas). The present study documents the colonization phenomena on *T. maxima* shells at all of the study sites. These phenomena differed from one another in the abundance and diversity of sclerobionts, and unexpectedly, the contaminated areas recorded the highest abundance and diversity of colonizing organisms.

Journal of Thermal Analysis
and Calorimetry
2013
(114)613-619



Utilization of electric arc furnace dust as an admixture to Portland cement pastes

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Abstract

Electric arc furnace dust (EAFD) is termed as a hazardous waste due to its contamination with heavymetals. Inertization of such very fine dust can be occurred via stabilization and solidification process within thehydrated Portland cement matrix. In this paper, the effect of the addition of various ratios of EAFD on the properties of the hardened Portland cement paste was investigated. Compressive strength, chemically combine water and free lime contents were determined. In addition, phase composition using XRD; DTA analysis; as well as microstructure of the formed hydrates for some selected samples were investigated using SEM. The obtained results showed that the paste containing 1/mass% EAFD give the highest compressive strength values at most hydration ages, specially the later ages, compared to the neat Portland cement blank paste. While as, the pastes containing 3 and 5/mass% EAFD showed lower values of compressive strength compared to those of the blank paste.



Adsorption and inhibitive properties of Tryptophan on low alloy steel corrosion in acidic media

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Abstract

The inhibition efficiency of Tryptophan (Trp) has been studied for the corrosion of low alloy steel ASTM A213 grade T22 in sulfamic (HSO_3NH_2) and hydrochloric (HCl) acid solutions. Corrosion inhibition was studied using electrochemical methods (electrochemical impedance spectroscopy; EIS and the new technique electrochemical frequency modulation; EFM) and weight loss measurements. The influence of inhibitor concentration, solution temperature, and immersion time on the corrosion resistance of low carbon steel (LAS) has been investigated. Trp proved to be a very good inhibitor for low alloy steel acid corrosion. EFM measurements showed that Trp is a mixed type inhibitor. Trp behaved better in 0.6 M HCl than in 0.6 M HSO_3NH_2 . Moreover, it was found that the inhibition efficiency increased with increasing inhibitor concentration, while a decrease was detected with the rise of temperature and immersion time. The associated activation energy (E_a) has been determined. The values of E_a indicate that the type of adsorption of Trp on the steel surface in both acids belongs to physical adsorption. The adsorption process was tested using Temkin adsorption isotherm.

Arabian Journal of Geosciences
2013
(5) 1349-1369



Geotechnical site investigations for possible urban extensions at Suez City, Egypt using GIS

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Abstract

With the development of economic activities in the world, the construction activities have also increased. A proper surface and subsurface investigation is made to assess the general suitability of the site and to prepare an adequate and economic safe design for the proposed work. The main purpose of the current study is to create a spatial model of the geotechnical conditions and considerations by using geographic information systems (GIS) techniques to develop and analyze a site model and to plan site activities at the new extension of Suez City (SC). In the geotechnical site evaluations, GIS can be used in four ways, data integration, data visualization and analysis, planning and summarizing site activities, and data presentation. The integrated data can be displayed; manipulated and analyzed using tools build into the GIS programs, thus creating the geotechnical site model of the study area. Decisions can be made for further site activities and the results of the site activities can be integrated into the GIS site model. Interpretation of geotechnical data frequently involves assimilating information from many sites each with a unique geographical location. Interpretation of these data requires the spatial location to incorporate into the analysis. Weights are assigned to different of mechanical, physical soil properties, geological, hydrogeological, and other ancillary data. Finally, the weighted maps are integrated using a GIS based on the construction purposes for the new extension of SC for significant cost savings in design, construction and longevity. The ideal and good zones' highest regime has been observed towards central and western regions with sporadic pockets. The marginal zones to average zones are moderately suited for shallow foundation.

Arabian Journal of Geosciences
2013
(8) 2829-2842



An integrated GIS and hydrochemical approach to assess groundwater contamination in West Ismailia area, Egypt

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Abstract

Groundwater is a very important resource across Ismailia area as it is used in domestic, agricultural, and industrial purposes. This makes it absolutely necessary that the effects of land use change on groundwater resources are considered when making land use decisions. Careful monitoring of groundwater resource helps minimize the contamination of this resource. This study developed a GIS-based model to assess groundwater contamination in the West Ismailia area based on its hydrochemical characteristics. The model incorporated five different factors which are standardized to a common evaluation scale. The produced factor maps include the depth to the water table, the potential recharge, the soil type, the topography, and the thickness of saturation. These maps are combined in ERDAS Imagine, ARC INFO, and ARC GIS software using geostatistics and a weighted overlay process to produce the final groundwater potential risk map. The model output is then used to determine the vulnerability of groundwater to contamination by domestic, agricultural, and industrial sources. The produced risk maps are then combined with the groundwater contamination potentiality map using an arithmetic overlay in order to identify areas which were vulnerable to contamination. The results of this study revealed that the groundwater is highly vulnerable to contamination that may result from the inappropriate application of agrichemicals and domestic and industrial activities. The produced integrated potential contamination maps are very useful tools for a decision maker concerned with groundwater protection and development.

Arabian Journal of Geosciences
2013
(1) 43-53



Define a protected buffer zone for Ismailia Canal, Egypt using Geographic Information Systems

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Department of Geology, Faculty of Science, Suez Canal University

Abstract

Ismailia Canal is the principle source of drinking water supply to Suez Canal and Sinai governorates. However, Ismailia Canal is endangered from unwise activities in the surrounding environment. Drinking water resources protection can be implemented using land-use monitoring system or through land-use controls based on hydrogeologic mapping to study the impacts of development on water quality. Our approach is to protect the direct and indirect catchment areas for surface water supply, especially the sensitive areas, those that are more vulnerable to contamination than other areas. Remote sensing and geographic information system techniques are applied to construct and integrate the hydrogeological data, inventory for potential sources of contamination and mapping the sensitive areas in order to construct the a protected buffer zone for Ismailia Canal, and to constrain the development activities in all the surrounding areas of surface water supply. The sensitive areas are delineated, where extra protection is required, based on soils properties, geology, and specific hydrogeological criteria. Industrial areas, drains, and septic tanks in the surrounding villages are the common potential sources of contamination. The hydrologic relation between Ismailia Canal and groundwater has great variations. Comprehensive plan for water protection were composed. It includes maintaining three natural protection zones of at least 300-m width along the main course of the Canal and delineating vulnerable zones depending on the aerial extension of the sensitive areas within 10 km on both sides of the Canal. Specific protection measures are recommended over the sensitive areas. The natural ecosystems of swamps around Ismailia Canal should be conserved and the processes of continuous burial prevented.

Surveys in Geophysics
2013
(4) 395-411



Application of Analytic Signal and Euler Deconvolution in Archaeo-Magnetic Prospection for Buried Ruins at the Ancient City of Pelusium, NW Sinai, Egypt: A Case Study

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Abstract

Progress in the past three decades in geophysical data processing and interpretation techniques was particularly focused in the field of aero-geophysics. The present study is to demonstrate the application of some of these techniques, including Analytic Signal, Located Euler Deconvolution, Standard Euler Deconvolution, and 2D inverse modelling, to help in enhancing and interpreting the archeo-magnetic measurements. A high-resolution total magnetic field survey was conducted at the ancient city of Pelusium (name derived from the ancient Pelusiac branch of the Nile, and recently called Tell el-Farama), located in the northwestern corner of the Sinai Peninsula. The historical city had served as a harbour throughout the Egyptian history. Different ruins at the site have been dated back to late Pharaonic, Graeco-Roman, Byzantine, Coptic, and Islamic periods. An area of 10,000 m², to the west of the famous huge red brick citadel of Pelusium, was surveyed using the magnetic method. The chosen location was recommended by the Egyptian archaeologists, where they suspected the presence of buried foundations of a temple to the gods Zeus and Kasios. The interpretation of the results revealed interesting shallow-buried features, which may represent the Temple's outer walls. These walls are elongated in the same azimuth as the northern wall of the citadel, which supports the hypothesis of a controlling feature such as a former seacoast or shore of a distributary channel.

Renewable Energy
2013
(55) 374–379



Optimal thermal water locations along the Gulf of Suez coastal zones, Egypt

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Abstract

Remote sensing and GIS techniques were utilized to specify criteria characterizing thermal water localities along the Gulf of Suez coastal zones. Surface temperatures were extracted from ETM+ (band 6) and AVHRR image data. Specific sites were characterized by high surface temperatures: 31–34 °C at Ayun Musa, 31–37 °C at Ain El Sukhna, and 34–43 °C at Hammam Faraun. The results were consistent with measurements taken during field visits. These springs are located in regions of tectonic heating due to the opening of the Red Sea and Gulf of Suez rifts. The heat for these springs is probably derived from high heat flow and deep circulation controlled by faults associated with rift opening. Data fusion was applied to ETM+ and ASTER images from 2000 to extract information about lineaments and major structures controlling hot spring distribution and geothermal localities in the Gulf of Suez area. The major geologic structures were oriented to NNW–SSE-trending faults. Principal component analyses and image classification techniques were applied to construct rock unit maps. The hot spring sites are covered by wadi deposits and surrounded by fractured Eocene limestone. The thermal water areas are characterized by low topography and high-order drainage patterns flowing toward the Gulf of Suez coastal zones. The results of this study indicate that localities most likely to contain thermal water along the Gulf of Suez are covered with fractured Eocene limestone and characterized by low topography, high-order drainage patterns, and surface temperatures ranging from 34 °C to 43 °C. These criteria can help in predicting the locations of other hot spring areas and selecting optimum sites for the generation of thermal energy.



Journal of Coastal Research
2013
(6) 1260 – 1267



Disturbance of Hydrodynamic Regime in the Mediterranean Coastal Zone of Egypt

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Abstract

Engineering structures induce variations in the physical parameters of incident waves approaching coastlines, affecting the rate of longshore sediment transport and the patterns of shoreline change. Landsat Thematic Mapper images acquired from 1990 to 2005 and field measurements were utilized to perform mathematical modeling along Mediterranean coastal zones in Egypt. The K_1 transport coefficient values used to calibrate the models ranged from 0.05 to 0.9. To accommodate changes in the physical conditions, a second calibration was required. The K_1 transport coefficient values determined by the second calibration ranged from 0.1 to 0.7. These results indicate that the hydrodynamic regime along the Nile Delta coastal zones during 1995–2000 (verification) and 2000–2005 (second calibration) was disturbed by the effect of engineering works. Therefore, the calibration parameters used in simulations before 1995 are not appropriate for use after 1995. These findings demonstrate how the physical parameters of waves and currents are disturbed after some protective structures are modified.

Marine Pollution Bulletin

2013

(1) 80–86



Use of remote sensing techniques and aeromagnetic data to study episodic oil seep discharges along the Gulf of Suez in Egypt

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Abstract

Four successive oil discharges were observed during the last 2 years following the recording of the earthquake events. Oil slicks were clearly observed in the thermal band of the Enhanced Thematic Mapper images acquired during the discharge events. Lineaments were extracted from the ETM+ image data and SRTM (DEM). The seismic activity is conformable in time and spatially related to active major faults and structural lineaments. The concerned site was subjected to a numerous earthquakes with magnitudes ranging from 3 to 5.4 Mb. Aeromagnetic field data analyses indicated the existence of deep major faults crossing the Gebel El-Zeit and the Mellaha basins (oil reservoirs). The magnetic field survey showed major distinctive fault striking NE–SW at 7000 m depth. Occurrence of these faults at great depth enables the crude oil to migrate upward and appear at the surfaces as oil seeps onshore and as offshore slicks in the Gemsa–Hurghada coastal zone.



Published Research Articles in International Journals 2012-2013

REVISTA DE CHIMIE
2013
12; 1413-1415



One-pot Synthesis of 3,4-dihydropyrimidin-2-(1*H*)-one / thiones bearing Sugar Side Chain Using Samarium Chloride as a Catalyst

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Abstract

A simple one-pot synthesis of 3,4-dihydropyrimidin-2(1*H*)-one / thiones sugar derivatives, using samarium chloride as a catalyst, from sugar aldehydes, 1,3-dicarbonyl compounds and urea or thiourea in ethanol was described. This new method has the advantage of excellent yields (76-83%) and short reaction time.



Current Organic Chemistry
2013
17, 1903-1909



Synthesis of *N*-protected Non-proteinogenic α -amino Acid Esters by Using Trichloroacetimidate and Acetate Coupling Methods

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Abstract

A series of *N*-protected non-proteinogenic α -amino acid esters have been prepared. The key step in this synthesis is the treatment of trichloroacetimidate 3, 8 or acetate 4, 9 derivatives with Lewis acid and C-active nucleophiles to afford the desired products *via* C-C bond formation and the introduction of substituents at the α -position of the amino acid in good yields and short reaction time.

