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Poster Session Abstracts

The abstracts are presented in alphabetical order by the presenter's last name.

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Preparation and Characterization of Carbon Nanofiber (CNF) Hydroxyapatite (HA) Nanocomposite for Biomedical Applications

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There are different types of bone defects that are caused due to trauma, infection, tumors or various diseases. Stress shielding, osteolysis, and mechanical motion will also lead to bone loss. There are orthopedic defects that will not heal without intervention or the smallest size tissue defect that will not completely heal over the natural life time of the animal is called "the critical size bone defect". Bone generally has the ability to regenerate completely; however, critical defects require some sort of scaffold to do so. Bone grafts may be autologous (bone harvested from the patient's own body, often from the iliac crest), allograft (cadaveric bone usually obtained from a bone bank), or synthetic (often made of hydroxyapatite or other naturally occurring and biocompatible substances) with similar mechanical properties to bone. In the current study we have proposed a method to obtain a carbon nanofibrous/Hydroxyapatite (HA) bioactive scaffold. The carbon nanofibrous nonwoven fabrics were obtained by the use of the electrospinning process of the polymeric solution of poly acrylonitrile "PAN" and subsequent stabilization and carbonization processes. The CNF membranes were functionalized by both HA and bovine serum albumin (BSA). These materials (CNF, CNF-6% HA, CNF-8% HA, CNF-BSA, CNF-6% HA-BSA, CNF-8% HA-BSA) were then tested for biocompatibility via subcutaneous implantation in New Zealand white rabbits. It was found that the histology results of different materials demonstrated that all the scaffolds that are modified by both HA, protein have fewer inflammatory cells of (neutrophils and lymphocytes) than ones with only HA over the period of 3 weeks.

Effects of Mulberry and Jackfruit Leaves Extracts on Blood Glucose, Oxidative Stress and DNA Damage

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In traditional medicine, mulberry (MLE) and jackfruit leaves extracts (JLE) were used for the treatment of diabetes mellitus. The current study was conducted to evaluate the efficacy of MLE and JLE, alone or in combination, compared to gliclazide, on streptozotocin-nicotinamide-induced diabetic rats for 8 weeks. For both extracts, acute oral toxicity studies were carried out; total polyphenols and total flavonoids were colorimetrically assayed; and different phenolic compounds and flavonoids were HPLC-assayed. Diabetes was induced in rats by a single intraperitoneal injection of streptozotocin (65 mg/kg), 15 min after the intraperitoneal injection of nicotinamide (230 mg/kg b.w.). Our observations demonstrated no signs of acute oral toxicity for both extracts up to 5 g/kg b.w., beside the presence of many flavonoids and polyphenols, including hisperedin, rutin, vitexin, hisperetin, OH-Tyrosol, benzoic, chicoric and e-vanilllic acids. Results, also, showed that diabetic rats had significant increase in fasting plasma glucose, glycosylated haemoglobin, thiobarbituric acid reactive substances, nitric oxide and liver tissues DNA damage levels compared to normal controls, whereas, liver glycogen, erythrocytes glutathione levels, superoxide dismutase and catalase activities were significantly decreased. Fasting plasma glucose levels and glycosylated haemoglobin were significantly decreased by treatment with MLE or JLE, and normalized by gliclazide. Alterations in plasma thiobarbituric acid reactive substances, glutathione and nitric oxide levels were reverted to near normal with MLE and mixture, respectively. Moreover, the mixture restored the activities of erythrocyte superoxide dismutase and catalase, while, JLE restored glutathione and catalase, to normal values. All treatments resulted in disappearance of DNA damage in diabetic livers. In conclusion, our findings suggest that MLE or JLE treatment exerts a therapeutic protective effect in diabetes by decreasing oxidative stress and hepatic tissues DNA damage. The antioxidant activities of JLE and MLE were attributed to the presence of a variety of polyphenols and flavonoids.

Effects of Type III Collagen on Monosodium Iodoacetate-Induced Osteoarthritis: X-ray Evaluation

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Osteoarthritis (OA) is a degenerative chronic disease that affects various tissues surrounding the joints, such as the subchondral bone and articular cartilage.
Aim of the study: The present study aimed investigate the beneficial effects of collagen type III (CIII; 10 mg/kg; p.o.) on the articular cartilage, including structural changes in the tibial subchondral bone, matrix degradation, and inflammatory responses, in OA by using a rat model of monosodium iodoacetate (MIA)-induced OA.
Methods: OA was induced by a single intra-articular injection of MIA through the infrapatellar ligament of the right knee of the rats. Oral administration of CIII was undergone for consecutive 14 days. Twenty four hours after the last dose of the drug the joint volume was measured then the rats were placed in the activity cage and hot plate, their activity was counted and the time when the rats retreat its legs was recorded. Oxidative stress biomarkers were assessed; measured as serum levels of malondialdehyde, reduced glutathione and NO. Moreover, inflammatory markers viz. interleukin-6 (IL-6), interleukin-1β (IL-1β) and tumor necrosis nuclear factor-alpha (TNF-α) was measured. In addition to X-ray and histopathological examination of the rats was performed.
Results: Oral treatment of MIA-induced osteoarthritic rats with CIII (10 mg/kg) for two weeks restored the serum levels of MDA, GSH, NO, IL-6, IL-1β and the TNF-α. MLN succeeded to suppress the exacerbation of OA in rats. CIII succeeded to ameliorate the detrimental effect of MIA on X-ray images and histopathological changes.
Conclusion: These results suggest that CIII can be used as a potential anti-osteoarthritic agent.

Land Use Change Detection Using Google Earth Imagery and GIS Techniques: A Study on Al-Beheira Governorate

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Land use change has become a vital component in current strategies for monitoring environmental changes and managing natural resources. Urban growth has brought serious losses of cultivated land, vegetation land and water bodies. In this study, we have taken North of Damanhour city as a case study to determine the urban growth and land use change that took place in a period of time about of 6 years from 2008 to 2014 for investigation of changes after January 25 Revolution.

The approach used in this study is the integration between Remote Sensing and GIS whereas the Google Earth was the source of data while ArcGIS for further analysis of the digitized data. Google Earth has positioned itself at the forefront of a spatial information wave through providing free access to high-resolution imagery with simple, user-friendly interface.

The surface change detection is performed using historical imagery options as a new tool in Google Earth program. Change detection rate shows that the built-up area has been increased by 107.22% between 2008 and 2014 whereas the urban area was 62.07 ha in 2008 and became 128.62 ha in 2014, in the other side the cultivated area has been decreased by 11.15% between 2008 and 2014 whereas it changed from 596.74 ha in 2008 to 530.19 in 2014. Land Use change and urban expansion are very useful to local government and urban planners for sustainable development. This paper highlights the land use and land cover types in the study area and the change over the years from 2008 to 2014 and the causes of the change.

