

**Proceedings of the World Congress & Expo on
Biotechnology and Bioengineering**

Keynote Presentations

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March 27-29, 2017, Crowne Plaza Dubai – Deira, Dubai, UAE



Osama O. Ibrahim
Bio Innovation LLC, USA

The history of biotechnology in drugs discovery and its future perspectives

Bioprocess technology encompasses all of the basic and applied sciences in microbiology, biochemistry and molecular biology as well as the engineering aspects to fully exploit living systems and bring their products to the market place. To-day bioprocesses have become widely used in several fields of commercial biotechnology including in medicines and drug discovery. While our understanding of biotechnological process has rapidly and remarkably advanced in recent years, it has been in existence since prehistoric times, making it one of the oldest technology even before the discovery of the field of microbiology. The discovery of microbial enzymes and the development of bioconversion technology led to the production of new drug with high yields and cost effective. Bioconversion process is also known by the name biotransformation and refers to the use of living organisms or its extracted enzymes to carry out chemical reactions that are not feasible or costly when produced by synthetic chemistry methods. These enzymes convert a substance to a chemically modified form with multiple uses and applications including medicines. In the 1980s, the recombinant gene technology led to the production of genetically engineered insulin for diabetes as the first product manufactured with recombinant technology. This newly developed genetic engineering technology has led to the introduction of a large number of new bio drugs such as interferon, tissue plasmogen activator, erythropoietin, colony-stimulating factors, and monoclonal-antibodies.

Biography

Osama Ibrahim is a highly-experienced Principal Research Scientist with particular expertise in the field of microbiology, molecular biology, food safety, and bioprocessing for both pharmaceutical and food ingredients. He is knowledgeable in microbial screening /culture improvement; molecular biology and fermentation research for antibiotics, enzymes, therapeutic proteins, organic acids and food flavors; Biochemistry for metabolic pathways and enzymes kinetics, enzymes immobilization, bioconversion, and Analytical Biochemistry. Dr. Ibrahim was external research liaison for Kraft Foods with Universities for research projects related to molecular biology and microbial screening and holds three bioprocessing patents. In January 2005 retired from Kraft Foods and formed his own biotechnology company providing technical and marketing consultation for new startup biotechnology and food companies.

Ibrahim received his B.S. in Biochemistry with honor and two M.S. degrees in Microbial physiology/ Fermentation and in Applied Microbiology. He received his Ph.D. in Basic Medical Science (Microbiology, Immunology and Molecular biology) from New York Medical College. He is a member of American Chemical Society, American Society of Microbiology, and Society of Industrial Microbiology since 1979.

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Rob Brown

Synthetic Genomics Inc., USA

Harnessing the power of nature to address global challenges

Today, many products we know, use and consume are produced by biological systems — from medicines to nutritional products to chemicals. There are a multitude of institutes and companies around the globe utilizing synthetic biology and genomics to address issues of titer, productivity and yield of commercial products which tend to be manufactured in conventional systems such as *E. coli*, yeast and mammalian cell lines e.g. CHO or HEK. These systems have limitations but are pursued because of the developed tools and the familiarity with regulatory agencies.

At Synthetic Genomics Inc. we have extensive expertise in biodiscovery and cutting edge genomics to develop improved or novel hosts with the goal of achieving a step change improvement in production costs and quality. These novel hosts will also open up opportunities for innovative and sustainable solutions. Many products are currently sitting on the shelves of R&D labs because traditional hosts made producing those products technical unfeasible or cost prohibitive.

We believe that every product, solution and innovation starts with data. We have sequenced and annotated thousands of genomes and metagenomes from diverse environments around the world. Our proprietary bioinformatics platform enables scientists with a set of analytical and design tools, to decipher complex genomic information, understand phenotypic and metabolic traits and translate them into actionable information. Understanding nature's design rules, how living organisms have evolved, and how they function allows smooth transition from in silico design to DNA synthesis and assembly.

Here I show several examples where we have developed novel production systems by engineering and optimizing both the cell specific productivity as well as the manufacturing process. We continue to leverage to the power of Mother Nature to revolutionize the current paradigm in bio-based production.

Biography

Rob leads a multifunctional metabolic engineering team in the design and development of microbes for the production of advanced biofuels and chemicals. This includes a world class phototrophic strain development group. Rob has over 20 years of experience in molecular biology and gene expression in the Biotechnology sector. Prior to SGI, Rob worked at Diversa Corp. (San Diego), developing recombinant expression systems for industrial enzymes and animal vaccines. Before coming to the US Rob held research positions at; Solexa Ltd (Illumina Inc.), The Dow Chemical Company, Chirotech Ltd. (Dr Reddys), Chiroscience Plc. (Celltech, UCB) working on enzyme engineering for industrial applications including single molecule DNA sequencing, pharmaceutical intermediate production and assay development for drug discovery. He received his PhD in bacterial pathogenesis from the Centre of Microbial Research and Microbiology, Porton Down, UK and has over 20 issued patents and pending applications in various areas of industrial biotechnology.

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Jianguo (James) Yang
Abpro, USA

Strategic partnership for success in biologics

Biologic drugs on the market now have been results of some partnership from RD to commercialization. Increasing complexity of biologic drug development requires more collaborations or partnerships in biopharma industry. This presentation will review current status of biologic drugs market and articulate landscape and importance of strategic partnerships in biologic drug research and development, and future trends.

Biography

Jianguo (James) Yang has over 20-year extensive experience in biopharma industry. Currently, Yang is President / CEO Abpro-China (Abpro, a Biotech company based in Boston area, USA). Before joining Abpro, Yang was CSO / VP Biologics in Qilu Pharmaceuticals, and also had scientific leadership positions in several global 500 pharmaceutical companies, including in Abbott Lab Pharma Division (current AbbVie), MedImmune /AstraZeneca, Genzyme / Sanofi. Yang has published numerous patents and scientific papers, and is an editor advisor and reviewer for Bioprocess International (Journal), and Executive Director, Sino-America Pharmaceutical Association-NE (2012-2014), and reviewer for several scientific journals. As international recognized scientist in biopharma Industry, Yang is a frequently-invited speaker for international biotech/biopharma conferences. Yang got his Ph.D. in cell/molecular biology from Illinois Institute of Technology, USA.

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Keiko Ikemoto

Iwaki Kyoritsu General Hospital, Japan

D-cell hypothesis of schizophrenia: A breakthrough for novel therapeutic strategies of neuropsychiatric disorders

Due to complexity of the human central nervous system (CNS), there is an urgent necessity to elucidate pathophysiology of disorders in the human CNS. By using a Patent Cooperation Treaty (PCT) patent-required method, the author specified anatomical subgroups of human CNS D neurons (trace amine (TA) neurons) (Ikemoto et al. 2016), demonstrated D-neuron decrease in the nucleus accumbens (Acc, D16) of postmortem brains with schizophrenia (Ikemoto et al. 2003), and established “D-cell hypothesis (TA hypothesis) of schizophrenia”. The human D-neuron system is far developed in the forebrain in comparison with that of other species, including non-human primates (Kitahama et al. 2009). The TAAR1 (TA-associated receptor, type 1), exclusive receptor of TAs in humans, has a large number of ligands including tyramine, β -phenylethylamine and methamphetamine, which effect on human mental states. The “D-cell hypothesis” is that accumbal D-neuron decrease in schizophrenia and consequent TAAR1 stimulation decrease onto terminals of midbrain ventral tegmental area (VTA) DA neurons induces mesolimbic DA hyperactivity (Bradaia et al. 2009) of schizophrenia. Dysfunction of subventricular neural stem cells (NSC) located in Acc (Sanai et al. 2004) is the cause of D-neuron decrease in Acc (Ikemoto 2012). DA hyperactivity which inhibits NSC proliferation (Kippin et al. 2005) causes disease progression of schizophrenia. The rationale is that the “D-cell hypothesis of schizophrenia” is a pivotal theory to link NSC dysfunction hypothesis to DA hypothesis. (1) TAAR1 agonists or TAAR1 partial agonists (Revel et al. 2013), (2) DA D2 antagonists, and (3) neurotrophic substances (e.g., brain-derived neurotrophic factor (BDNF), lithium, anticonvulsants, and antidepressants) have potential to normalize mesolimbic DA hyperactivity. In future, iPS-induced D-neurons would be available in the treatment of neuropsychiatric disorders, including degenerative disorders such as dementia, as well as developmental disorders. D-neuron-TAAR1 signals in pathophysiology of neuropsychiatric disorders should further be explored.

Biography

Keiko Ikemoto, psychiatrist and neuroscientist, is the director of Department of Psychiatry, Iwaki Kyoritsu General Hospital, and visiting professor of Tokushima Graduate University. She graduated Shiga University of Medical Science, Japan in 1985, got PhD in graduate school. She has national qualifications of psychiatry and that of autopsy. She reported D-neurons (dopa decarboxylating neurons) in the human striatum (1997), which she discovered during her stay as Boursiere du Gouvernement francais in Department of Experimental Medicine, Claude Bernard University, France, and later, striatal D-neuron reduction in brains with schizophrenia. She established “D-cell hypothesis (trace amine hypothesis) of schizophrenia” in 2012.

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Sharad Kumar Yadav

Uttar Pradesh Pandit Deen Dayal Upadhyay Pashu Chikitsa Vigyan Vishvidhyalaya Ewam Go-Anusandhan Sansthan (DUVASU), India

Herpes viruses of animal importance and their complexities in disease causation & in control

Among animal Herpes viruses, bovine herpesvirus 1 (BoHV-1) is accountable for infectious bovine rhinotracheitis (IBR), a disease of major economic importance in the cattle industry globally. BHV-1 is a member of the genus Varicellovirus in the sub family Alphaherpesvirinae, belonging to the family Herpesviridae.

The property of establishing a latent state in ganglionic neurons after infection is responsible for complexity of animal herpes viruses to persist in the body and spread the disease from a latently infected carrier to a non-infected herd and results in clinical as well as sub-clinical carrier animal population. Once a patient has become infected by herpes virus, the infection remains for life. Intermittently, the latent genome can become activated, in response to various stimuli, to produce infectious virions. Because virus latency is a normal sequel to BoHV infection, the identification of positive animals provides a useful and reliable indicator of infection status.

BHV infection can be diagnosed by cell culture, histopathology, serology, PCR, and electron microscopy. In our study we have developed a PCR technique for early detection of IBR disease in livestock, on the line as advocated by O.I.E. A new set of primer were designed to standardize PCR in case where already available primers did not cover the entire subtype of BoH virus running in the U.P. state for significant detection of IBR virus in sub clinical & apparently affected carrier animals by using PCR. Two sets of primer of gC and gD gene were designed using prime-3 software. These genes were chosen because gD is essential gene and gC is non-essential gene but shows more divergence between BHV-1 and BHV-5 than gB and gD. Clinical carrier cases of IBR as detected by PCR in cattle were 25.00%, 27.27%, 25.64% and 7.41% for Gaushalas, Organized Farms, Dairy Farm & Rural Herd, respectively with an overall positive cases of IBR as 22.98 %. Similarly, carrier cases of IBR in buffalo was 8.33%, 10.00 % and 8.695% for Organized Farms, Dairy Farm & Rural Herd, respectively with an 8.77% overall clinical carrier cases of IBR. IBR positivity in bull was 30.77% and 16.67% for Organized Farms and Dairy Farm, respectively with an overall 28.13 % positive cases of IBR. Overall 20.40 % ruminants were found to be suffering from IBR virus infection in U.P., as detected by PCR. The variation in the % positivity of IBR may be largely due to the differences in sample size, location of the specimen collected, and inclusion of samples from different sexes & seasons, management practices etc.

Biography

Sharad Kumar Yadav has 27 years of teaching and research experience and has served to various senior positions of the University including Registrar of the DUVASU University. He is currently Professor, Head of Department of Veterinary Microbiology, and Director at Cow Research Institute at DUVASU, Mathura India. He has published number of papers in reputed International & National journals and has a vast experience in the arena of BHV-I virus.

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Scientific Tracks Abstracts

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Expression of Shiga-like toxin fused to vascular endothelial growth factor (VEGF/SLT) in *E. coli* for targeting angiogenesis

Osama O. Ibrahim

Bio Innovation LLC, USA

Angiogenesis is a highly controlled process of growing new blood vessels under normal circumstances. However, in a large number of pathologies, such as solid tumor growth, angiogenesis is a crucial component of the disease process. Therefore, inhibitors of angiogenesis are being investigated as potential therapeutics for tumor growth. During angiogenesis endothelial cells of existing blood vessels undergo a complex process of reshaping, migration, growth, and organizing into new vessels. Vascular Endothelial Growth Factor (VEGF) is a central mediator of this process and acts via receptors whose expression is restricted almost exclusively to endothelial cells. Because of its selectivity, VEGF represents a unique vehicle for delivery of inhibitors of angiogenesis to endothelial cells. Among potential inhibitors of angiogenesis, the Shiga-like toxin-1 (SLT-I) produced by *E. coli* O157:H7 has the advantage that endothelial cells appear to be particularly sensitive to its action. The hypothesis that combining an SLT-I toxin with VEGF as a delivery vehicle would serve as a highly selective and active inhibitor of angiogenesis. To this end, fusion proteins containing VEGF₁₂₁ and two forms of Shiga-like toxin-I (SLT-I) were developed and tested *in vitro* for activities that have the potential to inhibit angiogenesis *in vivo*. Plasmids encoding the fusion proteins VEGF₁₂₁/A₁ containing the catalytically active fragment of the SLT-1 A subunit and VEGF₁₂₁/A containing the full length A subunit of SLT-1 were constructed in plasmids pET-29a and pET-32a systems. *Escherichia coli* BL21 (DE3) pLysS bacteria were transformed with the plasmid constructs for the expression of these two fusion proteins. Both purified fusion proteins inhibited the translation of luciferase mRNA as a reporter gene *in vitro* translation system, indicating that both fusion proteins retain the *N*-glycosidase activity of SLT-I. However, only VEGF₁₂₁/A₁ fusion proteins displayed the ability to induce auto-phosphorylation of the VEGF receptor KDR/FLK-1 and displayed a strong, selective growth inhibition of cultured cells expressing KDR/FLK-1 receptors. These results indicated that VEGF/SLT fusion proteins are promising therapeutic agents that can be developed into powerful and selective inhibitors of angiogenesis.

Biography

Osama Ibrahim is a highly-experienced Principal Research Scientist with particular expertise in the field of microbiology, molecular biology, food safety, and bioprocessing for both pharmaceutical and food ingredients. He is knowledgeable in microbial screening /culture improvement; molecular biology and fermentation research for antibiotics, enzymes, therapeutic proteins, organic acids and food flavors; Biochemistry for metabolic pathways and enzymes kinetics, enzymes immobilization, bioconversion, and Analytical Biochemistry. Ibrahim was external research liaison for Kraft Foods with Universities for research projects related to molecular biology and microbial screening and holds three bioprocessing patents. In January 2005 retired from Kraft Foods and formed his own biotechnology company providing technical and marketing consultation for new startup biotechnology and food companies. Ibrahim received his B.S. in Biochemistry with honor and two M.S. degrees in Microbial physiology/ Fermentation and in Applied Microbiology. He received his Ph.D. in Basic Medical Science (Microbiology, Immunology and Molecular biology) from New York Medical College. He is a member of American Chemical Society, American Society of Microbiology, and Society of Industrial Microbiology since 1979.

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Automatic optical molecular cancer image segmentation via Distance Regularized Level Set Evolution

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²Soonchunhyang University, Korea

Optical molecular image has been spotlighted since it can detect cancer with lower cost, and faster implementation than other medical images. If the image is separated with cancer region and background, meaningful information about the cancer such as shape, motion, area, those are helpful to treatment or analysis, can be obtained. However, the segmentation of the image has difficulties, since resolution of optical molecular image is remarkably lower than image resolution of a general digital camera or even other medical images resolution. Moreover, especially, cancer image may have irregularly distributed necrosed or necrosing cells near the cancer, which do not luminesce or dimly luminesce, it makes difficulties to obtain exact boundary of region of interest (ROI). Therefore, despite of its high necessity, the segmentation of optical molecular cancer image rarely has been studied yet, so it is frequently segmented by visually, or naively using only intensity information to partitioning cancer from the image.

Meanwhile, image segmentation of other medical images have studied various methods, among them, the level set based methods have been studied actively to do image segmentation, since it has advantages that it can find nice contour of ROI, and cope with change of topology of ROI. In our simulation, we performed segmenting the cancer region from the images by using the distance regularized level set evolution (DRLSE) method, which overcomes problems of re-initialization stage of prevailing level set based methods. Thus, we verified robustness of the DRLSE method by analyzing accuracy of the result of segmented images by using the method compared with visually segmented cases.

Biography

Jiwan Kim received the B.S. degree from electronics and information engineering from Korea University, Korea, in 2015. He is currently M.S. degree in same major in the university.

On Seok Lee graduated from the Korea University with B.S., M.S., and Ph.D. in Biomedical engineering in 2011, where he developed biomedical engineering techniques such as computer vision, haptics, and molecular imaging.

Mingi Kim received B.S degree from Korea University Seoul, in 1977, the M.S degree in electrical engineering from Columbia University, New York, NY, in 1985, and Ph.D. degree for research on image processing from Polytechnic University, Brooklyn, NY, in 1991. He is now professor in the electronics and information engineering Department of Korea University.

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Study of antimicrobial and antioxidant activities of seeds of *Plantago ovata*

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Objective: The aim of the present study was to discover and invent safer antimicrobial and antioxidant agents from medicinal plant, *Plantago ovata* which is expected to be eco-friendly and easily obtainable.

Introduction: Medicinal plants are the nature's souvenir for the humankind to heal various ailments and to spend a prosperous healthy life. The development of microbial resistance has led to the discovery of new drugs, modification of antibiotics, administration of two or more antibiotics, use of traditional medicinal plants and their combinations with antibiotics. There are almost 200 species of the genus *Plantago*. Among them, *Plantago ovata* is a common medicinal plant. Its medicinal potential is due to the presence of various biologically active compounds.

Methods: Plant extracts of *Plantago ovata* were prepared using different aqueous and organic solvents by Alade and Irobi method. The plant extracts were screened for the antibacterial and antifungal properties by agar well diffusion method. Phytochemical investigations of plant extracts were carried out using Singleton and Slinkard protocols. The antioxidant properties of the plant extracts were determined via the DPPH free radical scavenging and total antioxidant capacity methods.

Results: *Plantago ovata* extracts exhibited broad spectrum of antimicrobial activities against all the tested bacterial and fungal pathogens. Qualitative phytochemical analysis of the plant extracts performed confirmed the presence of various important secondary metabolites viz alkaloids, flavonoids, phenols, steroids, tannins, terpenoids and saponins.

Conclusions: The plant shows effective antimicrobial and antioxidant activities. The phytochemicals in *Plantago ovata* may be potentially responsible for the antimicrobial efficacy of the plant extracts. The plant could be exploited as a promising source of natural antioxidant and antimicrobial agents for dreadful human diseases and oxidation prevention.

Biography

Saadia Mohammed Ali is a gold medalist and had completed her Ph.D. in Biotechnology from Integral University, India. After completing her studies, she had guided student projects for undergraduate and post graduate programs. Dr. Saadia has worked for almost a decade towards screening for the antimicrobial and antioxidant activities of traditionally used medicinal plants. She had been awarded with a SC Pant Memorial Young Scientist award for her contribution to science.