BioMed Research International
2013
15 pages



Pretreatment Hepatoprotective Effect of the Marine Fungus Derived from Sponge on Hepatic Toxicity Induced by Heavy Metals in Rats

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Abstract

The aim of this study was to evaluate the pretreatment hepatoprotective effect of the extract of marine-derived fungus *Trichurus spiralis* Hasselbr (TS) isolated from *Hippospongia communis* sponge on hepatotoxicity. Twenty-eight male Sprague-Dawley rats were divided into four groups (). Group I served as -ve control, group II served as the induced group receiving subcutaneously for seven days 0.25 mg heavy metal mixtures, group III received (i.p.) TS extract of dose 40 mg for seven days, and group IV served as the protected group pretreated with TS extract for seven days as a protection dose, and then treated with the heavy metal-mixture. The main pathological changes within the liver after heavy-metal mixtures administrations marked hepatic damage evidenced by foci of lobular necrosis with neutrophilic infiltration, adjacent to dysplastic hepatocytes. ALT and AST measurements show a significant increase in group II by 46.20% and 45.12%, respectively. Total protein, elevated by about 38.9% in induction group compared to the -ve control group, in contrast to albumin, decreased as a consequence of metal administration with significant elevation on bilirubin level. The results prove that TS extract possesses a hepatoprotective property due to its proven antioxidant and free-radical scavenging properties.

J Mater Sci Mater Med.
2013
(4):911-30



Decreasing the diabetic complication by vanadyl(VO)²⁺/vitamin B6 complex in alloxan-induced diabetic mice.

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Abstract

The scope of this work was to synthesize a novel bifunctionalized vanadyl(VO)(2+)/vitamin B 6 complex. The diabetic therapeutic efficacy of the new complex was investigated in alloxan-induced diabetic mice. The results suggested that vanadyl(VO)(2+)/vit B6 complex has an anti-diabetic potency, improved the lipid profile and liver and kidney functions. The new complex possesses an antioxidant activity. The current results support the therapeutic potentiality of vanadyl(VO)(2+)/vitamin B 6 complex for the management of diabetes.

Italian Journal of Zoology
2013
(3):345-357



Bioaccumulation and histopathological changes of the digestive gland of the land snail *Eobaniavermiculata* (Mollusca: Gastropoda), as biomarkers of terrestrial heavy metal pollution in Taif city

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Abstract

The present study aimed to investigate the efficiency of bioaccumulation and histological changes of *Eobaniavermiculata* as biomarkers for terrestrial heavy metal pollution. *E. vermiculata* were collected from polluted and non-polluted areas. The contents of cadmium, copper, iron, calcium, lead and zinc were evaluated in the digestive gland of the snail, shell and soil. The bioaccumulations of heavy metal in the digestive gland and shell as well as in soil were determined. Moreover, the histological and histochemical changes in the digestive gland were examined. The results revealed appreciable alterations of the histological changes as biomarker values in the field, accompanied by significant correlations with bioaccumulation. Therefore, this study suggests *E. vermiculata* is a suitable sentinel organism and the selected biomarkers are efficient for terrestrial heavy metal biomonitoring.

Powder Technology
2013
(234):26–31



Rapid fabrication of nanostructured magnesium hydroxide and hydromagnesite via microwave-assisted technique

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Abstract

Magnesium hydroxide and hydromagnesite nano and microstructures have been prepared by using microwave-assisted technique. Magnesium chloride, magnesium acetate and magnesium metal have been used as a magnesium source. Urea has been added to the solution with controlled pH = 10 while the temperature was 220 °C. The hydrolysis of urea under these hydrothermal conditions leads to the production of hydromagnesite instead of magnesium hydroxide. The as-prepared samples were investigated using scanning electron microscope (SEM), X-ray diffraction (XRD), thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). SEM shows a wide distribution of pseudo-hexagonal nanodisk up to microdisk. Spherical rosette morphology has been noticed in the samples in which the urea has been used. XRD reveals the existence of Mg(OH)₂ with some impurities which can be attributed to the high concentrations of the initial materials and absorption of carbon dioxide from the air when urea is not employed and hydromagnesite when urea is present in the synthesis. TGA showed a weight loss within the temperature range of 360–450 °C with a total percentage of weight loss 29% which can be attributed to the (Mg(OH)₂). However in the case of synthesis with urea the weight loss was 57% which is the expected value for hydromagnesite. The production of pure hydromagnesite utilizing hydrothermal methods has been reported; the synthesis reported here is much simpler and faster.

Journal of Materials Science
2013
(24):8588-8595



Study of the structure–property relationships in a high impact and shape memory polyester by the stereoisomer selection of the cyclobutane diol monomer

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Abstract

The diol and dicarboxylic acid in polyester synthesis are significant independent variables that relate directly to the structure–property-dependent variables of polyesters. The choice of the stereoisomers of the diol in the polyester synthesis can significantly alter the mechanical and thermal performance. Terephthalate polyesters prepared from the proper ratio of 2,2,4,4-tetramethyl-1,3-cyclobutanediol (CBDO) and 1,3-propanediol have superior impact resistance when compared to ballistics grade polycarbonate. In addition these polymers exhibit very strong self-healing behavior that is activated by heat. These copolymers were all produced with a mixture of *cis* and *trans* isomers with a ratio of 43/57, respectively. This study reports research conducted to determine the structure–property relationships that can be attributed to the stereoisomers of the CBDO monomer. The polyester prepared with 99 % *cis* (CBDO) monomer has significantly improved mechanical and thermal performance when compared with the polyester prepared with a 43:57 mixture of *cis* and *trans* isomers or 100 % *trans* isomer. Thermal gravimetric analysis and differential scanning calorimetry demonstrated that the *cis* CBDO polymer exhibit a much higher T_g (99 °C for *cis* and 69 °C for the *trans* 84.5 °C for the mixed polymer) and better thermal stability than the *trans* form of the polymer (onset of decomposition of *trans* at 345 and 360 °C for *cis*). Dynamic mechanical analysis and the Notched Izod demonstrated that the *cis* form of the polymer was much tougher than the *Trans* form. Wide angle X-ray diffraction showed that the *trans* form was semicrystalline and the *cis* form was amorphous. The Notched Izod impact was 1070 J/m for the *cis* CBDO-based copolymer with the *trans* form having an impact factor of 841 J/m with the mixed polymer exhibiting an intermediate value of 944 J/M. Molecular modeling supports the experimental evidence that the choice of stereoisomers for the diol significantly influences the molecular architecture of the polyesters. The molecular architecture of polyesters in addition to polar attraction and molecular weight variables provides a dramatic increase in mechanical and thermal performance.

Materials Chemistry and Physics
2012
(1):119–124



Direct growth of carbon nanotubes on hydroxyapatite using MPECVD

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Abstract

For the first time carbon nanotubes (CNTs) have been successfully grown directly on hydroxyapatite (HA) by using microwave plasma enhanced chemical vapor deposition (MPECVD). Such integration has potential to capitalize on the merits of both HA and CNTs. This type of coating could be useful to improve the interface between bone and the implant. Scanning electron microscope SEM investigations show that; the surface of the CNTs is relatively clean and free of amorphous carbon. The CNTs diameters lie in the range 30–70 nm. In addition HA encapsulation by carbon was observed at a growth temperature 750 °C. Raman spectroscopy indicates that the CNTs are of high quality and the I_G/I_D ratio lies between 1.243 and 1.774. The changes in the X-ray diffraction (XRD) patterns give an indication that during the plasma deposition the HA-substrate surface is subjected to a temperature sufficient for partial conversion to the β -tricalcium phosphate via dehydroxylation.

European Journal of Medicinal
Chemistry
2013
(66):106–113



Regioselective synthesis, characterization and antimicrobial evaluation of *S*-glycosides and *S,N*-diglycosides of 1,2-Dihydro-5-(1*H*-indol-2-yl)-1,2,4-triazole-3-thione

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Abstract

Glycosylation of 1,2-Dihydro-5-(1*H*-indol-2-yl)-1,2,4-triazole-3-thione with 2,3,4,6-tetra-*O*-acetyl- α -D-glucopyranosyl bromide, 2,3,4,6-tetra-*O*-acetyl- α -D-galactopyranosyl bromide and 2-acetamido-3,4,6-tri-*O*-acetyl-2-deoxy- α -D-glucopyranosyl chloride was investigated in the presence of Et₃N and K₂CO₃ as acid scavengers. A regioselective *S*-glycosides were obtained by using Et₃N whereas, using K₂CO₃ gave a mixtures of two hybrids having two glycosidic bonds. The two products of each mixture were separated and characterized as *S,N*¹- and *S,N*²-bis(glycosylated) derivatives. The structures of the newly synthesized compounds were elucidated by ¹H NMR, ¹³C NMR, 2D NMR and mass spectra. The compounds were screened for their antibacterial and antifungal activities. Some compounds exhibited strong inhibition activity compared with the reference drugs (chloramphenicol and baneocin)

Beilstein J Org Chem.
2013
9:135-46



A new synthetic access to 2-N-(glycosyl)thiosemicarbazides from 3-N-(glycosyl)oxadiazolinethiones and the regioselectivity of the glycosylation of their oxadiazolinethione precursors

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Abstract

Glycosylations of 5-(1H-indol-2-yl)-1,3,4-oxadiazoline-2(3H)-thione delivered various degrees of S- and/or N-glycosides depending on the reaction conditions. S-Glycosides were obtained regiospecifically by grinding oxadiazolinethiones with acylated α -D-glycosyl halides in basic alumina, whereas 3-N-(glycosyl)oxadiazolinethiones were selectively obtained by reaction with HgCl₂ followed by heating the resultant chloromercuric salt with α -D-glycosyl halides in toluene under reflux. On using Et₃N or K₂CO₃ as a base, mixtures of S- (major degree) and N-glycosides (minor degree) were obtained. Pure 3-N-(glycosyl)oxadiazolinethiones can also be selectively obtained from glycosylsulfanyloxadiazoles by the thermal S \rightarrow N migration of the glycosyl moiety, which is proposed to occur by a tight-ion-pair mechanism. Thermal S \rightarrow N migration of the glycosyl moiety can be used for purification of mixtures of S- or N-glycosides to obtain the pure N-glycosides. The aminolysis of the respective S- or N-glycosides with ammonia in aqueous methanol served as further confirmation of their structures. While in S-glycosides the glycosyl moiety was cleaved off again, 3-N-(glycosyl)oxadiazolinethiones showed a ring opening of the oxadiazoline ring (without affecting the glycosyl moiety) to give N-(glycosyl)thiosemicarbazides. Herewith, a new synthetic access to one of the four classes of glycosylthiosemicarbazides was found. The ultimate confirmation of new structures was achieved by X-ray crystallography. Finally, action of ammonia on benzylated 3-N-(galactosyl)oxadiazolinethione unexpectedly yielded 3-N-(galactosyl)triazolinethione. This represents a new path to the conversion of glycosyloxadiazolinethiones to new glycosyltriazolinethione nucleosides, which was until now unknown.

Research on Chemical Intermediates
2013



Synthesis and antimicrobial activity of some isoindole derivatives

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Abstract

Oxoisoindolium hexachloroantimonate (1) was reacted with different nitriles to afford the intermediate 2-azoniaallene salts, which underwent cyclisation reaction upon heating furnished the tetracyclic compounds 2a,b. Oxoisoindolo [2,1-a]quinazolinium hexachloroantimonate (3) reacted with *p*-toluidine to afford the corresponding salt 4, which neutralized with sodium carbonate to give the corresponding free base 5. While the isoindolo[2,1-a]quinazoline derivative 6 was prepared by treatment of 3 with benzohydrazide in dichloroethane. The reaction of extremely sensitive salt of oxoisoindolium 7 with aminothiazole derivative 8 was also investigated to afford the formal salts of 2-azoniaallene 9, which neutralized to the corresponding free base 10. The structures of the synthesized compounds were confirmed by IR, ¹H-NMR, ¹³C-NMR and mass spectral technique. Also, the free base compounds were screened for their antimicrobial activities.