Transgenic Maize Plants Expressing Enhanced Tryptophan Levels As a Defense Mechanism Against Biotic

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Anthranilate Synthase (AS) is a key regulatory enzyme in (Trp.) biosynthesis and is subject to feedback inhibition by Trp. The gene encoding ASA2α& β under the control of 35 S promoter was introduced into maize calluses type II varieties 166,168 and SC10 by particle bombardment with 1100 psi single and double shot. A total of eleven different transgenic lines that showed markedly increased accumulation of free Trp. In spite of the marked increase in free Trp. content, metabolic profiling by high – performance liquid chromatography coupled with amino acid analyzer. The results of this study pointed to develop a reproducible and efficient method for inserting genes into nuclear genome of many important plant species using the naturally occurring feedback-insensitive anthranilate synthase gene ASA2 from tobacco.These results indicate transformation with ASA2α& β gene is a reliable approach to improve the defense mechanism of maize and increase the nutritional quality of maize which is very important for human and animal food.

Identification of Sex-Specific Molecular and Cytogenetic Markers in Date Palm Trees

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The date palm is a dioecious long-lived plant, with separate male and female trees. The dioecy represents the major challenge in development of breeding programs as it is impossible to distinguish tree gander till they flower approximately five to eight years after planting. To date, there is no reliable way to determine the sex of date palm plants before reproductive age. Here, we employed different effective methodologies (Molecular markers "AFLP, SCoT, SSR, CDDP, ITAP and RAPD", and Cytogenetic markers "FISH localization of 5S and 45S rDNA genes") in an attempt to develop a novel set of reliable sex-specific markers which can be helped in early gender determination in Egyptian date palm trees. The results revealed that six SCoT, two CDDP, one ITAP, four RAPD and one AFLP primer/PC exhibited differential bands between males and females belonging to five Egyptian date palm cultivars. These differential bands were sequenced. BLAST analysis results indicated that the eleven sequences generated from different gene-targeting marker systems revealed main similarity with master transcription factors, transcriptional activators/repressors and regulatory proteins involved in plant hormone signal transduction pathways and plant development in date palm or oil palm. On the other hand, FISH results successfully revealed a clear differences between males and females belonging to cv. Zaghloul and Siwi by using 45S rDNA FISH. The FISH with 45S rDNA localized two clear signals in females of cvs. Zaghloul and Siwi. While, it exhibited three clear signals in male trees of the same cultivars. Based on the above results, we hypothesize that the third signal (unpaired signal) of 45S rDNA probe is located on a male chromosome (Y chromosome). These findings can be utilized and used as a molecular and cytological markers to differentiate between male and female trees in Egyptian date palm at an early stage.

Identification of Novel Dnabarcodes for Tritium Spp Using Chloroplast Genome-Wide in Silico Approach

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Evolution, taxonomy and identification studies achieved tremendous progress with the vast development in DNA markers, maps and barcoding approaches. One of the most important challenges faces the taxonomical, evolutional and species identification research is to identify the best loci in complex genomes cases. Because of its stability, chloroplast genes are demonstrated outstanding utulity in such cases. In this study, we aimed at identifying the most variable chloroplast loci suitable to be used as DNA barcodes for plant species belonging to genus *Triticum* (complex genome case). Ten available chloroplast genomes of different *Triticum* species and sub-species were obtained from NCBI and a Chloroplast genomes-wide analysis was conducted to investigate all possible genomic elements (genes and intragenic regions) to find the most variable chloroplast loci. A total of 136 genomic elements were identified and evaluated, including 79 chloroplast genes, eight gene combinations, 25 intragenic regions and 24 intragenic regions combinations. Our results revealed the difficulty of a single locus to discriminate between different *Triticum* species. The discrimination between triticum species was possible by using a combination of different loci including one gene combination (AtpF, trnK and rps16), and four intragenic regions combinations of (trnfM-trnT) with (trnD-psbM), (petN-trnC), (matK-rps16) or (rbcL-psaI). We recommend further research on using intragenic regions as standard DNA barcode loci in plants.

Dietary Supplementation Impacts of a Novel Marine Strain of *Lactobacillus plantarum* as an Immune Stimulant

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A novel bacterial strain isolated from marine environment rendered maximum antagonistic activity against fish pathogens and was chosen as a safe isolate. The bacterial isolate was identified as *Lactobacillus plantarum* through 16S rRNA sequencing and supplemented with basal diet at four different concentrations (D-0, D-I, D-II, and D-III) equivalent to 0.0, 3.4×107, 6.8×108, and 1.3×109 colony-forming units (CFU) g-1 diet, respectively. During the experiment, *Oreochromis niloticus juveniles* (24.4+0.1g) were cultured in triplicates and fed with these respective diets (3% of body weight) for 40 days. Growth performance inferred that a maximum weight gain of 29.84+0.85 g, SGR of 1.99+0.03% and a better FCR of 2.02+0.05 were obtained in D-II group. After challenged with Aeromonas hydrophila survival was high (78.3+3.07%) in D-II group compared to a low survival of (25+4.28%) displayed in D-0 group. Various hematological and immunological parameters were examined pre-challenge and post-challenge such as total protein, albumin, globulin, phagocytic activity, lysozyme activity and total immunoglobulin were significantly higher in D-II group when compared to that of other diets fed *O. niloticus*. Further, the expression of three immune-related genes in liver was significantly up-regulated in D-II group compared to D-0, including post-challenge. A significant increase in the microvilli (MV) density (P= 0.007) and length (P= 0.027) were recorded in the *L. plantarum* group. Collectively, the use of a novel marine strain of *L. plantarum* has positive effects on growth performance of Nile tilapia and on disease resistance against A. hydrophila by stimulating humoral and cellular immune responses.

Molecular Cloning, Expression and Bioinformatics Analysis of Sb-gly II Gene from the Egyptian Sorghum

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Salinity is one of the major environmental factors limiting growth and productivity of crop plants in coastal areas and irrigated farm land. Salinity tolerance is a polygenic and complex trait. Plants adapt to salinity stress by coordinated and orchestrated functioning of various complex mechanisms. GlyoxalaseII is one of the key enzymes in the glyoxalase pathway. In this study, the full-length cDNA of glyII (designated Sb-glyII) was cloned from Egyptian Sorghum using RT-PCR and the full length of SbglyII consists of an open reading frame of 1011 bp encoding a polypeptide of 336 amino acids with a molecular weight of 37 kDa and isoelectric point 7.89 when expressed in Escherichiacoli BL21DE3 using pF1AT7 Flexi vector. The amino acid Sequence deduced from sorghum bicolor cDNA showed 100, 97.9, 91.3, 87.7 and 86.5% identity with Sorghum bicolor hypothetical protein (M002462620.1), Zea maize (EU961814.1), Oryza sativa (AY054407.1), Brassica juncea (AY185202.1) and Triticum aestivum (AK332051.1) respectively. Moreover, analysis of phylogenetic tree showed that species classified into three groups, group 1 consists of gly ii from Egyptian sorghum, Sorghum bicolor hypothetical protein and Zea maize, group 2 consist of Oryza sativa and *Brassica juncea* and group 3 cosist of *Triticum aestivum*. The phylogenetic tree generated by amino acid sequences has served to clarify significantly the evolutionary relationships between these species.