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Interactome analysis and docking sites prediction of MutS Homologs (MSH) proteins in *Arabidopsis thaliana*

Mohamed Ragab Abdel Gawwad and Aida Marić

International University of Sarajevo, Bosnia and Herzegovina

Due to their sedentary lifestyle, plants are constantly exposed to different stress stimuli. Stress comes in variety of forms where factors like radiation, free radicals, and chemical mutagens result in genotoxic or cytotoxic damage. In order to fight the stress, plants have developed strong tools. One of them is DNA mismatch repair pathway. Crucial part of MMR is MutS homologue (MSH) protein family. The genome of *Arabidopsis thaliana* encodes at least seven homologues of MSH family: AtMSH1, AtMSH2, AtMSH3, AtMSH4, AtMSH5, AtMSH6 and AtMSH7. Despite their importance, AtMSH homologs have not been studied well. In this work, bioinformatic tools have been used to obtain better understanding of MSH-mediated DNA repair mechanisms in *Arabidopsis thaliana* and to understand additional biological role of AtMSH family. In silico analysis that included phylogeny tracking, prediction of 3D structure, interactome analysis and docking site prediction, suggests interactions with proteins important for physiological development of *A. thaliana*. MSH homologs extensively interact with TIL1 and TIL2, proteins involved in cell fate determination during plant embryogenesis and involved in the flowering time repression. Additionally, interactions with RECQ protein family and proteins of nucleotide excision repair pathway have been detected. Taken together the results presented here confirm important role of AtMSH proteins in mismatch repair and suggest important new physiological roles.

Biography

Mohamed Ragab Abdel Gawwad is currently Associate Professor and Genetics and Bioengineering program Coordinator, Natural sciences Dept., at International University of Sarajevo, Sarajevo, Bosnia and Herzegovina since 2009. In 1996, he was appointed as Assistant at Minia University, Faculty of Sciences, Botany Dept., Egypt then He appointed as assistant at Cairo University, Faculty of Sciences, Botany Dept., Fayoum, Egypt. Abdel Gawwad received his B.Sc. in Botany in 1996 at Minia University, Egypt. He got M.Sc. in Molecular Biology in 2003 from Dijon University, France. Dr. Mohamed Ragab Abdel Gawwad obtained Ph.D. from University of Perpignan, France in 2008 in Molecular Biology. Mohamed Ragab Abdel Gawwad is currently participating in many scientific EU projects, member of many scientific organizations around the world and Chief Editor of Journal of Plant Biology Research. Abdel Gawwad's current research interests are Plant DNA repair proteins, Protein interactome, protein 3-D Structure prediction.

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Enhanced production of Aloe Mannan using plant biotechnology

Zarreen Badar

University of Karachi, Pakistan

Plants have been an exemplary source of medicine since ancient times. Aloe vera fresh gel, juice or formulated products have been used for medicinal and cosmetic purposes since centuries. Chemical synthesis of its unique bioactive compound “Aloe mannan”, commercially known as acemannan and other Aloe vera based beneficial products of pharmaceutical and medicinal value is difficult and expensive.

Plant tissue culture is a promising technology, especially for the multiplication and production of novel and improved plants species and for an increased biosynthesis of products of industrial and medicinal value from vegetative resource.

Aloe vera acemannan enhancement: Aloe vera calli were cultured in vitro with four different carbon sources (sucrose, mannose, glucose and galactose) and five concentrations (2%, 3%, 4%, 5% and 6%) and kept in dark conditions for 1 month. Then the cultures were analyzed for acemannan content. FT-IR, ¹H-NMR and HPLC techniques were employed for qualitative and quantitative analysis of this medicinal compound.

The investigation revealed quite interesting results. The acemannan yield increases several fold in the in vitro regenerated callus cultures having 3% mannose sugar, producing the highest concentration of acemannan i.e 0.95 mg/mL, which revealed a remarkable enhancement of acemannan production in vitro as compared to the in vivo propagated Aloe vera plant in soil conditions giving yield of 0.43 mg/mL acemannan. On the contrary, when glucose and galactose were added in the culture media the yield of acemannan was suppressed in all the tested concentrations.

Evaluation of Genetic Stability/ Variability of Aloe vera plants by RAPD and ISSR Marker Assay: Despite having phenotypic similarities in the plantlets, variation in the genomic constituents has been effectively established through Random Amplified Polymorphic DNA (RAPD) and Inter Simple Sequence Repeats (ISSR) markers showing 33% and 25% polymorphism respectively.

Biography

Zarreen Badar received her PhD in 2016, from the Dr. A.Q.Khan Institute of Biotechnology and Genetic Engineering, University of Karachi, Pakistan. She has also been associated as a Research Scientist with the Biotechnology Wing of International Center for Chemical and Biological Sciences. Specific interests and work disciplines of her research group are in the areas of Plant Tissue Culture, Biotransformation, Molecular Biology, Protoplast Hybridization, Plant Metabolomics and Genetic Engineering.

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Cloning and extracellular expression of thermostable alkaline protease gene from *Bacillus stearothermophilus* AEAL2 in *Pichia pastoris*

Essam F. Alwan Al-Jumaily*, Safaa A. Hadie Salh
University of Baghdad, Iraq

The thermostable, extracellular Serine alkaline protease enzyme (aprE), which can have many applications especially in detergent, may be industrially an important. The aim of this study is to develop a metabolically engineered *Pichia pastoris* strain for production of an active extracellular thermostable alkaline protease enzyme produced from Local isolate *B. stearothermophilus* AEAL2 by using genetic engineering techniques. In the first part of study, Local isolate *B. stearothermophilus* AEAL2 was grown under the optimum conditions in production media for 48hr. at 55°C to produce alkaline protease.

In the second part of the study, was designed to produce a thermostable protease in *P. pastoris* expression system in order to obtain higher yields of the enzyme. The highly thermostable alkaline protease gene from *Bacillus stearothermophilus* AEAL2 was amplified by polymerase chain reaction (PCR) using consensus primers based on the sequences of alkaline serine protease genes from related species. The DNA fragment which contain recognition enzyme site were cloned into expression vector pPICZαA (methanol inducible). This was shuttle vector, therefore the recombinant construct was transformed into *Escherichia coli* strain TOP 10 for propagation purposes prior to transformation into *Pichia* hosts. This recombinant plasmid was later introduced into AOX1 locus in *P. pastoris* strain X-33 genome. The selection of positive transformants was done on YPD agar containing 100 µg/ml zeocin. The recombinant *P. pastoris* clone carrying alkaline protease gene in its genome was named as PE1. YTPD was found to be the best medium, producing the highest expression level. In *Pichia pastoris* expression system, the recombinant AEAL2 protease was secreted successfully into the culture medium driven by the α-factor secretion signal. However, the expression and secretion of AEAL2 protease produced higher results to secretion by the native microorganism of AEAL2 protease (*B. stearothermophilus*). Recombinant protein (aprE) was secreted into the culture medium with activity reached to 7956.5 U/mg while, compared with, 1152U/mg produced from native *B. stearothermophilus* AEAL2. Recombinant protein purified to homogeneity in one step employing hydroxyapatite and the yield of enzyme was 17.58 With 6.796 purification fold. While apr E produced by *B. stearothermophilus* was purified by three steps with yield reached to 18.63 and 10.65 for purification fold. These data show that the expression level of AEAL2 protease gene can be increased in *P. pastoris* system without affecting the enzyme function.

Biography

Essam Fadel Al-Jumaili is the academic teaching and supervision, scientific administration and consultancies in the Institute of Genetic Engineering and Biotechnology (IGEB), Baghdad University, Baghdad. Professor Al-Jumaili has published over 225 scientific research papers on the subject of Microbial Biotechnology, Purification of Enzyme and Biotechnology materials with downstream production. He is a recognized expert in the use of purified medical and microbiology enzymes, giving many invited papers at international and national conferences around the world. After obtaining Ph.D.1989 in Biochemistry from the University of Southampton, U.K., he started work at Food Science and Biotechnology Department, Basrah University. During his time at Basrah University and Later in Baghdad University Science college, in Biotechnology Department he continued his research in purification of Enzyme and Biotechnology Materials and Scientific achievement awards, Annual Science Day of Higher Education and Scientific Research (1999, 2001, 2002).,In 1999, I founded the Institute of Genetic Engineering and Biotechnology (IGEB) for graduate studies in the University of Baghdad, with Prof. Dr. Ali A. Al-Zaag deanship, the IGEB has been recognized as one of Iraq's advanced research institutions. Where he was responsible for Head of the Biotechnology Department and in 2012 became Assistant Dean of Genetic Engineering and Biotechnology Institute for postgraduate studies, in 2014 until now he is professor of genetic engineering and Biotechnology Institute (IGEB). Form this period he supervised the thesis of 90 graduate students in different molecular research, projects and as follows: 30 Ph.D students; 50 MSc students and 10 Graduate Diploma. Dr. al-Jumaili have get new Inventors patent under NO 4604 and a patent application No. 2016/87 under title: MAKE NEW ELISA KIT TO DIAGNOSIS CANDIDA ALBICANS (CA18).

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Decontamination of petroleum contaminated soil using earthworm species

Vipin Kumar* and Ms. Zeba Usmani

Indian Institute of Technology (ISM) Dhanbad, India

Contamination of soil due to spillage of oil persists as a major environmental problem, leading to noticeable damage to the environment. Vermicomposting technology has been arising as a sustainable tool for efficient restoration of oil contaminated soil. A vermin-bin study was conducted to observe the bioremediation efficiency of earthworm species, *Eisenia fetida* in soil contaminated due to oil spill. Soil sampled from oil tank storage areas of Hindustan Petroleum Corporation Limited (HPCL) were inoculated with earthworms and monitored daily for 9 weeks. The physico-chemical attributes determined were pH, TOC, nitrate, phosphate, sodium, potassium and calcium. Analysis of total petroleum hydrocarbon (TPH) was done using Atomic Absorption spectrophotometer (AAS). Earthworm tissues were analyzed for TPH and BTEX (benzene, toluene, ethylbenzene, and xylene) using GC-FID. The results demonstrated that there was a significant enhancement in physico-chemical parameters of contaminated soil due to decrease in percentage of sodium, potassium, calcium, magnesium and total organic carbon. There was an appreciable decrease in concentration of benzene, toluene, ethylbenzene and xylene. Accumulation of TPH in earthworm tissues were about 54%, while for benzene and toluene accumulation was 42% and 25% respectively. *Eisenia fetida* was found to be efficient in bioremediation of oil contaminated soil.

Biography

Vipin Kumar is currently working as Assistant Professor in the Department of Environmental Science and Engineering at, Indian Institute of Technology (ISM) Dhanbad, Jharkhand, INDIA. He did Post Graduate in Microbiology and Doctorate in Environmental Biology. He has more than 7 years teaching and research experience in the field of Environmental Microbiology and Biotechnology in different capacities. Earlier He worked as a Research Associate and Senior Research Fellow in Referral Laboratory under the Department of Biotechnology (DBT) Government of India, New Delhi. He has published more than 45 Research publications in reputed International and national journals and Conferences.

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Assessing nano-sensors in determination of the degree of endothelial dysfunction and lifespan of the cardiovascular system

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²Ohio University, USA

Nowadays the free radicals and reactive oxygen species (ROS) hypothesis of ageing, especially cardiovascular ageing play a significant role in the explanation of the cellular changes underlying the ageing process. The disturbance in the balance between ROS generation and antioxidants mechanisms leads to excessive production of ROS resulting in long term irreversible cellular damage.

Dysfunctional endothelium is associated with an impaired generation of nitric oxide. This work investigated the relationship between the degree of endothelial dysfunction and the lifespan of the cardiovascular system. Ames dwarf (df/df), transgenic giant (Tg) and normal mice were used for the studies. The dwarf mice appear to outlive their control siblings by about one year. However, the Tg mice have an over-expressed growth hormone that stimulates the growth of their bodies. One of the most important features of the Tg mice is their reduced life lifespan. An array of nitric oxide ($\bullet\text{NO}$), superoxide (O_2^-) and peroxynitrite (ONOO^-) electrochemical nanosensors (diameter 300 – 500 nm, detection limit of 1×10^{-9} mol/L) was used for the in vitro measurements. $\bullet\text{NO}$, O_2^- and ONOO^- were measured simultaneously in endothelial cells of the left ventricle and aorta of mice under investigation.

The sensors were positioned $5 \pm 2 \mu\text{m}$ from the cell membrane, and the concentrations of $\bullet\text{NO}$, O_2^- and ONOO^- were monitored after stimulation with calcium ionophore or acetylcholine. Therefore, the change in dynamics of $\bullet\text{NO}$ release in the dysfunctional endothelium can be attributed to the increase in generation of O_2^- as well as that of ONOO^- . The imbalance between pro-oxidative and anti-oxidative processes increases with age. Dysfunctional endothelium is associated with production of $\bullet\text{NO}$ and over generation of O_2^- . Our data indicated that dysfunctional endothelium in Tg mice, the reduced lifespan is associated with high concentrations of O_2^- and ONOO^- that most likely leads to accumulation of tissue oxidative damage.

Biography

Febbe Louka has completed her PhD in 2004, from Ohio University in Analytical Chemistry. She is an Associate professor in Analytical/Environmental and Medical Chemistry, University of Louisiana at Lafayette. She is a CoPI in \$1,025,000 grant on effect of oil spills by the Gulf of Mexico Research Initiative and other enhancement grants. She is a Certificated Trainee by Marine Environment Laboratories (Monaco) International Atomic Energy Agency in "Monitoring the environmental pollution". She was awarded the Summer Research Award 2012. She was awarded the Outstanding Undergraduate Research Mentoring 2014. She is also the awardee of Marvin and Warren

Boudreaux / BoRSF Professorship in Chemistry (2012-18). She was awarded the Outstanding Teaching Award College of Sciences 2016. She has published over 62 articles and presentations in peer-reviewed journals and conferences. She is a member of the American Chemical Society. She has mentored more than 65 undergraduate students and two graduate students.

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Cancer cured by bio electron's laser acupuncture

Nick Kostovic

Kostovic Acupuncture by bio Electron's Laser Corp., USA

New advanced technology in medicine by bio electron's photons special circuit

Bio-electric current is converted from standard electricity, by using a bio-electron-laser. This energy format can deeply penetrate into any physical organ, including the brain, heart, lungs, etc., with no risk. It is absolutely safe, None-lethal, and does not cause any electrical shocks.

This revolutionary technology using 120 Voltages of AC knowing the Human body's resistance to ground is could be 1,000 Ohms, /wet/ produces the effect of approximately 12 Micro Amperes. By utilizing Nick's newly discovered RC Reverse Current we cancel magnetic from electricity and thereby prevent electromagnetic shock. Which means this K-BTE device produces 10,000 times less speed – strength of electrons then today's developed technology. Throughout the world today, the most advanced technology can only perform at the Mili Amperes frequency which is too high speed-strength of electrons, and for this reason it is considered electric shock therapy and is lethal. We are the only Center in the world who has successfully canceled magnetic from electro-magnetic enabling us to perform at the unrivaled gentle frequency of Micro Amperes and Nano Amperes.

The Kostovic Bio-Technology Energetic Device has the ability to extract bio-electron photons from H₂O electric fluid. Creating 1A= 1,000,000 Micro Amperes. Using the power of standard 120 Voltages yet creating such a very low frequency of Micro Amperes we do not create any electric shock, it is NOT at all lethal. We can also bring the frequency down even smaller to the Nano amperes level with is 1A= 1,000,000,000 billionth Nano amperes and control them like tame sheep.

My Center discovered technology produces photons of bio electrons at this Micro amperes and Nano amperes level which is gentle yet precise and efficient in burning off oxidized proteins and dead cells while energizing the hibernating healthy cells within the vascular fiber tissue system and the injured organ, as well as plaque from arteries, veins and capillaries of entire vascular system. This advanced technological laser is capable of performing medical surgeries on the brain, heart, lungs, kidneys, all malignant cancers destroying metastases and lesions in any physical organ with no risk and no harm to the healthy cells and of course with no negative side effects absolute safe. He has been performing treatments for last 15 years in USA with more than 40,000 hours using these gentle Micro Amperes and Nano Amperes frequencies.

Biography

Born on December 6, 1950 in Split, Croatia, Nick graduated from the Split Gymnasium in 1969 with an Associate of Art's degree in Humanities and Science. Nick was bored with school and since his parent's had gleaned a basic knowledge of energetic medicine from studying his great, great grand Uncle Nikola Tesla's research papers, and other military secret documents, he decided to follow in their footsteps.

1980-2000 Using all this collected information Nick was able to accomplish his goal of taking Quantum Mechanics Physics and Electromagnetic science and created a device to improve healing of humanity. He canceled the Magnetic from industrial Electromagnetic electricity and converted this into his discovery *Bio electricity*.

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Development of broad spectrum antimicrobial nanofibrous formulation based on natural materials and bacteriophage

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¹American University in Cairo, Egypt

²Misr University for Science & Technology, Egypt

In 2011, the World Health Organization has declared “no action today, no cure tomorrow” raising awareness towards the serious problem of bacterial resistance against current antibiotics. The problem is overcomplicated with the marked decrease in the production of new antibiotics. Consequently, researchers as well as companies are turning back to an old answer; bacteriophages, nature's bacterial enemies¹. Bacteriophages are viruses that infect and rapidly destroy bacteria, however bacteriophages' narrow host range stands as an important challenge that calls for innovative solutions. Within this study, electrospun (HPCS-AE/CE) honey (H)/chitosan (CS) based nanofibers loaded with two natural extracts: *Allium sativum* (AE) and *Cleome droserifolia* (CE)² were further loaded with the bacteriophage (DM2) to fabricate broad spectrum antimicrobial HPCS-AE/CE-DM2 nanofibers. The isolated bacteriophage host range and stability were analysed. Additionally, the HPCS-AE/CE-DM2 nanofibers were characterized via SEM and TEM, followed by evaluation of their swelling and weight loss abilities as well as their cytotoxicity and effect on fibroblast cell proliferation. Moreover, their antibacterial activity against multidrug resistant *Pseudomonas aeruginosa*, methicillin resistant *Staphylococcus aureus* (MRSA), *Staphylococcus aureus*, and *Escherichia coli* was evaluated. It was observed that the isolated DM2 bacteriophage could specifically infect and lyse *E.coli*. Upon loading the DM2 bacteriophage within the HPCS-AE/CE-DM2 nanofibers, enhanced antibacterial activity against *E.coli*, *S.aureus* and MRSA was achieved. Such enhanced broad spectrum antibacterial activity was attributed to the combination of bacteriophage and natural extracts within the nanofibers. Moreover, the HPCS-AE/CE-DM2 nanofibers exhibited no cytotoxicity and allowed enhancement in the fibroblast cell proliferation.

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Biography

Wesam Sarhan is the Chief Technology Officer and co-founder of NanoEbers Startup Company. She has achieved her PhD degree in Applied Sciences with specialization in Nanotechnology from the American University in Cairo (AUC) in 2016. She has a B.Sc. in Pharmaceutical science and M.Sc. in microbiology. She is a co-author of several publications and a book. She is a co-inventor on a patent filed with the US PTO. Additionally, she has participated in entrepreneurial business competitions, namely TechConnect 2015 and MIT Arab Startup competition in which her team was third place winner in the ideas track. She has won (Peoples' choice) in the Three Minute Thesis Competition held at the AUC in 2015. She was awarded the certificate of outstanding academic achievement from the AUC in 2013. She also participated in a number of international conferences with posters and oral presentations. She has strong expertise in nanotechnology, electrospinning, characterization of nanomaterials, phytochemicals and microbiology. Microbiology. He received his Ph.D. in Basic Medical Science (Microbiology, Immunology and Molecular biology) from New York Medical College. He is a member of American Chemical Society, American Society of Microbiology, and Society of Industrial Microbiology since 1979.

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chairman of several International Drug Discovery Science and Technology Congress. He is editorial member and reviewer of renowned journals.