Plant Systematics and Evolution

2013

(299) 1819-1828



Soil seed bank contributes significantly to genetic variation of *Hypericum sinaicum* in a changing environment

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Abstract

The contribution of soil seed bank of a desert endemic plant species in maintaining genetic diversity has been addressed in this paper through investigating the differences in genetic diversity and structure (using AFLP markers) between plants grown from soil seed bank and standing crop plants within and among five populations of *H. sinaicum* growing at St. Katherine Protectorate, southern Sinai, Egypt. Standard genetic diversity measures showed that the molecular variation within and among populations was highly significantly different between standing crop and soil seed bank. While soil seed bank had lower genetic diversity than standing crop populations, pooling soil seed bank with standing crop samples resulted in higher diversity. The results revealed also that soil seed bank had lower differentiation (7 %) than among populations of the standing crop (18 %). Results of neighbor-joining, Bayesian clustering and principal coordinate analysis showed that soil seed banks had a separate gene pool different from standing crop. The study came to the conclusion that the genetic variation of the soil seed bank contributes significantly to the genetic variation of the species. This also stresses the importance of elucidating the genetic diversity and structure of the soil seed bank for any sound and long-term conservation efforts for desert species. These have been growing in small-size populations for a long time that any estimates gained only from aboveground sampling of populations may be ambiguous.

Conservation Genetics

2012

(13) 9-19



Conservation genetics of Sinai's remnant populations of *Moringa peregrina*, an economically valuable medicinal plant

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Abstract

Moringa peregrina is an economically valuable tree of Egyptian deserts. It is used medicinally, provides a highly nutritious supplement to Bedouin diets, provides fodder for livestock, and is used for fire wood. *M. peregrina* seeds have been a source of high-quality oil for cosmetics and perfumes since antiquity. Due to unmanaged grazing and over-collection, *M. peregrina* has become one of the most endangered tree species in the Egyptian desert ecosystem. A long-term conservation program is urgently needed to maintain or increase the number and size of *M. peregrina* populations. Ten populations harboring a total of 130 adult *M. peregrina* were sampled from three disjunct Wadis in South Sinai (W. Me'ar, W. Fieran and W. Zaghra). Open-pollinated seedlings were electrophoretically analyzed to address two basic questions: (1) how is genetic diversity distributed within and among populations within these three Wadis; and (2) what is the mating system of this species. *M. peregrina* has a mixed mating system with a selfing rate up to 16% and has limited genetic diversity within and significant genetic differentiation among its populations, the majority of which occurs among Wadis. Direct protection is urgently needed to decrease genetic deterioration within *M. peregrina* populations and to improve their ability to maintain or improve their population numbers. The priority of in situ conservation should be to conserve a few large well-distributed populations representing different Wadis. Ex situ germplasm collections should be made across the species' range to ensure a representative sample of its genetic variation. Seed orchards designed to maximize cross-fertilization among unrelated individuals should be established to generate propagules to supplement natural populations.

APPLIED ECOLOGY AND
ENVIRONMENTAL RESEARCH

(4): 351-366



ECOLOGICAL ASSESSMENT AND PHENOTYPIC AND FITNESS VARIATION OF SINAI'S REMNANT POPULATIONS OF *MORINGA PEREGRINA*

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Abstract

Moringa peregrina which is one of the most valuable and economically important medicinal species in the Egyptian desert has become one of the most endangered trees due to unmanaged grazing and over-collection. The present study aims to provide ecological assessment of the species and to investigate whether progeny from the remnant fragmented populations show reduced fitness. Sixteen sites containing a total of 197 trees were sampled upon survey of Wadis in South Sinai, where vegetation parameters and associated species were recorded. Variation in edaphic factors, phenotypic traits, germination, and early life-history fitness were assessed and analyzed. The results indicated that *M.*

peregrina has narrow distribution and grows on cliffs and at the base of hills (300 - 800 m a.s.l.) with very rugged topography. Almost all the reproductive trees grow on south facing slopes and crevices of metamorphic rocks. The study clearly showed that the studied populations have very low early stage fitness estimated as an index of maternally affected life-history characters. The study suggested that the deteriorated environmental circumstances have affected negatively the fitness of maternal plants in small populations and the performance of their offspring. It concluded that direct protection is urgently needed to stop further deterioration of the populations and to improve their number and size.



Effect of carbon microfiber materials on sensitivity of adenosine and hydroxyadenine at carbon microfiber sensors

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Abstract

The relationship between the sensitivity measurements and microfiber electrodes made from different carbon microfiber materials, such as polyacrylonitrile (PAN T650 and PAN HCB) and Pitch P25 was established in this work. The different microfiber electrodes were nanostructured by an electrochemical pretreatment method. Sensitivity of adenosine (ADO) and 2, 8-dihydroxyadenine (2,8-DHA) was measured at different carbon microfiber sensors made from different carbon microfiber materials. Sensitivity of PAN microfiber electrodes for ADO and 2,8-DHA determinations measured at 500 V s⁻¹ vs. SCE is higher than that measured at Pitch P25 microfiber electrodes due to more defects in PAN microfiber electrodes. Adsorption of ADO and 2,8-DHA is greater at PAN HCB electrodes. High conductivity of PAN fibers correlates with sensitivity determinations of the investigated analytes.

Biotechnology and biotechnological
Equipments
2013
(3), pp. 3834 - 3842



Prevalence And Characterization Of Shiga-Toxin O157:H7 And Non-O157:H7 Enterohemorrhagic *Escherichia Coli* Isolated From Different Sources

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6Slovak Academy of Sciences, Institute of Molecular Biology, Bratislava, Slovakia

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Abstract

Shiga-toxin-producing *Escherichia coli* (STEC) is recognized as an important foodborne pathogen responsible for sporadic cases to serious outbreaks worldwide. The morbidity and mortality associated with several recent outbreaks due to STEC have highlighted the threat this organism poses to public health. This study was conducted to identify, characterize the virulence traits and antibiogram of enterohemorrhagic *E. coli* (EHEC) from different sources. A total of 384 samples from human, animal and environmental sources were collected from different locations in Ismailia city, Egypt. *E. coli* isolates (n = 283) were identified by conventional microbiology culture, and phenotypically characterized with biochemical and motility tests. Multiplex PCR (mPCR) was applied for the detection of virulence genes (stx1, stx2, eaeA, and EHEC hlyA). From the overall prevalence of *E. coli* isolates, 31 % (89/283) were isolated from stools of people with diarrhea; 17.3 % (49/283) were from stools of sheep, cattle and chicken with diarrhea; 16.5 % (47/283) were from urine of people with a urinary tract infection; 17.3 % (49/283) were from fresh water; 6.4 % (18/283) from seafood; 6.02 % (17/283) from processed meat products; 3.9 % (11/283) from dairy products; and 1.1 % (3/283) from poultry products (liver). The antibiotic sensitivity pattern showed that the isolates carried a multidrug resistance (MDR) phenotype to at least four antibiotics from different classes: erythromycin (E), gentamicin (CN), cefazolin (CZ), thiampinicol (TP), vancomycin (VA), ciprofloxacin (CIP), and ampicillin (AM). Shiga toxin was identified in ten suspected EHEC by mPCR. Serotyping of these 10 *E. coli* isolates demonstrated the circulation of five serotypes (O157, O158, O114, O125 and O26) (10/283 [4%]): three isolates from people (serotype O157, O158), four isolates from animals (serotype O114, O26), two isolates from meat products (serotype O125, O158), and an isolate from fresh water (serotype O114). This study identified STEC O157 from human cases with diarrhea, and demonstrated that meat and water were contaminated with more than one serotype of non-O157 STEC strains. This is a cause of concern owing to their potential to cause human infections.



Epibiota of the spider crab *Schizophrys dahlak* (Brachyura: Majidae) from the Suez Canal with special reference to epizoic Diatoms

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Abstract

This study aims to describe the epibiota of the spider crab, *Schizophrys dahlak* with special reference to epizoic diatoms. Specimens were collected from the Suez Canal between autumn 2008 and summer 2009. Macro-epibionts consisted of the tube worm *Hydroides elegans*, the barnacle *Balanus amphitrite* and *B. eburneus*, the bivalve *Brachidontes variabilis* and the urochordate *Styela plicata*. Total coverage of macro-epibionts was greater on females' carapaces than those of males with apparent seasonal variations. The highest coverage was noticed in spring and winter for both males and females. Sixty five diatoms taxa were recorded as epibionts belonging to 25 genera. The maximal total averages of cell count were observed during summer and spring with the highest average of 10.9 and 44x 10³ cells d⁻² for males and females, respectively. A single diatom taxon *Fragilaria intermedia* comprising 73.5% of all epizoic diatoms, was the most dominant species during spring, whereas *Amphora coffeiformis* and *Cocconeis placentula* were the most dominants during summer. The masking behavior of *S. dahlak* was discussed in terms of the significant role of epizoic diatoms.

Frontiers in Zoology
2012
(9), page 1 -14



Tagmatization in Stomatopoda – reconsidering functional units of modern-day mantis shrimps (Verunipeltata, Hoplocarida) and implications for the interpretation of fossil

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Abstract

Introduction: We describe the tagmatization pattern of the anterior region of the extant stomatopod *Erugosquilla massavensis*. For documentation we used the autofluorescence capacities of the specimens, resulting in a significant contrast between sclerotized and membranous areas.

Results: The anterior body region of *E. massavensis* can be grouped into three tagmata. Tagma I, the sensorial unit, comprises the segments of the eyes, antennules and antennae. This unit is set-off anteriorly from the posterior head region. Ventrally this unit surrounds a large medial sclerite, interpreted as the anterior part of the hypostome. Dorsally the antennular and antennal segments each bear a well-developed tergite. The dorsal shield is part of tagma II, most of the ventral part of which is occupied in the midline by the large, partly sclerotized posterior part of a complex combining hypostome and labrum. Tagma II includes three more segments behind the labrum, the mandibular, maxillulary and maxillary segments. Tagma III includes the maxillipedal segments, bearing five pairs of sub-chelate appendages. The dorsal sclerite of the first of these tagma-III segments, the segment of the first maxillipeds, is not included in the shield, so this segment is not part of tagma II as generally thought. The second and third segments of tagma III form a unit dorsally and ventrally. The tergites of the segments of tagma III become progressively larger from the anterior to the posterior, possibly resulting from a pedomorphic effect during evolution, which caused this reversed enlargement.

Conclusions: The described pattern of tagmosis differs from current textbook knowledge. Therefore, our re-description of the anterior body area of stomatopods is of considerable impact for understanding the head evolution of Stomatopoda. Likewise, it has a bearing upon any comparisons with fossil stomatopods, as mainly sclerotized areas are fossilized, and, on a wider scale, upon larger-scale comparisons with other malacostracans and e crustaceans in general.



Advances in Difference Equations
2013
8pages



On certain hypergeometric identities deducible by using the beta integral method

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Abstract

The aim of this research paper is to demonstrate how one can obtain eleven new and interesting hypergeometric identities (in the form of a single result) from the old ones by mainly applying the well-known beta integral method which was used successfully and systematically by Krattenthaler and Rao in their well known, very interesting research papers. The results are derived with the help of generalization of a quadratic transformation formula due to Kummer very recently obtained by Kim *et al.* Several identities, including one obtained earlier by Krattenthaler and Rao, follow special cases of our main findings. The results established in this paper are simple, interesting, easily established and may be potentially useful.

Abstract and Applied Analysis
2013
6 pages



On an Extension of Kummer's Second Theorem

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Abstract

The aim of this paper is to establish an extension of Kummer's second theorem in the form $e^{-x/2} {}_2F_2 \left[\begin{matrix} - \\ 2+d; x \end{matrix} \middle| \frac{x^2}{16} \right] = 0$

${}_1F_1 \left[\begin{matrix} - \\ a+3/2; \end{matrix} \middle| \frac{cx^2}{16} \right] + \left(\frac{a/d - 1/2}{(a+1)} \right) x {}_0F_1 \left[\begin{matrix} - \\ a+5/2; \end{matrix} \right]$

${}_1F_1 \left[\begin{matrix} - \\ a+3/2; \end{matrix} \middle| \frac{cx^2}{16} \right] + (cx^2/2(2a+3)) {}_0F_1 \left[\begin{matrix} - \\ a+5/2; \end{matrix} \right]$, where $c = (1/(a+1))(1/2 - a/d) + a/d(d+1)$, $d \neq 0, -1, -2, \dots$

For $d = 2a$, we recover Kummer's second theorem. The result is derived with the help of Kummer's second theorem and its contiguous results available in the literature. As an application, we obtain two general results for the terminating ${}_3F_2(2)$ series. The results derived in this paper are simple, interesting, and easily established and may be useful in physics, engineering, and applied mathematics.



Published Research Articles in International Journals 2012-2013

American Journal of Computational
Mathematics
2013
3, 175-184



Numerical Solution of Nonlinear System of Partial Differential Equations by the Laplace Decomposition Method and the Pade Approximation

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Abstract

In this paper, Laplace decomposition method (LDM) and Pade approximant are employed to find approximate solutions for the Whitham-Broer-Kaup shallow water model, the coupled nonlinear reaction diffusion equations and the system of Hirota-Satsuma coupled KdV. In addition, the results obtained from Laplace decomposition method (LDM) and Pade approximant are compared with corresponding exact analytical solutions.



