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Participants Abstracts

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Management of Fusarium oxysporum f.sp lycopersici through Biopesticides and Chemicals

Fusarium oxysporum f.sp *lycopersici* is highly destructive soil borne pathogen that have potential to attack on broad range of crops. The present research is an attempt to manage this disease through bio control agents as well as chemicals. Although chemical control is an easy and cheaper way, it disturbs the natural ecosystem. Chemicals (Nativo, Ridomil Gold, Antracol, and Cordate) and bio-control agents (Poly beta hydroxyl butyric acid, Teagro (Bacterium based product), *Trichoderma harzianum*) were applied in field under RCBD design at research area of Department of Plant Pathology University of Agriculture Faisalabad to determine their response against Fusarium wilt of tomato. Maximum reduction in disease (25.06%) was expressed by Nativo followed by Teagro (30.14%), Antracol (40.47%), and Cordate (46.47%) as compared to control (65.09%). In Green house under CRD design evaluation of Chemicals and bio-control agents abovementioned also done where maximum reduction in disease Teagro (31.74%), followed by Nativo (32.75%), *Trichoderma harzianum* (33.45%), Antracol (34.89%), Poly beta hydroxyl butyric acid (41.93%), Cordate (46.41%) as compared to control (73.47%). Maximum plant height was observed by Poly beta hydroxyl butyric acid (25 cm) followed by Teagro (22.88 cm), Cordate (21 cm), Trichoderma harzianum (19.88 cm), Antracol (18.66 cm), as compared with control 17.66 cm). Maximum number of leaflets by Poly beta hydroxyl butyric acid (10.55%), followed by (10.11%), Cordate (9.77%), Teagro (9.55%), Nativo (8.22%), *Trichoderma harzianum* (8.0%) as compared with control (6.66%). In laboratory evaluation of Chemicals under CRD design was done. Food poison technique and dual culture technique was used in *in vivo* conditions. Maximum growth inhibition (0.62 cm) was expressed by Nativo followed by Antracol (2.41 cm), Ridomil Gold (2.42 cm), Cordate (2.81 cm) as compared with control (93.71 cm). Nativo and Teagro performed better among all chemicals and biocontrol agents. So, these two products are recommended against Fusarium wilt of tomato.

Keywords: Biocontrol, Fusarium wilt, Dual Culture Technique

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Metal-Free and Multicomponent Approaches for the Synthesis of Heterocyclic Compounds

In this project, we have developed a simple and efficient metal-free methodology for the highly regioselective synthesis of 1, 4-disubstituted-1, 2, 3-triazoles by applying a novel inverse electron-demand-1, 3-dipolar cycloaddition approach. This practical one-pot metal-free strategy has accomplished by various alkylidene malononitrile and aromatic azides in the presence of base. It has an excellent functional-group tolerance on both the alkylidene malononitrile and aromatic azides. In this new methodology we have used both one pot strategy by simple mixing of aromatic azides, aliphatic aldehyde and malononitrile as well as by treating preformed alkylidenelonitrile and aromat azide in the presence of DBU as a base and DMSO as a solvent. From the current project we have published two artilces in the Journal of Chemical Communications – Royal Society of Chemistry (current Impact Factor 6.834) while further research is under progress.

Keywords: Triazoles, Metal-free, Regioselective

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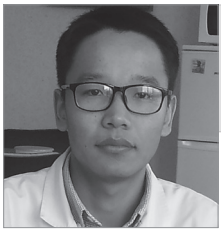
Towards Pollution Control and Supply of Nutrition: Production of Spirulina Using Digested Sugar Industry Waste

Spirulina platensis is an important Cyanophyta known as 'Spirulina' rich in high quality protein (60-65%) and essential lipids (1.3-1.5%), γ-linolenic acid (30-35% of total lipid) rarely found in pla\nt tissue, vitamins, carotenoids and essential minerals. It can be used as food and good source of complementary dietary ingredient of feed for fish, shrimp and poultry, bees and for children to prevent malnutrition. Spirulina powder can be used as health foods to enhance milk secretion in mothers showing a decrease in lactation. Today, 60 sugar industries are operating in different places of Bangladesh. These industries discharge a considerable amount of wastes contain sugar, carbohydrate, cellulose, protein, nitrogenous compounds, lipids and other essential nutrients. These industries are causing pollution around the industry areas which are generating bad effect on human health and agriculture by producing a huge amount of waste. To overcome this acute pollution and to get Spirulina rich in nutrients, this research is using/culturing this digested sugar industry waste to grow Spirulina platensis in laboratory conditions. This research work will bring a long term benefit in at least two ways for the nation by producing Spirulina which can be used as source of nutrition; and by creating pollution free environment for the nation.

Keywords: Spirulina, Sugar industry waste, Nutrition, Pollution mitigation



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Apolipoprotein A5 Gene Polymorphisms and Lipid Metabolism in Metabolic Syndrome

A large number of longitudinal studies indicate a significantly increased risk of cardiovascular events and death in patients with the metabolic syndrome. The prevalence of metabolic syndrome was 32.7% in general Mongolian population. Transgenic mice overexpressing human apolipoprotein A5 had decreased plasma triglyceride concentrations to one-third of those in comparison to control mice; conversely, knockout mice lacking APOA5 had four times as much plasma triglycerides as controls. ApoA5 has profound effects on plasma TG levels.

The objective of this study is to determine some polymorphisms of ApoA5 gene in patients with metabolic syndrome.

160 patients with metabolic syndrome for case group and 144 healthy individuals for control group selected in this study. Lipids levels were measured and DNA were extracted from blood samples. ApoA5 gene -1131T>C, IVS3+476G>A, c.1177C>T, c.1259T>C polymorphisms were genotyped by PCR-RFLP.

The results of this study is that C allele of ApoA5 -1131T>C gene polymorphism is a risk factor of metabolic syndrome in Mongolian subjects. Risk alleles of -1131T>C, IVS3+476G>A, c.1177C>T, c.1259T>C polymorphisms of ApoA5 gene are associated with increased level of serum triglyceride.

Keywords: Metabolic syndrome, Lipid metabolism, ApoA5 gene polymorphism, -1131T>C, IVS3+476G>A, c.1177C>T, c.1259T>C

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Transfer of On-farm AM-fungi Inoculum Production Technology to Enhance Rock Phosphate Use Effeciency and Crop Production of Small Holders in Africa to Farmers

In Africa, soil Phosphorus (P) deficiency constitute a constraint to smallholder's cassava and maize production. Continuous cropping in the absence of external nutrient inputs to soils has led to unproductive agricultural lands due to exportation of nutrients including P and decrease in food production. This problem is increased due to the low efficiency and high cost of soluble fertilizers. Unfortunately, only 1% the Rock Phosphate (RP), a good and cheaper source of phosphorus, produced in Mali is used by farmers because of its low solubility. One alternative is to use low-cost Rock Phosphate (RP) as P source together with inoculation of Arbuscular Mycorrhizal Fungi (AMF) and P solubilizing microbes to improve the efficiency of RP as P-fertilizer and therefore crop yields. The AMF are known to improve the P-uptake by plants. However, industrial AMF inoculum production is expensive. The aim of this project is to diffuse the technology of on-farm production of AMF inoculum in smallholder farms. For that, we willorganize training and capacity building programs, select effective AMF strains for cassava and maize, introduce On-Farm production of AMF inoculum into cassava and maize production systems and, disseminate the AMF inoculum production technology into cassava and maize small farms. The main results awaited are enhancement of Rock Phosphate P availability to cassava and increase in cassava and maize yields by at least 20%.