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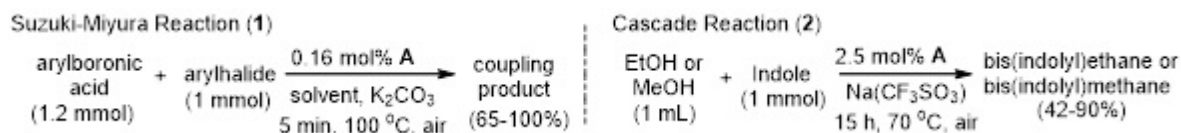
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Development of bimetallic solid solution catalyst for organic synthesis

Md. Shahajahan Kutubi*, Katsutoshi Sato, Katsutoshi Nagaoka

Oita University, Japan

Over oxidation of metal nanoparticle (NP) surface components, monometallic catalytic mode of multimetallic NPs, influence of supporting materials to change of metal NP catalytic modes and metal leaching in heterogeneous metal NPs catalysis are well-recognized severe snags in liquid phase organic reactions (LPOR). Therefore, such drawbacks make supported metal NP catalysts refrain from industrial application in LPORs. Considering these drawbacks, we, for the first time, developed unsupported Pd_{0.5}Ru_{0.5}-PVP alloyed solid solution NPs (**A**) for LPOR and outstanding catalytic efficiency was investigated in Suzuki-Miyaura reaction (**1**) and solvent-free aerobic oxidative cascade reaction (**2**): selective oxidation of EtOH/MeOH and C–H activated C–C coupling in indole without extra oxidant (Scheme 1), revealing no physical/chemical changes in NP surface structure and no metal leaching found.



Scheme 1. Pd_{0.5}Ru_{0.5}-PVP, **A**-catalyzed Suzuki-Miyaura Reaction (**1**) and solvent free aerobic oxidative cascade reaction (**2**). Pd_xRu_{1-x}-PVP NPs was synthesized by wet-chemical reduction method and characterized by HRTEM, STEM-EDX, XPS, XRD *etc.*, and applied to investigate catalytic efficiency in **1** and **2**. Here **A** relative to other Pd_xRu_{1-x}-PVP revealed excellent catalytic activity/selectivity in LPORs **1** and **2** for homogeneous composition of Pd and Ru and uniform development of Pd^{δ+} and Ru^{δ-} by uniform charge transfer from by Pd to Ru in **A** surface and subsequently approach of duel Lewis acidic/basic bifunctional catalytic mode at a time by new mechanism trait to other Pd-based catalyst. In **1**, Ru was found to be activated by Pd presence, while Pd activated by Ru presence in **2**, revealing maximum synergistic effect in **A** relative to other compositions. Besides, both hot filtration and ICP studies explored no metal leaching found under the conditions in Scheme 1 correlating to no chemical/physical changes in **A** surface after 3rd cycle. This explored innovative novel strategy of interelemental fusion for the environmentally benign organic synthesis.

Biography

Md. Shahajahan Kutubi is a JST-ACCEL Researcher at the Dept. of Applied Chemistry, Oita University, Japan. He is a Bangladeshi. After M.Sc. from Jahangirnagar University, Bangladesh in Feb. 2006, he got the grand of Japanese Government MEXT for his research/M.S. /Ph.D. at Saga University, Japan for Oct./2006–March/2012. During his academic sessions he carried out the research on electroanalytical environmental chemistry, synthetic electroanalytical chemistry and homogeneous catalyzed organic syntheses. He got Saga University Seminar Award in Nov./2011. After Ph.D. in March/2012, he joined to Oita University as a JST-CREST Researcher in April/2012 and developed heterogeneous bimetallic solid solution catalyzed organic reactions. he has been enrolled in JST-ACCEL Project at same place in April/2016. All research attributed 7 articles and two patents. His motivation is to develop transition metal-free nanomaterials-catalyzed organic syntheses.

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Biomolecule separation: A bio filter

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Micro fluidics technologies is being very challenging today in the biomolecule analysis. This has become feasible with today's advanced technologies by design and fabrication of Microfluidic channel. These Microfluidic channel structures are used previously to separate large molecules, where molecular dimension of the fluidic filter is greater than the gap size. In this work, separation of biomolecules (like RBC, WBC) that are smaller than the microfluidic filter gap size is demonstrated. This study is possible by steric hindrance effect of the biomolecules, where the entropy of biomolecules has to be reduced for the molecules to enter the microfluidic filter, which results in free energy barrier for the molecular transport. This result clearly shows the importance of using microfluidic filters as a sieving medium for smaller biomolecules such as RBC, WBC. Compared with traditional random nanoporous materials such as gel or polymer monolith, nanofluidic channels can be made precisely to have a pre-determined 'pore' size and shape, which allows characterization and optimization of biomolecule separation process.

Biography

S.Praveenkumar Doing his Ph.D in Anna university. He Started his academic career as Assistant Professor in Jaya Engineering College, Chennai from 2005 to 2007. Currently He is working as Associate Professor in Saveetha Engineering College, Chennai in the Department of Electronics and Communication Engineering since 2007. He is a Head for MEMS Design Centre and Wet Lab for Saveetha Engineering college, He is an active MEMS Researcher, IEEE Branch Counselor, SEDS SATELLITE Coordinator for more than couple of years. His interested research areas are MEMS, NEMS, Biosensors, VLSI, Sensor Networks, Microsystem packaging. His research area is fabrication of Biosensors & Microfluidic filters in MEMS technology. He has attended several International workshops and seminars on his research areas. He has presented in many international conferences which includes IEEE China, ACSM Singapore. He has published 12 international journal which 6 publication in IEEE.

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The effect of transition metal addition in the thermo-mechanical behavior of nanocrystalline Al alloy processed through mechanical alloying

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²Qassim University, KSA

³Suez University, Egypt

In this study, the thermo-mechanical behavior of the nanocrystalline Al-10 wt.%Fe-5wt.%Ti alloys was investigated. The initial powder mixtures were subjected to 150 hours of mechanical alloying (MA), to produce nano-grained alloy. The bulk alloy for characterization purposes were produce from the processed powder using a high frequency induction heat sintering (HFIHS) system. The characterization techniques used include; X-ray diffraction (XRD), Vickers microhardness, field emission scanning electron microscopy (FESEM), differential scanning calorimetry (DSC) and transmission electron microscopy (TEM). The crystallite size of the as-milled powder was found to be 20 nm, whereas the crystallite size and the microhardness of the bulk alloy were found to be 27 nm and 2.65 GPa, respectively. From the experimental results of the as-milled powder, it was observed that Iron (Fe) and Titanium (Ti) formed supersaturated solid solution with Aluminum (Al). High temperature compression experiments were performed to determine the thermal stability of the alloys. The addition of Fe and Ti in the Al-10 wt.%Fe-5wt.%Ti alloy showed enhanced thermal stability when compared with the pure Al. The achieved microstructural stability was attributed to the formation of Fe, Ti containing phases with Al, such as $Al_{13}Fe_4$ and $Al_{13}Ti$.

Biography

Muneer Baig has completed his Ph.D in 2009 from the University of Maryland Baltimore County, Maryland, USA. After completion of his study, he joined Creative Systems Design as a research scientist, where he worked for a year. He joined King Saud University as an assistant professor in the year 2010. He is in-charge of the material testing laboratory and has several funded projects in the solid mechanics area. His area of research is in the synthesis of nanocrystalline materials and its characterization. He has several publications in peer reviewed high impact factor journals and applied for a patent.

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Boosting lipid productivity of the oleaginous microalga *Nannochloropsis gaditana* via genome engineering

Rob Brown*, I. Ajjawi¹, M. Aqui, J. Verruto, L.B. Soriaga, J. Coppersmith, K. Kwok, L. Peach, E. Orchard, R. Kalb, W. Xu, T.J. Carlson, K. Francis, K. Konigsfeld, J. Bartalis, A. Schultz, A.S. Schwartz, E.R. Moellering

Synthetic Genomics Inc., USA

To address the global desire of supplementing petroleum-based fuels with next generation biofuels, the on-going R&D collaboration between Synthetic Genomics and ExxonMobil has focused primarily on improving overall lipid productivity of different microalgal species through synthetic biology and genetic engineering approaches. Three major impediments of progress towards this end have been i) a lack of robust genome editing tools, ii) poor understanding of how carbon flow to storage lipid is regulated, and iii) the inability to significantly increase lipid productivity without decreasing growth. Here, we address all three of these challenges as we describe how we expanded the genetic toolkit available for microalgae and doubled lipid productivity of the oleaginous species, *Nannochloropsis gaditana*. Via genome editing we fine-tuned the expression of a novel transcription factor and demonstrated continuous lipid production at lab-scale. Furthermore, beyond creating the improved strains, we reveal strong evidence for the mechanistic basis of the lipid phenotype—which we consider a major advance in understanding how to overcome one of the primary technical hurdles in algal biofuels research.

Biography

Rob leads a multifunctional metabolic engineering team in the design and development of microbes for the production of advanced biofuels and chemicals. This includes a world class phototrophic strain development group.

Rob has over 20 years of experience in molecular biology and gene expression in the Biotechnology sector. Prior to SGI, Rob worked at Diversa Corp. (San Diego), developing recombinant expression systems for industrial enzymes and animal vaccines. Before coming to the US Rob held research positions at; Solexa Ltd (Illumina Inc.), The Dow Chemical Company, Chirotech Ltd. (Dr Reddys), Chiroscience Plc. (Celltech, UCB) working on enzyme engineering for industrial applications including single molecule DNA sequencing, pharmaceutical intermediate production and assay development for drug discovery. He received his PhD in bacterial pathogenesis from the Centre of Microbial Research and Microbiology, Porton Down, UK and has over 20 issued patents and pending applications in various areas of industrial biotechnology.

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Utilizing Silent Signals of Consumers in Food Product Development and Marketing Activities to Benefit the Competitiveness of SMEs, a case study

Anna-Maria Saarela

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Consumer-oriented product development improves operative development and marketing processes in companies. To understand consumer behavior, it is essential to obtain accurate information collected in real-life environments. The aim of this paper is to illustrate the importance of utilizing consumers in product development and highlight one case study how to collect silent signals of consumers in real-life settings for product development purposes. Future Food RDI hub approach created under the EU-funded [Tradeit-project](#) by FP7-KBBE involves consumers throughout the whole product development process from creating ideas to collecting the authentic real-life setting data in versatile environments. The world-wide recognized VAP-WAVO approach (Verbal Analysis Protocol combined to Wireless Audio-Visual Observation) has successfully been applied for example by a bakery, Trube Ltd. The VAP-WAVO method allowed the researchers to collect large amounts of accurate verbal and visual information on the interactions between extrinsic and intrinsic cues as consumers made their shopping decisions at different supermarkets in different cities. According to silent signals of consumers collected, the company renewed visual outlook of their products and was able to increase sales of cinnamon bread 88% and butter bread 22%. The simultaneous use of multiple data-gathering methods makes it possible to collect several forms of qualitative and quantitative information by recording data simultaneously from different perspectives and sources, namely, the consumer's visual range, the wider study environment (which provides useful contextual information), and the consumer's verbalizations. Using consumer-oriented methods in product development and marketing processes enhances competitiveness in particular by developing new products and expanding their markets towards new consumer groups. Understanding consumer behavior is a key for financial and sustainable business success.

Biography

Anna-Maria Saarela (PhD., nutrition, MSc. biochemistry, MSc. nutrition, authorized dietician; food safety officer), is a senior research lecturer, a facilitator of the Future Food RDI Hub Finland and FP7-project manager at Savonia University of Applied Sciences. Anna-Maria has competence in international projects, food product development, consumer behavior and multidimensional research approaches. She developed a method verbal analysis protocol combined to wireless audio-visual observation in real-life settings. Anna-Maria has over 16 years' experience in educating, supervising thesis (> 50), carrying scientific projects with industry and academia. Anna-Maria is an active writer and has published several scientific peer-reviewed papers.

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Antibacterial characterization and pharmaceutical formulation from leaf extract of *Datura innoxia*

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² Dr Ram Manohar Lohia Institute of Medical sciences, India

Resistance to antibiotics by different pathogenic bacterial strains is becoming a serious threat for human population over worldwide. The emergence of antibiotic-resistant forms of pathogenic *S. aureus* e.g. Methicillin-resistant *Staphylococcus aureus* (MRSA) is a worldwide problem in clinical medicine. Plants are known to be the prospective reservoirs for many pharmaceuticals in form of secondary metabolites and their derivatives. So, hexane extract of leaves from *Datura innoxia* used against *Staphylococcus aureus* as crude, purified and in Gel formulation. This crude Hexane extract of *Datura innoxia* was purified through column chromatography and collected as eight different fractions. Antibacterial activity Assay was carried out by analyzing zone of inhibition (ZOI), and minimum inhibitory concentration (MIC). The most effective purified fraction (A viscous yellow compound) was further analyzed for its properties by Electrospray Ionization mass spectra (ESI-MS), Reverse phase High Performance liquid chromatography (HPLC). The HPLC finger print so obtained is used for further research work. The spectrum developed by ESI-MS of the unknown component was compared with the spectrum of the known components stored in the NIST library. The name, molecular weight and structure of the components of the test materials were ascertained. One of the components in the fraction is identified as Triacylglycerol. Its structure was further identified by using corona software. ZOI was calculated as significant for crude and for one of the purified fraction and moderate for gel formulation. MIC is carried out and 50mg/ml was considered best antibacterial effect in minimum quantity. *Datura* and other wildy growing plants may have high potential for herbal antibiotics like activity. There is urgent need to work more on *Datura* and other plants, up to the compound & formulation level.

Key words: *Datura innoxia*, *Staphylococcus aureus*, emulgel formulations, zone of inhibition, minimum inhibitory concentration, High Pressure liquid chromatography, ESI-MS, corona software.

Biography

Priti Mathur is working on concept of “herbal antibiotic “has proved that antibiotics like compounds can be isolated from plant source. This is evident by her recent research papers published in national and international journal and patent “herbal antibiotic formulation” submitted to patent office, Government of India. Priti Mathur is working on “Isolation and characterization of antibacterial compounds from wildy growing plants”.Priti Mathur has done PhD from CSIR organisation- Centre Institute of Medicinal and Aromatic Plants and Post doctorate from ICAR organization -Indian Institute of Sugarcane research. Presently she is working as Assistant Professor in Amity Institute of Biotechnology, Amity University Uttar Pradesh. She has filed two patents and published many research papers in reputed national/ international journal and presented her work in various national/international conferences and awarded for her work.

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Role of PCR for evaluation of Short Term Fever with Flu like symptoms in a tertiary level hospital in Bangladesh

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Molecular diagnostic methods have revolutionised the diagnosis of microorganisms in infection. Among these Polymerase Chain Reaction (PCR)- biotechnology, is the well-developed technique till now. Real-Time PCR (RT-PCR) has both qualitative and quantitative result. So it is considered a fast and accurate tool for microbiological diagnosis. Short term fever, a major public health concern is commonly caused by influenza virus especially in no vaccinated population in developing countries like Bangladesh. A cross-sectional study designed to identify common causes of short term fever and diversity of causative different viral strains was done in medicine and paediatrics department, Comilla medical college hospital, Bangladesh from November 2013 to October 2014. Patients having fever with flu-like symptoms for less than 7 days were selected. Nasopharyngeal swab was analysed by RT-PCR for virus detection, Malaria parasite detection, blood culture especially for salmonella and urine culture were done. Out of 529 patients virus were isolated in 122, of which Influenza A (31), Influenza B (34), both A & B (1), non-influenza (48) and mixed viral pathogens (9). Salmonella (40), malarial parasites (4) and urinary tract infection (8) were also found. Among Influenza A positive cases, H3N2 (29) and 2 cases H1N1 (pdm09) subtype. This study revealed influenza A and B, other non-influenza viruses and salmonellosis as main aetiology of short term fever and RT PCR is an important investigation for early detection.

Key words: Short term fever, influenza virus, PCR. RT-PCR

Biography

Professor Md. Mahabubul Islam Majumder, Internist, now Professor and Head of the Department of Medicine, Comilla Medical College, Bangladesh, Head of Medical Education Unit, Comilla Medical College and chairperson of Bangladesh society of Medicine, Comilla branch. He was graduated from Chittagong Medical College in 1983 and had fellowship (FCPS) in Internal Medicine from Bangladesh College of Physicians and Surgeons, and FRCP from Royal College of Physicians, Glasgow, UK. He is member of American College of Physicians (ACP). He is credited for 45 national and international publications and 40 scientific oral and poster presentations on Infection and Osteoporosis which is his research activity. In this year he has started research on Sarcopenia with International Sarcopenia society. He is life member of Bangladesh Society of Medicine, society of Rheumatology and executive member of Bangladesh society of Topical Medicine and Toxicology and member of international osteoporosis forum.

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Estimation of milk protease activity from uninfected mammary glands of Nili-Ravi buffaloes, Sahiwal and cross-breed cows of Pakistan

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²Department of Theriogenology, FVS, UAF

Pakistan is at 4th place among largest milk producing countries of the world and it produces 49.5 million tons of milk annually. Dairy industry of Pakistan consists of buffaloes and cows. The share in annual milk production of country by cow is 17.37 million tons and by buffalo is 30.46 million tons. Protease activity was determined by the casein digestion assay described by Drapeau (1974). The level of protease activity in milk was tested and compared in milk samples from Nili-Ravi buffaloes, Sahiwal and cross-bred cows. The milk protease activity differed significantly ($p < 0.05$) among tested dairy species/cattle. The mean value for protease activity in milk was highest for cross-bred cows followed by Sahiwal cows and lowest for Nili-Ravi buffaloes. With a minimum value of 32 units/mL and a maximum value of 95 units/mL, the mean value of milk protease activity for Nili-Ravi buffaloes was 57.3 ± 2.16 units/mL. For Sahiwal cows, the minimum value of milk protease activity was 33 units/mL while maximum value was 99 units/mL with a mean value of 69.6 ± 3.02 units/mL. For cross-bred cows, minimum value of milk protease activity was 39 units/mL and maximum value was 127 units/mL with a mean value of 81.3 ± 3.35 units/mL. As for as protease activity was concerned, the milk of Nili-Ravi buffaloes was comparatively better as compared to other two dairy animal types investigated. Moreover, values being reported can be used as reference values of protease activity in milk for Nili-Ravi buffaloes, Sahiwal and cross-bred cows.

Biography

Razia Kausar working as Assistant Professor in the department of Anatomy. She did her DVM in 1999, M.Phil in 2001 and PhD in 2015 in Anatomy. She has 20 publications with impact factor 12.56. She has 15 articles in English and Urdu in news papers and scientific magazines.

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Escalating cultivars of *Daucus carota* prove to be enthusiastic functional food

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Root vegetables traditionally prepared and eaten with starchy bread are recognized for their adequate nutritive potential. The aim of present study was to explore the nutritive potential of newly invented cultivars of *Daucus carota* on commercial scales. The physicochemical and nutritive attributes of selected cultivars were investigated and the significant results ($p > 0.05$) obtained viz. moisture (86.6 – 92.89%), proteins (0.56 – 1.68%), crude fibers (1.55 – 3.28%), ash (0.40 – 1.20%), carbohydrates (6.44 – 8.13%), fats (0.27 – 0.46%) and Calorific energy (26.38 – 38.42 kcal/100g). The mineral contents determined by atomic absorption spectrophotometer (AAS) viz. Co (0.19 – 0.48 μ g/g), Cu (1.20–1.99 μ g/g), Fe (4.01 – 5.90 μ g/g), Sr (2.94 – 4.17 μ g/g) and Zn (2.0–3.15 μ g/g). Spectrophotometric analysis presented the appreciable level of β -carotene (6.12–14.87 mg/100g) proving the medicated properties of newly invented cultivars of *D. carota*. All these results proved that the selected cultivars of *D. Carota* if consume in adequate quantity, would contribute significantly to the nutritional requisites for human health.