Variational iteration method and a domain decomposition method for fourth-order fractional integro-differential equations

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Abstract

In this paper, linear and nonlinear boundary value problems for fourth-order fractional integro-differential equations are solved by Variational iteration method (VIM) and a domain decomposition method (ADM). The fractional derivative is considered in the Caputo sense. The solutions of both problems are derived by infinite convergent series. Numerical examples are presented to illustrate the efficiency and reliability of two methods.

Journal of Archaeological Science
2013

(40) 1946-1955



Near-surface imaging of a buried foundation in the Western Desert, Egypt, using space-borne and ground penetrating radar

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Abstract

ALOS/PALSAR L-band full polarimetric data have been used to detect and characterize a well-defined geometric target hidden under sand deposits in the Western Desert of Egypt. This buried object is rectangular in shape with very straight boundaries and encloses an area of 500 m². Inside the rectangular area there is a perfectly circular feature of approximately 53 m² area. High and medium resolution optical satellite images (WorldView-2, LOS/AVNIR-2) and field investigation confirm that the topography of the study area is relatively flat and completely covered by dry sand. The electromagnetic wave scattering behavior of the detected buried object was measured by decomposing the scattering matrix of ALOS/PALSAR full polarimetric data into Entropy-Alpha (H/a) and Freeman and Durden decompositions.

Furthermore, a combination of unsupervised classification algorithms and Constant False-Alarm Rate (CFAR) edge detection was performed on the polarimetric data which revealed a well-defined geometric shape with straight borders. These borders have high angles with low entropy, which physically means double bounce scattering mechanism with low randomness and is very similar to that of an urban scatterer, indicating that the detected target might be a buried wall-like foundation of a man-made structure. Moreover, 28 ground penetrating radar (GPR) profiles were acquired using a 270 MHz shielded antenna to validate the satellite radar remote sensing results. The GPR profiles reveal very clear hyperbolic shapes at 1.5 m depth with one of them showing a large hyperbolic shape-like structure, which might indicate the presence of a buried foundation. Thus the site might have significance to archaeological studies of the Western Desert, particularly previous human occupation and the sources of water for such habitation.

European Journal of Medicinal
Chemistry
2013
(60) 503-511



Synthesis and antifungal activity of some s-mercaptotriazolobenzothiazolyl amino acid derivatives

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Abstract

A series of s-triazolobenzothiazolylthioacetyl/propionyl amino acid derivatives were synthesized with the aim of evaluating their antifungal activity. Their chemical structures were confirmed by ^1H , ^{13}C NMR, IR, mass spectrometry and elemental analyses. The synthesized derivatives were screened for their antifungal activity against *Aspergillus flavus* and *Candida albicans*. Five compounds (3, 5, 7c, 8 and 17) were found to possess high activity comparable to fluconazole at 100 mg/mL against *C. albicans*.

Journal of Synchrotron Radiation
2013
20, 116–124



Towards high-resolution synchrotron radiation imaging with statistical iterative reconstruction Essam A. Rashed and Hiroyuki Kudo

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Abstract

Synchrotron radiation (SR) X-ray micro-computed tomography (CT) is an effective imaging modality for high-resolution investigation of small objects, with several applications in medicine, biology and industry. However, the limited size of the detector field of view (FOV) restricts the sample dimensions to only a few millimeters. When the sample size is larger than the FOV, images reconstructed using conventional methods suffer from DC-shift and lowfrequency artifacts. This classical problem is known as the local tomography or the interior problem. In this paper, a statistical iterative reconstruction method is introduced to eliminate image artifacts resulting from the local tomography. The proposed method, which can be used in several SR imaging applications, enables high-resolution SR imaging with superior image quality compared with conventional methods. Real data obtained from different SR micro-CT applications are used to evaluate the proposed method. Results indicate a noteworthy quality improvement in the image reconstructed from the local tomography measurements.

Journal of African Earth Sciences
2013
(83) 1–9



Locating suitable mangrove plantation sites along the Saudi Arabia RedSea Coast

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Abstract

This paper describes a method to locate suitable sites for mangrove plantations along the southern Saudi Arabian Red Sea Coast based on the geological setting of the area. Geological characteristics such as soil type, geomorphology and drainage were considered as siting criteria. Satellite imagery and digital elevation models were interpreted to determine most of the parameters.

The study determined that mangrove stands are primarily concentrated in the southern part of the study area and that they are sparsely found northward. Using data provided by satellite imagery, topographic maps and soil samples, the study was able to determine that three areas now barren of vegetation have the environmental elements necessary to support mangroves. One, in particular, would be especially suitable for establishing a plantation. In this paper, we describe the methods we used to make this determination and show the results of the analysis.

Journal of Environmental Informatics
(JEI)
2013
(2) 102-111



The Impact of Camping Activities on Soil Degradation in Kuwait

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Abstract

Desert camping is an old tradition in Kuwait. Today's camping involves activities that negatively impact the soil due to surrounding camp sites with barriers from the top soil, off-road transport by cars, using heavy equipment such as electrical generators, camping facilities such as bathrooms with cement floors, soccer and volleyball fields. This study used remote sensing and Geographic Information System (GIS) techniques to study the role of camping activities on soil degradation in camping areas and recommend new camping sites and scenarios for environmentally safe camping. Soil erosion, soil compaction and vegetation cover decline were used as indicators for evaluating the degree of soil degradation in camping sites. Satellite images were processed, enhanced and interpreted to find out the area of camping sites. The rate of soil erosion was estimated by Revised Universal Soil Loss Equation (RUSLE). About 43% of the camping sites studied had high soil erosion rate that reached 16 tons/acre/year. The other 57% of camping sites had moderate soil erosion rates of 14 tons/acre/year. Camping soil barriers increase the rate of erosion inside the camping sites. The study shows that soil and vegetation are badly affected by camping activities. Soil bulk density in camping areas surpassed that of areas not subjected to camping by an average of 12%. The vegetation coverage outside camping area was markedly higher than that inside camping. To avoid soil degradation by camping new environmentally safe sites for camping were recommended.



PARIPEX - INDIAN JOURNAL OF
RESEARCH
2013

Biological Activity and Mass Spectra Investigation of Some Coumarin Derivatives

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Abstract

3-(Aroyl)amino-6,8-disubstituted coumarins(2a-c) were prepared via condensation of salicylaldehyde derivatives (1) with N-aroylglycine in presence of fused sodium acetate and acetic anhydride. Hydrolysis of 2a with hydrochloric acid 6N HCl yield the corresponding 3-amino-6-bromocoumarin(3), followed by condensation of 3 with 5-bromosalicylaldehyde to give 3-(5-bromo-2-hydroxybenzyliden)amino-6-bromo- coumarin(4).Acetylation and alkylation of 2b with acetic anhydride and ethylchloroacetate afforded the corresponding N-acetyl and N-alkyl derivatives(5and 6). EI mass spectrometric behavior of compounds 2a, b, 5 and 6 show a weak molecular ion peak and a base peak of 105, While the compound 2c a base peak of 139, resulting from a cleavage fragmentation. The compounds 3 and 4 give a characteristic fragmentation pattern with stable fragments of m/z 121 and m/z 226. Some representative compounds showed antimicrobial and antitumor activity in vitro by the drug diffusion methods.



Research on Chemical Intermediates
2013
(2) 537-553

Synthesis of some nitrogen heterocycles and in vitro evaluation of their antimicrobial and antitumor activity

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Abstract

Treatment of ethyl β -aryl- α -cyanoacrylate (2a, b) with thiourea, guanidine hydrochloride, and thiosemicarbazide in presence of anhydrous potassium carbonate in methanol led to formation of pyrimidine derivatives 3 and 5 and thiosemicarbazone derivative 9. Thiazole derivative 10 was prepared via cyclization of thiosemicarbazone derivative 9 with 4-methoxy phenacyl bromide. Acetylation of 3a, 5, and 10 with acetic anhydride yielded the acetoxy and *N*-acetyl derivatives 4, 6, and 11. The mass-spectral fragmentation patterns of nitrogen heterocycles were investigated to elucidate the structure of the prepared compounds. Biological studies of nitrogen heterocycles were carried out to investigate their antimicrobial and anticancer activities; it was found that compounds 5, 10, and 11 were highly active against bacteria and fungi, and compounds 3a and 3b were also active against bacteria and fungi.



Research on Chemical Intermediates

2013

Synthesis of fused 1, 2, 4-triazines as potential antimicrobial and antitumor agents

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J. A. Hasanen Chemistry Department, Faculty of Science, Suez Canal University, Ismailia, Egypt

Abstract

5-Benzylidene-3-(p-chlorophenyl)-2-aminothiocarbonyl-1,2,4-triazine (2) was prepared via condensation of oxazolinone (1) with thiosemicarbazide. Fused 1,2,4-triazine derivatives (3, 4 and 9) were synthesized from the reaction of compound 2 with x-bromomethyl aryl ketones, ethyl chloroacetate, and acetic anhydride. Treatment of 4 with acetic anhydride and aromatic aldehydes yielded the corresponding acetyl, diacetyl derivatives (6 and 7) and 7-benzylidene-5-(p-chlorophenyl)-4-thioxo-3-arylidene-1,2,4-triazino [2,1-a]-1,2,4-triazine-1,8-diones (8). The electron impact mass spectra of both the above series of compounds have also been recorded and their fragmentation pattern is discussed. All synthesized fused 1,2,4-triazine derivatives were primary in vitro screened for their antimicrobial and antitumor activity.

Solar Energy
2013
(92) 1–6



Electrical and photoresponse properties of Al/p-CuFeO₂/p-Si/Al MTCOS photodiode

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^f Department of Physics, Faculty of Science, Firat University, Elazig 23169, Turkey

Abstract

A p-type transparent semiconductor, CuFeO₂ was synthesized by sol gel method to fabricate metal/transparent conducting oxide– semiconductor (MTCOS) Schottky photodiode. The optical and electrical properties of the CuFeO₂ film and Al/p-CuFeO₂/p-Si/Al diode were studied. The optical band gap of the CuFeO₂ film was calculated using optical data and was found to be 2.82 eV. The diode exhibits a photoconducting behavior with a high photosensitivity value of 1.31×10^3 under 100 mW/cm². the ideality factor and barrier height of the diode were obtained to be 1.67 and 0.2 eV, respectively. The interface states have been used to explain the results obtained in this study. It is evaluated that MTCOS photodiode can be used for optoelectronics applications.

Materials Letters
2013
(105)106–109



Preparation and characterization of dye sensitized solar cell based on nanostructured Fe_2O_3

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Abstract

Thin films of hematite (Fe_2O_3) were synthesized using sol–gel spin coating method on fluorine doped tin oxide and glass substrates. The synthesized Fe_2O_3 film was used to fabricate ruthenium dye sensitized solar cells. The average transmittance of the Fe_2O_3 film was observed to be more than 75% in wavelength range of 600–900 nm. The optical band gap of Fe_2O_3 films was calculated using transmittance data and observed to be 2.21 eV. The current–voltage characteristics of the solar cell showed that the photocurrent of the solar cell is increased with increase in the light illumination intensity. The output power–voltage characteristics indicate that the output power of the solar cell improved is increased with irradiance. Although the efficiency of the Fe_2O_3 film based solar cell is poor for practical applications, Fe_2O_3 film can be used in dye sensitized solar cells.

Journal of Material Science
2013
48:3067–3074



Effect of nanocrystallization on the structural and electrical conductivity enhancement of vanadium-based glasses

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Abstract

A new glass–ceramic nanocomposites material was prepared by a thermal nanocrystallization of V_2O_5 – Bi_2O_3 – P_2O_5 system with different V_2O_5 content. The amorphous state of glassy materials is confirmed by X-ray diffraction. It was shown by XRD and SEM studies that by suitable heat-treatment glasses can be turned into glass–ceramic nanocomposites consisting of crystallites smaller than 80 nm inserted in the glassy matrix. Also, it was shown that thermal nanocrystallization of as-prepared glassy samples leads to creation of nanocrystalline grains of V_2O_5 , Bi_2O_3 , and $BiVO_4$ phases. The glass–ceramic nanocomposites obtained show giant enhancement of electrical conductivity than the as-prepared glasses. The conductivity enhancement was recognized to interfacial regions adjacent crystalline grains. The conduction of the present glasses and their glass–ceramic nanocomposites was confirmed to be due to primarily non-adiabatic hopping of small polaron between vanadium ions.