HPLC-DAD Method for Analysis of Econazole, Triamcinolone, Benzoic Acid and Butylated Hydroxyanisole

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A comprehensive stability indicating high performance liquid chromatography with diode array detection (HPLC-DAD) method was developed for simultaneous determination of econazole nitrate (EN), triamcinolone acetonide (TA), benzoic acid (BA) and butylated hydroxyl anisole (BHA). To the best of our knowledge, no published methods could be found in the scientific literature for analysis of this quaternary mixture. Effective chromatographic separation was achieved using Thermohypersil BDS C8 column (4.6 x 150 mm, 5 µm particle size) with gradient elution of the mobile phase composed of 0.2% w/v phosphoric acid (adjusted to pH 3.0 using ammonia solution) and methanol. The quantification of EN and BA was based on measuring their peak areas at 225 nm while quantification of TA and BHA was based on measuring peak areas at 242 nm and 290 nm respectively. BA, TA, BHA and EN peaks eluted at retention times 7.93, 12.14, 14.01 and 18.07 minutes respectively. Analytical performance of the proposed HPLC procedure was thoroughly validated with respect to system suitability, linearity, ranges, precision, accuracy, specificity, robustness, detection and quantification limits. The linearity ranges for EN, TA, BA and BHA were 1.5–300, 1–200, 0.6–100 and 1–100 µg/mL respectively with correlation coefficients >0.9999. The analytes were subjected to forced-degradation conditions of neutral, acidic and alkaline hydrolysis, oxidation and thermal degradation. The proposed method proved to be stability-indicating by resolution of the analytes from their forced degradation products. Moreover, specificity of the method was verified by resolution of the 4 compounds from more than 20 pharmaceutical compounds of various medicinal categories. The validated HPLC method was successfully applied to the analysis of the cited compounds in their cream dosage form. The proposed method made use of DAD as a tool for peak identity and purity confirmation.

Catalogue of Expression of Octopamine and Tyramine Receptors In the Fruit Fly, *Drosophila melanogaster*

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The octopamine and tyramine are the invertebrate counterparts of epinephrine and norepinephrine, which transmit their actions through sets of G protein coupled receptors. In Drosophila, four different octopamine receptors (Oamb, Octß1R, Octß2R, Octß3R) and 3 different tyramine receptors (TyrR, TyrRII, TyrRIII) are present. In this study, GAL4 lines containing the presumptive promoter regions of all 7 octopamine and tyramine receptors were generated. Consequently GAL4/UAS system was used. The Gal4/UAS system was utilized to elucidate their complete expression pattern in larvae as well as in adult flies. All these receptors show strong expression in the nervous system but their exact expression patterns vary substantially. Common to all octopamine and tyramine receptors is their expression in mushroom bodies, centers for learning and memory in insects.

Outside the central nervous system, the differences in the expression patterns are more conspicuous. However, four of them are present in the tracheal system, where they show different regional preferences within this organ. On the other hand, TyrR appears to be the only receptor present in the heart muscles and TyrRII is the only one expressed in oenocytes. Skeletal muscles express octß2R, Oamb and TyrRIII, with octß2R being present in almost all larval muscles. Taken together, this study provides comprehensive information about the sites of expression of all octopamine and tyramine receptors in the fruit fly, thus facilitating future research in the field.

Thin Layer Chromatographic and Spectrophotometric Determination of Sulpiride and Bromazepam in a Binary Mixture

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High-performance thin layer chromatography (HPTLC) (Method I) and derivative spectrophotometric (Method IIa and IIb) methods were described for the simultaneous determination of sulpiride and bromazepam in their combined capsule dosage form. The proposed HPTLC-densitometric method was simple and effective separation was achieved by using Merck HPTLC aluminum plates of silica gel 60 F254 and a simple mobile phase composed of dichloromethane: methanol (8.5 : 1.5 v/v) followed by densitometric measurement of the separated spots at 216 and 237 nm for sulpiride and bromazepam, respectively. The RF values were found to be 0.12 ± 0.03 for sulpiride and 0.65 ± 0.03 for bromazepam. Linear relationships were obtained between peak areas and concentrations of sulpiride and bromazepam in the ranges of 0.05 – 0.4 and 0.05 – 1.5 µg/spot, respectively. The second method relies on derivative spectrophotometry for the determination of this binary mixture, where sulpiride was determined by first derivative spectrophotometry (Method IIa) using the peak amplitude at 302.5 nm and the calibration curve was found to be linear in the concentration range 20 – 160 µg/mL. However, both drugs were quantified simultaneously by using the derivative ratio method (Method IIb) and linear relationships were obtained between the drugs concentrations and the first derivative of ratio spectra using peak amplitudes at 251 and 303 nm for sulpiride and 273.5 nm for bromazepam. The linearity ranges were 2 – 60 and 1 – 20 µg/mL for sulpiride and bromazepam, respectively. All the proposed methods were successfully applied for the simultaneous determination of sulpiride and bromazepam in their laboratory prepared capsules.

Marine Actinomycetes Crude Extracts with Potent TRAIL-Resistance Overcoming Activity against Breast Cancer

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We screened the TRAIL-resistant overcoming activity of 21 crude extracts of marine actinomycetes isolated from Red Sea shore of Sharm El-Sheikh, Egypt. only 4 crude extracts corresponding to the strains S1, S3, S24, and S34 reveald significant cytotoxic and synergistic effect in TRAIL-resistant breast cancer cell line. Two possible apoptotic pathways were suggested (1) stimulation of the extrinsic pathway by activation of both caspase-8 and-10 and (2) Induction of ER-stress mediated apoptosis via activation of the ER-stress sensor BiP and IRE1. Our results are expected to provide a new insight toward the development of led compounds against breast cancer and other types of cancer as well.

Ethyl Cellulose Nanoparticles as a Platform to Decrease Ulcerogenic Potential of Piroxicam: Formulation and *In Vitro/In Vivo* Evaluation

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Introduction: Nanoparticles (NPs) have long gained significant interest for their use in various drug formulations in order to increase bioavailability, prolong drug release and decrease side effects of highly toxic drugs.
Aim: To evaluate the potential of ethyl cellulose based nanoparticles (EC-NPs) to modulate the release and reduce ulcerogenicity inflicted by piroxicam (PX) after oral administration. Methods and results: PX loaded EC-NPs were prepared by solvent evaporation technique using different stabilizers at three concentration levels. Morphological examination of selected formulas confirmed the formation of spherical nanoparticles with slightly porous surface. Formulation containing poloxamer stabilized EC-NPs (P188/0.2), having particle size (240.26 ± 29.24 nm), polydispersity index (PDI) (0.562 ± 0.030), entrapment efficiency (EE) (85.29% ± 1.57) and modulated release of PX (88% after 12 hours), was selected as optimum formulation. Differential scanning calorimetry (DSC) demonstrated the presence of PX in an amorphous form in the nanoparticles. Fourrier-transform infrared spectroscopy (FT-IR) revealed the possible formation of hydrogen bond formation and the absence of detected chemical interaction. In vivo study, pharmacokinetic parameters, gastric irritation potential and histological examination were conducted after administration of the selected formulation. Time to reach maximum plasma concentration, tmax, of poloxamer stabilized EC-NPs showed a significantly higher value than that of Feldene® 20 mg capsules ($P \leq 0.001$). Encapsulation of the acidic, gastric offender PX into NPs managed to significantly suppress gastric ulceration potential in rats ($P \leq 0.05$) as compared to that of PX suspension. A reduction of 66% in mean ulcer index was observed.
Conclusion: In conclusion, poloxamer stabilized EC-NPs (P188/0.2) had a significant potential of offsetting deleterious side effects common of PX use.