Keywords: AM-fungi, Rock Phosphate, Inoculum, Household farmer, Mali

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Synthesis of Functionalized 7-sec.amino-6H-benzo[c]thiochromene-8-carbonitriles as α-glucosidase and Protein Tyrosine Phosphatase Inhibitors

The α-Glucosidase inhibitors are a class of compounds that inhibit the breakdown of oligo and disaccharides from dietary complex carbohydrates in gastrointestinal tract and slowdown the absorption of absorbable monosaccharides and reduce the postprandial insulin and glucose peak. The major advantage of this class of compounds is that they are not associated with hypoglycaemia and weight gain, which are the side effects of other class of antihyperglycemic agents. The least side effects and various advantages of α-glucosidase inhibitors may help us to design and synthesize new class of compounds and intermediates, which could be tested in diabetic animal model for their α-glucosidase and protein tyrosine inhibitory activities.

The synthesize of various functionalized polycylic compounds as 7-sec.amino-9,10-disubstituted6Hbenzo[c]thiochromene8carbonitriles;7sec.amino6Hbenzo[c] thiochromene-8carbonitriles, 9-amino-7-secamino-6H-benzo[c]thiochromene-8, 10-dicarbonitriles and 2-amino-4-sec.amino-5H-thiochromeno[4,3-b]pyridine-3-carbonitriles has been reported for their biological activity against diabetes.

The modification of these compounds with various groups and changing of their position will probably enhance the inhibitory activity. We expect that among these compounds, probably some compound will exhibit excellent activity for these targets and can be helpful in generation of new drug candidate.

Keywords: α-glucosidase, Protein Tyrosine Phosphatase Inhibitors

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Physico-chemical and Pharmacological Evaluation of Essential Oils of Aromatic Medicinal Herbs and Food Plants of Mauritius

Essential oils (EOs), which are complex blends of biologically active substances, are classified as natural products having pharmacological potential that can be of therapeutic benefits in the treatment and management of human diseases. EOs extracted from medicinal herbs and food plants are gaining much interest for their multifarious properties and are widely recognised by consumers because of their ephemeral and biodegradable nature. Moreover, EOs are part of an economic trade which is a significant source of income and the market value tend to show an exponential increase in its rate of production and consumption. Nonetheless, there is currently a dearth of study pertaining to the biological activities of EOs from tropical plants from Mauritius. In addition, there has been a rise of multidrug resistant pathogens in Mauritius which is having a high impact on healthcare particularly in acute care and chronic care. Therefore, this study was designed and geared to study the physico-chemical and possible pharmacological potential of EOs extracted from 19 tropical medicinal herbs and food plants of Mauritius.

Keywords: Antibiotic resistance, Biofilm, Essential oil, GC-MS

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Dietary Evaluation of Rubber Protein Isolate: Effects on Growth Performance, Antioxidant Capacity, and Physio-Metabolic Response of *Labeo rohita*

Rubber protein isolate was prepared following the principle of iso-electric precipitation. One hundred and eighty fingerlings (average weight 4.45±0.01 g) ere randomly distributed into five treatment groups in triplicates following a completely randomized design. Five isonitrogenous diets were formulated as 0%, 25%, 50%, 75%, or 100% Rubber Protein Isolate (RPI) as replacement for Soybean Protein Isolate (SPI), and designated as Control, RPI25, RPI50, RPI75, RPI100, respectively. The RPI contributed 0%, 13%, 26%, 39% or 52% of the dietary protein in the diets. The experiment lasted for 60 days under aerated condition. Fish were fed to satiation with the respective experimental diets twice daily at 10:00 and 18:00. The highest Final Body Weight (FBW), Weight Gain (WG), Metabolic Growth Rate (MGR), Daily Growth Coefficient (DGC) and Feed Efficiency Ratio (FER) values were recorded in the control group, which was not statistically different ($P>0.05$) from the RPI-fed groups. The antioxidant (SOD, CAT) and metabolic (AST and ALT) enzymes activities did not differ significantly ($P>0.05$) among the various groups. The control group recorded higher value for total protein, but other biochemical parameters such as albumin, globulin, A/G ratio showed no variation ($P>0.05$). The results of this study provide background information on the potential of rubber protein isolate in the diets for Labeo rohita (rohu) without compromising growth and animal welfare.

Keywords: Aquafeed, Rubber protein isolate, Growth, Metabolic enzymes, *Labeo rohita*

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Comparative Antifungal Study of *Trichoderma viride* and *Chaetomium globosum*

Trichoderma viride and *Chaetomium globosum* were isolated from the Cucumber soil (rhizosphere), Omar Makram Farm in Beheara Governorate, Egypt. Isolated fungi were identified at the Plant Pathology Department, National Research Centre (NRC), Egypt, and confirmed by Fungal Taxonomy Department, Plant Pathology Research Institute, Agricultural Research Centre, Giza, according to the morphological and culture characters.

The aim of this study is concerned on evaluation the antifungal activity of *Trichoderma viride* and *Chaetomium globosum* against different pathogenic fungi. Both fungi caused inhibition of the mycelial growth of Fusarium solani, Rhizoctonia solani and Sclerotium rolfsii in the bi-culture test by (29.76, 15.27 and 19.73%) for *Trichoderma viride* and (31.44, 27.54 and 21.96%) for *Chaetomium globosum*, respectively. Phytochemical screening tests for volatile constituents, carbohydrates, tannin, sterols and/or terpenoids, alkaloids and/or nitrogenous compounds, proteins, and anthraquinones have been performed, in addition to the moisture, total ash content, water-soluble ash and acid insoluble ash have been determined on the air-dried powders of the mycelia of *Trichoderma viride* and *Chaetomium globosum*.

Further studies must be done to apply both fungi in the agricultural field as promising biological control agents of different plant diseases.

Keywords: *Trichoderma viride*, *Chaetomium globosum*, Antifungal, Bi-culture test

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Water Treatment Using Functionalized Carbon Nanofiber

Template-free porous carbon nanofibers embedded by vanadium oxide and decorated with WO3 nanoparticles (W@V-CNF) were prepared in a time and cost-saving manner by combining electrospinning and heat treatment processes. Cost-saving ammonium metavanadate was used as a semiconductor precursor of vanadium oxide (VO_x) as well as porogen. The generated pores in the carbon nanofiber (CNFs) matrix formed pathways between the embedded VO_x and the surface of CNFs and Fe NPs, thus, facilitate photo-generated electron transfer.

The characterization results revealed that W@V-CNF comprised graphitic fibers with well-dispersed distribution of nanosized Fe NPs (~7 nm) along the surface of CNF. Thereby, it enhanced the visible-light harvesting. The prepared W@V-CNF had remarkable light absorption in the visible region. It demonstrated much higher photocatalytic efficiency of photodegradation of organic dyes compared with the pure CNF and vanadium oxide embedded CNF (V-CNF). Notably, W@V-CNF achieved 99.9% dye degradation within 15-20 minutes. And, it could be conveniently recycled due to its one-dimensional nanostructural property.

Keywords: CNF, Membrane, Photocatalyst, Visible-light, Water treatment

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Core-shell Magnetic Molecular Imprinted Nanoparticles for Selective Determination of Folic acid in Different Food Samples

Folic acid (FA) is naturally occurring vitamins, which is found in a variety of food. Numerous chronic diseases are related to the deficiency of folic acid in human. In this work, Magnetic Molecularly Imprinted Polymers (MMIPs) were synthesized and tested for the determination of Folic Acid (FA) in different food samples. The MMIPs were polymerized at the surface of Fe_3O_4@SiO_2 Magnetic Nanoparticles (MNPs) using acrylonitrile (functional monomer) and Ethylene Glycol Dimethacrylate (EGDMA) as cross-linking agent and azodiisobutyronitrile (AIBN) as an initiator. The morphological and topological characteristics of the MMIPSs were investigated by Field Emission Scanning Electron Microscopy (FEGSEM), High Resolution Transmission Electron Microscopy (HRTEM), energy-dispersive X-ray spectrometer (XRD), and Fourier Transform Infrared (FTIR) analysis. The characterization, adsorption capacities and selectivity of MMIPs is investigated and compared with MNIPs. The adsorption experimental data demonstrate that maximum adsorption capacity of MMIP at equilibrium was 8 mg g^{-1} and adsorption process of FA over MMIPs follows Freundlich adsorption isotherm and pseudo-first-order reaction kinetics. These results demonstrate that MMIPs can be used efficiently for the selective extraction and determination of folic acid from different food samples.