Solid State Sciences
2013
(16) 111-116



A pentacene thin film transistor with good performance using solegel derived SiO₂ gate dielectric layer

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c Faculty of Science, Department of Physics, University of Tabuk, Tabuk, Saudi Arabia

d Faculty of Science, Department of Physics, Suez Canal University, Ismailia, Egypt

e Department of Physics, Faculty of Science, Firat University, Elazig 23169, Turkey

Abstract

A low-voltage pentacene field-effect transistor with solegel derived SiO₂ gate dielectric was fabricated. The mobility of the transistor was achieved as high as 1.526 cm²/V on the bare SiO₂/Si substrate by a higher dielectric constant. The interface state density for the transistor was found to vary from 3.8×10^{10} to 7.5×10^{10} eV⁻¹ cm⁻² at frequency range of 100 kHz to 1 MHz. It is evaluated that the SiO₂ derived by low cost solegel is quite a promising candidate as a gate dielectric layer for low-voltage pentacene field-effect transistor.

Solid State Sciences
2013
(19) 111-116



Synthesis, magnetic and ethanol gas sensing properties of semiconducting magnetite nanoparticles

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e Department of Physics, Faculty of Science, Firat University, Elazig 23169, Turkey

Abstract

The superparamagnetic magnetite (Fe_3O_4) nanoparticles with an average size of 7 nm were synthesized using a rapid and facile microwave hydrothermal technique. The structure of the magnetite nanoparticles was characterized by X-ray diffraction (X-ray), field effect scanning electron microscopy (FESEM), energy dispersive X-ray spectroscopy (EDS), and transmission electron microscopy (TEM). The prepared Fe_3O_4 was shown to have a cubic phase of pure magnetite. Magnetization hysteresis loop shows that the synthesized magnetite exhibits no hysteretic features with a superparamagnetic behavior. The ethanol gas sensing properties of the synthesized magnetite were investigated, and it was found that the response time is less than 10 s with good reproducibility for ethanol sensor. Accordingly, it is evaluated that the magnetite nanoparticles can be effectively used as a solid state ethanol sensor in industrial commercial product applications.



PLOS ONE
2013
(8) 1-12

Machine Learning for Automatic Prediction of the Quality of Electrophysiological Recordings

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Sylvia Anton^{2ab}

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Abstract

The quality of electrophysiological recordings varies a lot due to technical and biological variability and neuroscientists inevitably have to select “good” recordings for further analyses. This procedure is time-consuming and prone to selection biases. Here, we investigate replacing human decisions by a machine learning approach. We define 16 features, such as spike height and width, select the most informative ones using a wrapper method and train a classifier to reproduce the judgement of one of our expert electrophysiologists. Generalisation performance is then assessed on unseen data, classified by the same or by another expert. We observe that the learning machine can be equally, if not more, consistent in its judgements as individual experts amongst each other. Best performance is achieved for a limited number of informative features; the optimal feature set being different from one data set to another. With 80–90% of correct judgements, the performance of the system is very promising within the data sets of each expert but judgments are less reliable when it is used across sets of recordings from different experts. We conclude that the proposed approach is relevant to the selection of electrophysiological recordings, provided parameters are adjusted to different types of experiments and to individual experimenters.

J Enzyme Inhib Med Chem.
2013
(1):105-12.

Immunomodulatory properties of S- and N-alkylated 5-(1H-indol-2-yl)-1,3,4-oxadiazole-2(3H)-thione.

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Abstract

A series of S- and N-alkylated indolyloxadiazoles 2-7 were prepared. All compounds were tested for their immunomodulatory activity against T-cell proliferation, oxidative burst and cytokine analysis. Compounds 1, 2a, 2b, 2c and 2k demonstrated highly significant ($P \leq 0.005$) inhibition on PHA activated T-cell proliferation with IC(50) less than 3 $\mu\text{g/mL}$ concentration, while 3b exert a moderate inhibitory effect with IC(50) 8.6 $\mu\text{g/mL}$. Among all compounds of the series, only 2h was found to suppress phagocytes ROS production (IC(50) 2.4 $\mu\text{g/mL}$) in luminol-based chemiluminescence (CL) assay. Compounds 2a-k have stimulatory effect on proinflammatory cytokine predominantly IL-1 β but no effect on IL-4 and NO production indicating that these compounds might have selective inhibitory effect on T-cell proliferation. Cytotoxic effect on T-cell proliferation was tested on NIH-3T3 mouse fibroblast normal cell line. All compounds were found to be free from toxic effects up to 100 μM concentration.

Macedonian Journal of Chemistry
and Chemical Engineering
2013
1, pp. 25–39



PREPARATION AND APPLICATIONS OF SOME COMPLEXES DERIVED FROM LANTHANIDES (III) IONS WITH SOME LIGANDS DERIVED FROM PYRAZOLE

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Abstract

The novel complexes derived from some pyrazole derivatives ligands: 2,4-dihydroxybenzylidene- 3'-imino-5'-methylpyrazole (L1); salicylidene-3'-imino-5'-methylpyrazole (L2); 2-hydroxynaphthylidene-3'-imino-5'-methylpyrazole (L3) and LaCl_3 , $\text{Ce}(\text{NO}_3)_3$ and $\text{Nd}(\text{NO}_3)_3$ were prepared and characterized using elemental analysis (C, H, N, M), mass spectrometry, FT-IR spectroscopy, electrical conductivity and thermal gravimetric analysis (DTA/TG).

The electrical conductivity of 0.001 M solutions in DMSO revealed that the electrolytic behavior of all formed complexes as 1:1 (coordination sphere cation: ionization sphere ions) ratio for the complexes derived from L1 and L2 ligands while L3 gave 1:2 electrolyte ratio. The thermal analysis (DTA/TG) of the synthesized complexes revealed the presence of two types of water molecules, one as water of crystallization and the other as coordinated water which acts as a ligand. The complexes could be formulated as $[\text{M}(\text{L})_2 \cdot (\text{H}_2\text{O})_n] \cdot \text{Z} \cdot m\text{H}_2\text{O}$ for $\text{L} = \text{L1 and L2}$, $[\text{M}(\text{L}) \cdot (\text{H}_2\text{O})_n] \cdot \text{Z} \cdot m\text{H}_2\text{O}$ for $\text{L} = \text{L3}$ ($\text{Z} = \text{Cl}^-$ for $\text{M} = \text{La(III)}$ and $\text{Z} = \text{NO}_3^-$ for $\text{M} = \text{Ce(III)}$ and Nd(III)). The $\text{Nd(III)}-\text{L3}$ complex exhibits promising catalytic activity towards the aerobic oxidation of p-phenylenediamine (PPD) to the corresponding semi-oxidized form (PPD^+). Furthermore, the antimicrobial activity of the investigated complexes was tested and discussed.

The simulated molecular structure and the energy of the formed complexes were performed using the ChemOffice program suite. The relation between the spatial arrangement of the formed complexes and its antimicrobial activity was evaluated

Spectrochim Acta A Mol Biomol
Spectrosc
2013
(107) 179-187



Spectral, coordination and thermal properties of 5-arylidene thiobarbituric acids

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Abstract

Synthesis of 5-arylidene thiobarbituric acids containing different functional groups with variable electronic characters were described and their Co(2+), Ni(2+) and Cu(2+) complexes. The stereochemistry and mode of bonding of 5-(substituted benzylidene)-2-TBA complexes were achieved based on elemental analysis, spectral (UV-VIS, IR, (1)H NMR, MS), magnetic susceptibility and conductivity measurements. The ligands were of bidentate and tridentate bonding through S, N and O of pyrimidine nucleolus. All complexes were of octahedral configuration. The thermal data of the complexes pointed to their stability. The mechanism of the thermal decomposition is discussed. The thermodynamic parameters of the dissociation steps were evaluated and discussed.



Synthesis and Reactivity in Inorganic, Metal-Organic, and Nano-Metal Chemistry
2013
(1) 63-75

Spectral, Magnetic, Thermal and DNA Interaction of Ni(II) Complexes of Glutamic Acid Schiff-Bases

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Abstract

Ni(II) complexes with Schiff-bases obtained by condensation of glutamic acid with salicylaldehyde; 2,3-; 2,4-; 2,5-dihydroxybenzaldehyde and o-hydroxynaphthaldehyde have been synthesized using the template method in ethanol or ammonia media. They were characterized by elemental analyses, conductivity measurements, magnetic moment, UV, IR and ¹H NMR spectra as well as thermal analysis (TG, DTG, DTA). The Schiff-bases are dibasic tridentate or tetradentate donors and the complexes have square planar and octahedral structures. The complexes decompose in two or three steps where kinetic and thermodynamic parameters of the decomposition steps were computed. The interactions of the formed complexes with FM-DNA were monitored by UV and fluorescence spectroscopy.

Int.J.Cur.Microbiol.App.Sci
2013
(5) 378-395



Risk assessment mapping of *Acacia tortilis* subspecies *raddiana* growing in South Sinai, Egypt, using integrated field survey, remote sensing and GIS

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Abstract

The main objective of the present study is to assess the ecological risk at *Acacia tortilis* sup. *raddiana* populations in Wadi Feiran hydrographic basin in South Sinai. To achieve such aim, multiple data sets were collected, analyzed and integrated by means of Geographical Information System (GIS). The datasets used in the analyses included environmental factors of both human and geological factors derived from satellite images and field observations. Fifty-seven sites were selected in thirteen localities representing the geographic distribution of *A. tortilis* in the study area. SRTM-DEM was used for the detection of both drainage gradient (slope) and parameters of fracture density and intersection. According to the integration process of the different parameters through GIS, the populations at high risk lies within the central part of the study area with two distinctive clusters, the first one is assigned to Wadi Akhbar and W. Sebah and the second include W. Qusier, W. El-Tar, and W. Surief. The study recommended to manage the different human activities at high risk areas, and to propagate *Acacia* trees in situ to overcome the present decline in populations' sizes.

World Applied Sciences Journal
2013
(9): 1130-1140



Bioprospecting of *Streptomyces* sp. MECO2 from Stones of an Ancient Egyptian Tomb with Promising Antitrichophyton Activity under Optimized Cultivation Conditions

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2Botany Department, Faculty of Science, Suez Canal University, Egypt

3Microbiology and Immunology Department, Faculty of Pharmacy, Cairo University, Egypt

Abstract

The present work was initiated by isolating terrestrial actinomycetes from the stones of one of the Egyptian ancient tombs where 127 pure actinomycetes isolates could be recovered. Ten of them were tested for their antimicrobial activities against *Trichophyton mentagrophytes* pathogen. The phenotypic features of the isolate with the highest activity were studied. Additionally the molecular characterization was carried out for the active isolate, where the PCR amplicons of the promising isolate were sequenced and aligned against the 16S rRNA of the Ribosomal Database Project. The high level of sequence similarity of the *Streptomyces* isolate No. 1 was to *Streptomyces* sp.

MECO2 which has similarity (99%). Series of experiments were conducted to optimize the physiological and fermentation conditions allowing maximum activity of the selected organism. Relatively high antitrichophyton activity was attained with cultivation medium composed of (g/l): glucose, 5; casein, 0.0075; KNO₃, 0.05; NaCl, 2; KH₂PO₄, 6; MgSO₄·7H₂O, 0.05; CaCO₃, 0.02 and FeSO₄·7H₂O, 0.01; pH 7

adjusted using phosphate buffer, inoculum size 2ml/50ml medium and agitation rate of 200 rpm at 30°C for 9 days incubation. The mycelial cake ethylacetate extract was subjected to chromatographic fractionation followed by preliminary characterization to the most active fraction



Renewable and Sustainable
Energy Reviews
2013
(24): 84–91

Quantitative appraisal of biomass resources and their energy potential in Egypt

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Abstract

The utilization of biomass as a renewable source of energy is important from the energetic as well as the environmental viewpoint. It can reduce the rate of fossil fuel depletion caused by the rapid increase in energy consumption. This paper presents an estimation of the biomass and its potential energy in Egypt. Four main types of biomass energy sources are included: agricultural residues (dedicated bioenergy crop residues), municipal solid wastes, animal wastes, and sewage sludge. The potential biomass quantity and its theoretical energy content were computed according to statistical reports, literature reviews, and personal investigations. The results show that Egypt produces a considerable amount of biomass with a total theoretical energy content of 416.9×10^{15} J. The dry biomass produced from bioenergy crop residue sources has been estimated at about 12.33 million tons/year, of which 63.75% is produced from rice straw. This source represents the highest percentage (44.6%) of the total theoretical potential energy in Egypt, followed by municipal solid wastes, which could produce 41.7% from an annual amount of 34.6 million tons. Meanwhile, the rest of the total theoretical potential energy could be produced from animal and sewage wastes. The estimated biomass with its considerable potential energy content represents an important renewable energy source in Egypt.