Genome-wide Analysis of Microsatellites in *Spodoptera littoralis* Nucleopolyhedrovirus (SpliMNPV)

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Microsatellites or Simple Sequence Repeats (SSRs) are playing diverse roles in eukaryotic and prokaryotic genomes. Determination of microsatellites distribution in baculoviruses is crucial for understanding the evolution of baculoviral genomes. In this study, we undertook a survey of microsatellites in *Spodoptera littoralis* multiple nucleopolyhedrovirus (SpliMNPV) genome (isolate AN-1956). Out of 55 microsatellite motifs (represent mono-, di-, tri- and hexa-nucleotide repeats) identified in the SpliMNPV-AN1956 genome by in silico analysis, 39 motifs were found to be distributed in coding regions (cSSRs). While, 16 motifs were identified within intergenic or noncoding regions. Among the 39 motif (cSSRs), 21 motifs were found to be located within known functional genes and 18 motifs located within sequences annotated as hypothetical protein genes. Among the identified SSR motifs, the most abundant type of repeats was trinucleotide (80%), followed by dinucleotide (13%), mononucleotide (5%) and hexa-nucleotide (2%). Within the 55 SSR motifs identified in SpliMNPV genome, 39 motifs were analyzed in vitro using PCR analysis. Out of these 39 motifs, only 21 motifs were located in 15 known functional genes and were characterized by sequencing. The sequence data analysis revealed that the 15 sequenced cSSR markers showed low degree of nucleotide substitutions reflecting high degree of similarity with their equivalent genes sequences in the published SpliMNPV-AN1956 genome. Finally, the developed 33 cSSRs markers (15 cSSRs within defined functional genes and 18 cSSRs within hypothetical protein genes) were further mapped/localized on the SpliMNPV-AN1956 genome. To our knowledge, the obtained results represent the first case-study focusing on the applications of genome-wide in silico analysis, Characterization and identification of microsatellites in baculoviral genomes. The development of microsatellite markers specific to SpliMNPV genome represents a useful tool for isolate identification, genetic diversity and evolutionary analysis.

Gastro Therapeutic Effect of Banana Fruit and Zinc Consumption in Experimental Rats Impaired with Gastric Ulcer

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The aim of this study was to evaluate the effect of banana pulp powder (BP) and extract (BE) and also zinc on ethanol induced gastric ulcer (10 ml/kg ethanol once weekly). 49 Sprague Dawley rats were divided into normal group and six ethanol gastric ulcer groups that were control positive and treated groups which were BP(0.5 g/kg), B E (100 mg/kg), Zn (20 mg/kg), B P+ Zn and B E+ Zn groups. Ulcerative rat groups that treated with banana either powder or extract separately or in combination with zinc showed improvement of nutritional values, significant decrease in volume of gastric juice, total acidity and values of NO and malondialdehyde (MDA) and also significant increase in values of antioxidant enzymes compared to rats of control positive group. B P+ Zn and B E+ Zn treated groups showed normal values of NO and MDA and significant decreased in ulcer index and showed grade 1 of inflammation compared to control positive group. It seems likely that administration of mixture of banana powder or banana extract with zinc offered antiulcerative effects on ethanol induced gastric mucosal lesion.

Adsorptive Removal of Nickel from Aqueous Solutions by Activated Carbons from Doum Seed (Hyphaenethe)

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Nowadays, the utilization of agro-wastes as adsorbent is currently receiving wide attention because of their abundant availability and low-cost owing to relatively high fixed carbon content and presence of porous structure.
The present study aims to investigate the adsorption of Ni2+ ions from aqueous solutions onto activated carbon prepared from a low cost agricultural by product such as doum seed (Hyphaenethebaica) coat.
Nickel was selected as an adsorbate because its compounds have widespread applications in many industrial processes such as non-ferrous metal, mineral processing, paint formulation, electroplating, batteries manufacturing, porcelain enameling leading to relatively high concentrations in aquatic environment. Some nickel compounds, such as nickel carbonyl, are carcinogenic and easily absorbed by the skin.
The exposure to this compound, at an atmospheric concentration of 30 mg/l for half an hour, is lethal. High concentration of nickel causes cancer of lungs, nose and bone. At very high levels of exposure, nickel salts are known to be carcinogenic.
Two activated carbons had been prepared from raw doum-palm seed coat; as well, the raw material was used as an adsorbent. Batch adsorption experiments were performed as a function of pH of solution, initial nickel ions concentration, dose of adsorbent and contact time. Adsorption data were modeled using different models. Different error analysis conforms that the isotherm data followed Freundlich models for all adsorbents. Adsorption kinetic data were tested using pseudo-first order, pseudo-second order and Elovich model. Adsorption mechanism was investigated using the intra-particle diffusion model. Diffusion coefficients were calculated using the film and intraparticle diffusion models.
It was concluded that the use of doum seeds in the treatment of wastewater for the removal of Ni2+ ions could be a low cost technology and a promising recycling strategy of corps wastes and nutrients in wastewater.

Conjunctivitie As an Insides Job: the Role of Human Eye Microbiome in the Development of Conjunctiva

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The Human Microbiome Project was launched in 2007 to identify human-associated microbes at different anatomic sites (mouth, nose, skin, colon, and vagina). Since then, major discoveries were made on the impact of the human microbiome on human health, disease, and immunity status; however, studies on the eye microbiome are still lagging behind. The human eye is in contact with the environment and is thus exposed to various types of microbes. A resident microbiota resists colonization of pathogenic microbes by occupying the colonization sites, secreting antimicrobial agents, or enhancing host immune response. Here, we aim to discover the role of resident eye microbes in the development of bacterial conjunctivitis, an infection that affects millions of people and ranges from self-limiting to severe infection that may lead to blindness. To this end, we collected 108 conjunctival swabs from 54 patients, and we used a paired design to minimize interindividual variations by comparing infected and uninfected eyes of each patient. Of the collected samples, 64 (59.29%) were culture positive, and their commonly isolated bacteria were *Staphylococcus aureus* followed by *S. epidermidis* and Acinetobacter. Antimicrobial susceptibility profiles of the cultured microbial communities were determined, but were mostly similar in both eyes. Ten samples (5 patients) were further subjected to high-throughput 16S sequencing for comprehensive microbiome profiling. Many bacterial taxa were determined that were undetected by culture-based techniques, among which are Moraxella and Corynebacteria. Beta diversity between patients was higher than the diversity between eyes of the same patients; however, a few species were consistently more abundant in infected eyes (e.g., Staphylococcus). In conclusion, our findings suggest that conjunctivitis is an "inside job", i.e., caused by resident eye microbes that expand subsequent to an eye injury or perhaps an undetermined viral infection. We are currently confirming this hypothesis by sequencing 20 more sample pairs.