Key words: Calorific energy, β -carotene, Proteins, Carbohydrates

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Coal and alkali pretreated seawater stimulates the production of marine microalgae, clean coal and magnesium

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Spirulina and *Dunaliella* are high market valued microalgae due to their higher content of nutraceutical and pharmaceutical ingredients. *Spirulina* spp. are being cultivated in fresh water, although freshwater shortages and the high-cost carbon feed stock restrict *Spirulina* production. *Dunaliella* sp. cultivation requires high saline water. Thus, use of seawater with low-cost culture media should be evaluated for both species. Conversely, Ca^{2+} and Mg^{2+} of natural seawater (NSW) cause milky turbidity and nutrient precipitation when $\text{PO}_4\text{-P}$ is added to prepare culture media. Here, NSW was pretreated with bituminous coal and NaOH to sediment Ca^{2+} and Mg^{2+} , to obtain total organic carbon (TOC) enriched pretreated seawater supernatant (PSWS) for using of *Spirulina* and *Dunaliella* algae cultivation, clean coal to produce energy with less CO_2 emission and to precipitate Mg, respectively. We devised formulae for calculating bituminous coal and NaOH concentrations required for adequate sedimentation of Mg^{2+} and Ca^{2+} in NSW of any salinity level. Precipitation rate of Ca^{2+} and Mg^{2+} was 32.52% and 99.91%, respectively, while TOC increased 6.97-fold in PSWS compared to NSW. Biomass production costs of *S. maxima* and *D. salina* were ca. 3 and 2.16 fold lower in formulated medium than standard media. Carbon of 3.18 to 4.61% and volatile matter of 2.0% were diluted in PSWS from coal. Washed coal produced 320 Kcal/kg which was similar to original coal. Mg content was 22822.70 mg/L in sediment. Thus, CO_2 emission reduction, use of NSW and low production cost of *Spirulina* and *Dunaliella* can play important role in global climate change and socio-economy.

Biography

Md. Abu Affah has completed his Ph.D. at the age of 31 years from Jeju National University, Republic of Korea and postdoctoral studies from Korea Institute of Ocean Science and Technology (KIOST). He is an assistant professor, Department of Marine Biology, Faculty of Marine Science, King Abdulaziz University. He has published more than 35 papers.

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Eri Medical Device - Nanotechnology which reveals psychosomatic links in the body

Elena van Dijk

Private Clinic Elena van Dijk, Slovakia

All human cells each maintain certain electric potential. The membrane potential is constantly changing and reflexes status of internal processes in the cell. This dynamic is accompanied by constant emission of an electric field from cells, organs and organism. Based on recording dynamic changes of electric field of organs such as heart (ECG) or brain (EEG) medicine is able to estimate function of these organs.

ERI MEDICAL DEVICE measures million times weaker dynamic electric emission of other organs and their subcellular structures. Instead of 2D recordings such as ECG or EEG, Swiss Medical System ERI converts the emitted signals into 3D recordings. This information is further computerized into so called spectral dynamic markers which hold information about the particular organs, tissues, cells or intracellular structures up to the level of signal molecules and neuropeptides. The system can scan 1,400,000 parts of the body and compare them with the same amount of markers in its database. Outcome is a report with causal links of hidden and manifested pathologies.

ERI technology is a unique system which apart from establishing a diagnosis also allows correction of the most relevant pathologies. Software generated correcting signal-specifically related to individual findings - harmonizes electric potential on the cell's membrane of existing pathology and resets correct metabolism of the cells.

ERI technology reveals existing and hidden pathologies, sets diagnosis and restarts own reparation processes in the body to recover healthy status of the organism including harmonisation of mental state.

Examination and therapy can be performed also on distance which opens bright new way of treatments and prevention of diseases.

This technology was launched in Europe by PRIVATE CLINIC Elena van Dijk.

Biography

Elena van Dijk graduated in Biochemistry, extended by 3y scientific study of neurotransmitters at the Faculty of Medicine of the University of Comenius in Bratislava. 5y experience in cancer research at the Teaching Children hospital in Bratislava. 10y General manager of Teva Pharmaceuticals. From 2013 till now CEO & Owner of Private Clinic EvD in Slovakia/ Belgium.

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A case report of using gold nanorod assisted near-infrared plasmonic photothermal therapy for treatment of chronic extended spectrum Beta Lactamase (ES β L) *Klebsiellapneumoniae* infected subcutaneous fistula in eight years old Griffon bitch

Haithem A.M. Farghali*¹, Moustafa R.K. Ali², Hala R. Ali³ and Ahmed H.A. Osman¹

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²Georgia Institute of Technology, USA

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Raises in the occurrence of antibiotic resistant bacterial infections need novel methods for control. It is currently clear that a nanotechnology-driven method using nanoparticles to target and terminate pathogenic bacteria can be positively applied. Plasmonic photothermal therapy (PPTT) is a hopeful minimally-invasive antibacterial therapy as well as oncological treatment strategy. The objective of this work was to detect the clinical bactericidal activities of gold nanorods (AuNRs) using PPTT against pathogenic extended spectrum Beta Lactamase (ES β L) *Klebsiella pneumoniae* infection of chronic subcutaneous fistula had no tendency to heal in clinically affected eight years old Griffon female dog. The fistula was infiltrated along its pyogenic wall and intraluminal in multiple spots with AuNR at 7.5 nM concentration and then exposed to an 808 nm diode laser with power of 5.8 W/cm² and spot size about 5.6 mm². The PPTT session was repeated every two weeks for four successive sessions. The evaluations of the curative response were done through clinical, microbiological and histopathological repetitive examinations. Clinically, the purulent discharge decreased in the quantity until it disappeared at the third PPTT session and complete regression of the fistula occurred after the fourth PPTT application. Microbiologically, *Klebsiella pneumoniae* isolate showed dramatic reduction in number after first session and was completely absent at the fourth PPTT application. Regarding histopathology, there was massive liquefied necrotic area infiltrated mainly by neutrophils represented as grade **+3** and after first session of PPTT, there was circumscribe necrotic area infiltrated by few numbers of neutrophils and represented as grade **+1**. After third session of PPTT, complete absence of necrotic tissues and new fibrous connective tissue formation were observed. Altogether, these outcomes powerfully recommend that AuNRs could be a motivating choice to control antibiotic resistant bacterial infections as well as pyogenic conditions which has no tendency to heal.

Biography

Haithem Farghali is an assistant professor of veterinary surgery, anesthesiology, and radiology, faculty of veterinary medicine, Cairo University, Egypt. He was born in 10-May-1974. Haithem was married and had three kids. He began his professional life as a demonstrator in the same faculty from 1998 till 2001, then assistant lecturer from 2001 till 2007, lecturer from 2007 till 2012 and finally assistant professor from 2012 till now. His scientific objective is to apply new technology in clinical and experimental veterinary surgery that will solve some medical and surgical obstacles. Haithem worked in different veterinary surgical fields as stem cell therapy in neurological affections, platelet rich plasma in wound healing and Nano-gold applications in breast cancer treatment researches. Currently, Haithem Farghali works as a member of the research team of Professor Dr. Mostafa Elsaid for the treatment of mammary gland tumors using plasmonic photo-thermal therapy in clinically affected dogs and cats.

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Silver nanoparticles to improve control of nosocomial infections

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A novel bactericidal surface was developed by incorporating polyurethane silver nanoparticles and gentian violet, also known as crystal violet, by using a simple dipping technique. The dye selected was crystal violet because it has been demonstrated that in vitro it can disrupt *Pseudomonas aeruginosa* biofilms and can kill MRSA. The nanoparticles used for this study were silver ions because the antimicrobial activity of Ag⁺ ions is well documented.

It is well known that MRSA is a substantial public health problem not restricted to any geographic area, but worldwide. The same is true for the opportunistic pathogen *Pseudomonas aeruginosa*. Micro-organisms selected for this study were Epidemic MRSA 4742 representative of a Gram-positive epidemic bacteria isolated at UCL Hospital and *Pseudomonas aeruginosa* PAO1 as well as the clinical strand isolated at UCL representative of Gram-negative bacteria resistant to the majority of currently used antibiotics. Concerning this, a complementary study of its biofilm-mediated resistance to antibiotics has been followed.

This work involves developing research areas that did not exist previously, such as the light activated polymers which have been studied at Chemistry Department UCL and in some cases commercialized. The antimicrobial polyurethane coating films produced were tested against these micro-organisms to demonstrate their efficacy. The critical importance of the presence of silver nanoparticles to improve the functional property of the inanimate surface has also been studied. The next step of this project will be to use this bactericidal surface to improve safety and quality of diagnosis e.g. to apply it to a new Italian patent in the field of ultrasound diagnosis "SynDiag" that outputs a quantitative triangular mesh in PLY format ready for further mathematical analysis.

Biography

Alessandra Piccitto is a registered Pharmacist in the United Kingdom. She received her MPharm degree from the University of Turin (Italy) after completing a research project at Durham University (UK) in 2010. She has been teaching human anatomy and chemistry in high schools of the north of Italy. She started her PhD at Politecnico of Turin (Italy) and she is currently continuing it at University College London to develop a novel bactericidal surface with a strong activity against MRSA and *P. aeruginosa*.

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Nanotechnology applications in brewery waste management

Akash D talampally*, Gorantla Likith, M.C.Sampath Kumar

B.M.S College of Engineering, India

A brewery industry in North Bangalore has been selected as a case study. It has an elaborate conventional treatment plant. In the proposed investigation suitable Nano material has been explored and identified to be used for effluent treatment. The industry has a conventional effluent treatment plant which is the source of huge maintenance costs

Waste water treatment issues have been growing problems these days. Its treatment is becoming mandatory in this Industrial world. Nanoparticles have a great potential to be used in wastewater treatment. Some of the unique characteristics of it having high surface area can be used efficiently for removing toxic metal ions, disease causing microbes, inorganic and organic solutes from water. The different classes of nanomaterials also have the authority to be efficient for water treatment like metal-containing nanoparticles, carbonaceous nanomaterials and zeolites. Nanotechnology has led to various efficient ways for treatment of wastewater in a more precise and accurate way on both small and large scale

Various methods such as Photo catalysis, Nano filtration, Adsorption, and Electrochemical oxidation involve the use of TiO₂, ZnO, ceramic membranes, nanowire membranes, polymer membranes, carbon nanotubes, submicron Nano powder, magnetic nanoparticles, nanostructure boron doped diamond are used to resolve or greatly diminish problems involving water quality in natural environment. Nanoparticles when used as adsorbents, Nano sized zerovalent ions or nanofiltration membranes cause pollutant removal/ separation from water whereas nanoparticles used as catalysts for chemical or photochemical oxidation effect the destruction of contaminants present.

Biography

Akash D Talampally final year civil engineering student from, B.M.S College of Engineering Bangalore, India. An autonomous Institution under Visvesvaraya Technological University. His interests are in Nanotechnology applications in engineering and Community Development. Currently he is doing research in Nanotechnology applications in waste water treatment in particular Brewery waste treatment.

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Safety aspects and waste management in a brewery industry

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B.M.S College of Engineering, India

Like any other industry, the brewing industry is subject to extensive government regulations. Some of the regulations imposed involve production, distribution, labeling, advertising, trade and pricing practices, credit, container characteristics, and alcoholic content requirements. Governmental entities also levy various taxes, license fees and other similar charges and may require bonds to ensure compliance with applicable laws and regulations. This investigation discusses the various safety aspects and effluent management aspects in a brewery industry located in North Bangalore.

Brewery wastewater typically has a high chemical oxygen demand (COD) from all the organic components (sugars, soluble starch, ethanol, volatile fatty acids, etc) . It usually has temperatures ranging from 25 °C to 38 °C, but occasionally reaching much higher temperatures. The pH levels can range between 2 and 12 and are influenced by the amount and type of chemicals used in cleaning and sanitizing (e.g., caustic soda, phosphoric acid, nitric acid, etc.). Sanitizing chemicals which include chlorine compounds ensure that the surfaces are free of any microorganisms harmful to the brewing industry and the public consuming the beer

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant environmental impacts during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project. Monitoring should be conducted by trained individuals. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Uncontrolled release of process gases or inadequate ventilation, particularly in confined or enclosed spaces such as fermentation and maturation rooms can result in accumulation of sufficient concentration to present asphyxiation and EHS concerns. Appropriate safety measures should be developed based on a risk assessment, and may include enhanced ventilation, guidance on safe working in confined spaces contained within the General EHS Guidelines, and the use of personal gas detectors in high risk areas.

Biography

Kathik Y is final year civil engineering student from, B.M.S College of Engineering Bangalore, India. An autonomous Institution under Visvesvaraya Technological University. His interests are in Nanotechnology applications in engineering and Safety issues in an Industry. Currently he is doing research on Safety aspects and waste management in Brewery Industry.

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Bio-ethanol project (Economic & Development)

Osama O. Ibrahim

Bio Innovastion LLC, USA

The world economy depends on low -cost energy that is derived from petroleum. Because this petroleum (oil) is produced in unstable regions of the world resulted in severe price shocks and shortages that causing considerable damages to the world economy. As a result, the U.S. and many other countries sought to develop new sources of energy that would reduce oil import and improve their strategic and economic strength.

Bio-ethanol is ethyl alcohol produced by microbial fermentation processes, as opposed to synthetically produced ethanol from petrochemical sources.

Bio-ethanol can be utilized as a liquid fuel in internal compulsion engines either neat or in blends with petroleum. It offers high octane, high heat of vaporization, and other characteristics that allow it to achieve higher efficiency use in optimized engine and gasoline. It has low toxicity and volatility resulting in reduced ozone formation and smog compared to conventional fuel.

The main advantages of bio-ethanol are that the fuel is renewable and that is not a net contributor to greenhouse gas emissions. This is due to the fact that the biomass cultivated for bio-ethanol is able to re-fix (by-photosynthesis) the carbon dioxide produced during bio-ethanol production and consumption.

Drawbacks include the fact that food crops (first generation feed stocks) and agriculture land might be used for the production of bio-ethanol and this may impact adversely on food security. However, as will be outlined in the presentation, this disadvantage can be ameliorated by using lignocelluloses materials in agriculture byproducts such as corn stover, rice straw and bio-wasted as a second generation feed stocks for bio-ethanol production.

The predominant microorganism responsible for ethanol fermentation is the yeast *Saccharomyces cerevisiae*, but other yeasts and certain bacteria have future potential in this bio-fuel industry.

The cost of bio-ethanol production is variable depending on the sources of biomass and will be presented and discussed in presentation.

Biography

Osama Ibrahim is a highly-experienced principal Research Scientist with particular expertise in the field of microbiology, molecular biology, food safety, and bioprocessing for both pharmaceutical and food ingredients. He is knowledgeable in microbial screening /culture improvement; molecular biology and fermentation research for antibiotics, enzymes, therapeutic proteins, organic acids and food flavors; Biochemistry for metabolic pathways and enzymes kinetics, enzymes immobilization, bioconversion, and Analytical Biochemistry. Dr. Ibrahim was external research liaison for Kraft Foods with Universities for research projects related to molecular biology and microbial screening and holds three bioprocessing patents. In January 2005, he accepted an early retirement offer from Kraft Foods and in the same year he formed his own biotechnology company providing technical and marketing consultation for new startup biotechnology and food companies. Ibrahim received his B.S. in Biochemistry with honor and two M.S. degrees in Microbial physiology/ Fermentation and in Applied Microbiology. He received his Ph.D. in Basic Medical Science (Microbiology, Immunology and Molecular biology) from New York Medical College. He is a member of American Chemical Society, American Society of Microbiology, and Society of Industrial Microbiology since 1979.

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Designing functional thermally sprayed biocoatings – A statistical design of experiments approach

Joseph Stokes

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Traditional cementless type femoral orthopaedic implants are Thermally Sprayed (plasma coated) with Hydroxyapatite (HA) to improve bone in-growth and osseointegration. Hydroxyapatite bioceramics are proven to be good materials for bone replacement and repair applications, due to their similarity in chemical composition to bone. Plasma spraying has been commonly used to apply hydroxyapatite coatings onto metallic implants for use in orthopaedic surgeries. The addition of HA coatings was successful in improving the performance of titanium implants. However, this type of implant has shown some limitations with regards to mechanical (implant loosening) and biological (infections) behaviour. This research shows how functional biocoatings can be achieved with scientific and statistically based Design of Experiments optimization, where such biocoatings can offer flexibility in what they deliver through a bi-layer deposit rather than the classical monolithic type deposits.

Keywords: Biocoating, Hydroxyapatite, Hip Replacement

Biography

Joseph Stokes, Head of School of Mechanical and Manufacturing Engineering in Dublin City University, was awarded the degrees of B.A. and B.A.I. in Mechanical and Manufacturing Engineering from Trinity College Dublin in 1997 and attained his PhD in Mechanical and Manufacturing Engineering from Dublin City University in 2003. He has been research active in the area of Surface Engineering since 1997. His professional achievement includes the production of coated and free-standing engineering components using the HVOF (High Velocity Oxy-Fuel) process, other processes include Atmospheric Plasma and Flame Thermal Spray Applications of his research include: Wear Reduction, Bio-coatings for Implant Replacement Therapy, BioEnergy Generation, Oil and Gas Protective Coatings to mention a few. He is an active member of the Centre for Medical Engineering Research (MEDEng) and the National Centre for Plasma Science and Technology (NCPST).

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Removal of petroleum from produced water by liquid-liquid and adsorption processes

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Produced water from oil wells is generally reutilized for injection, reuse or discarded. For any of these applications, the water must be treated, considering both the environmental impact (guidelines established by CONAMA 357) and preservation of the industrial components through which the water will be handled. This study aimed to assess the most efficient oil removal method between liquid-liquid extraction and adsorption at the ranges studied. Removal by liquid-liquid extraction uses hexane and kerosene, while the other process involves adsorption in activated carbon with different particle sizes. The study was conducted with PETROBRAS oil well samples from Guamaré, Rio Grande do Norte state, an onshore production area in Brazil. The best results were obtained with adsorption in pulverized carbon (99.2%), due to the large surface area of the material, which exhibit fine particle size. In the liquid-liquid extraction process, the best results for the sample range were around 78% oil removal using organic extractants.

Biography

Ana Karla Costa de Oliveira has completed her PhD from UFRN-RN (2015). She is professor of FEDERAL INSTITUTE OF RIO GRANDE DO NORTE-CNAT-BRAZIL since 2009. She is CHEMICAL ENGINEER AND CHEMISTRY and she has several publications in the areas of oil, wastewater and oil derivatives. She was coordinator of the oil and gas Course in IFRN-BRAZIL. She was engineer in CTGAS-ER, working with petroleum and gases of oil industry (2002-2005). She worked at UFRN of 2006-2009.

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A validated LCMS-MS method for the determination of cortisol in human plasma and its application in stability studies

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King Faisal Specialist Hospital & Research Center, Saudi Arabia

A rapid Liquid Chromatographic Tandem Mass Spectrometric (LC-MS/MS) assay for the measurement of cortisol level in human plasma was developed and validated. Cortisol and tolperisone (IS) were extracted from plasma using hexane and ethyl acetate (1:4, v:v) and reconstituted with 100 μ l mixture of mobile phase. The mobile phase consisted of 2 mM ammonium acetate and acetonitrile (50:50, v:v). Analysis was performed at room temperature using a reversed phase Atlantis dC₁₈ (2.1 x 100 mm, 3 μ m) column. The components of interest were detected in the positive ion mode of electrospray ionization using transition 363.1 \rightarrow 121.0 and 246.0 \rightarrow 97.9 for cortisol and the IS, respectively. The relationship between cortisol concentration in plasma and peak area ratio of cortisol to IS was linear ≥ 0.9915 in the range of 2.5–400 ng/ml; intra- and inter-day accuracy between 89-106 %, and coefficient of variations were $\leq 9.7\%$. The quantification limit of cortisol in 0.5 ml plasma was 2.5 ng/ml and the detection limit was 1.0 ng/ml. The method was successfully validated and used in bioanalysis.