Res Microbiol.
2013
(7):761-9

Generic and functional diversity in endophytic actinomycetes from wild Compositae plant species at South Sinai – Egypt

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Abstract

The diversity of culturable endophytic actinomycetes associated with wild Compositae plants is scantily explored. In this study, one hundred and thirty one endophytic actinobacteria were isolated from ten Compositae plant species collected from South Sinai in Egypt. Microscopic and chemotaxonomic investigation of the isolates indicated fourteen genera. Rare genera, such as Microtetraspora, and Intrasporangium, which have never been previously reported to be endophytic, were identified. Each plant species accommodated between three to eight genera of actinobacteria and unidentified strains were recovered from seven plant species. The generic diversity analysis of endophytic assemblages grouped the plant species into three main clusters, representing high, moderate and low endophytic diversity. The endophytes showed high functional diversity, based on forty four catabolic and plant growth promotion traits; providing some evidence that such traits could represent key criteria for successful residence of endophytes in the endosphere. Stress-tolerance traits were more predictive measure of functional diversity differences between the endophyte assemblages (Shannon's index, $p = 0.01$). The results indicate a potential prominent role of endophytes for their hosts and emphasize the potency of plant endosphere as a habitat for actinobacteria with promising future applications.

Toxicon
2013
(74):193-207



Venom proteomic and venomous glands transcriptomic analysis of the Egyptian scorpion *Scorpio maurus palmatus* (Arachnida: Scorpionidae)

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Abstract

Proteomic analysis of the scorpion venom *Scorpio maurus palmatus* was performed using reverse-phase HPLC separation followed by mass spectrometry determination. Sixty five components were identified with molecular masses varying from 413 to 14,009 Da. The high percentage of peptides (41.5%) was from 3 to 5 KDa which may represent linear antimicrobial peptides and KScTxS. Also, 155 expressed sequence tags (ESTs) were analyzed through construction the cDNA library prepared from a pair of venomous gland. About 77% of the ESTs correspond to toxin-like peptides and proteins with definite open reading frames. The cDNA sequencing results also show the presence of sequences whose putative products have sequence similarity with antimicrobial peptides (24%), insecticidal toxins, b-NaScTxS, k-KScTxS, a-KScTxS, calcines and La1-like peptides. Also, we have obtained 23 atypical types of venom molecules not recorded in other scorpion species. Moreover, 9% of the total ESTs revealed significant similarities with proteins involved in the cellular processes of these scorpion venomous glands. This is the first set of molecular masses and transcripts described from this species, in which various venom molecules have been identified. They belong to either known or unassigned types of scorpion venom peptides and proteins, and provide valuable information for evolutionary analysis and venomomics.

Journal of Venomous Animals and
Toxins including Tropical Diseases
2013
19:10



Conus vexillum venom induces oxidative stress in Ehrlich's ascites carcinoma cells: an insight into the mechanism of induction

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Abstract

It is estimated that venoms of marine cone snails (genus *Conus*) contain more than 100,000 different small peptides with a wide range of pharmacological and biological actions. Some of these peptides were developed into potential therapeutic agents and as molecular tools to understand biological functions of nervous and cardiovascular systems. In this study we examined the cytotoxic and anticancer properties of the marine vermivorous cone snail *Conus vexillum* (collected from Hurgada and Sharm El-Shaikh, Red Sea, Egypt) and suggest the possible mechanisms involved. The in vitro cytotoxic effects of *Conus* venom were assessed against Ehrlich's ascites carcinoma (EAC) cells. Results: *Conus* venom treatment resulted in concentration-dependent cytotoxicity as indicated by a lactate dehydrogenase leakage assay. Apoptotic effects were measured in vivo by measuring levels of reactive oxygen species and oxidative defense agents in albino mice injected with EAC cells. *Conus* venom (1.25 mg/kg) induced a significant increase ($p < 0.05$) in several oxidative stress biomarkers (lipid peroxidation, protein carbonyl content and reactive nitrogen intermediates) of EAC cells after 3, 6, 9 and 12 hours of venom injection. *Conus* venom significantly reduced ($p < 0.05$) the activities of oxidative defense enzymes (catalase and superoxide dismutase) as well as the total antioxidant capacity of EAC cells, as evidenced by lowered levels of reduced glutathione. Conclusions: These results demonstrate the cytotoxic potential of *C. vexillum* venom by inducing oxidative stress mediated mechanisms in tumor cells and suggest that the venom contains novel molecules with potential anticancer activity.

Environmental Biology of Fishes

2013



Effect of habitat characteristics on the distribution and abundance of damselfish within a Red Sea reef

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- (3) *Present address:* School of Marine and Tropical Biology, James Cook University, Townsville, QLD, 4811, Australia

Abstract

For coral reef fish with an obligate relationship to their habitat, like Pomacentrid damselfish, choosing a suitable home amongst the reef structure is key to survival. A surprisingly small number of studies have examined patterns in adult damselfish distributions compared to other ontogenetic phases. The aim of this study was to determine which reef and coral colony characteristics explained adult damselfish distribution patterns in a Red Sea reef. The characteristics investigated were reef type (continuous or patchy), coral species (seven species of *Acropora*), and coral morphology (coral size and branching density). The focal damselfish species were *Dascyllus aruanus*, *D. marginatus*, *Chromis viridis*, and *C. flavaxilla*. Occupancy (presence or absence of resident damselfish), group size and fish species richness were not significantly different between the seven *Acropora* species. However, within each coral species, damselfish were more likely to occupy larger coral colonies than smaller coral colonies. Occupancy rates were also higher in patchy reef habitats than in continuous sections of the reef, probably because average coral colony size was greater in patchy reef type. Fish group size increased significantly with coral colony volume and with larger branch spacing. Multi-species groups of fish commonly occurred and were increasingly likely with reduced branching density and increased coral size.

PLOS ONE
2013
8(5): e64651



Spatiotemporal Variability of Dimethylsulphoniopropionate on a Fringing Coral Reef: The Role of Reefal Carbonate Chemistry and Environmental Variability

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Abstract

Oceanic pH is projected to decrease by up to 0.5 units by 2100 (a process known as ocean acidification, OA), reducing the calcium carbonate saturation state of the oceans. The coastal ocean is expected to experience periods of even lower carbonate saturation state because of the inherent natural variability of coastal habitats. Thus, in order to accurately project the impact of OA on the coastal ocean, we must first understand its natural variability. The production of dimethylsulphoniopropionate (DMSP) by marine algae and the release of DMSP's breakdown product dimethylsulphide (DMS) are often related to environmental stress. This study investigated the spatiotemporal response of tropical macroalgae (*Padina* sp., *Amphiroa* sp. and *Turbinaria* sp.) and the overlying water column to natural changes in reefal carbonate chemistry. We compared macroalgal intracellular DMSP and water column DMSP+DMS concentrations between the environmentally stable reef crest and environmentally variable reef flat of the fringing Suleman Reef, Egypt, over 45-hour sampling periods. Similar diel patterns were observed throughout: maximum intracellular DMSP and water column DMS/P concentrations were observed at night, coinciding with the time of lowest carbonate saturation state. Spatially, water column DMS/P concentrations were highest over areas dominated by seagrass and macroalgae (dissolved DMS/P) and phytoplankton (particulate DMS/P) rather than corals. This research suggests that macroalgae may use DMSP to maintain metabolic function during periods of low carbonate saturation state. In the reef system, seagrass and macroalgae may be more important benthic producers of dissolved DMS/P than corals. An increase in DMS/P concentrations during periods of low carbonate saturation state may become ecologically important in the future under an OA regime, impacting larval settlement and increasing atmospheric emissions of DMS.



Published Research Articles in International Journals 2012-2013

Faculty of Engineering- Ismailia

International Journal of Electrical
Power and Energy Systems
2012
(43)688-695



Classification of power system disturbances using linear Kalman filter and fuzzy-expert system

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Abstract

Identification and classification of voltage and current disturbances in power systems is an important task in power system monitoring and protection. This paper presents a new approach for power system disturbances identification and classification. The concept of linear Kalman filter together with discrete wavelet transform (DWT) is used to extract two parameters; the amplitude and the slope from the captured voltage or current waveform. DWT is used to help Kalman filter to give a good performance; the captured distorted waveform is passed through the DWT to determine the noise inside it and the covariance of this noise is fed together with the captured voltage waveform to the Kalman filter. The two parameters are the inputs to fuzzy-expert system that uses some rules on these inputs to identify the class to which the waveform belongs. To prove the ability of the new approach for classifying power system disturbances, detailed digital simulation and experimental results involving various types of power quality events are presented. The results depict that the proposed technique has the ability to accurately identify and classify PQ disturbances.

IET Generation, Transmission & Distribution

2013

(7)1105-1115



Probabilistic approach for optimal planning of distributed generators with controlling harmonic distortions

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Abstract

In this study, a probabilistic planning approach is proposed for optimally allocating different types of distributed generator (DG) (i.e. wind-based DG, solar DG and non-renewable DG) into a harmonic polluted distribution system so as to minimise the annual energy losses and reduce the harmonic distortions. The proposed planning methodology takes into consideration the intermittent nature of the renewable resources, load profile and the technical constraints of the system. The objective function is the total system annual power loss. The constraints include voltage limits at different buses (slack and load buses) of the system, feeder capacity, total harmonic distortion (THD) limits and maximum penetration limit of DG units. The optimisation process is achieved using the genetic algorithm optimisation method. This proposed approach has been applied to a typical rural distribution system with different scenarios including all possible combinations of distributed energy resources. The simulation results using Matlab programming environment show that significant reductions in the energy losses and THD are achieved for all the proposed scenarios. Also simulation results depict that the proposed method is robust and computationally efficient.



Published Research Articles in International Journals 2012-2013

Faculty of Science - Suez

Plant Syst Evol
2013
299:873–885



Foliar secretory trichomes of *Ocimum obovatum* (Lamiaceae): micromorphological structure and histochemistry

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² Botany Department, Faculty of Science, Suez Canal University, Suez, Egypt

Abstract

This study characterises the micromorphology, ultrastructure and main chemical constituents of the foliar glandular trichomes of *Ocimum obovatum* using light and electron microscopy and a variety of histochemical tests. Two types of glandular trichomes occur on the leaves: large peltate and small capitate. The head of each peltate trichome is made up of four broad head cells in one layer. The head of each capitate trichome is composed of two broad head cells in one layer (type I) or a single oval head cell (type II, rare). In peltate heads, secretory materials are gradually transported to the subcuticular space via fracture in the four sutures at the connecting walls of the head cells. Release to the head periphery occurs through opposite fracture in the four sutures in the head cuticle. In type I capitate trichomes, release of the secretions to subcuticular space occurs via pore between the two head cells, and release to the head periphery occurs through opposite pore in the head cuticle. In type II capitate trichomes, the secreted material is released from the head cell through ruptured particular squared area at the central part of the head cuticle. These secretion modes are reported for the first time in the family Lamiaceae. Histochemical tests showed that the secretory materials in the glandular trichomes are mainly essential oils, lipophilic substances and polysaccharides. Large peltate trichomes contain large quantity of these substances than the small capitate trichomes. Ultrastructural evidence suggests that the plastids produce numerous lipid droplets, and the numerous polysaccharide small vesicles are derived from Golgi bodies.

Journal of Herpetology
2013
(47):148-155



Ecology of the Rough-tailed Gecko, *Cyrtopodion scabrum* (Squamata: Gekkonidae) in the Suez Canal Zone, Egypt

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Abstract

Field observations and lab studies were carried out on the Rough-tailed Gecko (*Cyrtopodion scabrum*) in the Suez Canal Zone to assess sexual size dimorphism, activity, habitat selection, growth rate, diet, and reproduction. *Cyrtopodion scabrum* showed no significant sexual difference in body size and head shape characters. The lizard's maximum activity was in autumn and the minimum in winter, with peaks of daily activity during the first 3 h following sunset; air temperature was a major factor controlling daily and seasonal activity of *C. scabrum*. Lizards were solitary and had small home ranges. They occupied all available substrates and assumed different positions at heights ranging from 5 to 500 cm above the ground. The greatest rate of growth occurred in spring, and growth ceased altogether during winter. Lizards with the smallest snout-vent length had the highest growth rate. A total of 14 arthropod orders were recorded in the diet of *C. scabrum*; dipterans and hymenopterans dominated in number and volume, respectively. *Cyrtopodion scabrum* showed evidence of a sit-and-wait foraging mode. Males and females both ate prey of similar numbers and sizes; however, lizard stomachs were filled with food in spring more than any other season, which may indicate the lizard's increased need for energy for reproduction. The reproductive season extended from March through September. Peak reproductive activity for both sexes was in June and July. Female *C. scabrum* deposited single-egg clutches more commonly than two-egg clutches and displayed communal nesting, which was previously unrecorded for the species.