Design and Development of a Harvesting and Cleaning Unit for Jojoba Seeds

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Jojoba is being cultivated to provide a renewable source of a unique high-quality oil. It is an economic crop that its seeds contain from 50–60% oil by weight which utilized in: Cosvmetics, Pharmaceuticals, Lubrications, Foods, Electrical insulators and Plasticizers. Egypt is a suitable country for cultivation jojoba plant. It was introduced in Egypt through the regional project for cultivating jojoba in some Middle East countries. Jojoba seeds don't mature at the same time so, more than one harvest may be necessary. Most of jojoba farmers collect seeds by hand or by primitive methods since the mature seeds fall down naturally to the soil surface. This requires intensive labor work force and low harvesting efficiency that makes it too expensive for most of their uses. In view of this the physical and aerodynamic characteristics of jojoba seeds and material-other-than grain were studied to design and construct a proposed prototype harvesting unit. To harvest the jojoba seeds from the ground surface, one or more harvesting passes per season were needed depending upon the amount of matured seeds, weather conditions and plant growing performance. The harvesting unit was constructed and developed at the workshop of Agricultural and Biosystems Engineering Department, Faculty of Agriculture, Alexandria University, Egypt. To predict the performance of the proposed harvesting jojoba seeds unit, factors such as air velocity (m/s), machine forward speed (km/h), length of the suction hose (m), clearance of the suction hose from the soil surface (cm) and the percentage of materials other than jojoba seeds (MOG%) were tested. This research is the first trial to produce a prototype harvester, and then evaluate its performance under different field conditions. Although the performance of the harvester was considered acceptable at this stage for a prototype, it still requires further modifications to achieve more satisfactory results for commercial use.

Pyrolysis–GC Products of Bulk Organic Matter Related to Carbon and Glomalin Dynamics in Soils Under different land use (NE Spain)

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Chemical components of soil organic matter (SOM) determined by Pyrolysis Gas Chromatography (Py-GC) may give valuable information on organic carbon and glomalin dynamics. This information together with selected physical, chemical, biological, and biochemical parameters related to organic matter pool may further improve investigations directed to establish the potential for carbon storage in different shallow soil environments under land use change. Seasonal measurements were carried out along 2011, and expressed as yearly means. Soils properties varied significantly ($p < 0.05$) along the different soil environments from recently abandoned vines to old scrubs under renaturalisation processes. Soil organic carbon and glomalin were significantly correlated ($p < 0.01$) and also varied significantly ($p < 0.05$) along the observed period with mean ranges of 2.50-36.24 g kg-1 and 1.04-4.85 g kg-1 respectively. Significant variability ($p < 0.05$) was found between the pyrolytic fragments obtained by Py-GC indicating that SOM transformations occurred at different extent along the period of abandonment. Moreover, the mineralization indices of labile (Furfural/Pyrrole) and more stable (Pyrrole/Phenol) organic compounds and the reserve energy index (Aliphatic/Aromatic organic compounds) strengthened that SOM evolution was more consistent in older soil environments.

Colorimetric and HPLC Assays of Ursodeoxycholic Acid Based on Reaction with 2-Nitrophenylhydrazine

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This work describes the development, validation and application of two simple, accurate and reliable methods for the determination of ursodeoxycholic acid (UDCA) in bulk powder and in its pharmaceutical dosage forms. The carboxylic acid group in UDCA was exploited for the development of these novel methods. Method I is the colorimetric determination of the drug based on its reaction with 2-nitrophenylhydrazine hydrochloride (NPH) in presence of a water soluble carbodiimide coupler: 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide hydrochloride (EDC) and pyridine to give the acid hydrazide derivative, which ionizes to produce intense violet color with maximum absorption at 553 nm. Method II relies on reversed phase high performance liquid chromatography with diode array detection (HPLC-DAD) determination of UDCA after pre-column derivatization based on the same previous reaction. The acid hydrazide reaction product was separated using a Pinnacole DB C8 column (4.6 x 150 mm, 5 µm particle size) and a mobile phase consisting of 0.01 M acetate buffer (pH=3), methanol and acetonitrile (30: 30: 40, by volume) pumped isocratically at a flow rate 1 mL/min. Ibuprofen was used as an Internal Standard (IS). Monitoring of peaks of the reaction product and IS was carried out at 400 nm. Different experimental parameters for both methods were carefully optimized. Analytical performances of the developed methods were statistically validated with respect to linearity, ranges, precision, accuracy, specificity, robustness, detection and quantification limits. Calibration curves showed good linear relationships over the concentration ranges 32-192 and 60-600 µg/mL for methods I and II, respectively. The proposed methods were successfully applied for the assay of UDCA in bulk form, in capsules and oral suspension with good accuracy and precision. Assay results were statistically compared with a reference pharmacopoeial HPLC method where no significant differences were observed between the proposed and reference methods.

Artificial Neural Network Model for Prosopagnosia (Face Recognition Disorder)

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More than one billion people around the world suffer from various neural disorders currently. One outstanding method that addresses this complicated problem is Artificial Neural Networks (ANN). ANNs are used as models for several processes that occur from the microscopic level (neurons) to the macroscopic level (behavior and cognition). By developing and tracing the functionality of an ANN, we can have a more accurate view of how a healthy brain works, the effects of disorders on it and hopefully of possible treatments. Prosopagnosia or (Face recognition disorder) is an example of a neurological problem that can be modeled. Such study will observe the pathways and allow better understanding of the disease properties.

Clinical and Molecular Spectrum of Egyptian Patients with 17βHSD-3 deficiency

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17-β-hydroxysteroid dehydrogenase type 3 (17βHSD-3) deficiency is an autosomal recessive cause of 46, XY disorder of sex development (DSD). The prevalence of DSD in Egypt has been estimated at 1:5,000 live births. Patients with mutations in the HSD17B3 gene encoding for 17βHSD-3 enzyme, may go unnoticed at birth since female external genitalia is common. Although 17βHSD-3 deficiency can be provisionally diagnosed by systematic endocrine evaluation; the diagnosis is confirmed by molecular studies.

This study is the first to investigate Egyptian patients suspected to have 17βHSD-3 deficiency. Through the years 2011 till 2014, 80 patients with 46, XY DSD were referred from the outpatient Clinical Genetics and Endocrinology clinics at the National Research Centre. Out of them 22 patients were provisionally diagnosed to have 17βHSD-3 deficiency.

After sequencing HSD17B3 gene, 12 patients were detected to carry mutations. Novel mutations were determined in exons 1, 2, 7 and 8. The pathogenicity of the novel mutations were confirmed by 100 control individuals, and through in silico functional studies. Parental consanguinity was noted in 70% of the families. While, negative parental consanguinity was shown in probands came from rural villages in Upper Egypt. This study reconfirmed the importance of inbreeding as a major factor in establishing 17βHSD-3 deficiency.

The current study has shown that 17βHSD-3 deficiency is not an uncommon disorder among the DSD cases, it represents 15% (12/80) of the referred 46, XY DSD cases. Also it was evidenced that the disease mutational profile is rather heterogeneous, as it has a high degree of novel genetic defects (11/22 alleles). Furthermore, molecular genetic analysis provides accurate diagnosis. As serum T/Δ4 ratios are not always reliable parameters for the diagnosis of 17β-HSD3 deficiency. Finally, the multidiscipline's nature of DSD management should be reemphasized through the conjoined and complementary use of clinical, clincopathological, cytogenetics and molecular modalities.

Analysis of Seeds Marketing and Its Reflection on Agriculture Sustainability in Egypt

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Seeds is vital input in agricultural production inputs, the agriculture production efficiency is relay on an effective access of certified seeds to farmers, therefore, balanced marketing of seeds in Egypt is essential to enable farmers with required seeds in needed time with fair price.