Keywords: Molecularly Imprinted Polymer, Folic acid, Magnetic Nanoparticles, Food

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Tolerance to Salt Stress by Plant Growth-Promoting Rhizobacteria Isolated from *Panax schinseng on Brassica rapa var. glabra*

Salinity stress is one of the most enormous environmental problems that adversely affect crop production by reducing the plant growth. A promising alternative is to mitigate the salt stress by inoculating the germinated seeds with Plant Growth Promoting Bacteria (PGPB). The effects of rhizobacterial strains to attenuate the salinity stress on the germination of *Lactuca sativa* and *Raphanus sativus* seeds were tested using four concentrations of NaCl (50, 100, 150, and 200 mM). Also, PGPR strains were tested to enhance the early germination of Chinese cabbage seeds under normal conditions. *Lactobacillus sp*. and P. putida inoculation showed higher radicle length compared to non-inoculated radish seeds. LAPmix inoculation increased the radicle length of lettuce seedling by 2.0 and 0.5 cm at salinity stress of 50 and 100 mM of NaCl, respectively. Inoculation by Azotobacter chroococcum, significantly increased plumule and radicle length of germinated seeds compared to non-inoculated control. A. chroococcum increased the radicle length higher than the uninoculated seeds by 4.0, 1.0, and 1.5 cm at 50, 100, and 150 mM of NaCl, respectively. LAPmix inoculation significantly improved the radicle length in germinated radish seeds by 7.5, 1.3, 1.2 and 0.6 cm under salinity stress of at 50, 100, 150 and 200 mM of NaCl, respectively.

Keywords: Rhizobacteria, Salinity, Tolerance, Plant Growth Promotion

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Contrubtion of the Satellite Imagery Treatment to the Moniotoring of the Coastal Zone of Gulf of Hammamet, Tunisia, Northen Africa

The coastal zone of the Gulf of Hammamet is subject, since the last decade, of disproportionate and increasing occupation of natural spaces. The resultant of natural and/or human pressure is a perturbation of the coastal ecosystem. The purpose of this study is to use geospatial data sets from the satellite imageries to assess the shoreline, vegetation and anthropic occupation evolution. The methodology is based on the treatment of multidates (2001-2014) Landsat5, Landsat8 satellite imagery and ETM+ data set. Cartographic documents (missions 1981, scales 1/25000) data were completed in order to monitor and to quantify, the temporal scale evolution of the coastal areas. Three components have been the objects of the study: green space, human occupation and the coastline level. The sector of study, the bay of Hammamet, is located in the north by the Cape Ras Maâmour and the Cape Hergla towards the south. The result of the treatment of the satellite imagery shows that surface green decreased by 30% between 1987 and 2014 (±1%). Beside, the human landscapes increased from 120 km² (1987) to 1400 km² (2014) (±1%). The coastline regressed on several part as 1 m/an in northern bay and 1.2 m/an (±0.5%) in the center (Yassmine Hammamet harbour). The human infrastructures i.e., the harbour and the tourism growth disturbed sediment distribution of the coastal zones leading to the shoreline retreat. Green lands are therefore highly vulnerable to increases in human pressures.

Keywords: Satellite imagery, Cartography, Coast, Shoreline, Hammamet, Tunisia

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Noncoding RNA (ncRNAs) Expressions Pattern to Predict the Environment and Gene-Regulatory Influence Network and Phenotype of Halobacterium

Large numbers of RNA transcripts that do not correspond to known genes have been produced in all known living organisms. It has been suggested that these transcripts do not encode proteins thus it is called noncoding RNA (ncRNAs), but ncRNAs may function as RNAs to produce many biological functions.

Non-coding RNAs (ncRNAs) are involved in many biological processes and are increasingly seen as important. It appears that increasing the biological complexity is positively correlated with the relative genome-wide expansion of noncoding RNAs. Therefore the human genome and those of other complex organisms express an enormous repertoire of ncRNAs, and that their cells are awash with these RNAs, which constitute a hidden layer of molecular genetic signals.

In general lncRNAs expression levels appear to be lower than protein-coding genes and some lncRNAs are preferentially expressed in specific condition under environmental stress while lncRNAs are expressed in specific tissues in eukaryote.

Our task in this project is to discover and characterize a significant fraction of the gene regulatory network associated with the inter coordination of physiological processes in Halobacterium according to noncoding RNA expressions patterns.

Our research will help understanding how structures and dynamics of gene regulatory networks influenced by the pattern of noncoding RNA expressions have evolved to regulate complex phenotypes in Halobacterium. We will develop tools that will allow the rational engineering of gene regulatory networks at both the cellular component and network structure levels.

Keywords: Bioinformatics, Next Genertaion Sequencing, Regulatory network, Arachea

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Myco-remediation of Chromium Contaminated Liquid Using Shake Flask Technique

Chromium is a heavy metal that is widespread in the environment in trivalent and hexavalent forms. It is highly toxic to most organisms and has been shown to cause cancer in humans and chlorosis as well as necrosis in plants. Fungi play a functional role in the bioremediation processes in removal of heavy metal contaminated environment. In the present study, soil samples for fungal isolation were collected from mechanic, furniture workshops and refuse dumpsite in Benin City, Nigeria. Samples were subjected to standard microbiological culture-based method. Standard analytical methods were used to assay for chromium concentration. Based on phenotypic characterization; *Aspergillus fumigatus*, Penicillium and *Saccharomyce scerevisiae* were isolated from the sampling sites. The remediation abilities of these fungi were ascertained by Norkrans shake flask experiment incorporated with chromium (III) chloride. Samples were collected on days 0, 5, 10 and 20 and analyzed for chromium concentration using Atomic Absorption Spectrophotometer (AAS). Significant reduction was observed at a concentration of 0.0000129 mg/l of chromium in the flasks inoculated with Penicillium sp. At a concentration of 0.000126 mg/l of chromium, S. cerevisiae was shown to reduce the metal significantly on day 20. In all the control experiments that contain only the chromium without the fungi, there was no reduction in the chromium concentration. Also, in the control experiments that contain only the fungi without the chromium, the AAS readings were zeros (0.000 mg/l). On day 10, *A. fumigatus* was able to reduce 0.0000129 mg/l to 0.0000008 mg/l of chromium. The decrease in chromium concentration in the flasks amended with chromium and fungi suggest that the fungi possess the capacity to bio – adsorb the metal for their cell growth which reflected in the increase in the homogenized fungal mycelial weight using AAS machine also. These results showed that *A. fumigatus*, Penicillium sp. and S. cerevisiae have the potentials to remove chromium from environmental matrix.

Keywords: Bio-adsorption, Chromium, Contamination, Environment, Fungi, Mycoremediation, Norkrans medium

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Developing Sustainability Concept in Egyptian Curriculums

The concept of higher education for sustainable development has been highlighted by the UNESCO (2011). In their conference, three levels of university contributions are recommended including: "campus", "curriculum" and "community". According to Müller-Christ G. et al. (2014) the conference discussion related to the curriculum agreed on six ways to increase the existence of sustainability development education such as introducing new sustainability modules in architecture study. Although it is true that sustainability is broadly recognised as a core studied topic, however; implementing a view in university curriculums throws up new challenges to the academic system. This requires assessing the teaching methods and progression in order to present robust teaching methods that involve both theory and practice. This study discusses the current problem that architectural design studios in the Egyptian universities are mostly detached from the sustainability modules. This widens the gap between understanding and applying the concept. Hence, it is concerned with the ability to reach the optimum learning outcomes from integrating the sustainable development education and the architectural engineering studies. It aims to assess the influence of using different approaches to introduce the concept of sustainability on the architecture students' awareness and usability of sustainable development principles. Research methods used a comparative analysis to assess the approaches used to integrate sustainability modules in academic curriculum in both Cairo University (CU) and the British University in Egypt (BUE) representing public and private higher educational organisations respectively. The result of reviewing both academic curriculums, as well as analysing questionnaires' responses from both students and academic staff members provide valuable sort of quantitative analysis to the current problem. Research findings are intended to provide the higher educational organisations with guidelines proposed for a new curriculum which enhances the architectural students' awareness of sustainable development process and practices. Proposing these guidelines would help students apply the sustainability concepts in their practical life and meet the challenge of globalisation.