Biochimica et Biophysica
Acta – Biomembranes
2012
(1818):1502-1519



Phylogenetic and coevolutionary analysis of the β -barrel protein family comprised of mitochondrial porin (VDAC) and Tom40

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Abstract

Beta-barrel proteins are the main transit points across the mitochondrial outer membrane. Mitochondrial porin, the voltage-dependent, anion-selective channel (VDAC), is responsible for the passage of small molecules between the mitochondrion and the cytosol. Through interactions with other mitochondrial and cellular proteins, it is involved in regulating organellar and cellular metabolism and likely contributes to mitochondrial structure. Tom40 is part of the translocase of the outer membrane, and acts as the channel for passage of preproteins during their import into the organelle. These proteins appear to share a common evolutionary origin and structure. In the current study, the evolutionary relationships between and within both proteins were investigated through phylogenetic analysis. The two groups have a common origin and have followed independent, complex evolutionary pathways, leading to the generation of paralogues in animals and plants. Structures of diverse representatives were modeled, revealing common themes rather than sites of high identity in both groups. Within each group, intramolecular coevolution was assessed, revealing a new set of sites potentially involved in structure–function relationships in these molecules. A weak link between Tom40 and proteins related to the mitochondrial distribution and morphology protein, Mdm10, was identified. This article is part of a Special Issue entitled: VDAC structure, function, and regulation of mitochondrial metabolism.



Fungal Biology
2012
(116): 98-111



Identification of group I introns within the SSU rDNA gene in species of *Ceratocystiopsis* and related taxa

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Abstract

During a recent phylogenetic study, group I introns were noted that interrupt the nuclear small subunit ribosomal RNA (SSU rDNA) gene in species of *Ceratocystiopsis*. Group I introns were found to be inserted at the following rDNA positions: S943, S989, and S1199. The introns have been characterized and phylogenetic analysis of the host gene and the corresponding intron data suggest that for S943 vertical transfer and frequent loss appear to be the most parsimonious explanation for the distribution of nuclear SSU rDNA introns among species of *Ceratocystiopsis*. The SSU rDNA data do suggest that a recent proposal of segregating the genus *Ophiostoma* sensu lato into *Ophiostoma* sensu stricto, *Grosmannia*, and *Ceratocystiopsis* has some merit but may need further amendments, as the SSU rDNA suggests that *Ophiostoma* s. str. may now represent a paraphyletic grouping.

Fungal Biology

115(11):1122-37



The highly variable mitochondrial small-subunit ribosomal RNA gene of *Ophiostoma minus*

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Abstract

Mitochondrial genomes in the true fungi are highly variable both in size and organization. Most of this size variation is due to the presence of introns and intron-encoded open reading frames (ORFs). The objectives for this work were to examine the mitochondrial small-subunit ribosomal RNA (rns) gene of strains of *Ophiostoma minus* for the presence of introns and to characterize such introns and their encoded ORFs. DNA sequence analysis showed that among different strains of *O. minus* various rns gene exon/intron configurations can be observed. Based on comparative sequence analysis and RNA secondary structure modeling group I introns with LAGLIDADG ORFs were uncovered at positions mS569 and mS1224 and group II introns were present at positions mS379 and mS952. The mS379 group II intron encoded a fragmented reverse transcriptase (RT)-like ORF and the mS952 group II intron encoded a LAGLIDADG-type ORF. Examples of intron ORF degeneration due to frameshift mutations were observed. The mS379 group II intron is the first mitochondrial group II intron to have an ORF inserted within domain II, typically RT-like ORFs are inserted in domain IV. The evolutionary dynamics of the intron-encoded ORFs have also been examined.



American Journal of
Biomedical Sciences
2013
(4), 242-249



Calcium Phosphate Scaffold Loaded with Platinum Nanoparticles for Bone Allograft

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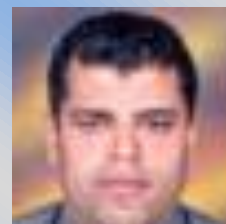
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Abstract

Inflammations are a predicament issue that leads to orthopaedic hard implants failure. Thereby, calcium phosphate platinum scaffolds possess anti-inflammatory properties, as powerful tools for successful bone regeneration. The effects of the platinum nanoparticles (PtNPs) on the scaffold's degradation and proliferation and attachment were evaluated. The scaffolds degradation rates ranged between 50-75 % and 80-95% for Scaffold with and without PtNPs respectively. Moreover, the cells proliferation and attachment on CPs-PtNPs scaffold were superior to CPs scaffold. The results warranted that, the synthesized scaffolds exhibit good biocompatibility and *in vitro* biodegradation, and also, it could be a used as a substrate for PtNPs delivery.

The International Inorganic
Chemistry Journal
2013
(401), 85–94



Oligonuclear homo- and mixed-valence manganese complexes based on thiophene- or aryl-carboxylate ligation: Synthesis, characterization and magnetic studies

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Abstract

Mixed-valence trinuclear manganese compounds $[\text{Mn}_3\text{O}(\text{O}_2\text{CTh})_6(\text{L})_x(\text{H}_2\text{O})_y] \cdot n(\text{solvent})$ (Th = thiophene, 1·CH₃CN: L = pyridine (py), $x = 3$, $y = 0$, $n = 1$, solvent = CH₃CN; 1·~H₂O: L = py, $x = 3$, $y = 0$, $n = \sim 1$, solvent = H₂O; 2: L = py, $x = 2$, $y = 1$, $n = 0.25$, solvent = CH₃CN; 3: L = 3-Mepy, $x = 2$, $y = 1$, $n = 0$) containing a $[\text{Mn}^{\text{II}}\text{Mn}_2^{\text{III}}(\mu_3\text{-O})]^{6+}$ core have been prepared. Homo-valence tetranuclear manganese complexes $(\text{NBu}^n_4)[\text{Mn}_4\text{O}_2(\text{O}_2\text{CAR})_9(\text{L})]$ (4·ThCO₂H·CH₂Cl₂: Ar = -Th, L = EtOH; 6: Ar = -Ph, L = H₂O; 7: Ar = -Ph-*p*-Me, L = H₂O; 8·CH₂Cl₂: -Ph-3,5-Me₂, no L) with a $[\text{Mn}^{\text{II}}_4(\mu_3\text{-O})_2]^{8+}$ core and $[\text{Mn}^{\text{II}}\text{Mn}^{\text{III}}_3\text{O}_2(\text{O}_2\text{CTh})_7(\text{bpy})_2]$ (5) were synthesized, structurally and magnetically characterized. Compounds 1–3 were obtained by comproportionation of $\text{Mn}^{\text{II}}(\text{O}_2\text{CMe})_2 \cdot 4\text{H}_2\text{O}$ with $(\text{NBu}^n_4)\text{Mn}^{\text{VII}}\text{O}_4$ in aprotic pyridine (1) or aprotic/protic py/EtOH (2) or Mepy/EtOH (3) solvent mixtures. Clusters 4–8 were synthesized by comproportionation of $\text{Mn}^{\text{II}}(\text{O}_2\text{CAR})_2 \cdot x\text{H}_2\text{O}/\text{ArCOOH}$ with $(\text{NBu}^n_4)\text{Mn}^{\text{VII}}\text{O}_4$ in EtOH/CH₃CN. X-ray structural characterization of the 2-thiophenecarboxylate (ThCO₂[−]) containing compounds 1·CH₃CN, 1·~2H₂O and 4·ThCO₂H·CH₂Cl₂ revealed a thiophene ring disorder about the (O₂)C–C(Th) bond so that the S atom and opposite (5–)CH group are distributed over two ring positions each. The Mn^{II} atom in the approximately isosceles triangular $[\text{Mn}^{\text{II}}\text{Mn}_2^{\text{III}}(\mu_3\text{-O})]^{6+}$ cores in 1 could be clearly assigned from bond valence sum calculations and bond distances. The $[\text{Mn}_4(\mu_3\text{-O})_2]^{8+}$ core in the anionic complexes in the structures of 4·ThCO₂H·CH₂Cl₂ and 8·CH₂Cl₂ has an all Mn^{III} oxidation level and “butterfly-like” arrangement. The magnetic properties of 4–8 were investigated by variable temperature magnetic susceptibility and magnetization measurements. Similar magnetic behavior was observed for the $[\text{Mn}^{\text{III}}_4(\mu_3\text{-O})_2]^{8+}$ butterfly-core compounds 4, 6–8, with antiferromagnetic interactions between pairs of manganese ions with amplitude of $\sim 14.5 \text{ cm}^{-1}$ and $\sim 4.6 \text{ cm}^{-1}$ for the Mn_b...Mn_b and Mn_b...Mn_w coupling, respectively (b = body, w = wing). Changing the Ar-ligand size in $[\text{Mn}_4\text{O}_2(\text{O}_2\text{CAR})_9(\text{L})]^-$ does not have a significant effect on the magnetic properties of these butterflyclusters.



Published Research Articles in International Journals 2012-2013

Faculty of Agriculture

Journal Applied Entomology
2013
(137), 104–112



Effects of prohydrojasmon-treated corn plants on attractiveness to parasitoids and the performance of their hosts

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Abstract

We investigated the effect of prohydrojasmon [propyl (1RS,2RS)-(3-oxo-2-pentylcyclopentyl) acetate] (PDJ) treatment of intact corn plants, on their attractiveness to the specialist endoparasitoid, *Cotesia kariyai* Watanabe (Hymenoptera: Braconidae), and on the performance of the common armyworm, *Mythimna separata* (Walker) (Lepidoptera: Noctuidae) under laboratory conditions. Attractiveness of *C. kariyai* to PDJ-treated plants was studied in a wind tunnel, whereas performance of *M. separata* larvae was tested in plastic cages. The attractiveness of the treated plants increased with concentrations of PDJ increasing to 2 mm, which was equivalent to the attractiveness of host-infested plants. PDJ-treated corn plants emitted 16 volatile compounds (a-pinene, b-myrcene, (Z)-3-hexenyl acetate, limonene, (E)-b-ocimene, linalool, (E)-4,8-dimethyl-1,3, 7-nonatriene, (+)-cyclosativene, ylangene, (E)-b-farnesene, (E, E)-4,8,12- trimethyl-1,3,7,11-tridecatetraene, a-bergamotene, c-cadinene, d-cadinene, a-muulolene and nerolidol), most of which were observed in the headspace of host-infested corn plants with some quantitative and qualitative differences. We also tested the effects of PDJ treatment on the performance of *M. separata* larvae. The survival rates of the larval and pupal stages were significantly lower at 2 mm level of PDJ. A significant decrease in weight at 6th stadium larvae was observed only at 2 mm level of PDJ. In contrast, PDJ treatment at all PDJ concentration levels caused significant reduction in weight of pupal stage as compared to control. These data suggested that PDJ, originally developed as a plant growth regulator, especially to induce coloring of fruits, has the potential to induce direct and indirect defenses in corn plants against common armyworm, *M. separata*.

Journal Applied Entomology
2012
(23), 8492



A new bacterial disease on *Mandevilla sanderi* caused by *Pseudomonas savastanoi* — lessons learned for bacterial diversity studies

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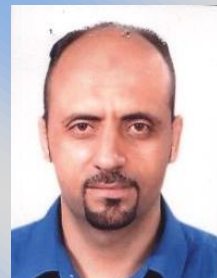
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Abstract

Leaf lesions of *Mandevilla sanderi* were shown to be caused by *Pseudomonas savastanoi*. While BOX-fingerprints were similar for *P. savastanoi* from different host plants, plasmid restriction patterns and sequencing of plasmid-located pathogenicity determinants revealed that *Mandevilla* isolates contained similar plasmids distinct from other isolates. A *repA*-based detection method was established.

Journal of Food Engineering
2013
(117), 235–246



Chemical-free assessment and mapping of major constituents in beef using hyperspectral imaging

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Abstract

Developing a rapid and non-destructive method for food safety and quality monitoring has become a crucial request from the meat industry. Hyperspectral imaging technique provides extraordinary advantages over the traditional imaging and spectroscopy techniques in food quality evaluation due to the spatial and spectral information that it can offer. In this study, a laboratory-based pushbroom hyperspectral imaging system in reflectance mode was developed in the near infrared (NIR) range (900–1700 nm) for non-invasive determination of the major chemical compositions of beef. Beef samples collected from different breeds were scanned by the system followed by traditional assessment of their chemical composition by using the ordinary wet-chemical methods. The extracted spectral data and the measured quality parameters were modeled by partial least squares regression (PLSR) for predicting water, fat and protein contents yielding a reasonable accuracy with determination coefficients R^2_P of 0.89, 0.84 and 0.86 concomitant with standard error of prediction (SEP) of 0.46%, 0.65% and 0.29%, respectively.

Some image processing algorithms were developed and the most relevant wavelengths were selected to visualize the predicted chemical constituents in each pixel of the hyperspectral image yielding the spatially distributed visualizations of the sample contents. The results were promising and implied that hyperspectral imaging technique associated with appropriate chemometric multivariate analyses has a great potential for simultaneous assessment of various chemical constituents without using hazardous chemical reagents.