The Egyptian Seeds Industry (ESI) is longstanding industry and rooted in more than 122 years ago. Throughout this period, ESI is subjected to governmental policies in terms of production and marketing before privatization change came true, as of 2004 onward, private sector beside government entities led the process of seeds marketing in Egypt. As result to above, the private sector obtained permits for trading and marketing seeds in Egypt and, besides the existence permits of Ministry of agriculture entities.

This paper investigates on the efficiency of issuing permits for marketing and trade of seeds in Egypt alongside of highlighting the flexibility availed in the quality of the permits and its geographical scope with considering of cropped area in each governorate in Egypt.

This study shows the issued permits for seeds marketing to both governmental and private sectors in remote areas of Egypt were insufficient to supply farmers with certified and improved seeds needed in compare with cropped areas in those governorates and with compare to other governorates.

According to the current land reclamation expansion strategies in Egypt especially in remote areas, the study comes with recommendations based on results of strengthens and weaknesses analysis to seeds marketing in Egypt, which contribute food security and farmers returns.

Discovery of Novel Candidates of the Mmpl Family of Efflux Pumps in Pathogenic *Escherichia coli*

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Escherichia coli is a beneficial common resident of the intestine, but a few strains can be pathogenic, e.g. *E. coli* O157, which causes serious diseases. Because of *E. coli's* versatility and genome plasticity, the bacteria have alarmingly developed resistance against many commonly used antibiotics by different mechanisms. Although *E. coli* has been extensively studied, around 30% of its genes remain unknown. Thus, it is possible to discover novel resistance genes. One resistance mechanisms the acquisition of genes encoding efflux pumps, among which are the mycobacterial membrane-proteins (Mmp), classified as resistance, nodulation and division (RND) efflux pumps. In mycobacteria, these proteins are involved in the transport of mycolic acid precursors outside the cell wall. In methicillin-resistant Staphylococcus aureus, an MmpL homolog is involved in oxadiazole resistance. In *E. coli*, members of this family were characterized in commensal strains, but not in pathogenic ones. The purpose of this study is to identify novel efflux pump genes that belong to the MmpL superfamily. To this end, we screened the E. coli O157:H7 genome and found two candidate mmpL-like genes, which are: Z4861 and yegN. Next, we screened all E. coli genomes in the NCBI database and we found that yegN is highly conserved (it has homologs in 198 genomes with <97% similarity while Z4861 homologs are only found in 28 genomes). Experimental screening of clinical isolates using the polymerase chain reaction (PCR) corroborated the bioinformatic analysis: out of 33 clinical isolates, yegN was detected in 27 (81%) while Z4861 was only detected in 6 isolates (18%). Additionally, we successfully confirmed, using reverse transcription PCR, both genes are expressed in E. coli O157. Future studies will use deletion mutants of both genes to further investigate their specific function in E. coli O157:H7.

Community Patterns of Bees and Wasps in the Canopy and Understory of Haliburton Forest, Canada

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Canopy research has received increasing attention in the last few decades, gaining insights into the community ecology of tree-dwelling arthropods. The distribution of species in forests is expected to vary with their position in the canopy or near the ground. Abiotic factors such as radiation, moisture, temperature, wind and biotic factors (tree architecture, foliage quality and floral resources) differ between canopy and understory. How forest-dwelling bees and wasps respond to this variation in terms of tree strata merits further investigation. This study examined hymenopteran communities, a species-rich and ecologically diverse group in temperate forest canopies in an eastern deciduous mixed-wood forest near Haliburton, Ontario, Canada during 2013/2015, to uncover vertical community patterns in wasp and bee diversity. Using Pan and Intercept traps revealed the presence of 1500+ individuals of order Hymenoptera. Bees composed 40% of all specimens, from five bee families; Apidae accounted for ~49% of all bees. Braconidae and Ichneumonidae (Superfamily, Ichneumonoidea) represented 45% of all wasps and 26% of all Hymenoptera. Traps in the tree canopies collected Apidae (65%) while understory traps collected Ichneumonoidea (60%). Wasps and bees were more abundant in traps near the ground than in the canopy throughout study seasons. However, hymenopteran diversity (Shannon Index) did not differ between ground and canopy traps.

Whey Protein Isolate Protects Against Cyclophosphamide-induced Liver and Kidney Damage in Rats

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Cyclophosphamide (CYP) is commonly used chemotherapeutic agent. The drug itself and its metabolites interfere greatly with the antioxidant systems of many vital organs including the liver and kidneys.

Objective:

In the present study, we investigated the protective effect of whey protein isolate (WPI), a byproduct of cheese manufacturing that possesses myriad nutritional and biological properties, against CYP-induced acute liver and kidney damage in rats.

Methods:

Forty adult Sprague-Dawley rats were allocated into five groups. The first group received the vehicles and act as normal control. In the other groups, rats were injected with a single dose of CYP (200 mg/kg, i.p). The last three groups were pretreated with oral WPI at doses of 75, 150 and 300 mg/kg/day, respectively, for 15 successive days. Forty-eight hours following CYP injection, rats of all groups were investigated for the serum levels of alanine transaminase, aspartate transaminase, urea and creatinine, as well as the liver and kidney contents of reduced glutathione, malondialdehyde, nitrite, interleukin 1β, and myeloperoxidase. Histopathological examination of liver and kidney tissues was also conducted.

Results:

CYP resulted in acute liver and kidney damage in rats as evidenced by alteration of both oragans' function biomarkers, oxidative stress, and inflammatory markers, and confirmed by the histopathological outcomes. Pretreatment of rats with WPI significantly protected against CYP-induced deterioration of liver and kidney functions and showed marked anti-oxidant and anti-inflammatory properties that were demonstrated by the biochemical and histopathological findings. WPI, at dose of 300 mg/kg, exerted significant anti-oxidant and anti-inflammatory effects compared to lower dose levels.

Conclusion:

The current study demonstrated the protective effects of WPI, with preference to higher dose level, against CYP-induced liver and kidney damage, and suggested a role of its antioxidant and anti-inflammatory properties.

Evaluation of Culture Conditions Affecting Production of Thermostable Xylanase by *Geobacillus stearothermophilus*

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Enhancement production of the microbial thermophilic, xylanlytic enzymes under optimum conditions is necessary for conversion biomass into economically viable product that can used for various purposes such as biofuels, detergents, animal feeds, etc. Thermophilic bacteria are found as a novel source of highly active xylanase enzyme with significant activity at high temperature. This study has been undertaken to isolate thermophilic, xylanytic bacteria, optimization of fermentation conditions and characterization of the xylantic enzyme produced by the most promising isolate. The selected experimental strain (NASA267) was identified by sequencing the PCR amplified 16S rDNA genes. NASA267 was affiliated to the genus *Geobacillus*, where isolate NASA267 showed 99% similarity to *Geobacillus stearothermophilus*. By controlling features of the environments of growth conditions including medium, incubation time, pH, temperature, carbon sources, nitrogen sources and additives that affect the xylanase production by *Geobacillus stearothermophilus* NASA267 were studied using the Plackett-Burman design then Box-Behnken design. *Geobacillus stearothermophilus* NASA267 produced 89 U/ml/min of xylanase. Accordingly, based on Plackett-Burman results, a preliminary experiment was carried out using different formulations which gave the highest yield of thermostable xylanase (115 U/ml/min). Among Box-Behnken design, the maximum xylanolytic activity was observed 176 U/ml/min. The study also describes the applications of the xylontic enzymes for the pretreatment of lignocelluloseic materials which can be used as raw materials of ethanol production.