Keywords: Sustainability, Social and Environmental Responsibility, Egyptian Undergradute Curriculums

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Efficiency of QTL Mapping for Quality Trait in Tropical Popcorn Population

Previous studies on Quantitative Trait Loci (QTL) mapping efficiency assumed few QTLs of higher effect, no minor genes, and low marker density. This study assessed the efficiency of the Least Squares (LS), Maximum Likelihood (ML), and Bayesian approaches for QTL mapping assuming high Single Nucleotide Polymorphism (SNP) density, zero to three QTLs and eight or nine minor genes per chromosome, and low proportion of the phenotypic variance explained by each QTL. We simulated 50 samples of 400 individuals of F2 population, which were genotyped for 1,000 SNPs (average density of one SNP/centiMorgan) and phenotyped for three traits controlled by 12 QTLs and 88 minor genes. The genes were randomly distributed in the regions covered by the SNPs along 10 chromosomes. The heritabilities were 0.3 and 0.7, and the sample sizes were 200 and 400. The LS and ML approaches were equivalent. The QTL mapping efficiency was not influenced by the degree of dominance but it was affected by heritability, sample size, marker density, and QTL effect. The Bayesian analysis showed greater power of QTL detection, mapping precision, and number of false-positives compared to the LS and ML approaches. The most important factor affecting the QTL mapping efficiency is the QTL effect.

Keywords: F2design, Power of QTL Detection, False QTL, Bias in QTL position

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Effect of Salicin Isolated from Egyptian Willow Leaves (Salix subserrata) against Gamma Irradiation-Induce Damage in Reproductive Organs in Rats

Radiotherapy is one of the most important cancer treatment modalities that relies on the generation and use of Reactive Oxygen Species (ROS) to eradicate tumors. Gamma irradiation increased the oxidative stress marker Malondialdehyde (MDA) in the ovarian and testicular tissues. Follicle-Stimulating Hormone (FSH) and Luteinizing Hormone (LH) levels were increased significantly without change in Estradiol (E2) level in serum of irradiated female rats. In male rats, testosterone was deceased by irradiation while FSH and LH showed insignificant variations. Moreover, Irradiation induced histopathological alterations, qualitative and quantitative mutagenic effects in protein and esterase patterns in the ovary and testis tissues. Salicin treatment decreased the FSH and/or LH level in some groups of irradiated female rats whereas it elevated testosterone level in some male groups. Salicin prevented the qualitative mutagenic effect of irradiation on the native electrophoretic protein pattern and esterase pattern in the ovary tissue of some irradiated salicin treated group but it could not prevent the quantitative mutation. In the testes tissue, salicin could not resist the disturbances occurred as a result of irradiation effect in number and arrangement of the bands in all irradiated salicin treated groups. On salicin administration, conflicting results were obtained, although attenuation of irradiation damage appeared in some salicin treated group, no improvement were found in others suggesting overlap the indiscriminate effect of radiation and the order of salicin administration.

Keywords: Gamma irradiation, Salicin, Ovary, Testes, Protein electrophoresis, Esterases

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Characterization of Mandarin Fish (Siniperca chuatsi) Type I IFN and Their Receptors: Step Towards Antiviral Therapy

The increasing prevalence of viral infections in wild and commercially maintained aquatic species is raising considerable concerns. The Type I Interferons play a keyrole in the cellular defense against pathogens. In this study, we identified three IFN subtypes: ScIFNc, IFNd and a novel subtype ScIFNh and three IFN receptors: CRFB1, CRFB2 and CRFB5 from mandarin fish (*Siniperca chuatsi*), determined their relationship with other vertebrate orthologs, and examined their expression patterns and potential interactions in order to explore their role in immune defense reactions. In addition, the bioactivity of mandarin fish IFNs is investigated to explore their role in antiviral defense. Expression analysis revealed high constitutive expression of ScIFNs in lymphatic organs from healthy fish, suggesting a potential role in innate and adaptive immunity. When the in vitro modulation of ScIFNs was analyzed, it was observed that the different IFNs were regulated differentially in a time and dose dependent manner. The expression of ScIFNs was also strongly induced in head kidney lymphocytes during the stimulation using poly I:C and resiquimod (synthetic viral mimic), revealing a possible function in defense against viral infection. While *in vivo* expression analysis showed a strong induction of all IFN genes and their receptors upon stimulation using poly I:C. The recombinant ScIFN proteins were produced in Escherichia coli and were found to induce the expression of antiviral proteins such as Mx, viperin, ISG15 in head kidney lymphocytes. Consistent with mammalian IFN homologues, our expression and bioactivity results imply that mandarin fish IFNs play an important role in inducing downstream antiviral genes and host innate immune responses directed against different pathogen groups.

Keywords: Type I IFN, Mandarin fish, Antiviral function, Signal pathway

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Uncovering Potential of Indonesian Plants for Treatment of Diabetes Mellitus

Lowering lipid accumulation in adipose tissues (fat cells) is as important as enhancing insulin sensitivity in obesity-related diabetic patients due to the association between obesity and insulin resistance. Therefore, there is a growing need for medicine with twofold properties. Dried Indonesian medicinal plants were extracted with 50% (v/v) aq. methanol. The extracts were dissolved in 50% DMSO when being tested against 3T3-L1 cells. Insulin-induced glucose uptake enhancement was performed by incubating differentiated 3T3-L1 cells with samples. Originality Indonesian traditional medicine (jamu) has been practiced to treat various diseases. This is the first study which reports in vitro screening of anti-diabetes jamu in insulin-induced glucose uptake enhancement and lipid lowering activity on 3T3-L1 adipocyte model cells. This study has uncovered the potential of both *Eurycoma longifolia Jack* and *Piper nigrum L.* to increase insulin sensitivity and suppress lipid production without causing cell death in 3T3-L1 adipose cells. It is expected that the plants would promote lead compounds in new drug discovery as well as functional food.
This work provides scientific basis of the use of *Eurycoma longifolia Jack* and *Piper nigrum L.* in obesity-associated diabetes mellitus.

Keywords: Traditional medicines; Diabetes mellitus; Functional food; Medicinal plants

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Quantum Chemical Investigations of Selectivity and Mechanism of Alkylation of $[MeCHNO_2]^-$ by Me_3O^+ (oxonium) and $[x\text{-}ArCHNO_2]^-$ (X = H, NO_2, MeO) + CH_3Cl Reactions In Gas-Phase and In Solutions.

In order to reveal the solvent and alkylating agent effects, the methylation reaction $[MeCHNO_2]^-$ [(2)] + Me_3O^+ (oxonium) was studied in the gas-phase and in solution with B2PLYP/6-311+G(d,p) calculations. The results show regioselectivity towards O-methylation in the gas-phase and more significantly in solution (dichloromethane), which is in agreement with the experimental observation. In addition, it shows that the regioselectivity is highly dependent upon the reactivity of the alkylating agent (MeI vs. Me_3O^+). This same method was employed for the $[XC_6H_4CHNO_2]^-$ + MeCl (X = H, p-MeO, p-NO_2) reactions in the gas-phase and in solution (DMF). The results in solution show a slight regioselectivity towards O-methylation, however; considering that the methylating reagent used in the experiments was methyl p-bromobenzenesulfonate (MeOBS), which is much more reactive than MeCl, it should thus be expected an increase of the calculated selectivity.