Biography

Syed N Alvi obtained his PhD. in Chemistry from Osmania University, Hyderabad, India in 2001. He is currently scientist at King Faisal Specialist Hospital & Research Centre, Riyadh, Saudi Arabia. He has published more than forty five papers in reputed international journals. His research interest includes: method development and validation and application for pharmacokinetic and bioequivalence studies.

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Geothermal springs as a source of thermophiles with biotechnological potential

Hovik Panosyan

Yerevan State University, Armenia

Study of microorganisms able to grow and propagate at high temperature environments, including geothermal springs, are relevant and open new prospects in biotechnology. Numerous geothermal springs are found on the territory of Armenia. Thermophilic microbial community of Armenian geothermal springs are still poor investigated and represented a challenge for searching of new biotechnological resources. In this context the prokaryotic (both bacterial and archaeal) diversity thriving in Armenian geothermal springs were studied using both culture-independent molecular and culture-dependent approaches. 16S rRNA gene libraries were generated from total community DNA using universal archaeal and bacterial oligonucleotide primer sets. BLAST results and phylogenetic analysis of obtained bacterial sequences indicated that they originated from *Firmicutes*, *Cyanobacteria*, *Epsilon-*, *Alfa-* and *Gamma-Proteobacteria*. The representative archaeal phylotypes, mainly belonged to phylum of *Euryarchaeota*, *Crenarchaeota* and *Thaumarchaeota*. The majority of the phylotypes detected in the gene libraries were most closely related to uncultivated organisms detected only by molecular methods and shared less than 95% identity with their closest match in GenBank, indicating that studied springs harbour a unique community of novel species with undescribed biotechnological potentials. Culture-dependent methods were applied to isolate thermophilic aerobic nonspore-forming (*Thermus*) and endospore-forming bacteria (*Anoxybacillus*, *Aeribacillus*, *Anaerobacillus*, *Bacillus*, *Brevibacillus*, *Geobacillus*, *Paenibacillus*, *Sporosarcina*, *Ureibacillus* and *Thermoactinomyces*). The production of some hydrolytic enzymes (such as protease, amylase and lipase) from isolates was studied and active producers of thermostable enzymes were selected. Isolated thermophilic bacilli were analyzed also for exopolysaccharide (EPS) production and active producers of EPS were selected too.

Biography

Hovik Panosyan is Associate Professor at the Department of Biochemistry, Microbiology and Biotechnology, Yerevan State University. He has completed his PhD on microbiology at age 27 years. He is author of 2 books, 1 chapter of book, 42 peer-reviewed publications, and over 50 presentations. Dr. H. Panosyan is a member of several advisory boards and professional societies. He is married, have a son and daughter.

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Antibiotics resistance pattern and biofilm detection of acinetobacter species obtained from tertiary care hospital

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²Ram Manohar Lohia Institute of Medical Sciences India

The genus *Acinetobacter* includes a group of bacteria that are non-motile, Gram-negative coccobacilli, displaying strict aerobic metabolism. *Acinetobacter* species have evolved as important nosocomial pathogens. They cause severe infections in immunocompromised patients by colonizing on different medical devices and surviving on these surfaces. A large number of reports describe the outbreaks of *Acinetobacter*-associated nosocomial infections such as secondary meningitis, pneumonia, wound, burn and urinary tract infections (UTI). Biofilm formation is an important feature of most clinical isolates of *Acinetobacter* species. Biofilms are assemblages of surface microbial cells that are enclosed in an extracellular polymeric matrix. It is clear from the epidemiologic evidence that biofilms play a role in infectious diseases such as cystic fibrosis and periodontitis, in bloodstream and UTI because of their ability to indwell medical devices. *Acinetobacter* species is known to show resistance to a majority of commercially available antibiotics and therefore raised an important therapeutic problem. Therefore, the present study was undertaken to observe antibiotics resistance pattern and detection of biofilm formation of *Acinetobacter* species. A total of 45 isolates of *Acinetobacter* species were isolated for study from various clinical specimens like pus, wound swabs, urine, sputum, blood culture specimens, body fluids etc. from the patients in hospital. Isolates from different clinical specimens were processed and confirmed by conventional microbiological methods. The isolates of *Acinetobacter* are identified on the basis of certain biochemical test like catalase positive, oxidase negative, urease negative, nitrate negative, indole negative and non-motility test. Biofilm formation was studied by microtiter plate assay and Congo red agar method. Antimicrobial susceptibility testing was performed by Kirby Bauer disc diffusion method according to CLSI guidelines. In the present study, a total of 34 out of 45 (75.5%) are resistant to commonly used antibiotics and 16 out of 34 (47%) isolates produced biofilm. Biofilm formers showed highest resistance to imipenem, ceftazidime, ceftazidim, tobramycin, ciprofloxacin as compared to cefoperazone, gentamycin, amikacin. The present study will help in understanding the correlation between biofilm formation and multiple drug resistance in *Acinetobacter* species.

Keywords: *Acinetobacter* species, Nosocomial pathogen, Antibiotic Resistance, Biofilm, Microtiter plate assay, Congo red agar.

Biography

Rachna Chaturvedi is Assistant Professor at the Amity Institute of Biotechnology, Amity University Uttar Pradesh Lucknow India. Obtained B.Sc. in 1983, M.Sc. in 1985 and Ph.D. in Botany in 1992 from Ram Manohar Lohia University Faizabad India. Dedicated research efforts in microbiology for the last two decades. Published over many research articles and reviews in international and national journals in addition to book chapters. Appointed as associated editor, Editor, member of the Editorial Board and reviewer in several international and national journals. Participated in the organizing committee of international and national scientific conferences and presented over 45 papers in international and national scientific conferences. An active life member of the Academy of Environmental Biology, UPASTA (Uttar Pradesh Association for Science and Technology Advancement, Indian Aerobiological Society and Society of Toxicology India.

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Fermentation of milk with a view to antioxidant activity

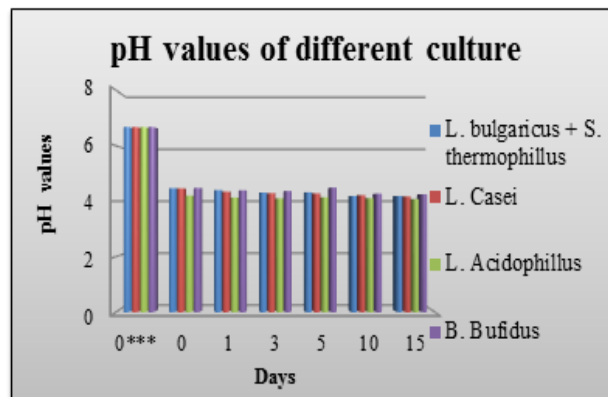
Mirjana Menkovska*¹, Julijana Tomovska², Nikola Gjorgievski², Borche Makarijoski²

¹Ss. Cyril and Methodius University, Macedonia

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This study focused on investigating the milk fermentation process and the development of antioxidant activity (AOA). Factors having impact on the antioxidant activity, acidity activity (pH) and titratable acidity (oSH) were also monitored during the fermentation process and statistical processed. Homogenized and sterilized whole cow milk was used in the milk fermentation during 4 hours in a 15-day period with 5 control points. Symbiosis of the cultures *Streptococcus thermophilus* and *Lactobacillus delbrueckii* ssp. *Bulgaricus*, as well as the monocultures *Lactobacillus casei*, *Lactobacillus acidophilus* and *Bifidobacterium bifidus* were applied as starter cultures. The AOA was determined by DPPH assay by measuring the absorbance spectrophotometrically at 517nm, and was expressed in (%) of the neutralization of free radical. Titration acidity (oSH) was determined according Soxlet-Henkel.

The results showed that during fermentation process, with the all milk samples fermented with different microbial cultures was a great increase in titratable acidity and AOA, compared with those obtained with unfermented milk samples. The values for titratable acidity ranged from 8 (oSH) in nonfermented milk to 40.0 (oSH) with milk fermented with *Lactobacillus acidophilus* in the 10th and 15th day. The average value for these milk samples was 38,05. High AOA was also registered with the milk samples fermented with *Lactobacillus acidophilus*, having the average value of 54,86 (%) and the highest value of 63.99 (%) obtained after the fermentation process. With the all fermented milk samples analysed, it was noticed a decrease in the values of acidity activity ranging from 6,67 with the unfermented samples to the lowest of 4,08 with samples fermented with *Lactobacillus acidophilus*. The dynamics of pH changes in all control points can best be seen from Graph 1. If we compare the values of pH, a decrease was noticed, and that trend continued till the final control point at the 15th day.



Graph 1: Values of pH fermentation with different culture

Biography

Mirjana Menkovska, Ph.D. is Full Professor at Department of Food Technology and Biotechnology at the Institute of Animal Science, Ss. Cyril and Methodius University (UKIM) in Skopje, Macedonia. Her background is Food Technology taken at UKIM, where she also took MS degree in Instrumental Analysis in Chemistry and Technology. She took her Ph.D. Degree in Food Technology at the University of Belgrade, Serbia. She was visiting scientist for cereal research at world known centers such as Grain Marketing Research Center in Manhattan, Kansas, USA, Cereal Research Institute in Detmold, Germany and other known European centres. Prof. Menkovska has published more than 150 papers in domestic and foreign scientific journals and has participated at 90 scientific meetings in the country and abroad being member of Organising and Scientific Committees.

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Beating treatment to enhance degradability of lignocellulosic material for biogas improvement

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Digestibility of lignocellulosic materials is limited by several factors like particle size, available surface area, crystallinity and lignin content. Mechanical treatments (like grinding, milling, ultrasonic etc.) have a positive effect on these factors. In this paper the new mechanical treatment “*Beating treatment*” has been used to treat lignocellulosic materials (maize silage). Treated and untreated maize silage combined with digester sludge was anaerobically co-digested in batch laboratory scale reactors at mesophilic condition (37°C), with Hydraulic Retention Time (HRT) of 21 days. Improvements in the degradability during anaerobic co-digestion and in the biogas production were successfully achieved. 25.4% of efficiency of increment in biogas production was obtained after 20 minutes beating treatment in comparison with untreated samples, while 15.7% and 15.1% of efficiency were obtained after 1 hour and 3 hours beating time respectively. The concentration of CH₄ and CO₂ of untreated sample were 51% and 37% respectively, while the concentrations after 20 minutes beating were 53% and 35% respectively. Energy analysis shows that first level of treatment have a positive energy balance.

Keywords: Biogas, Anaerobic Co-digestion, Mechanical Treatment, Beating Treatment

Biography

Joseph Stokes, Head of School of Mechanical and Manufacturing Engineering in Dublin City University, was awarded the degrees of B.A. and B.A.I. in Mechanical and Manufacturing Engineering from Trinity College Dublin in 1997 and attained his PhD in Mechanical and Manufacturing Engineering from Dublin City University in 2003. He has been research active in the area of Surface Engineering since 1997. His professional achievement includes the production of coated and free-standing engineering components using the HVOF (High Velocity Oxy-Fuel) process, other processes include Atmospheric Plasma and Flame Thermal Spray Applications of his research include: Wear Reduction, Bio-coatings for Implant Replacement Therapy, BioEnergy Generation, Oil and Gas Protective Coatings to mention a few. He is an active member of the Centre for Medical Engineering Research (MEDEng) and the National Centre for Plasma Science and Technology (NCPST).

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Laparoscopy box

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The "Laparoscopy Box" is an apparatus for the practice of laparoscopic surgery. His invention is carried out in the face of the need to develop skills within the medical team with little or no experience in laparoscopic surgery, it is an accessible tool with a minimum cost that is available to 100% of the population that requires the development of destruction in Laparoscopy. It is materialized in a rectangular box of wood and a mirror reflector that makes the functions of monitor screen. The floor consists of a slate template for liquid chalk that allows drawing and erasing lines or figures and two screws centrally anchored to hold the practice piece. In its inner front part is assembled a rectangular mirror slightly inclined backwards that is appreciated from above through a previous rectangular window. In the ceiling and behind the mentioned window a series of holes are introduced to introduce the practical instruments. The rear end is open and at the base has four rubber supports.

The practice consists of introducing the laparoscopy tweezers through the holes and with the tip of them to start tracking the previously drawn figures simulating redrawing, manipulating and sectioning the practice fabric anchored in the screws, perform sutures and internal knots; These movements are observed through the mirror allowing the cerebral adaptation in such a way that it coordinates the movements and inverse turns of the hands through the indirect three-dimensional vision that is reflected in the mirror.

Biography

Gasman Ochoa received his degree in Medical science from University of Loja, Ecuador, and his post graduate degree in Laparoscopic Surgery from the same University, now he is working as Professor of Medicine in Polytechnic College of Chimborazo, and is the head of Surgery department at the IEES Hospital in Riobamba, Ecuador, Ochoa is also a member of International Organization for Medical Training and Research (IOCIM), and he has received the "Prize to the Medical by Achievement for a Better Life" from the same Organization. At present, he is working in Innovative and low-cost technology in surgery.

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Protection against streptozotocin -induced diabetes and oxidative stress by L-Arginine in experimental animals

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²Alexandria University, Egypt

Objectives: This study was undertaken to investigate the possible beneficial effects of L-arginine in protection against diabetes and oxidative stress induced by Streptozotocin (STZ) in rats, and also to explore the mechanism by which L-arginine might exert its actions.

Materials and methods: Sixty four healthy adult male Wistar rats, weighing 176-200 g, were randomly divided into two groups: non-diabetic (n=32) and diabetic (n=32). At the beginning of the experiment, sixteen-hour fasted normal non-diabetic rats were injected with 0.05 M citrate buffer (pH 4.5) by an iv tail injection of 1 ml/kg body weight. One week after, normal rats were subdivided into four categories (8 rats in each). The first (control) subgroup received a daily i.p. injection of saline 1 ml/kg body weight. The second received i.p. injection of L-Arginine (100 mg/ml saline/kg body weight) every day for 28 days. The third received a daily i.p. injection of iNOS inhibitor, L-NAME (10 mg/ml saline/kg body weight) for the same period of time; while the fourth received a daily i.p. injection of L-NAME (10 mg/ml saline/kg body weight) followed by L-arginine (100 mg/ml saline/kg body weight) for 28 days. Diabetes was induced by a single iv tail injection of STZ. Diabetic rats (n=32) were divided into four subgroups: saline, L-arginine, L-NAME and L-NAME + L-arginine, treated groups (8 rats in each). Treatments of those subgroups were the same as mentioned previously for non-diabetic rats. All animals were sacrificed. For all groups, serum levels of insulin, NOx, lipid profile, creatinine, urea and plasma glucose were measured. Levels of total oxidant Status (TOS), Malonaldehyde (MDA), total antioxidant capacity (TAC), oxidative stress index (OSI) and activities SOD and GPx were measured in hepatic tissues. Also, pancreatic tissues were obtained for histopathological examination.

Results: For diabetic rats, there was a significant increase in serum levels of TC, TG, LDL-C, VLDL-C urea and creatinine as well as in plasma glucose, while serum HDL-C and insulin levels were significantly decreased. A significant increase in hepatic TOS, MDA and OSI, accompanied by a significant decrease in TAC and anti-oxidant enzymes (SOD and GPx) were found, with no significant change in serum NOx. However, administration of L-arginine significantly lowered the elevated levels of plasma glucose, lipid profile (except HDL-C) and lipid peroxidation parameters in diabetic rats. Simultaneously, L-arginine significantly increased serum NOx, insulin, HDL-C, hepatic TAC and antioxidant enzyme activities. The inclusion of L-NAME in the inhibition group prevented the effects seen in the treatment group.

Conclusions: This study shows that L-arginine supplementation, exerts multiple beneficial effects on the biochemical abnormalities in diabetic rats after 28 days of treatment. It alleviates hyperglycemia, ameliorates oxidative stress and improves dyslipidemia in STZ diabetic rats. L-arginine also increases serum insulin levels and antioxidant enzyme activities. This protective effect is most likely to occur through NO-NOS pathway through increased production of NO.

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Microencapsulating of nutrition with Arabic Gum: Efficiency and Stability Review

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²AL-Azhar University, Egypt

This review for the science and technology of Arabic Gum from the side of Nutrition, Microencapsulation, the chemical and physicochemical characteristic, structure of the Arabic Gum and its distinct fractions. The health benefit with its medical and biology of the Arabic Gum with its industrial and nanotechnology applications is also reviewed. Resistant Oligosaccharide Arabic Gum is Polyelectrolyte Natural gum obtained from seaweeds; it is interact strongly with oppositely charged surfaces and macromolecules. Because of this, it is widely used as rheology and surface modifiers. The Arabic Gum (Acacia Senegal) is the most widely used polysaccharide emulsifiers in food applications as the nutritional fiber and the richest natural source of prebiotic. Arabic gum can be used as a nontoxic phytochemical construct in the production of readily administrable Gold nanoparticles for diagnostic and therapeutic applications in nanomedicine. It is used also as the coating material in microencapsulation due to its water solubility.

Biography

Name: Gamal Abd-El Naim Hassan Soliman.

Nationality: Egyptian

Present Appointment: Assistant Professor in Polymer Materials Researches Department, Advanced Technology and New Materials Research Institute, City of Scientific Researches and Technological Applications, P.O. Box 21934, Alexandria, Egypt.

PhD Title: "Physicochemical Studies on Polycarbonate Feeding Baby Bottles to Reduce their Potential Risks on Children Health", in Chemistry department, faculty of Science, Al Azhar university, Cairo, Egypt.

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Nanotechnology: Concepts and reasoning

José Dionísio de Paula Júnior*¹, Luciano José Minette², Natália Costa Martins²

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The nanotechnology extends to materials science to the field of particles and interfaces with dimensions of extremely small, on the order of one to one hundred nanometers. Particles of this size, or "nanoparticles", have a large surface area and often exhibit distinct mechanical, optical, magnetic or chemical properties of particles and macroscopic surfaces (Quina, 2004).

The science and technology in nanoscale have attracted considerable attention in recent years, the expectation of the impact that the nanostructured materials can cause in improving the quality of life and the preservation of the environment. It is expected that nanotechnology can provide the generation of new products and new market opportunities, through the integration of science and technology. Most of the current industries will benefit from the innovations of nanotechnology. The collaborations and interactions between industry, academia and government institutions, on a world scale, will accelerate the development of new products (Ferreira, 2009).

Thus, the nanoscience research and manipulation of matter of a nanometric scale, comes in search of investigative procedures that do not work as a discipline in isolation from each other, as physics, chemistry and biology, but an attempt (and we can say that it is absolutely essential) to work in an interdisciplinary way toward new discoveries (Santos, 2010).

However, nanotechnology has found many applications in medicine with respect to tissue engineering, diagnostics, ultra-sensitive and more effective medicines and insurance.