Spectroscopic Differentiation and Chromatographic Separation of Six Indole Aldehyde Regioisomers

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The six regioisomeric indole aldehydes (2-, 3-, 4-, 5-, 6- and 7-formylindoles) are the starting precursors for the synthetic cannabinoid drug of abuse 3-(1-naphthoyl)-1-pentylindole (JWH-018) and its regioisomeric 1-naphthoyl substituted 1-n-pentylindoles. The six compounds have the same elemental composition C9H7NO and similar EI mass spectra with base peak at m/z 145 in addition of other fragments of significant abundances at m/z 116 and 89. The 3-formylindole isomer can be slightly distinguished by its base peak at m/z 144 instead of 145. On the other hand, their UV absorption spectra and FT-IR spectra especially in the fingerprint region provide useful information for differentiation among this set of regioisomers. GC separation on a capillary column containing a trifluoropropyl methyl polysiloxane (Rtx-200) stationary phase provided excellent resolution of these six compounds with elution order 7-, 2-, 4-, 6-, 5- and finally the 3-formyl isomer. In addition, effective HPLC separation was achieved using Zorbax Eclipse Plus C18 (2.1×100 mm, 1.8 µm) column with a mobile phase composed of water and acetonitrile in the ratio 75:25 (by volume). The mobile phase was pumped at a flow rate 0.25 mL/min and detection wavelength was 220 nm. Unlike the GC separation, the 3-formyl isomer eluted first followed by 5-, 4-, 6-, 2- and finally the 7-formyl isomer.

A Mathematical Model to Simulate Total Ammonia Nitrogen Concentration in Intensive Fish Culture Systems

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Aquaculture is an important sector of food production. Most of the modern aquaculture systems in intensive. In these intensive systems, the production of ammonia is the most serious problem. It is toxic even in very small concentration. Therefore, a simulation model was developed to predict the total ammonia-nitrogen concentration in the water. The simulation model was mathematically developed and tested with the experimental results. The model was developed using math balance approach. Important parameters such as: ammonia excreted by fish, ammonia added or lost by water exchange, ammonia volatile from the system and ammonia absorbed by microorganisms, were included in the model. The determination coefficient (R2) was 0.86 and data of the model had the same trend with data of the experiment. This model can be used for predicting ammonia concentration in intensive fish culture systems.

Chemical Inducers Increased Systemic Acquired Resistance of Potato against *Alternaria solani*

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Induction of systemic acquired resistance might enhance plant's own defense responses. Current study aimed to promote potato resistance toward the Early Blight disease caused by *Alternaria solani* through multiple application of low doses of 2,4-D, abscisic acid (ABA), and hydrogen peroxide (H_2O_2) along with the recommended fungicide. Two potato cultivars (Resistant and Susceptible) were treated once a week with micro-level doses of 2,4-D, ABA, and H_2O_2 for 6 weeks and then inoculated with field strain of *A. solani*. After 48 hours of infection, half of the plants within each treatment were sprayed once with the fungicide that is recommended to control A. solani. Results showed that phenylalanine ammonia lyase (PAL), polyphenoloxidase (PPO), and peroxidase (POD) enzyme activities were significantly increased after 1 d of infection and lasted for more than 15 d of infection. Application of the fungicide revealed slightly increased levels of the enzymes activity. The greatest enzymes activity was recorded after treating potato with 2,4-D and H_2O_2. The resistant potato cultivar (Nicola) showed greater level of enzyme activity compared to the susceptible one (Sponta). Induction of systemic acquired resistance using low molecular weight and auxin-like chemicals might be incorporated in the management programs of plant pathogenic fungi.

Comparison Between Spectrophotometric and HPLC Methods for Analysis of Oxprenolol and Cyclopenthiazi

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Three validated methods were conducted and compared for the analysis of an anti-hypertension fixed dose combination of Oxprenolol (OXP) and Cyclopenthiazide (CYPZ) in laboratory prepared tablet. Two spectrophotometric (SPEC) methods (derivative and derivative ratio) and a stability-indicating HPLC-DAD method were applied for the analysis. For the SPEC methods, the major problem encountered was attributed to extensive spectral overlap and challenging ratio of drugs in their dosage form (CYPZ: OXP -0.2:100). The derivative (D) method was based on using the first (1D) and second (2D) derivative spectra for analysis of CYPZ and OXP at 335.5 and 280.5 nm, respectively. For the derivative ratio method (1DR), OXP was determined at 285.5nm and CYPZ at 335 nm. The linear range was 10-200 µg.mL-1 for OXP and 0.2 – 12 µg.mL-1 for CYPZ. The SPEC methods are simple, economic and with low solvent consumption. The HPLC method was based on using a C18 column with mobile phase containing acetonitrile and 50mM phosphate buffer of pH 3.5 (50:50). To quantify OXP and CYPZ with maximize sensitivity; the DAD was set at 224 nm. Optimization of chromatographic conditions was done at which OXP eluted at 4.34 min and CYPZ at 6.69 min with optimum sharpness and peak symmetry. The linear range was 1–300 µg.mL−1 for OXP and 0.15–150 µg.mL−1 for CYPZ. The study of forced degradation of both drugs was done under various conditions including; hydrolysis (acid, alkaline and neutral), oxidation, dry heat and photo-decomposition. The HPLC method separates each drug peak from those of the forced degradation product peaks. The purity of the drugs peaks was confirmed using DAD. The data obtained by SPEC and HPLC were statistically comparable by ANOVA test. No significant difference was recorded. However, HPLC-DAD method is more sensitive and can quantify drugs in presence of their degradation products.

Novel Green Fluorescent Protein Chromophore Analogous as Biosensors and Photosensitizing Drugs

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Green Fluorescent Protein (GFP) has revolutionized the area of molecular biology and has been used extensively as reporter gene and in fluorescence microscopy. We have designed and synthesized novel Green Fluorescent Protein (GFP) chromophore analogues to mimic the natural GFP chromophore. These new chromophores were synthesized from readily available hippuric acid via Erlenmeyer–Plöchl azlactone synthesis to form 4-Arylidene-2-Phenyl-5-(4H)-Oxazolone (1). Compound (1) was then converted into 3,5-dihydro-imidazol-4-ones (2) by nucleophilic substitution of different amines on the lactone ring of compound 1.

These new chromophores can act as biosensors for different metals, especially the metals that exist in the biological system. We have tested our chromophores as sensors for zinc and cobalt. The produced complexes showed absorption/emission maxima at 366/470 nm while in the absence of metals, the chromophore was weakly fluorescent with absorption/emission maxima at 400/450 nm.

In our search for new therapeutic agents to be used in photodynamic therapy, we have used our chromophores as ligands for La and Eu to increase their extinction coefficients and achieve high singlet-to-triplet intersystem crossing efficiencies. These two merits are very crucial for the development of ideal photodynamic therapy agents.