Keywords: Nitronates, Mechanism, RRKM theory, SN_2, Hybrid-DFT, Intrinsic reactivity, Solvent effects, Selectivity

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Algae Mass Production from Waste Water

High Rate Algae Oxidation Ponds (HRAOPs) are paddle wheel raceways that were originally conceived by the late Professor William J. Oswald of the University of California, Berkeley. The system was developed for the final polishing of domestic waste water emerging from an Advanced Facultative Pond (AFP). A by-product of this scrubbing resulted in controlled eutrophication from algae proliferation and the symbiotic bacteria development. Recently ponds have been adapted for the generation of algae biomass for commercial utilization. Photosynthetic oxygenation occurring in this component renders this system ideal for the virtually passive perpetual production of a mixed algae consortium, in an open bioreactor. This system has various limitations regarding commercialization for algae production, however; these be assessed during this study. Amendments to the design of the system could result in improved mass transfer of carbon dioxide from gas to liquid, improved volume to surface area ratios for the effective absorption of photons. This project will consider the modification of the traditional high rate algae oxidation pond to overcome constraints associated with commercializing raceways for algae production. Two identical raceways will be constructed and one will be modified by the addition of elements that will provide both improved gas-mass transfer and volume to surface areas ratios with the view to improve average productivities of the raceway to $50 g^{-1}.m^{2}.yr^{-1}$.

Keywords: Micro algae, waste water, remediation, sustainability

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Influence of Acupuncture on Management of Cancer Pain

Pain is a distressing and pervasive problem for people with cancer. In recent years, acupuncture has gained increasing attention among researchers as an alternative management strategy for Cancer-Pain Management (CPM). The Objective of this study to evaluate the effectiveness of acupuncture for CPM. Seven databases (Medline, CINAHL, Scopus, the Cochrane Library, CAJ Full-text Database, China National Knowledge Infrastructure (CNKI) and the Wan Fang Database) were searched up to May 2015. In addition Randomized Controlled Trials (RCTs) of acupuncture for CPM treatment were considered for inclusion.

The Results show that in cancer pain management, acupuncture is effective for head and neck pain, back pain, waist pain, abdominal and chest pain. Many studies confirm the excellent efficacy of acupuncture against symptoms of vomiting and nausea, including those induced by chemotherapy and radiotherapy. The currently available evidence suggests that acupuncture is a safe, effective and low cost therapy, which further permits cancer patients to actively participate in their own care plan.

The conclusions of the study provides reviews of variable quality showing that acupuncture, either used in isolation or as an adjunct to conventional therapy, provides improvements in pain and function for CPM. More efforts are needed to improve both internal and external validity of RCTs in this area.

Keywords: Pain, Cancer pain, Acupuncture, Traditional Chinese Medicine

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The Synthesis of Ni-based Nanostructured Catalysts for the Methane Reforming with CO_2

Climate change and air quality are major environmental concerns because they directly affect the way we live and breathe. In order to meet the present and future threats generated by emissions to the atmosphere, environmental agencies around the world have issued more stringent regulations. One of them is the control of residual sulfur in diesel fuel and emission standards for particulates from diesel vehicles. All these facts have recently aroused renewed interest in the Fischer Tropsch Synthesis because it can produce super clean diesel oil fraction with high cetane number without any sulfur and aromatic compounds, using syngas from natural gas. Other factors such as the increase in the known reserves of natural gas, reforming low-cost natural gas to produce hydrogen can provide the commercial hydrogen production capacity needed to support a full fleet of fuel cell electric vehicles. Over the long term, hydrogen production from natural gas will be augmented with production from renewable, nuclear, coal (with carbon capture and storage), and other low-carbon, domestic energy resources. Producing hydrogen from natural gas does result in the emission of greenhouse gases, as shown in the chemical reactions above. When compared to internal combustion engine vehicles using gasoline, however, using hydrogen produced from natural gas reduce greenhouse gas emissions. The work focuses on the synthesis of Ni-based nanostructured catalysts for the methane reforming with CO_2. A series of Ni-based catalysts were synthesized using organometallic complexes precursors in order to assess nanoparticle formation. Different Ni contents over La_2O_3 were initially used in order to establish the "metal load/support" mass ratio necessary to improve the catalytic activity and reduce deactivation by carbon formation. Synthesized solids were characterized by techniques such as AES-ICP, FT-IR, XRD, TPR, BET surface area and TGA-DSC.

Keywords: Nanoparticles, Syngas production, Ni-ethylenediamine Complexes; Methane Dry Reforming

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Morphodynamics of Sandbar Under Storm on the Microtydal Beach of the Medjerda delta, Gulf of Tunis, Tunisia, Mediterranean Sea

The study area is located in the western bay of the Gulf of Tunis: sandy beaches of Kaâlat Andalous and Raoued (mouth of the Medjerda delta). The analysis was carried out with a sediment surface sampling and topo-bathymetric measurements of the nearshore bedforms under summer storm surge i.e., southern east waves (June 2014). A total of 70 samples were collected in the swash-surf zone (isobaths: 0 to - 4 m). The calculation of the morphodynamics parameter Ω (Gourley index) and ξ (surf similarity index) indicates respectively between 2,7 - 6 and 0, 4 -1,33 values; The Medjerda beaches are intermediate beaches. The beaches of Kalâat Andalous are dissipative (Ω = 11,4 and 12,4; ξ = 0,54 and 1,52). The spatial distribution of textural sediment during the summer storm is often heterogeneous. On the other hand, the bathymetric 3D and 2D mapping shows the existence of nearshore sandbars systems: the inner sandbar (recorded at -1.5 m depth), which the shape is transversal and continuous (TBR) and the outer sandbar (at -4 m depth) seems to be asymmetrical and crescentic shape. The grain size analysis established reveals coarseness and bimodality of the sediment trend on the lee side of the sandbar and the deepest interspaces i.e. to rip channel structure. This preliminary study shows that the sandbar forms an unstable structure where breaking and segment reorientation can occur depending on changes, of swell conditions. The shortage of available sand depends of the source supply whish are obviously changed (human and natural factors).

Keywords: Storm, Intermediate beach, Sandbars, Grain size, Gulf of Tunis

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Greenhouse Biocontrol of Tomato Ralstonia Wilt Using Selected Bacillus Strains

Plant diseases continue to devastate food crops, thus, affect food production negatively meanwhile the demand for food continues to rise with the rapidly growing population. Conventional plant diseases control measures are either lacking or are associated with negative impacts on the environment, human and animal health. Recently, Plant Growth Promoting Rhizobacteria (PGPR) have attracted attention as safer alternatives to the harmful chemical inputs in agriculture. PGPR promotes plant growth and crop productivity by acting as biocontrol agents of plant diseases and biofertilizers, and some help plants to tolerate environmental stresses like salinity and heavy metals. The effectiveness of PGPR as plant growth promoters and biocontrol agents has been substantiated in many parts of the world, however, PGPR show a high degree of specificity in action and work differently in different environments, plants and against different plant pathogens. This study therefore aimed at establishing the effectiveness of 9 Bacillus strains as biocontrol agents against tomato Ralstonia wilt in greenhouse conditions and eventually as possible sustainable alternative control measure against plant crop diseases. The studied strains reduced the Ralstonia disease incidence of tomato at varying degrees, with B. amyloliquefaciens subsp. plantarum (UCMB5140) and B. atrophaeus (UCMB5137) showing the most effectiveness. Priming the tomato plants by Induced Systemic Resistance (ISR) and/or antimicrobial compounds produced by the strains were suggested as mechanisms of action against the bacterial wilt pathogen. The results of this study show that Bacillus strains may potentially be applied as biocontrol agents against Ralstonia tomato wilt, however; further studies in field conditions and experiments with combinations of Bacillus strains showing most promising results are recommended to come up with a biocontrol strain(s) that can be developed into a commercial product.