Journal of Food Engineering
2013
(117), 272–280



Prediction of water and protein contents and quality classification of Spanish cooked ham using NIR hyperspectral imaging

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Abstract

This study was carried out to investigate the ability of hyperspectral imaging technique in the NIR spectral region of 900–1700 nm for the prediction of water and protein contents in Spanish cooked hams.

Multivariate analyses using partial least-squares regression (PLSR) and partial least squares-discriminant analysis (PLS-DA) were applied to the spectral data extracted from the images to develop statistical models for predicting chemical attributes and classify the different qualities. Feature-related wavelengths were identified for protein (930, 971, 1051, 1137, 1165, 1212, 1295, 1400, 1645 and 1682 nm) and water (930, 971, 1084, 1212, 1645 and 1682 nm) and used for regression models with fewer predictors. The PLS-DA model using optimal wavelengths (966, 1061, 1148, 1256, 1373 and 1628 nm) successfully classified the examined hams in different quality categories. The results revealed the potentiality of NIR hyperspectral imaging technique as an objective and non-destructive method for the authentication and classification of cooked hams.

Meat Science
2013
(93), 292–302



Robust linear and non-linear models of NIR spectroscopy for detection and quantification of adulterants in fresh and frozen-thawed minced beef

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Abstract

This study aimed to evaluate the potential of near infrared spectroscopy (NIRS) as a fast and non-destructive tool for detecting and quantifying different adulterants in fresh and frozen-thawed minced beef. Partial least squares regression (PLSR) models were built under cross validation and tested with different independent data sets, yielding determination coefficients (RP^2) of 0.96, 0.94 and 0.95 with standard error of prediction (SEP) of 5.39, 5.12 and 2.08% (w/w) for minced beef adulterated by pork, fat trimming and offal, respectively. The performance of the developed models declined when the samples were in a frozen-thawed condition, yielding RP^2 of 0.93, 0.82 and 0.95 with simultaneous augments in the SEP of 7.11, 9.10 and 2.38% (w/w), respectively. Linear discriminant analysis (LDA), partial least squares-discriminant analysis (PLS-DA) and non-linear regression models (logistic, probit and exponential regression) were developed at the most relevant wavelengths to discriminate between the pure (unadulterated) and adulterated minced beef. The classification accuracy resulting from both types of models was quite high, especially the LDA, PLS-DA and exponential regression models which yielded 100% accuracy. The current study demonstrated that the VIS-NIR spectroscopy can be utilized securely to detect and quantify the amount of adulterants added to the minced beef with acceptable precision and accuracy.

Indian Journal of
Experimental Biology
2013
(51), 739-745



Somatic embryo-like structures of strawberry regenerated *in vitro* on media supplemented with 2,4-D and BAP

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Abstract

Somatic embryo-like structures (SELS) were produced *in vitro* from leaf disk and petiole explants of two cultivars of strawberry (*Fragaria x ananassa* Duch) on Murashige and Skoog medium with different concentrations and combinations of 2,4-dichlorophenoxyacetic acid (2,4-D), 6-benzylaminopurine (BAP) and sucrose to check the embryonic nature of these structures histologically. A large number of SELS could be regenerated in both cultivars on media with 2 - 4 mg L⁻¹ 2,4-D in combination with 0.5 - 1 mg L⁻¹ BAP and 50 g L⁻¹ sucrose. Histological examination of SELS revealed the absence of a root pole. Therefore these structures cannot be strictly classified as somatic embryos. The SELS formed under the tested culture conditions represent malformed shoot-like and leaf-like structures. The importance of these results for the propagation of strawberries via somatic embryogenesis is discussed.

Chemistry and Ecology
2013
(6): 501-510



Efficacy of rapeseed residue and eggshell waste on enzyme activity and soil quality in rice paddy

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Abstract

Addition of plant residue into soils improves soil physiochemical properties and its fertility. Rapeseed residue is an emerging N source to paddy soils via rice-rape double-cropping practice. The objective of this study was to evaluate the effects of rapeseed residue and eggshell waste on chemical changes and enzyme activity in the rice paddy soil. The powdered eggshells at 0, 1, 3, and 5% were applied once to 7.0 kg paddy repacked soils in each pot treated with the rapeseed residue or the conventional N, P, and K fertilisers. Eight rice seedlings (*Oriza sativa* L. cv. Ilmibyeo) (40 days after sowing) were transplanted to the treated each pot. The contents of total C (TC) and N (TN), and organic matter (OM) were significantly increased in soils treated with the rapeseed residue compared to the N, P, and K fertilisers. With the addition of eggshell containing ~92% CaCO₃, a considerable increase of soil pH was observed in soils treated with the rapeseed residue and the N, P, and K fertilisers, compared to the untreated soil. Activities of β -glucosidase, urease, and arylsulfatase enzymes were higher in soils treated with the rapeseed residue than soils treated with the N, P, and K fertilisers. The eggshell additions at 1, 3, and 5% into soils treated with the rapeseed residue increased enzyme activity mainly resulting from N mineralisation, whereas no change in enzyme activity was observed in the soils treated with the NPK fertiliser. The combined use of the rapeseed residue and the eggshells can be beneficial to improve soil environment.

The Plant journal
2013
(74): 59-73



The maize lipoxygenase, ZmLOX10, mediates green leaf volatile, jasmonate and herbivore-induced plant volatile production for defense against insect attack

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Abstract

Fatty acid derivatives are of central importance for plant immunity against insect herbivores; however, major regulatory genes and the signals that modulate these defense metabolites are vastly understudied, especially in important agro-economic monocot species. Here we show that products and signals derived from a single *Zea mays* (maize) lipoxygenase (LOX), ZmLOX10, are critical for both direct and indirect defenses to herbivory. We provide genetic evidence that two 13-LOXs, ZmLOX10 and ZmLOX8, specialize in providing substrate for the green leaf volatile (GLV) and jasmonate (JA) biosynthesis pathways, respectively. Supporting the specialization of these LOX isoforms, LOX8 and LOX10 are localized to two distinct cellular compartments, indicating that the JA and GLV biosynthesis pathways are physically separated in maize. Reduced expression of JA biosynthesis genes and diminished levels of JA in *lox10* mutants indicate that LOX10-derived signaling is required for LOX8-mediated JA. The possible role of GLVs in JA signaling is supported by their ability to partially restore wound-induced JA levels in *lox10* mutants. The impaired ability of *lox10* mutants to produce GLVs and JA led to dramatic reductions in herbivore-induced plant volatiles (HIPVs) and attractiveness to parasitoid wasps. Because LOX10 is under circadian rhythm regulation, this study provides a mechanistic link to the diurnal regulation of GLVs and HIPVs. GLV-, JA- and HIPV-deficient *lox10* mutants display compromised resistance to insect feeding, both under laboratory and field conditions, which is strong evidence that LOX10-dependent metabolites confer immunity against insect attack. Hence, this comprehensive gene to agro-ecosystem study reveals the broad implications of a single LOX isoform in herbivore defense.

European Journal of Plant Pathology
2013
(137): 821-834

Compost enhances plant resistance against the bacterial wilt pathogen *Ralstonia solanacearum* via up-regulation of ascorbate-glutathione redox cycle

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Abstract

The interactions between the pathogen *Ralstonia solanacearum* and potato *Solanum tuberosum* plants were studied to investigate the reactive oxygen species metabolic system and ascorbate (ASC)-glutathione (GSH) redox cycle in response to compost application. Single potato eyepieces were germinated and grown in pots containing sandy soil with or without compost at a rate of 7.5 g kg⁻¹ soil. Non-compost- and compost-treated plants (CTP) were inoculated with *R. solanacearum* 25 days after planting and then analyzed after 10 days, unless otherwise stated. The present results revealed that pathogen infection caused a remarkable decrease in plant growth related parameters and productivity and an increase in disease incidence. However, under these conditions compost had substantially improved plant growth and decreased disease incidence and bacterial population. *R. solanacearum* resulted in significant enhancement in the activities of NADPH oxidase, lipoxigenase, the production rate of superoxide and hydroxyl radicals, levels of hydrogen peroxide, membrane lipid peroxidation, and protein oxidation indicating the induction of oxidative stress in potato roots. However, the pathogen-mediated enhancement in indices of oxidative stress was considerably decreased by compost application, which enhanced the activities of ascorbate peroxidase (APX, EC 1.11.1.11), monodehydroascorbate reductase (MDHAR, EC 1.6.5.4), dehydroascorbate reductase (DHAR, EC 1.8.5.1) and glutathione reductase (GR, EC 1.6.4.2) in infected potato plants, implying a better ROS-scavenging activity. Data also indicated that there were general increases in ASC and GSH content in infected compost treated plants, but non-compost treated ones significantly had lower levels of such redox metabolites. In addition, significantly higher ratios of ASC/DHA (dehydroascorbate) and GSH/GSSG (glutathione disulphide) were generally found in CTP than in non-compost treated-ones. The obtained results suggest that compost provides effective protection against the *Ralstonia* bacterial pathogen via up-regulation of the capacity of the ASC-GSH cycle and modulation of the cellular redox status, thereby eliminating ROS damage and sustaining membrane stability.

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(137): 821-834



Bee Fauna (Apoidea: Hymenoptera) of the Suez Canal Region, Egypt

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Abstract

The diversity of solitary bees varies depending on the vegetation, nesting habitats, and nesting fragmentation. The agriculture development in the Suez Canal region is receiving a great deal of attention in Egypt, thus, the diversity of solitary bees are essential for high quality production of seeds, vegetables, and fruit. The objective of this study was to evaluate the biodiversity of solitary bee populations around the Canal region. About 900 - 1000 specimens of bees were collected from different locations of the Ismailia, Suez, and Sinai Governorates. Fifty-five species of bees were identified. With the exception of Melittidae family, all the bee families were present in the Canal region. The total number of species for each family were 7, 9, 11, 13, and 15 species for Andrenidae, Colletidae, Apidae, Halictidae, and Megachilidae, respectively. *Lasioglossum mandibularie* (Morawitz, 1866) is a newly recorded species collected from Egypt. In the Suez Canal region, the most abundant species found with large populations were *Andrena ovatula* ssp. *ovatula* (Kirby, 1802), *Ceratina tarsata* Morawitz, 1872, and *Colletes lacunatus* Dours, 1872.



Published Research Articles in International Journals 2012-2013

Faculty of Education Ismailia

Computers & Education
2012
59: 861–872



Using Wiki in teacher education: Impact on knowledge management processes and student satisfaction

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Abstract

The current study reports on the use of Wiki as an online didactic tool to develop knowledge management (KM) processes in higher education. This study integrates social constructivist principles to learning where learners are pro-active and collaborative through higher order cognitive processes. The study was administered in two countries, namely Egypt and Italy, to close a gap in the literature with an aim to introduce KM processes in teacher educational programmes. These processes are seen as necessary for teachers' professional skills. Such processes are claimed to enable teachers and therefore schools to evolve in a networked information-driven global society, especially as the complexity of subject knowledge is increasing. It is also a learning experience where teachers learn how to provide their students with educational settings where technology is enabled. Throughout the study, 27 Egyptian students and 36 Italian students participated in online activities and developed interdisciplinary projects for the primary and preparatory stages while collaborating in a Wiki experience within Moodle platform. The study followed a mixed methods approach that consisted of both quantitative and qualitative data. The authors developed several instruments in order to measure both processes and outcomes of the five-week online activities. This current study is reporting on the use of two closed question instruments and one open question instrument. These were: Knowledge Management Questionnaire (KMQ), Student Satisfaction Questionnaire (SSQ) and a Reflection Questionnaire (RQ). Data were analysed using statistical analysis and inductive content analysis. Results indicate that responses on the KMQ were all reliable >0.70 , and fulfilled the five processes of KM and participants were highly satisfied. The results suggest that Wikis can develop teachers' knowledge management processes and fulfil student's satisfaction while collaborating in designing interdisciplinary projects. Future implications and suggestions for teacher education programmes are provided in light of the findings.



Published Research Articles in International Journals 2012-2013

Faculty of Agriculture Science



International Food and Agribusiness
Management Review
2013
(4)77-100

Opportunities and Constraints for Small Agricultural Exporters in Egypt

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Abstract

This study analyzed specialist small- and medium-sized agricultural export firms in Egypt in order to identify perceived opportunities and barriers regarding present and future export activities. The results indicate that these firms have to deal with stiff foreign competition in terms of price and quality criteria, while lacking relevant knowledge and information on how to deal with these challenges. The firms that perceived most future opportunities from exports were identified as using e.g. digital information sources and were able to source products from exportcommitted domestic farmers.

BEST WISHES

PREPARED BY

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