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Increase perception of safety at C.R.Bt laboratory by development, implementation and training on standard operatory procedures and emergency plans

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Centre de Recherche en Biotechnologie (CRBt), Algérie

The CRBt is the first governmental institution in Algeria that is dedicated to biotechnology research and its applications in Agriculture, Healthcare, Food, Environment and Industry. It has been operational only since 2010 and it is expected to employ a couple of hundred research staff and technicians at full capacity. Most of the current research staff is young, ambitious and relatively inexperienced, fully aware of the importance of biosafety and biosecurity for the conduct of responsible research in biotechnology. The C.R.Bt has officially installed a Biosafety and Biosecurity Service. The service is responsible for implementing its biosecurity policy. Training is one of the pillars of this policy as the service needs to be empowered by pertinent knowledge, methodology and skills in order to effectively conduct its crucial mission and assert itself. The collaboration between C.R.Bt and Sandia National Laboratories since 2011 improves the biorisk management at our institution by the setting up of the biosecurity and biosafety policy through training, monitoring and evaluation. One of numerous projects we have:” Increase perception of safety at C.R.Bt laboratory by development, implementation and training on standard operatory procedures and emergency plans” including 3 principal steps:

1. Quizzes: used as performance indicators to measure the success of the project. A pre-quiz was given prior to the start of the project to determine the current safety knowledge at the C.R.Bt.
2. Standard Operating Procedures: development of standard SOP format,
3. Establishment of emergency response procedures.

Key words: Biorisk, biosafety, standard operating procedure, emergency plan, training.

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To enhance the fertility of postpartum cycles and folliculogenesis in the two main equine races

Barka Mohammed

University of Mostaganem, Algeria

In order to characterize the fertility in the equine breeds in Algeria, we have studied and compared two parameters; anatomical (follicular growth) zootechnical and (fertility rate) between the two major equine breeds beard and Arab Pur-Sang, they are high in the same conditions of livestock at the level of the national stud of Tiaret during the 2011 season. A sample of 13 and 37 mares of race beard and Arab Pur-Sang respectively, whose average age is between 5 to 25 years, is followed by an ultrasound device (ESOATE Pius Medical). The 5th day after the poulinage, all mares are passed to the Ultrasound system. We have inspected the two ovaries to see if there is a large follicle and check the uterine involution. This allows us to proceed or not to the protrusion of the mares. The ultrasound results obtained for the mares beard and Arab Pur-Sang, showed a rate of fertility of 42,85%vs 34,48% respectively. The average diameter of consecutive preovulatory follicles is 41.82 vs 45.48 mm, influenced by a combinatorial effect of race and age ($p < 0.001$). The optimization of the fertility of the cycles post-partum implies the mastery of the factors mentioned previously.

Biography

Barka Mohammed, he preparing his PhD studies at faculty of agronomical sciences, the University of Chlef, Algeria. His research on the fertility problems in locals Algerians equine breeds. He is now a veterinary doctor.

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Mutations of residues in the N- and C-termini of the sweet-tasting protein brazzein

Ju-Hee Chung, Hyo-Eun Choi, Kwang-Hoon Kong*
Chung-Ang University, Korea

Brazzein, a sweet tasting protein, is known for its high activity and stability which make it a good candidate for the substitute of sugar, the main cause of adult disease. It is of high interest to investigate the residues responsible for the sweetness of brazzein. To identify important residues responsible for sweetness of the sweet protein brazzein and elucidate the interaction mechanisms of brazzein with the sweet taste receptor, 7 mutants of the Lys5 and Glu53 residues in the N- and C-termini of brazzein were constructed by site-directed mutagenesis. We found that mutations of Lys5 to Asp or Glu at position 5 of the N-terminal significantly decreased sweetness, while mutation of Lys5 to Arg made the molecule similar to brazzein. Mutation of the Glu53 to Arg at position 53 of the C-terminal made the molecules significantly sweeter than brazzein, while mutations of Glu53 to Ala or Asp significantly decreased sweetness. In addition, mutation of the Glu53 to Lys made the molecule similar to brazzein. From these results, we suggest that the positive charge at the Lys5 in the N-terminal was necessary for structural integrity, whereas the charge and length of side chain at position 53 in the C-terminal play an important role in the interaction between brazzein and the sweet taste receptor. Our findings also support the previous results that mutations increasing the positive charge favor sweet-tasting protein potency.

Biography

Kwang-Hoon Kong got his PhD from Tokyo University of Japan in 1993. He is the professor of the Department of Chemistry at Chung-Ang University in Korea. He has published more than 90 papers in reputed journals and has been awarded The IBC TOP 100 Scientists in 2012, 2013 and 2015.

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Strategy to increase the sweetness in fruits through the expression of sweet proteins thaumatin and brazzein

Luis Felipe Quiroz Iturra*, Carolina Rosas, Lisette Colomer, Hita Barraza, Kevin Simpson, Claudia Stange
University of Chile, Chile

Thaumatin (TAU) and brazzein (BRA) are non-toxic proteins which are 2000 to 3000 fold sweeter than sucrose and 10 fold sweeter than stevia. At the present time, they have been used as sweeteners and flavor enhancers in different meals and unlike stevia, they have a similar taste to sucrose. Therefore, we realized the opportunity to add value to fruits with economical value, by increasing the sweetness without adding calories. To achieve this goal, we used metabolic engineering of TAU and BRA proteins. To accomplish this objective, we generated several vectors that express TAU and BRA in a fruit specific and constitutive manner, including a bicistronic expression system, which allow the expression of both proteins in a single open reading frame separated only by the coding sequence of the viral self-cleaving 2A peptide.

In this work, we present evidence on vectors functionality by means of transient expression in tobacco leaves and tomato fruits, showing that genes are expressed successfully after four days post agroinfiltration. The stable transformation of tobacco and tomato with TAU and BRA vectors were carried out and transgenic tobacco and tomato plants were selected through PCR technique. Currently, several transgenic lines are under functional evaluation.

Additionally, considering that Chile is the third largest exporter of kiwis in the world and the Hayward variety is the most popular and exported variety of kiwifruit by Chile, we are transforming this variety to enhance the fruit taste through the production of TAU and BRA in its pulp.

Acknowledgments to Grant FONDEF-VIU14E049.

Biography

Luis Felipe Quiroz Iturra, Engineer in molecular biotechnology from the University of Chile. At the moment, I am working in my doctoral thesis in the center of plant molecular biology of the University of Chile, framed in the PhD in molecular biotechnology from the same university. In parallel to the above, during the year 2016 and 2017 I have served as director in the VIU14E049 project, which aims to increase the sweetness of kiwi fruits through genetic engineering.

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Sympathetic ophthalmia as a major sight-threatening disorder

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SO Iris and eyeball inflammatory condition affecting both eyes that occurs after a penetrating injury as a delayed autoimmune reaction to eye injury. Patients present with pain, photophobia, paresis of accommodation, metamorphopsia and mild to significant visual loss. The granulomatous anterior uveitis is accompanied by posterior segment findings including moderate to severe vitritis, choroiditis, papillitis, perivasculitis, and yellow-white lesions of the retinal pigment epithelium (Dalen-Fuchs nodules). The inflammation can lead to serious retinal detachment and macular edema. Extraocular symptoms include headache, meningitis or cerebrospinal fluid pleocytosis, hearing loss, poliosis and vitiligo.

The inflammation is caused by a cell-mediated immune mechanism and autoimmune inflammatory response directed against ocular self-antigens released after the initial injury. SO may occur after ocular trauma (47 to 65 % of patients) or contusions. Wounds involving the ciliary body are associated with the highest risk. Surgical interventions may also trigger SO, with posterior segment surgery carrying a higher risk than anterior segment surgery.

Diagnosis of SO is mainly based on patient history and clinical presentation. Imaging studies (fluorescein or indocyanine green angiography, B-scan ultrasonography and optical coherence tomography) may be useful to confirm the diagnosis.

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Bioenergy management system using wireless technology

Srivas M C

B.M.S College of engineering, India

Bioenergy is one of the largest renewable energy sources today, providing 10% of world's primary energy supply. Bioenergy is being used extensively for cooking and heating applications in our daily life. Currently, the energy crisis in the world has required significant energy reduction in all areas. Energy saving and renewable energy sources are considered as method of solving energy consumption problems. The data formed when power is generated across different platforms and is utilized by numerous devices can be monitored and managed more efficiently with the help of wireless communication. This system measures the amount of power generated and utilized by each of the devices which is then transmitted wirelessly to a central server. The data obtained is then used to analyse, monitor and reduce wastage of energy. This system will not only reduce the health and environmental impacts caused by bioenergy to a good extent but also improve the quality and usage by monitoring, controlling the available energy. The power consumption of various appliances including renewable energy devices is thereby used for generating the total energy usage patterns. Moreover, this system will provide an analysis of the energy usage resulting in cost savings and energy conservation in turn benefitting the society. Energy and power consumption of Industrial, residential and commercial sectors can be monitored and managed with ease using this concept.

Keywords: bioenergy, central server, wireless communication, energy conservation

Biography

Srivas M C is currently a student of undergraduate program in Telecommunication Engineering. He has keen interest in the field of embedded systems and wireless communication. His recent works deals with the social and environmental concerns faced by the application of electronics. He has also published a paper in IEEE conference recently.

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Biological effect of gold and silver nanoparticules in ameliorating diabetic nephropathy induced in rats

Hiba Haj*, Amal Hamza, Widad Albishri
AlFaisalia, King Abdulaziz University, KSA

The present study was designed to investigate the ameliorative effect of gold and silver nanoparticles against diabetic nephropathy induced in experimental animals. To achieve our target 60 male albino rats were divided into 2 groups healthy group and Diabetic Nephropathy (DN) group. After DN confirmation healthy rats were further divided into 3 groups. Group (1) treated with saline and set as healthy control. Group (2) healthy group treated with silver nanoparticles (AgNPs). Group (3) healthy rats treated with gold nanoparticules (AuNPs). The diabetic nephropathy (DN) groups were further divided into 3 groups. Group (4) DN induced (positive control). Group (5) DN treated with AgNPs. Group (6) DN treated with AuNPs. Our results showed significant regression of blood glucose level and AGEPs accompanied by increase in insulin level in DN treated with Silver, and Gold nanoparticules compared to DN induced group. Also serum urea, creatinine and uric acid showed significant decrease in DN group treated with silver and gold nanoparticles as compared to DN group. Regarding cystatine C, fibronectin, TGF- β and Laminine, our results showed progressive enhancement in DN groups treated with Silver and Gold nanoparticules compared to DN induced group.

In Conclusion; the present study highlighted the biological effect of AgNPs, and AuNPs in ameliorating DN induced experimentally through anti-inflammatory and antidiabetic effect.

Key word: Diabetic nephropathy, Silver nanoparticules, Gold nanoparticules, Kidney functions.

Biography

Hiba Haj was born on August 6, 1991 in Jeddah, KSA. She received BSc degree in Biochemistry from King Abdulaziz University –KSA, Jeddah in 2013. In the mean time she is pursuing her master degree in biochemistry.

Hiba's career objective is to achieve her PhD degree and to be a renowned scientist in the field of biochemistry. Moreover, Hiba is looking forward to playing a supportive role for Saudi women building up their community.

Hiba is self-motivated; she likes reading, swimming, and gift wrapping. She lives in KSA, Jeddah.

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A low cost power supply using marine sediment microbial fuel cell stacks

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Universidad de Guadalajara, México

Microbial fuel cells (MFC) are bio-electrochemical systems that harness the metabolic energy produced by bacteria to generate electric current. Recently research in MFC is directed to the use to bacterial consortia due the versatility of the oxidizable substrates that result in greater coulombic efficiency.

It has been reported that sediments microbial fuel cells (SMFC) are capable to power electronic devices intermittently in high-power bursts. Its main drawback is the low current generated by a single SMFC which reduce the frequency oscillation of the low power electronic devices.

In this work we report the electronic and electrochemical characterization of an electrode-free catalyst power supply based on arrays of marine SMFC.

Bio-Battery operates as a parallel array with 6 SMFC units reaching an output voltage > 3.1 V (232.56 mAm⁻²). Preliminary calculation indicates that bio-battery costs approximately US \$100 can produce a power density 168 ± 7 mWm⁻² during 5 months. The experimental results indicate that the main advantage of marine SMFC is allow to the system maintain robustness and stability for a long time.

Each of six unit presents a mean output voltage of 510.2 ± 7 mV and 50.48 ± 4 mAm⁻² with internal resistance of 1.2 k Ω .

The electric current increases five-fold with parallel stack. The low cost power supply can be powered to the load every 8 s.

We consider as fundamental the pre-inoculation on the electrodes, the salinity and minerals present in the marine sediment, as well as the previous monitoring of the single SMFC to avoid differences in voltage units which produce energy losses.

Biography

Gabriela Becerra González received de B.S. degree in biomedical engineering from the Universidad de Guadalajara (U de G) in 2013. Since 2014 she has been working towards her master degree in electronics and computation oriented to electronic design. From the summer of 2013 she was a research fellow at the CICESE in Ensenada México with the project: “Fibrogenesis monitoring using birefringence microscopy”. During the summer of 2009 she worked at CIBNOR in La Paz México in techniques of PCR. Her interests include bioelectronics, microbial fuel cells and bio-signal processing.

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A Handy MCR Modification for PCR Cloning into Plasmid Vectors

Anastasia Sadova, Kirill Netchvolodov, Natalia Kupriyanova*

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There exist a lot of vectors for a wide range of experiments, and new modified plasmids appear every year. Most of them harbor different Multiple cloning Regions (MCRs) depending on specificity of the experiments. The main problem of such the trial-and-error method is that a lot of MCRs contain a limited number of Restriction Sites (RS), which often makes the process of subcloning arduous.

Here, we elaborated design of the MCR for a GeneClip vector that can be used both for cloning PCR products and transferring the insert from one plasmid to the others. The main idea of our experiment was preparing of double-stranded oligonucleotide as a polylinker with two XcmI recognition site variants for GeneClip vector. XcmI recognition sites were placed in such a way that a digestion of the modified vector with endonuclease XcmI could give rise to 3'-Ts overhanging on DNA duplexes complementary to adenines of the PCR products. It makes possible to clone PCR products directly into linearized T-vector. So, everybody can now construct MCRs for their own vectors using this manual.

Biography

Natalia Kupriyanova graduated from Moscow State Lomonosov's University (chemical faculty). She obtained her Ph.D degree on molecular biology in The Engelhard's Institute of Molecular Biology in 1979. Since 1992 up to now she works in the Institute of Gene Biology at the laboratory of Genome Organization under the direction of Prof. Alexei Ryskov as a senior researcher. She has coauthored about 60 publication including Gene, DNA research, BBRC, DNA sequencing, Leading Russian Journals, and a number of Reviews and chapters in Russian, and foreign books. The current research interests in their group include: (1) Management of the rRNA synthesis in the zone promoted by RNA polymerase I (Pol I); (2) Characteristics of the ncRNAs coded in the human ribosomal intergenic spacer (rIGS); (3) Study of ncRNAs transcription activation in the rIGS under specific conditions, and their role in the regulation of molecular networks.

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Assessment of Arsenic Toxic Levels in *Oryza sativa* Samples

Jhumi Jain*, PammiGaubha

Jaypee Institute of Information Technology, India

Rice is one of the most widely consumed staple diet in the endemic regions of arsenic contaminated ground water, mainly in the South and South-east Asian countries. India, is known as one of the most of arsenic contamination prone countries in the world. Across the country, various states like West Bengal, Bihar, Punjab, Haryana, Uttar Pradesh and Goa, being the coastal state of the country, faces the largest environmental health hazards related to arsenic toxicity in the country. In these regions, the arsenic contaminated ground water has been used not only for drinking and cooking, but, also for rice cultivation. Usage of this water for irrigation has led to accumulation of toxic levels of arsenic in the soil and therefore in the rice grains. Rice grains cooked with the arsenic contaminated water increases the arsenic burden in the cooked rice. Due to the various potential risks to humans through the consumption of agricultural produce of rice grown in fields irrigated with arsenic contaminated water, determination of the organic and inorganic levels of arsenic is the prime concern of the research. The arsenic samples are collected from the local state areas, known as the arsenic endemic states of the country. The concentrations of arsenic toxic levels were determined by ICP-MS. The maximum inorganic levels of arsenic were shown in the samples of Goa, being the coastal state of the country and then, West Bengal, known as one of the major arsenic hotspot in the world.

Key word: rice, arsenic, groundwater contamination, toxic levels.

Biography

Jhumi Jain, a 4th year student pursuing, B.Tech + M.Tech (an integrated 5 year course) in Biotechnology from IIIT University, Noida, India. Her goal is to build a long term career in the field of life-sciences by utilizing her interests, skills and knowledge by being the part of the technological advances, for the welfare of the people. Her current research work deals in the field of Environmental toxicology and remediation. She has also done her projects from NICPR (National Institute of Cancer Prevention and Research), Delhi, India and from BII (Bioinformatics Institute of India), Delhi, India on “Molecular Techniques for Diagnosis and Prevention of Cancer”; and “In-silico drug designing approaches targeting dihydropyrimidine synthase in lung cancer”, respectively. She has attended International Conferences, with her abstracts published. One of them being the International Conference on Civil Engineering and Environmental Technology, held at JNU, Delhi on the topic “Adverse Health Effects of Arsenic Toxicity” and the International Conference on Advances in Plant and Microbial Biotechnology, held at IIIT, Delhi, on the topic “Heavy Metal Toxicity”. She also attended workshops on “Drug Discovery and Designing”, held at AIIMS, Delhi. Publication of the review papers on the topic “Therapeutic approaches of Triple Negative Breast Cancer” and “Heavy Metal Toxicity” are in process.

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Treatment on HBeAg Positive or HBeAg Negative in Chronic Hepatitis B (HBV)

Trieu Nguyen Thi, Duc Tran Minh

Independent researcher, Vietnam

Recent studies have proved Phyllanthus Urinaria - Adenosma Glutinosum - Eclipta Prostrata - Ascorbic Acid combination plus Tenofovir in treatment of acute and chronic hepatitis B. Method the combination of drugs derived from pharmaco biology and pharmaco chemistry . To made a clean jobs for HBV - DNA in the patient's body - hope this is a new step of medicine, will no longer exist phrase "chronic HBV infection " Methods of safety, therapeutic effect on expected cost savings should easily apply to everyone everywhere in the world.

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Antiviral drug from industrial waste of human donor blood

Valentina.A. Divocha

Ukrainian Research Institute for Medicine of Transport, Ukraine

The flu remains till now to one of the most mass diseases which lead to hospitalisation of thousands diseased and a high mortality. Annually in Ukraine is ill from 10 to 14 million people that make 25-30 % of the general case rate of the population. Now the mortality from this disease and its complications does not decrease, and on the contrary, stabilisation and even augmentation of this indicator becomes perceptible. Actual there are questions of search of preparations for preventive maintenance and treatment of flu and ARVI, especially at early stages of disease. In our previous researches it is established that an antienzyme, an inhibitor of trypsin-like proteinases, take part in blocking of splitting of a hemagglutinin of a flu virus.

Objective: To excrete inhibitor of trypsin-like proteinases from industrial wastes of production of human gamma-globulin and albumin.

Materials and methods: In work used industrial wastes of I-st stage (II+III Cohn fractions) obtaining of a gamma-globulin from a donor blood of the humans which contained a significant amount of the given inhibitor excreted by a method of an ion-exchange chromatography on Diethylaminoethyl-cellulose (DEAE 53).

Results: We developed the way of reception of an inhibitor in the cleared kind which included such stages as: an extraction of an initial material; ultrasonic decomposition of cells; ion-exchange chromatography on DEAE-cellulose; dialysis; lyophilic drying. The given way has allowed to receive 5 isoforms possessing inhibitory activity. The greatest maintenance of an inhibitor of trypsin-like proteinases has been registered in fraction of V-th isoform. The fifth isoform possessing high inhibitory activity, used for studying of therapeutic properties at an experimental flu A at white mice. The given isoform has shown the expressed protective effect (80 % of animals had survived).

Conclusion: Industrial wastes of gamma-globulin and albumin production can serve as a good biomaterial for manufacturing of an antiviral preparation for the humans.