Keywords: Biocontrol, Plant Growth Promotion, food security

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Safety and Anti-Proliferative Activity of *Prunus africana*, *Warburgia stuhlmannii* and *Maytenus senegalensis* in Breast and Colon Cancer Cell Lines

Cancer is the leading cause of death worldwide. The objective of this study was to determine the anti-proliferative activity of *Prunus africana*, *Warburgia stulhamannii* and *Maytenus senegalensis* in breast (4T1 ATCC®CRL-2539TM) and colon (ATCC® CRL-2638TM) cancer cell lines. The *in vitro* assays involved determination of the cytotoxic concentration levels (CC_{50}) of the plant extracts on Vero cells as well as calculating the inhibitory concentration (IC_{50}) of the plant extracts on breast and colon cancer cell lines. The drugs with the highest Selectivity Index (SI) to have low IC50 in the breast and colon cancer cell lines and high CC_{50} in Vero cells were used in the *in vivo* assays which involved acute oral toxicity studies, conducted on 8 weeks old Swiss albino mice to calculate the median lethal dose (LD_{50}). The safest effective drugs were of leaf methanolic extracts of leaves from *Prunus africana* whose triplicate results showed an average IC_{50} of 164.64±4.14 µg/ml in the breast cancer cell lines and 21.33±0.5 µg/ml in the colon cancer cell lines, as well as the stem bark water extracts from *Warburgia stuhlmannii* whose triplicate results showed an average IC_{50} of 332.79±7.53 µg/ml in the breast cancer cell lines and 107.20±2.50 µg/ml in the colon cancer cell lines. Both extracts had an average CC_{50} of >1000 µg/ml in Vero cells. Based on positive cytotoxicity results on the two extracts, acute oral toxicity studies were conducted on 8 weeks old female Swiss albino mice.

Keywords: Breast cancer, Colon cancer, *Prunus africana*, *Warburgia stuhlmannii* and *Maytenus senegalensis*

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Alteration in Defense Related Enzymes in Alstonia scholaris due to *Pauropsylla tuberculata*

Alstonia scholaris is a small evergreen tree belongs to family *Apocyanaceae* and is of great medicinal value. Its bitter milky juice and bark are a source of cure for ulcers, malaria, heart diseases, asthma, leucoderma, tumors and very good for the treatment of chronic ulcers, chronic diarrhoea. Unfortunately in the vicinity of University of Punjab, Lahore, the vegetation of this tree is severely affected by an insect, which resulted in leaves deformation with gall like structures. In this study, physiological and biochemical assays of disease and healthy plant were done. The assays included were osmotic potential, Membrane Stability Index (MSI), Relative Water Content (RWC), sugar contents, protein content, Peroxidase activity (PO), Catalase activity (CAT), Phenyl Analine Ammonia Lyase (PAL), Polyphenol Oxidase (PPO), nitrate reductase, phenolic contents, and proline contents. Results showed that drastic reduction in chlorophyll content, PO, PAL, MSI and CAT of diseased leaf as compared to healthy one. Whereas, protein, PPO, sugar, phenol, proline and relative water content was significantly increased in affected leaf over control. It seems that pathogen collapse the plant defense system through deactivation and unbalancing the production of defense related enzymes. Therefore, it is imperative to take disease management measure to combat pathogen on urgent basis.

Keywords: *Alstonia scholaris*, Insect, Defence-related enzymes

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Functional and Structural Characteristics of Open Ditches for Non-Point Source Pollutants Management in the Central Sichuan Basin, China

The function of open ditches as contributors to the accelerated eutrophication of rivers has hardly been assessed, especially for a large basin Three Gorges Reservoir (TGR) open ditches. Forty open ditches in TGR from multiple land use types will be extensively investigated for two years for ten parameters of water quality. Surface ditches provide many ecosystem services resulting from a combination of geophysical, geochemical, and biological processes that make them unique in comparison to other aquatic ecosystems (Jeanne et al., 2015). The values and function of ditches have been generally ignored (Bennett et al., 2005). Moreover, ecosystem services provided by ditches may be valued as positive or negative. Ditches connected to agricultural fields may also contributes to the discharge of contaminants to downstream receiving water bodies, which has been recognized as a major contributor to the accelerated eutrophication of rivers and lakes. The objectives of this study were to to develop strategies for improving surface runoff treatment and reducing pollutants, to improve understanding of the functional and structural characteristics of surface ditches, and to develop groups that reflect the potential of ditches for mitigation strategies.

Keywords: Eutrophication, Land use types, Non-point pollution, Three Gorges Reservoir Area, Wetland plants and open ditch

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Glycerol-Based Green Synthesis of Shape-Controlled Gold Nanoparticles and Their Biological Applications

Owing to their widespread application, the preparation of monodisperse shape-controlled gold nanoparticle (AuNPs) by green methods and using low cost and environment friendly reagents is of great importance. Among the different shapes, gold nanorods (AuNRs) have recently attracted great attention due to their unique size-dependent optical properties which allows their application in diagnosis and treatment of diseases sensing and imaging and as thermal therapeutic agents, among others. Here, we introduce, for the first time, a one-pot seedless method for the preparation of single crystalline AuNRs in almost 100% yield based on the use of glycerol in alkaline medium as an eco-friendly, low cost and pH-tunable reducing agent. The effect of the presence of capping agent (CTAB) and the concentration of reactants (glycerol, pH, and AgNO3) on the yield and aspect ratio (AR) of AuNRs is discussed. AuNRs were obtained in almost 100% yield at room temperature and under mild reducing environment. We could tune the longitudinal plasmon resonance band of the resulting AuNRs between 620 to 1200 nm by varying the reaction conditions. Within this region, biological tissue has minimal effect on light. Variation of the pH of the reaction mixture in the range 12–13.5 results in the formation of AuNRs with different ARs (2-6) and in different yields (27–99%). For biological studies in the next step, these AuNRs will be functionalized with tannic acid to reduce cytotoxicity (due to CTAB) and improve cellular uptake. The biocompatibility of the functionalized AuNRs as function of concentration will be studies. Studies on the uptake of the functionalized AuNRs by mammalian cells will be studies and compared with pegylated GNRs.

Keywords: Gold nanorods, Gold nanoparticles, Biomedical, Glycerol, Green synthesis

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Design, Synthesis, and Biological Evaluation of Selenium-Based Novel Benzothiazoles

The antioxidant properties of organoselenium compounds have been extensively investigated with the aim of developing new drugs, since oxidative stress is responsible for a variety of chronic human diseases. Similarly, biological importance of benzothiazoles has attracted the attention of a large number of chemists and pharmacologist worldwide. Herein, we reported for the first time the synthesis of benzothiazole based oraganoselenides by a simple, environmentally friendly and robust synthetic route. All the products were obtained in good to excellent yields. These new hybrids of benzothiazole-based oraganoselenides represent promising structures with different biological activities, which can act against oxidative stress through diverse mechanisms of action. The glutathione peroxidase-like assay (GPx-like activity) of the new synthesized compounds indicated that they reduced H_2O_2 to water at the expense of PhSH. Most of the synthesized compounds are 17 times or more active than standard drugs and with no toxicity. Further biological studies (*in vitro* and *in vivo*) are in progress through the collaboration of different research groups in order to explore the potentiality of these compounds and possible animal trials.

Keywords: Antioxidant, Anticancer, Organoselenide, Benzothiazole

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The Study of Agronomic Characters of Heterogeneous Varieties Composition of Gliadin Proteins

The problem of increasing productivity and improving the quality of varieties of wheat grown in Republic of Uzbekistan has become one of the main objectives of plant breeders and genetics. Guarantee for a good harvest with improved processing and baking quality of grain can be achieved by maintaining the genetic purity of cultivated and breeding material.

In this connection, the study of the varietal purity for the recognized varieties of wheat using biochemical methods involves great interest. Alcohol-soluble storage protein of wheat gliadin is the cultivar specific. By analyzing the electrophoretic spectra, it can reveal the purity and composition of the populations of varieties and lines of wheat. We have analyzed the composition of the populations of some varieties of locally selected soft wheat using the method of polyacrylamide gel electrophoresis of gliadin proteins.