Effects of PDE Inhibitors in Epinephrine Induced Arrhythmia via Adiponectin Expression in Rats

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Background: Adiponectin is one of a variety of metabolically active proteins secreted by adipocytes, collectively termed adipokines. Decreased levels of adiponectin are associated with a variety of disease states, including obesity, type 2 diabetes, hyper-tension, and coronary artery disease.
The aim of this study was to examine the possible cardioprotective effect of members in the phosphodiesterase (PDE) inhibitors in epinephrine induced arrhythmia and oxidative stress in rats.
Methods; arrhythmia was induced by cumulative doses of i.v. bolus of epinephrine (4, 8, 16, 32, 64, and 128 mg/kg) that given at 10-minute intervals. Rats were randomly allocated into 5 groups as follows Group I: Normal control group received saline. Group II: Rats injected with epinephrine and served as arrhythmia group. Groups III, IV and V: Rats received daily Sildenafil (0.5 mg/Kg), Vardenafil (3 mg/Kg) and Tadalafil (10 mg/Kg; orally), respectively, prior epinephrine injection for 14 days. Estimation of the heart rate, RR interval, QTc interval and duration of arrhythmia were done. Serum reduced glutathione (GSH), malondialdehyde (MDA), nitric oxide (NO) and adiponectin contents as well as heart lactate dehydrogenas and creatin kinase. In addition, histopathological examination were carried out.
Results: injection of epinephrine to rats increased heart rate, RR interval, QTc interval and duration of arrhythmia. epinephrine group had lower GSH and adiponectin contents and higher MDA and NO contents while PDE inhibitors improve GSH and adiponectin contents as well as ameliorate MDA and NO contents.
Conclusions: PDE inhibitors may reduce or delay epinephrine-induced arrhythmia and associated myocardial apoptosis by inhibition of ROS and expression of adiponectin.

Polyaniline/Iron-Oxide Nanocomposite for Removal of Cd (II) from Aqueous Solution

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The removal of toxic cadmium (Cd (II)) ions from aqueous solution was investigated using nanocomposite of polyaniline (PANI) and iron oxide nanoparticles (NPs). Iron oxide nanoparticles (NPs) and PANI salt doped with HCl were prepared by co-precipitation and chemical oxidative polymerization methods, respectively. Polyaniline/iron-oxide nanocomposite (NC) was prepared using a mechanical mixed method. The synthesized materials were characterized by fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscope (SEM) and High Resolution Transmission Electron Microscope (HRTEM). It was indicated that the prepared iron oxide NPs were consisted of akaganéite as dominant phase plus minor phases of hematite, magnetite and/or maghemite. HRTEM images of the prepared nanocomposite demonstrated that the phases of iron oxide NPs embedded in the nanocomposite had the same crystallinity and morphology of pristine oxide NPs. It was found that size of nanocomposite particles has diameter ranged from 8.95 nm to 16.21 nm. The nanocomposite demonstrated high capability to remove 97.7% Cd (II) from polluted aqueous solution at pH 7 for 5 minutes contact time at room temp.

Fractionation of Metals in Surface Sediments of the Egyptian Mediterranean Coast and Risk Assessment

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Numerous indices have been developed to assess the environmental risk of metals in surface sediments, including the total content based Enrichment Factor (EF), exchangeable fraction based Risk Assessment Code (RAC), and biological toxicity test based Sediment Quality Guidelines (SQGs). In this study, the three indices were applied to surface sediments from 20 stations along the Egyptian Mediterranean coast, to assess the environmental risks of (Cr, Fe, Ni, Mn, Pb, and Zn). The results of the partitioning study showed that the residual form was the dominant fraction of the selected metals among most of the studied locations. The calculated mean EF was found to be in the following order: Pb > Cr > Ni > Zn > Mn. The degree of surface sediment contamination was computed for RAC, Individual Contamination Factor (ICF) and Global Contamination Factor (GCF). Risk assessment code analysis showed that Fe has no risk to local environment; Cr, Mn, Ni and Zn have posed low risk while Pb was at medium risk level. The results of ICF and GCF showed that sediments of El-Nobarreya, El-Max and Western harbor had high potential risk to fauna and flora of the study area. In terms of ICF value, a decrease order in environmental risk by trace metals was: Mn > Pb > Zn > Ni > Fe > Cr. Association with adverse effects to aquatic organisms was determined using the classification of the sediments according to SQGs. SQGs based on the consensus approach revealed that Zn had rare adverse ecological effects and frequent adverse ecological effects are related to Cr, Pb and Ni when using the total metal concentrations. The assessment based on the labile fraction showed rare adverse ecological effects for Ni and Cr. On the other hand, adverse ecological effects are possible but less frequent with respect to Pb.

Phytosterols in Vegetable Oils

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Phytosterols are important natural bioactive compounds have considerable interest as dietary supplements. They are reported to lower cholesterol levels and also have a positive impact on cardiovascular diseases. They are key structural components of plant cell membranes that assume the role that cholesterol plays in mammalian cells. In this study, phytosterols were isolated from different crop seed crops, such as soybean, cottonseed, sunflower and corn oils. Oils were extracted, saponified, and then the nonsaponifiable fractions were applied to Thin Layer Chromatography (TLC) to separate sterols. Spectrophotometeric method was used to quantify sterols in oils. In general, the results showed that the quantity of phytosterols varied among oils as expected. It was found that corn oil contained approximately twice the amount of total phytosterols as it was in sunflower oil. The lowest quantity was in cottonseed oil followed by soybean oil. The antioxidant activity of oil sterols was evaluated by different assays, including free radical-scavenging activity (DPPH) and total antioxidant activity compared with vitamin C and butylated hydroxylanisole (BHA). Phytosterols of soybean oil showed the highest inhibition effects followed by corn oil and cottonseed oil sterols while, the lowest effect was in sunflower oil. This study reflects the importance of enhancing the healthy protective effects of plant oil extracts. The FDA concluded that a daily dietary intake of 2 g a day of phytosterols is required to demonstrate a relationship between phytosterol consumption and cholesterol lowering for reducing CVD risk.

Phase Transitions of Samani Date Flesh Using Differential Scanning Calorimeter (DSC)

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The importance of the date palm tree is due to the economical as well as the nutritional value of its fruit. Egypt ranks first in terms of global production of dates (1,501,799 tons). Egypt can meet most of the world's demand for dates. The world production of dates has been increased many folds with modern biotechnological approaches. However, the date processing industries have not developed at that pace. Accurate prediction of thermal behaviour during freezing of dates is important for both the optimization process and selection of the equipment. Also, it is expected to be of a special interest in Egyptian date industry due to its high production. The effect of heating rate and annealing technique on phase transitions of Samani flesh dates were evaluated. Glass transition (Tg), onset of melting point (Tm), initial freezing point (TF), enthalpy change during melting (Hm) at heating rates of 1, 5, and 10 °C/min were measured using DSC. After knowing Tg and Tm from non-annealing trials, samples were annealed for 30 minutes at (Tm-1). Samples moisture content was 67.22 ± 0.078%. Tgp for non-annealed samples showed a linear increase with increasing heating rate where it was - 41.58, - 40.70 and - 39.31 °C at 1, 5, and 10 °C/min heating rate, respectively. The same trend was observed for annealed samples but with higher Tgp where it was - 38.51, - 37.59, and - 36.17 °C at the above heating rate, respectively. Tm and TF for non-annealed showed a linear decrease with increasing heating rates. Hm values were found to be the maximum at 1 °C/min heating rate. The obtained results can be used to enhance stability of stored dates, maintain quality, and extend its shelf life. The procedures developed can establish a protocol to yield phase transition information for dates using DSC.