Biography

Divocha Valentina in 1967 she graduated from I. I. Mechnikov Odessa State University, Faculty of Biology (Department of Virology). In 1973 continued her postgraduate study at Odessa Institute of Virology and Epidemiology (specialty virology). In 1974 she was awarded her candidate degree with the thesis "Interaction of Coxsackie B viruses with sensitive cell cultures and their antigenic relationships." In 2009 she was awarded her doctoral degree with the thesis entitled "Biological basis antiproteinase therapy of influenza". Under her leadership performed a doctoral and two master's theses. Scientific experience is 35 years. I have more than 190 scientific publications, 3 monographs, textbook "Virology" (2012), 10 patents, 3 innovations.

I am currently working as the head of the Laboratory of Experimental and Clinical Pathology for Ukrainian Research Institute of Transport Medicine, is the supervisor of the nine research programs in virology and biochemistry.

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Production of microalgae in sewage effluents for sanitation, reuse of water and byproducts

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Our objective is to evaluate the potential of microalgae to grow in sewage effluents, comparing three different methods (cell count, absorbance and chlorophyll). Since the production of algal biomass requires significant inputs of nutrients, radiation and CO₂, it would be possible to offset water treatment costs by utilizing algae in tertiary processes of sewage treatment in the north of Argentina -one of the seven regions with higher levels of solar radiation in the world. Tests in culture medium (modified Detmer) show a positive response of *Scenedesmus quadricauda* to the addition of nutrients: i) growth of 10% (g/l) with calcium nitrate (at 12%/wt); (ii) 26% with potassium phosphate (12%/wt); iii) 60% with glucose (8 g/l). A scaling was performed from 1x to 10x. In all cases 4 concentrations of sewage effluent were used (25, 50, 75 and 100%), achieving a gradual acclimatization of the specie to the effluent. Growth cycles were 20 days. For 50% dilution, the algae growth was similar to that obtained with the standard medium ($H = 0.38$, $p = 0.984$), meaning 94% of the latter. For 25% effluent concentration, the algal growth was 130% higher than using only standard medium ($H = 2.81$, $p = 0.589$). For a higher concentration, algae begin to decline from the seventh day. It is currently working with scaling (100x), observing if the recommendation emanating from the present, using a maximum of 50% effluent in the dilution, continues to maintain the same trend. Because almost 20% of households in the country are located in places close to contaminated water, this project could have a major social impact by reducing risk on human health and allowing water use in new activities, especially associated with areas with resource scarcity. Moreover, algal biomass contain many useful substances and we are exploring different use possibilities.

Biography

Engineer in Natural Resources and Environment and PhD in Sciences, with focus on Renewable Energy, graduated at the National University of Salta (UNSa) with honors and Exceptional Mention, respectively. She has conducted advanced courses in the areas of land management, environmental management, renewable energy, bioenergy, sustainability and others. She has directed, advised and participated in numerous research projects and has been a teacher of undergraduate, master and PhD programs. She has carried out consultancy in the areas of rural development and natural resource management, environmental monitoring and development of forestry projects. She is the author of books, book chapters, international and national scientific journals and has made presentations at scientific meetings. She is currently a post-doctoral researcher at CONICET (National Scientific and Technical Research) and Professor of the Master Program in Renewable Energy at UNSa.

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Site Attachment Inhibition Therapeutics

Simon Raymond

Melbourne University, Australia

The concern with respect to antimicrobial resistance and the associated health threat has gained increasing attention and there has been difficulty in gaining traction globally. Given the lack of success by the two pathways established to date which have focused on: 1) “replication of infective agent” and, 2) “immune system enhancement,” the current researcher has conceptualized and developed the new, or third, mode of action pathway represented by “site attachment inhibition (or, negation of cellular attachment by infective agents).” The current author anticipates site attachment inhibition therapeutics to include drug (medication) based therapies, stem cell based treatment (including prenatal and earlier) incorporating new generation immunization methods, and waveform (E.g. electromagnetic radiation) based treatment. With respect to viruses, support for the likely success of the new mode of action pathway: A) the known CCR5-Δ32 mutation achieves resistance (immunity) against HIV through negation of cellular attachment; B) other areas of medicine use analogous receptor antagonism (E.g. beta blocker therapy); C) advanced IT uses analogous site attachment inhibition to remove viruses. With respect to bacteria, support for the likely success of the new mode of action pathway: A) advanced IT uses analogous site attachment inhibition to remove IT infections; B) glycoproteins are key receptors for attachment and, analogous to glycoprotein IIb/IIIa medications which inhibit (negate) platelet aggregation and thrombus formation, it seems reasonable to pursue antagonism or blockade of other glycoprotein receptors in order to prevent bacterial attachment to human cells (note: this is also relevant to viral infections); C) the human immune system coats infective agents in an attempt to negate cellular attachment, therefore this mode of action represented by site attachment inhibition makes scientific sense. Attention must be directed toward correctly identifying the target receptors and appreciating the difference between association and causation. Looking at mutations noticed in the human population and connecting this to the innate resistance they possess to certain infections is not enough as this may simply represent association as opposed to causation. Even the known CCR5-Δ32 mutation has not been completely confirmed as direct/causative of the inhibition of attachment observed in research analyses.

Future research by the current author will likely include delineation of the application of quantum physics to medicine and surgery, starting with neurology and immunology, and in what circumstances this is appropriate. In addition, the merger between fields including immunology, neurology, IT, and advanced physics (quantum physics) that appears likely to commence. Furthermore, detailed delineation of new generation immunization methods to be developed based on site attachment inhibition. In addition, the details regarding the unique new mode of action pathway (site attachment inhibition) with the only previous related research (or, minority research) more focused on aspects such as masking foreign entity identification and related methods.

In conclusion, this paper presents the new, or third, mode of action pathway in antimicrobial therapy represented by *site attachment inhibition therapeutics*.

Biography

The author (researcher) of the current report, Dr. Simon Raymond MPH, is a consultant (specializing in medical and scientific research) and an Alumnus of Melbourne University (Rank of Number 1 in Australia and Number 33 in the World). The above stated researcher has acted as a reviewer for the respected Medical Journal of Australia, has received invitations internationally to review from prestigious medical journals including JAMA (Journal of American Medical Association) Network, received award in recognition of his research by Royal Australasian College of Surgeons (PSC, 2006) and invited to conferences internationally as an official delegate and researcher, including that in USA and China. Dr. Simon Raymond has acted as the principle researcher in the highest powered form of medical trial—Randomized Controlled Trial (RCT). The above stated researcher is also a member of the Golden Key International Society for honoured and outstanding academics and has been cited as a notable global leader.

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A Novel approach to study relationship between Cotton leaf curl virus (CLCuV) and Betasatellites

Ahmad Ali Shahid*, Aleena Khalid and Muhammad Azmat Ullah Khan

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Cotton is very important cash crop of Pakistan and due to non-motile nature of the plants it is susceptible to different kinds of biotic and abiotic stresses. Lethal threat to cotton is cotton leaf curl virus (CLCuV) which belongs to family *Geminiviridae* and genus *Begomovirus*. *Geminiviridae* is often associated with sub viral agents called DNA satellites. These small insect transmitted pathogenic viruses are responsible for various crop diseases in cotton crop. These defective interfering particles are associated with the infection like *Begomovirus* which is having monopartite and bipartite genomes. Our study is concerned with the DNA β or betasatellite component of cotton leaf curl virus which is playing a tender role in cotton crop damage. Plants positive for betasatellites were confirmed for this study first by using specific primers. Then viral titre of full length virus or original virus was identified by using molecular techniques like southern blotting and real time PCR. After the detection of defective virus by southern blotting correlation study has been done between defective betasatellites and cotton leaf curl virus effected plants. Plants containing different symptoms were used in this study. Viral titers for different plants was compared with the positive plants for betasatellites. This correlation study between betasatellites and CLCuV depicts the role of betasatellites in the symptom advancements and their number is higher in highly affected plants. If infection is acute then number of betasatellites is higher. Our study helps to focus on the need to investigate another class of defective virus (alphasatellites) and their role in the infection.

Biography

Ahmad Ali Shahid is working as Professor in Centre of Excellence in Molecular biology, University of the Punjab, Lahore, Pakistan. He completed PhD from University of the Punjab and Post Doc from University of the Nottingham UK. Field of interest is Plant Molecular Biology, Plant Biosafety and Forensic Science. Presently he is head of Plant Biotechnology and Forensic Science Research Groups. Seven PhD and forty M Phil students have completed their degrees under his supervision. He achieved eight research grants from different agencies. Dr. Shahid has published 06 books and more than 100 research publications with impact factor 115 and citation 500.

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Influence of products of cell-wall invertase on synchronization of microtuber formation in *Solanum tuberosum* L. *in vitro*

Alexander Deryabin

Russian Academy of Sciences, Russia

Tuber formation within an individual potato plant is subjected to a specific spatial and temporal hierarchy caused by both genotype and environmental conditions. Therefore, it is difficult to synchronize the processes of tuber formation *in vivo*. Before we showed the possibility to synchronize the process of tuberization *in vitro* through synchronization of cell divisions in axillary meristems of initial stem explants induced by low temperatures (Deryabin & Yur'eva, Russ. J. Plant Physiol., 2008. 55(6):829-833).

Role of cell-wall invertase (E.C. 3.2.1.26) in cold synchronization of microtuberization was studied using stem explants of non-transformed potato (*S. tuberosum* L., cv. Désirée) (control plants) and a transgenic line, which expresses the SUC2 gene encoding the invertase of the yeast under the control of B33 patatin promoter. The promoter contains a leader peptide of proteinase inhibitor II to provide the apoplastic enzyme localization. The plants were taken from the Max Planck Institute of Molecular Plant Physiology (Germany).

Cell divisions in the axillary meristems of stem explants were synchronized using their exposure to low temperatures (7°C) for 24 h in MS-medium containing 2% sucrose. Tuberization was induced on the 7th day with replacement of the initial MS-medium with the identical one supplemented with 8% sucrose (20°C). Sixty days after the induction of tuberization, we assayed physiological maturity of microtubers using the 0,5% water solution of 2,3,5-triphenyltetrazolium chloride.

The experiments showed that the proportion of synchronously dividing cells in the tissues of axillary meristems of control plants exposed to chilling increased 2-3-fold as being compared to the transformants. The used mode of chilling of stem explants synchronized the growth of stolons and promoted physiological maturity of microtubers only in the control plants. The SUC2 gene expression lead to the elevated activity of the cell-wall invertase and to glucose accumulation in microtubers, and all the microtubers were immature.

Biography

Alexander Deryabin graduated from the Biological Faculty of Mordovian State University (Saransk, Russia) in 1990 and got degree of Ph.D. in K.A. Timiryazev Institute of Plant Physiology of the Russian Academy of Sciences (IPP RAS, Moscow, Russia) in 1997. The thesis title “Analysis of tuberization of potatoes (*Solanum tuberosum* L.) in different types of bioreactors”. Since then he has worked as the senior researcher in the Laboratory of Cold Resistance of IPP RAS. His major interest is related to biology of potato tuberization and chilling tolerance of plants. He has published 35 original manuscripts in professional journals, 1 patent, 1 monography and successfully performed 5 research projects funded by Russian Foundation for Basic Research.

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Proactive model for locating and collecting cybercrime evidences on cloud computing

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The high scalability of cloud computing provides more opportunities to business and IT organization to develop high end computing services with low cost. Businesses has been given many choices in selecting cloud service providers as this process requires careful thinking to weight the advantages against the possible drawbacks of losing control on resources, applications and data storage. Despite the advancement of cloud storage and the advantageous it brings to all computer users, cloud storage is still subjected to misuse of malicious users and criminals. This includes the use of cloud storage for storing and exchanging illegal material and for committing botnet attacks. In fact, increasing number of crimes against cloud storage makes the investigation process of extracting and collecting cybercrime evidences in cloud forensics more challenging. Although a number of researches and solutions are proposed to address cloud computing security, several studies and surveys reported that security in cloud computing still posing several challenges to the researchers. Loss of control over the data stored in cloud computing is one of the security challenge in that clouds. Location of data storage in the cloud and the multi tenancy of customers on cloud servers are all representing security concerns. At the same time, cloud technology nowadays is also creating challenges for forensic practitioners. This paper reviews the current challenges in cloud forensic and propose a proactive model to improve the process of locating and collecting cybercrime evidences in cloud computing. The objective of this paper is two pronged. Former is to study the existing digital evidence collection methodology, the location and the data fragments left on user's computer prior to the usage of cloud storage application. Last is find the location and the data fragments left on user's computer prior to the usage of cloud storage application for new cloud storage.

Telomere length inheritance in the Egyptian population: Prove the concept of germ cell mortality

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Telomere is a structure of DNA and protein locates at the end of chromosomes in order to protect them. In every cell division, telomere length is getting shorter, therefore; it acts as a biomarker of aging. Being a part of the chromosome, it is a self-evident that telomere is inherited from parent to their offspring. However telomere length mode of inheritance is a much more complicated issue. Theoretically, germ cell is thought to be an immortal cell as it links generations. This indicates that telomere length may be completely inherited from a generation to another. Practically, the manner by which telomere is inherited is not fully understood up till now. One study demonstrated that it is an X-linked inheritance as they could observe no correlation between father and son telomere length of white blood cells, while there is a positive correlation between mother-daughter, father-daughter and mother-son. However, many studies revealed that a positive relationship between parental age and telomere length of offspring which refers to the immortality of germ cell. Other studies proved that the increase in paternal age is followed by decrease in offspring telomere length, which may indicate the mortality of germ cell. This theory conflicts with the one before. One possible suggestion for this conflict is that germ line stem cell is the responsible for this increase in telomere length at old ages. Herein, we aim to explore these previous studies by including the difference between telomere length of a certain population and their ancestors "such as the ancient Egyptian, the pharos" to demonstrate the change in telomere length throughout these years and then telomere length mode of inheritance and then prove the concept of the mortality or immortality of germ cell. _

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Probiotic Gouda cheese as functional foods: Proteolysis and sensory properties

El-Sayed El-Tanboly and Mahmoud El-Hofi

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The dairy products with probiotic bacteria recognition as functional foods that provide health benefits beyond basic nutrition and the emerging clinical evidence to their potential in preventing some diseases have notably enlarged their consumption and stimulated innovation and new product development. Cheese products enriched with probiotic bacteria are one of optimized functional foods. The objective of the present study was to influence of modified mesophilic starter and probiotic Lactobacillus, as adjunct culture, on product quality, in particular the proteolytic pattern of the Gouda cheeses. The composition and the pH value were almost identical between cheese. The rate of proteolysis of cheese with probiotic bacteria was slightly higher than that in control cheese, probably as a consequence of their different proteolytic activity. Levels of nitrogen fractions increased significantly with ripening period. Organoleptic evaluation showed that probiotic cheese had higher sensory evaluation than control cheese, without probiotic strain. The population of Lactobacillus survived to numbers $> 10^7$ cfu/g, which is necessary for positive effects on health. These results showed that the contribution of mesophilic starter and probiotic strain as adjunct culture can be successfully used in production of Gouda cheese.

The relation between Vitamin D receptor single nucleotide polymorphism and the frequency of osteoporosis in Egyptian children with Beta-thalassemia

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Background: Osteoporosis may complicate iron overload diseases. Vitamin D receptor (VDR) gene variation is highly associated with dysfunctions of vitamin D metabolism which may lead to defect in bone architecture. The aim of this study to investigate VDR Single nucleotide polymorphism SNP and its possible association with DEXA scan and bone mineral density (BMD) values in children with Beta-thalassemia (TM).

Methods: the children included in this study divided into two groups, group I: include seventy six TM children, group II included 51 age and sex matched healthy controls. All children subjected to full history taking, complete clinical examination. Renal and hepatic functions, calcium, phosphorous, alkaline phosphatase and vitamin D levels were measured. DEXA scan were done and BMD was determined. VDR rs2228570 SNP was assayed by real time PCR.

Results: There was a significant increase phosphorus, alkaline phosphatase and decrease in calcium, vitamin D levels and BMD in patients groups compared to control. There was a significantly increased frequency of the TT genotype and T allele of rs2228570 SNP of VDR in patients group compared to controls. There were significant decrease in BMD and increase in number and % of osteopenia and osteoporosis in patients group with TT genotype than both TC and CC ($p < 0.001$).

Conclusion: The VDR SNP rs2228570 TT genotype and T allele affect vitamin D function and associated with decrease BMD and high frequency of osteopenia and osteoporosis in children with Beta thalassemia.

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MERS-CoV: An Epidemic Whirlwind

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Corona virus as a Middle East Respiratory Syndrome (MERS) considered being a new complicated disease; it infects the epithelial cells in the respiratory and/or intestinal tracts, thus causing disease in epidemic proportions. The situation is exacerbated by either a short incubation period between 2-7 days or between 12-14 days. In September 2012, coronavirus was identified for the first time in a new series of infections, known as MERS-CoV. Since March 2012 and until the end of November 2015, a total of 1655 cases were reported with the number of 577 deaths and 630 recovering from the disease, while 28% of the data were analyzed throughout the world by WHO. The virus has been detected in Arabian Peninsula, European countries such as Britain, Germany, France, Italy and Middle East. However, to the idea that the Hajj season could trigger the transmission of MERS-CoV in Saudi Arabia remained controversial.

Study of genetic and epigenetic markers in relation to Tumor phenotype and clinical outcomes in Egyptian gliomas

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Introduction: Gliomas make up approximately 30% of all CNS tumors and 80% of all malignant brain tumors, they are defined and graded on the basis of histopathological features, but these features allows considerable inter-observer variability. Previous studies have shown conflicting results considering the role of the genetic markers; chromosome 1p36 and 19q13 copy number changes and the epigenetic marker; O6-methylguanine- DNA methyltransferase (MGMT) gene promotor methylation status on the grading and prediction of the clinical course of glioma subtypes. To the best of our knowledge, this study is the first to assess the genetic and epigenetic markers in the Egyptian glioma in relation to their clinicopathological outcome. **Methods:** We assessed the status of the genetic markers; chromosome 1p36 and 19q13 copy number changes and the epigenetic marker; MGMT promotor methylation status, in 40 patients with glioma using the fluorescent in situ hybridization (FISH) and methylation specific PCR (MSP) respectively, and correlated the results with clinicopathological parameters and survival using established statistical methodologies. **Results:** Interphase FISH analysis for chromosome 1p36 and 19q13 copy number changes revealed different subsets of outcomes; no deletion, co-deletion, and polysomy, with no significant association with longer survival in gliomas. MGMT promotor methylation analysis revealed 65% has methylated promotor and 35% has unmethylated ones with no significant predictive value related to different treatment modalities and overall survival. **Conclusion:** FISH analysis and methylation specific PCR is a reliable, clinically validated tools to assess chromosome 1p36 and 19q13 copy number changes and MGMT promotor methylation status helping stratifying glioma patients but their results should be interpreted with caution and weighed in the context of parameters such as age and histopathological diagnosis. Further study is needed considering their role in the patients overall survival prognosis and the prediction of which glioma patients can benefit from alkylating agents chemotherapy.

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***Leishmania mexicana* growth phase effect on MHC class I down-regulation**

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Expression of histocompatibility complex (MHC class I) is critical in recognition and control of intracellular pathogens. In this study, the effect of experimental conditions on MHC class I expression of host cells infected with *Leishmania mexicana* was investigated using flow cytometry. Results illustrated that infection with *L. mexicana* at different growth stages caused different levels of MHC class I down-regulation. Unexpectedly infection of U937 and MonoMac-6 cells with ratio of 1:10 (cell: parasite) at mid log stage induced a significant ($P<0.05$) down-regulation in MHC class I expression compared to late and stationary phases of *L. mexicana*. More experiments using qPCR analysis confirmed the parasite virulence at stationary phase compared to mid log phase as measured by the expression of virulence-associated GP63, LPG2, CHT1, CPC, CPB2 and CPB2.8 genes. The MHC I down-regulation induced by the stationary phase was dose dependent, it was down-regulated from 88% to 79.00%, 45.08%, and 1.74% using infection ratios of 1:10, 1:20 and 1:30, respectively. Treatment of *L. mexicana* infected cells with Fungizone, an anti *Leishmania* agent, partially restored MHC class I expression. In conclusion, the previously reported variations in the results of MHC class I expression following infection with *Leishmania* parasite may relate to variations in the growth phases of the parasite used as well as the infection dose.