The results of the study found that 9 out of 13 varieties are monomorphic in electrophoretic spectrum of gliadin, and the other four varieties consisted of different groups of electrophoretic populations. At present, the study of agronomic characters of heterogeneous varieties composition of gliadin proteins are carried out.

Keywords: Wheat, Protein, Gliadin, Electrophoretic, Heterogeneous

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Design and Synthesis of Selenium-based Oxdiazole Derivatives and their Pharmacological Study

Organoselenides have been documented as promising pharmacological agents against a number of diseases associated with oxidative stress. Furthermore, the biological importance of oxadiazoles has attracted the attention of a large number of chemists and pharmacologist worldwide. Here, we report the synthesis of new oxadiazoles core substituted with organoselenides as potential antioxidants, through a simple, environmentally friendly and robust synthetic route. These new selenides having oxadiazole core represent promising structures with various biological activities, which can act against oxidative stress through diverse mechanisms of action. The glutathione peroxidase-like assay (GPx-like activity) of the new synthesized compounds indicated that they reduced H_2O_2 to water at the expense of PhSH. All of these compounds are 15 times or more active than standard drugs and without any toxicity. These results contribute to understanding the influence of the structural design on the potential use of new organoselenium compounds as synthetic mimetics of antioxidant enzymes. Furthermore, detailed *in vivo* and *in vitro* biological studies are in progress in different research groups through the collaboration, in order to explore the potentiality of these compounds and possible animal trials.

Keywords: Oxadiazole, Antioxidant, Organoselenide, Anticancer

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Modelling of Environmentally Friendly and Smart Nano-Marine Antifouling Paints

The remarkable surface properties and favorable environmental impacts of nonstick, silicon-based, and Foul-Release (FR) paints support their economical and ecofriendly use in the marine shipping industry. The development of novel nanocomposite models has become vital to economic and ecological concerns. This work demonstrated the design of ecofriendly, smart, silicone-enriched, nanocomposites as novel models for maritime navigation applications. Different NPs concentrations were then bended in silicone nanocomposites using polymer solution casting for comparative purposes. Morphological and surface studies were conducted using scanning electron microscopy, transmission electron microscopy, X-ray diffraction techniques. The Surface Wettability (SW) of fabricated nanocomposites was determined through contact angle measurements. Results revealed the influence of well-dispersed polymer matrix nanocomposites on the surface, chemical, and mechanical features of the prepared FR coating. Several microorganisms were used to investigate the FR performance of the prepared nanocomposites. A field trial was also conducted to examine the AF performance in natural sea water for 12 months. The proposed nanocomposite system could be potentially used to completely control fouling via a nontoxic method through a physical antiadhesion mechanism.

Keywords: Shipping industry, Nanostick, Nanocomposites, Antifouling systems, Nanofillers, Laboratory assays, Field measurements

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Growth Performance and Feed Conversion Efficiency of Pigs Supplemented with *Moringa oleifera* Leaf Meal (MOLM)

This study was conducted to determine the potentials of supplementing growing pigs with *Moringa oleifera* plant in their diets. Twenty four (24) weaned pigs were assigned to four dietary treatments containing: 0% (T1), 3% (T2), 6% (T3) and 12% (T4) MOLM each with 2 replicates of 3 pigs each. Feed intakes, were recorded daily while the pig weights were measured weekly for a period of seven weeks. Descriptive statistics for feed intakes, daily gains and Feed Conversion Efficiency (FCE) were calculated and their significance assessed through one-way ANOVA. The average daily feed intakes for the T4 (3.16 kg) were significantly higher compared to the T2 (2.61 kg) and T3 (2.54 kg). The average daily gains (0.836 kg) for the T2 were significantly higher ($P<0.005$) compared to 0.807, 0.810, 0.810 and 0.810 kg for T1, T3 and T4 respectively. T2 group had significantly ($P<0.05$) higher FCE (31.57%) compared to 28.05% and 30.31% for the T1 and T4 respectively. In conclusion, MOLM could be included in pig's diet to a level of 3% without negative effects on growth rates, feed intakes and FCE.

However, the key areas that should be addressed by the subsequent studies are; to what extent of pig growth and feed conversion efficiencies are depressed by the higher dietary concentrations of MOLM and what could be the actual cause of the observed negative effects. Furthermore, in order to inform on the profitability and beneficial utilization of the plant in pig feed formulation in Kenya, the actual costs of production per kilogram of the MOLM ought to be determined.

Keywords: *Moringa oleifera* Leaf Meal, Feed Conversion efficiencies, Feed intakes, growing pigs

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Preservation of Traditional Wagashi Cheese Using Essential Oils: Impact on Microbiological, Physico-Chemical and Sensorial Characteristics

Modern society is increasingly looking for foods without synthetic additives. This has increased interest in essential oils recognized GRAS for food preservation. This study aims to increase the shelf life and to improve the quality of traditional cheese wagashi using essential oils. It has consisted to evaluate the microbiological, physico-chemical and sensory qualities of wagashi samples treated with 1000 ppm of essential oils of *Cymbopogon citratus*, *Ocimum gratissimum*, *Pimenta racemosa* and *Syzygium aromaticum* compared to that of wagashi treated with sorbic acid. The results showed that all samples treated with oils and stored at 25 °C and 4 °C were free of *Salmonella spp.*, *S. aureus*, *E. coli* and *Clostridium* spores for during the experiment time. Furthermore, microbial loads in total flora for wagashi were mainly composed of lactic flora and yeast. All samples tested were satisfactory, from the microbiological point of view following the requirements of the Trade Federation of Enterprises and Distribution (FCD, 2015) on traditional cheese. For the physicochemical quality, the pH of samples stored at 4 °C slightly decreases over time compared with those stored at 25 °C. Referring to the titratable acidity, the samples stored at 25 °C become more acidic over time. Samples stored at 4 °C have generally maintained their physicochemical integrity in two weeks unlike those stored at 25 °C. For the sensory quality of the initial products, the sample treated with sorbic acid has been well appreciated by the tasters noted that this sample was of very good quality followed by sample treated with C. citratus essential oil. Then, come the samples of wagashi treated with oils of Pimenta described as fairly good and those treated with the other two oils as fair quality. The study revealed that application of essential oils of Pimenta racemosa and Cymbopogon citratus as substitute of synthetic additives coupled with storage at 4 °C is the most promising process for wagashi preservation, as it increases shelf-life compared to the normal wagashi preservation.

Keywords: Essential oil

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Direct Synthesis of Mesostructured Carbon Nanofibers Decorated with Silver-Nanoparticles as a Multifunctional Membrane for Water Treatment

One-dimensional (1D) porous Carbon Nanofibers (CNFs) decorated by silver (Ag) nanoparticles (NPs) was prepared using a one-pot/self-template synthesis strategy by combining the electrospinning and carbonization methods. The characterization results revealed that Ag NPs were homogenously distributed along the CNFs and possessed a relatively uniform nano-size with an average of 12 nm. The novel membrane distinctively displayed enhanced photocatalytic activity under visible light irradiation. The membrane exhibited excellent dyes degradation and bacteria disinfection in batch and continues flow experiments. The high photocatalytic activity can be attributed to the highly accessible surface areas, good light absorption capability, and high separation efficiency of photogenerated electron–hole pairs. The as-prepared membranes can be easily recycled because of their 1D property.

Keywords: Self-templated, Mesostructured, Carbon nanofiber, Photocatalyst, Antibacterial

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Histological Analysis of Hybrids from *Vuralia turcica* and *Vicia faba*

Due to the appearance of a 2-3 free carpellate-ovary, *Vuralia turcica* possesses a valuable character in the breeding of fruit crops among the plant species of the family Fabaceae. Although this plant species is very important for crop improvement, based upon our review of the literature, no hybridization technique has to date been performed on this species. To understand whether gene transfer is possible between V. turcica and another species within the same family, crosses in this study were first accomplished by a classic technique. *V. turcica* and *V. faba* were used. Cross-pollination between *V. turcica* and *V. faba* was performed at Nezahat Gokyigit Botanical Garden of Istanbul, during the pollination period of May and June 2012. Six pistils from cross pollinated species were collected from the first to tenth day after pollination to perform pollination possibilities. All pistils were then fixed in a FPA-70 solution and stored at 4 °C. Pistil samples were stained with aniline blue; following staining and squashing, the samples were then observed under fluorescent microscope. As a result, in all samples of one day after pollination, pollen tubes reached the ovary. Ovule development tended to increase from
1 to 5 days after pollination. To determine embryo formation, paraffin block analysis was implemented and globular hybrid embryos were observed. The findings presented have implications for crop improvement and use of V. turcica in further plant breeding research.

Keywords: Cross-pollination, histological analysis, hybrid, *Vuralia turcica*, *Vicia faba*

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Designing Efficient Photocatalysts for Environmental Remediation through Heterogeneous Photocatalysis Using Solar Light

Heterogeneous photocatalysis based on TiO_2 has proved to be one of the most efficient methods for the photocatalytic degradation of indoor and outdoor pollutants. However, practical applications of semiconductor photocatalysts are limited by the requirement of continuous supply of UV light, which is only around 6% of the solar spectrum. In my current project, we are attempting to extend the application of TiO_2 to visible and IR region of the spectrum by preparing composite photocatalysts with architecture represented as SiO_2-WO_3-TiO_2/Ag where the active components (WO_3, TiO_2 and Ag) are supported on SiO_2 sub-micron particles in a core@shell configuration. The composite photocatalyst is expected to be active under both UV (direct activation of TiO_2) and visible light (due to WO_3 and Ag) illumination and show improved photocatalytic and antibacterial activity (due to Ag) owing to the increased specific surface area, better dispersion and higher thermal stability of the supported TiO_2 and efficient absorption/harvesting of light. The resulting composite photocatalyst will be tested for disinfection of water in a homemade photo-reactor under optimized illumination conditions. Adsorption of different commercial dyes on SiO_2@TiO_2 and Fe_3O_4@SiO_2@TiO_2 are being studied in order to relate the structure-photoactivity relationships and optimize the conditions for the photodegradation of the dyes. Another aspect of this project is to coat TiO_2 and Ag nanoparticles on inert flexible supports such as bacterial cellulose and plant cellulose and thus prepare antibacterial facemasks that can be safely discarded after low dose irradiation with a conventional UV lamp used in hospitals. The successful completion of the project may help in useful utilization of solar energy for photochemical and photoelectric applications based on TiO_2, especially environmental clean-up through heterogenous photocatalysis.

Keywords: TiO_2, WO_3, Photocatalysis, Thin coatings, Antibacterial, Dyes removal

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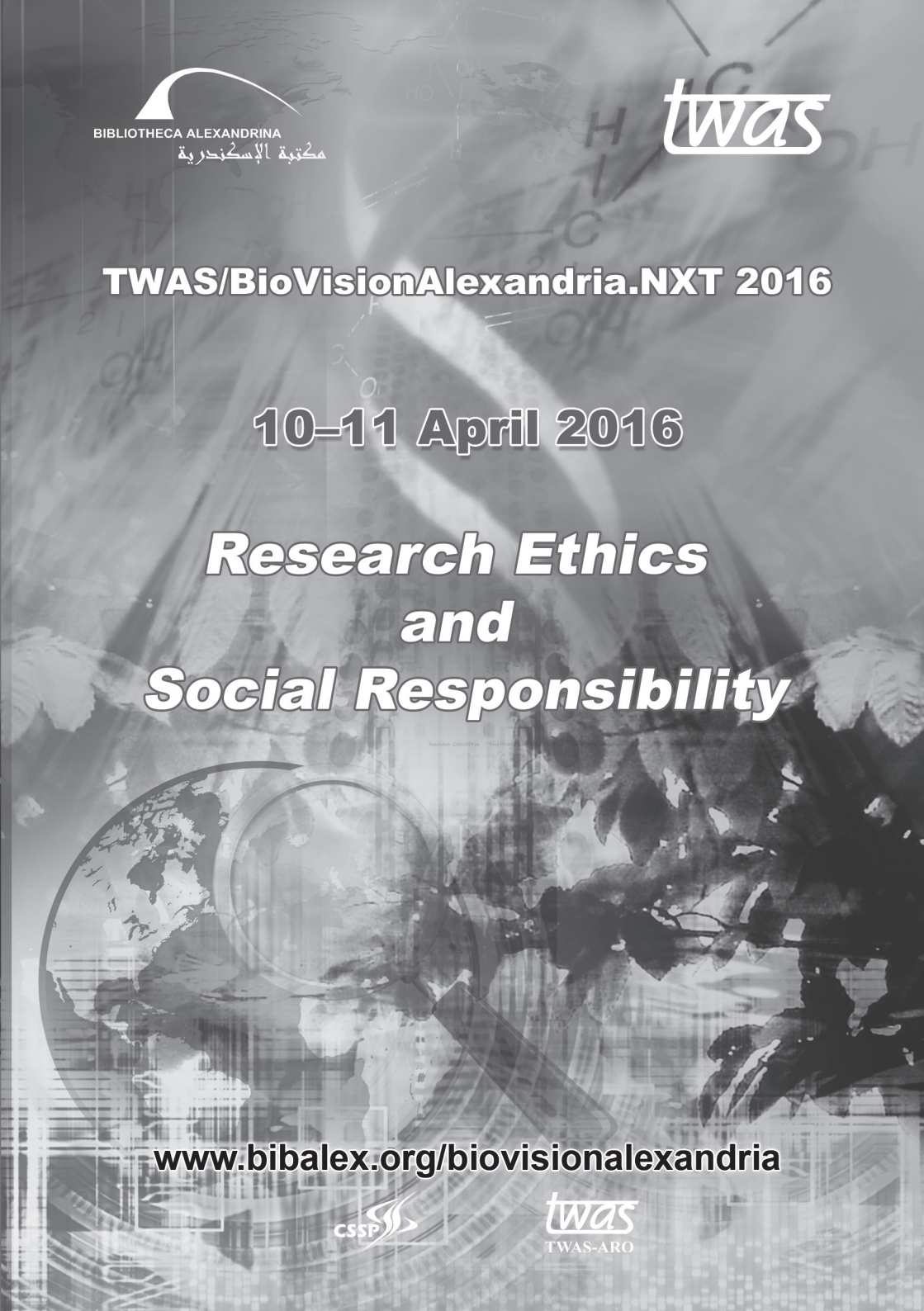
Fermentation of Pyrolytic Sugars Obtained from Cellulosic Waste Cotton with Yeast for Bio-Ethanol Production

Anhydrosugar, levoglucosan (1,6-anhydro-b-D-glucopyranose, LG) is the most abundant and the most attractive fermentation substrate found in pyrolysis oil produced by fast pyrolysis of cellulosic waste cotton. Bio-oil produced from untreated biomass contains up to 12% levoglucosan while pre-treated biomass can result in bio-oil that contains up to 30% LG. Pyrolysis oil was intially diluted with water and then extracted with ethyl acetate to remove phenolic inhibitors and then hydrolyzed with sulphuric acid in autoclave, after hydrolysis 5% activated carbon was used to remove further detoxify the hydrolysate. Saccaromyces cerevisiae was used to ferment the detoxified pyroltic sugars in shake flask as well stirred fermentor yielding 0.45±1 g/g glucose, and 0.44±1 g/g glucose respectively. The ethanol yield calculated in thus study was 90% of the theoretical yield of glucose. Further process optimiation studies in fermenter may improvethe overall productivity of ethanol production that would help in the commercialzation of pyrolysis bio-refinery.

Keywords: Pyrolysis oil, Pyrolytic sugars, Levoglucosan, Bio-ethanol, Levoglucosan kinas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