Fermentation of milk with a view to antioxidant activity

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This study focused on investigating the milk fermentation process and the development of antioxidant activity (AOA). Factors having impact on the antioxidant activity, acidity activity (pH) and titratable acidity ($^{\circ}\text{SH}$) were also monitored during the fermentation process and statistically processed.

Homogenized and sterilized whole cow milk was used in the milk fermentation during 4 hours in a 15-day period with 5 control points. Symbiosis of the cultures *Streptococcus thermophilus* and *Lactobacillus delbrueckii ssp. Bulgaricus*, as well as the monocultures *Lactobacillus casei*, *Lactobacillus acidophilus* and *Bifidobacterium bifidus* were applied as starter cultures. The AOA was determined by DPPH assay by measuring the absorbance spectrophotometrically at 517nm, and was expressed in (%) of the neutralization of free radical. Titration acidity ($^{\circ}\text{SH}$) was determined according to Soxhlet-Henkel.

The results showed that during fermentation process, with the all milk samples fermented with different microbial cultures was a great increase in titratable acidity and AOA, compared with those obtained with unfermented milk samples. The values for titratable acidity ranged from 8 ($^{\circ}\text{SH}$) in nonfermented milk to 40.0 ($^{\circ}\text{SH}$) with milk fermented with *Lactobacillus acidophilus* in the 10th and 15th day. The average value for these milk samples was 38,05. High AOA was also registered with the milk samples fermented with *Lactobacillus acidophilus*, having the average value of 54,86 (%) and the highest value of 63.99 (%) obtained after the fermentation process. With the all fermented milk samples analysed, it was noticed a decrease in the values of acidity activity ranging from 6,67 with the unfermented samples to the lowest of 4,08 with samples fermented with *Lactobacillus acidophilus*.

The dynamics of pH changes in all control points can best be seen from Graph 1. If we compare the values of pH, a decrease was noticed, and that trend continued till the final control point at the 15th day.

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Molecular characterization Isolates of *Pythium* spp. isolated from tomato seedlings in the Syria

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Tomato seedlings damping-off is a limiting factor in commercial greenhouse production. To determine the causal agents of disease, sampling and fungal isolation were performed during 2012. Samples were collected from infected seedlings growing in greenhouses in the Syrian coastal region, Isolation of fungi was done in the laboratories of the Agronomical Research Center, in Lattakia and the molecular analyses were done in the Biotechnology Center at Tishreen University, Lattakia, Syria, during the years 2012, 2013. Eight isolates of *Pythium* sp. obtained were purified using hyphal tip method (named P1, P2, P3, P4, P5, P6, P7 and P8). Isolates were morphologically identified by optical microscope, then molecularly characterized using genus specific ITS primers. The results of morphological characterization of pathogenic species suggested the detection of *Pythium aphanidermatum*, *P. ultimum*. The analysis of DNAs from the different isolates with ITS primers, recognizing the inter transcript spacer of nuclear ribosomal DNA proved that the eight, isolates were belonging to the species *P. ultimum*. The complete sequences of ribosomal DNA internal transcribed spacers regions of selected isolates were determined and submitted to GenBank. The GenBank-BLAST homology search revealed *P. ultimum*. as the most similar sequence (> 96% identity) with GenBank entry AB355596.

Toxic effects of synthetic pesticides and the need for non-toxic bio-alternatives- A review

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In the bid to increase food crop production and availability, farmers and stakeholders ignorantly or intentionally make use of non-selective pesticides. These potentially toxic pesticides last for a long time in the environment and pose numerous risks to living things including humans, many years after they have been used. Run-offs of such chemicals into marine and fresh water environments contaminate water bodies and kill aquatic lives. Children are more susceptible to the toxic effects of these pesticides. Data from the National Resource Defense Council reveals higher incidence of childhood leukemia, brain cancer and birth defects as possible aftermaths of early stage exposure to pesticides. The World Health Organization estimates 3 million cases of pesticide poisoning worldwide each year and up to 220,000 deaths. Interestingly, recent studies have shown the efficacy of the phytochemical components of medicinal plants to suppress the growth of weeds and also repel or kill insect pests on the field and in storage. There is therefore an urgent need to increase food availability without adverse effects on health and the environment by developing and commercializing non-toxic alternatives to synthetic pesticides.

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Isolation, characterization and bioevaluation of Chrysophanol and Parietin from *Platycladus orientalis* (L.) Franco

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The Islamia University of Bahawalpur, Pakistan

Anthraquinone-derivatives, Chrysophanol (1) and Parietin (2) were isolated from the leaves of *Platycladus orientalis* (L.) Franco by a series of silica gel column chromatography and purity of these compounds were checked by C18 HPLC analysis. Their structures were determined by spectroscopic analysis (1D and 2D NMR, FTIR, UV, and HR-TOF-MS) and comparison of literature values. Both compounds were already reported from different plants but first time isolated from *P. orientalis*. Mushroom tyrosinase inhibition assay was performed for compounds 1 and 2 and showed activities with IC₅₀ values of $39.2 \pm 3.4 \mu\text{M}$ and $41.62 \pm 2.9 \mu\text{M}$, respectively in comparison to the reference inhibitor, kojic acid with IC₅₀ $15.91 \pm 0.33 \mu\text{M}$. The inhibition mechanism analyzed by Lineweaver-Burk plots revealed that both the compounds 1 and 2 showed mixed type inhibition. In case of anti-inflammatory screening, compound 1 was found to suppress the inflammatory response and inhibited IL-1-induced COX-2 expression but no effect on cell growth in A 375 human melanoma cells.

Key words: Chrysophanol; Parietin; Tyrosinase; inhibition mechanism; Melanoma; Western blot

Biomedical Applications of Fibrous Structures: A Study of Collagen Boosters on Smart and Advanced Wound Dressings

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Textile materials and structures are actively being used as traditional and modern wound dressings. Cotton and viscose gauze have traditionally been employed in the acute wound applications but in chronic wound applications, they have been replaced by modern wound dressings. Polylactic acid (PLA), sodium and calcium alginate, chitin and chitosan, carboxymethylcellulose (Hydrofibre®), gelatine and collagen are utilised in the development of smart and responsive modern dressings for wound management applications. Various structures are currently employed to produce wound dressings, such as foam, film, hydrogel, hydrocolloid and nonwoven. There have been significant advances in the design and development of smart nonwoven composite wound dressings.

A novel concept, based on collagen boosting agent treatment, has been explored in this study, wherein the developed nonwoven structures were treated with two different collagen promoting agents at 0.5% and 3% levels by using a spray method. Vitamin C and zinc oxide (ZnO) were selected after screening the collagen enhancing property of various individual chemicals in literature. It should be stressed that there is no published literature to date regarding wound dressings containing collagen boosters. Besides, there are no such products listed on the Drug Tariff. With the rapid demand of modern and smart wound dressings, it is vital that an effort has to be made to develop novel wound dressings by making use of known collagen promoting agents such as vitamin C and ZnO to enhance wound healing especially cavity and difficult-to-heal wounds. It is in this context, an attempt was made to design and develop novel 'all-in-one' collagen-booster therapeutic nonwoven wound dressings.

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Identification of QTLs for Physiological Attributes in wheat mapping population under salt stress

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Salt stress disturbed plant physiological processes, caused nutritional imbalance and ion toxicity leads to reduction in plant growth. QTL mapping is to establish linkage between a marker allele and an allele of a locus responsible for a significant part of variation of a quantitative trait. Mapping population consisting of recombinant inbred lines (RILs) derived by cross of Pasban90 and Frontana was used in the present study to identify genomic regions associated with physiological attributes. The mapping population was mapped for relative water content, membrane stability index, water potential, osmotic potential, total chlorophyll content, chlorophyll a, chlorophyll b, sodium content, potassium content and potassium/sodium ratio. Mapping population was genotyped using two hundred and two polymorphic simple sequence repeats. Linkage map of RILs comprised of 21 linkage group and covered a map length of 2630.1 cM. B genome contributed to the highest number of QTLs under salt stress condition. Xgwm70 and Xbarc361 mapped on chromosome 6B was linked with Total chlorophyll, water potential and sodium content. Novel QTLs for water potential, osmotic potential, relative water content and chlorophyll content were identified.

Key words: Physiological attributes, QTLs, Wheat, and Salinity

Response of muskmelon germplasm against *Meloidogyne incognita* and its management through *Aspergillus* spp.

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Present investigation was planned to access the damage potential of *Meloidogyne incognita* to muskmelon. Screening of different muskmelon germplasm was done against *M. incognita*, both plant growth and nematode reproduction parameters were observed. Among different germplasm White candy was resistant, YIN YU-2 was moderately resistant, YIN YU-3 AND Visa-F1 moderately susceptible while Tarifa was susceptible to *M. incognita*. Potential of *Aspergillus* spp. (*A. niger*, *A. flavus*) was checked against *M. incognita* both *in vitro* and *in vivo* conditions. From *Aspergillus* spp., *A. niger* at 1×10^7 concentration was most effective in juveniles mortality and hatching inhibition under *in vitro* conditions. Under greenhouse conditions, effect of alone and combined application of *A. niger* and *A. flavus* at 1×10^7 concentration was evaluated on plant growth and nematode reproductive parameters. In combined application increase in shoot length, shoot weight, root length whereas reduction in nematode reproduction was observed. Results revealed that combined application of *A. niger* and *A. flavus* have more potential in controlling nematode population and helpful for sustainable crop protection.

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Direct Differentiation of Human iPS Cells Towards the Erythroid Lineage

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Pluripotent stem cells including iPS cells and ES cells are known for their distinctive property of indefinite self-renewal, with the potential to differentiate into all types of cells. Current protocols used in the differentiation of human iPS cells and human ES cells towards erythropoiesis utilize two main approaches: (1) EB formation, which influences heterogeneity of the produced population, and/or (2) co-culture with mouse stromal cells, where obstacles of purification of the cells rise, which makes the xeno-free culture requirement difficult to achieve. Moreover, these protocols reported low efficiency in number and functionality.

In this study, we have designed a novel protocol for direct differentiation of human iPS cells towards erythroid cells under serum-free conditions bypassing the EB formation step without requiring co-culture. Our protocol involves three steps: (1) hematopoietic/erythropoietic induction, followed by (2) erythroid differentiation, and finally, (3) erythroid maturation and enucleation. As early as day 7 of culture, an early hematopoietic marker, CD34, was observed, followed by a high expression of CD45, which is a pan-leukocyte marker in parallel to less expression of an early erythroid marker, CD71. Over the culture period, an increase in the expression of the late erythroid marker, CD235a, was monitored. Further studies on functional and morphological analysis using CFU assay showed that the cell population on day 14 were able to form erythroid progenitor colonies. Immunocytochemical staining and qPCR showed the presence of heme-containing proteins. Interestingly, staining with new methylene blue confirmed reticulocyte morphology, which indicated that partial maturation was achieved. Hypoxia condition is a key regulator for erythropoiesis and haemoglobin formation. This thesis thus presents a direct differentiation protocol toward erythroid cells using human iPS cells in serum-free and feeder-free system, resulting on high efficiency of erythroid cells formation within 4 weeks of culture, which include partial maturation and formation of adult-type haemoglobin.

Distribution of CTX-M Group -I and Group III-beta-lactamases produced by *Escherichia coli* and *Klebsiella pneumoniae* in Pakistan

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Little is known about CTX-M beta-lactamase producing bacteria in Pakistan. Therefore, study was carried out to investigate the distribution of CTX-M beta-lactamase producing *E. coli* and *Klebsiella pneumoniae* using phenotypic and molecular techniques.

A total of 638 *E. coli* and 338 *Klebsiella pneumoniae* were isolated from patients attending two hospitals and one diagnostic Centre in Pakistan during 2013-2015. ESBL production was screened by double disc synergism, combination disc (cefotaxime and ceftazidime with clavulanic acid) and E-test. These strains were further characterized by PCR (CTX-M I, CTX-M III) and sequencing. After ribotyping of strains accession number were obtained.

These isolates were highly resistant to cephalosporins, ceftazidime, cefotaxime, aztreonam, cefuroxime but susceptible to carbapenems, sulzone, amikacin and tazocin. Double disc synergism 76.4 % combination disc, 74 % E-test showed ESBL positivity in strains. In *E. coli* ESBL genes $bla_{\text{CTX-M-I}}$ and $bla_{\text{CTX-M-III}}$ were detected in 212 (72.1 %) and 25 (8.5%) respectively. In *Klebsiella pneumoniae* ESBL genes $bla_{\text{CTX-M-I}}$ and $bla_{\text{CTX-M-III}}$ were detected in 89 (82.4 %) and 10 (9.2 %). Combination of both genes $bla_{\text{CTX-M-I}}$ and $bla_{\text{CTX-M-III}}$ were found in 16 (5.4 %) in *E. coli* and 5 (4.6%) in *Klebsiella pneumoniae*. Sequencing revealed that CTXM-15 was predominately present in CTX-M-I group.

The prevalence of ESBL producing *E. coli* and *Klebsiella pneumoniae* isolates were high and majority of them positive for $bla_{\text{CTX-M-I}}$ as compared to $bla_{\text{CTX-M-III}}$. These findings highlighted the need to further investigate the epidemiology of other CTX-M beta-lactamases in Pakistan.

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Optimization of biosurfactant production using cost effective substrates by *Pseudomonas putida* SOL10

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Advances in technology involving the use of natural resources as an alternative source of energy have led to the manufacture of biosurfactants with high value in the global market. Biosurfactants have been paid increasing attention to replace the synthetic surfactants owing to their advantages such as biodegradability and low toxicity. The key factor governing the success of biosurfactant production is the development of economical processes that use low-cost materials (wastes) to give high yields. The present study involves the selection of cost effective substrates and optimization of cultural conditions viz temperature, pH, and agitation to replace costly yeast extract to minimize production cost and increase yield. Substrates including red beans, molasses, whey, potato peels, olive oil, castor oil, crude oil, kerosene oil and waste cooking oil were used for biosurfactant production by *Pseudomonas putida* SOL10. These sources were used individually and later on in different combinations along with urea as inducer. Biosurfactant production was assessed by surface tension and oil displacement assay. Substrate sources gave much better results in combination as compare to individual effects. Combination of waste cooking oil 2% and potato peels 1% along with 0.1% urea gave maximum biosurfactant production at 30°C temperature, 9.5 pH, and 150 rpm agitation. Surface tension reduction up to 29 mN/m with 6.7cm ODA zone was observed.

Genome-wide expression profiling of the transcriptomes of selected Faba bean in response to drought stress

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Drought and salinity are the major factors that limit faba bean production worldwide. Elucidating stress related genes will allow trait and crop manipulation and facilitate the production of stress tolerant elite genotypes. The main objective of the current project was to performed whole transcriptome analyses of drought tolerant Hasaawi 2 genotype, to better understand the molecular basis of stress response/adaptation. RNA-seq NGS technology was used to analyze samples of roots and leaves both at vegetative and reproductive stages under both control and drought induced conditions. In this project a total 167.25 Gb bases was generated after Illumina Hiseq sequencing. After assembly, unigenes were subjected for functional annotation with 7 functional databases (NR, NT, GO, COG, KEGG, Swissprot and Interpro). The highest annotated unigenes were obtained for Nt- and Nr databases which were 55.07 % and 54.82 % respectively while lowest were obtained with GO- data base. These annotated unigenes were classified into different GO catagories with 36.31% (38852) unigenes were for Biological processes, 29.42 % (31477) unigenes for cellular components and 34.26% (36661) unigenes for molecular function. The unigenes were also subjected to SSRs identification. In total, 15291 potential SSR motifs were identified and the majority belonged to trinucleotide (7620) and dinucleotide (6073) repeats. The unigeness thus obtained were further processed for gene expression analysis for identification of drought responsive genes. A pairwise comparison revealed divergent gene expression in the Hassawi 2 genotype at different developmental stages in toots and leaves. A total of 651 unigenes were up-regulated and only 11 were down regulated at flowering stage of leaves. However, at vegetative stage, a large number of unigenes were down regulated, 27803 unigenes were up-regulated and 17430 were down-regulated. In roots, majority of unigenes were down regulated at both developmental stages. At flowering stage, 19071 unigenes were up regulated while 24631 genes were down regulated in roots at flowering stage. However 89 unigenes were up regulated in roots and 1787 were down regulated. The results of this report will be further integrated with detailed bioinformatics analysis and also incorporated by quantitative PCR analysis of drought resistance genes in final progress report. These genes could be used for trait manipulation for development of faba bean genotypes with enhanced drought tolerance and adoption to the local environments.

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NanoTechnology - AI Deep Learning Techniques

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Nano technology is about study and application of extremely small things used in various science disciplines like chemistry, biology, physics, materials science and engineering. Artificial Intelligence based techniques like deep learning, neural networks, image processing and image recognition are used for scanning probe microscopy. This is to improve the ability to manipulate atoms and the interpretation of the microscope signal. The technique used for functional recognition imaging is artificial neural networks (ANN) with Principal Component analysis (PCA). Image processing and computer graphics are used in nano manipulators which provide interface to scanning probe microscopes. These microscopes are used to investigate and manipulate the surface at atomic scales.

An Artificial Neural Network is a collection of nodes with weighted connections. They are used in multimodal scanning probe microscopy. Functional recognition imaging requires big data and uses Artificial Neural Networks for data processing. ANN's are used in modeling functional relationship between input and output responses in the transparent conductive oxide deposition. Transparent conductive oxide is used in solar cells and organic light emitting diodes used in screen displays.

In molecular technology, genetic algorithms are used in automatic and intelligent system design. The other techniques used in intelligent systems are case based reasoning, knowledge based systems, representation and reasoning. The swarm intelligence technique is used to control intelligently the manufacture of nano metre scale devices. Dynamic problems in Nano mere scale devices are solved using soft computing techniques. Creation of Self assembling devices is another area where Artificial intelligence plays an important role. Self assembly consists of components, environment, assembly protocol and energy. Intelligent systems have techniques for creation of self assembling devices using the knowledge and representing components and environment as metadata.

AI techniques are used for speeding up of commercial and scientific research & development of nano-materials. New research is evaluated based on novelty and feasibility using machine learning techniques. AI can help in making complex decisions about market needs that are enabled by nano-technology.

Exploring the potentials of crispr & emerging gene-editing technologies in the control of Lassa haemorrhagic fever in Nigeria.

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The clustered regularly interspaced short palindromic repeats (CRISPR) has shown promising results in genome engineering. Research in life sciences and biomedicine stand to benefit tremendously from the precise gene-editing and modification potentials of CRISPR and Cas9 protein. From bacteria to yeasts, to zebra fish and humans, CRISPR has been tried in the modification of genes for various reasons. Recent researches have shown success in sgRNA-mediated gene editing in rice, and tobacco, among other crops. In the control of diseases, apart from cancer and other metabolic diseases, it has been tried on some infectious diseases through gene-derive based malaria vaccine, disruption of latent HIV-1 provirus, and development of RNA-vaccine for Ebola virus. This exploratory work attempts to look at the various ways in which, Lassa haemorrhagic fever, an RNA arena virus disease (much like Ebola fever) could be controlled or eradicated through CRISPR technology. This involves a short review of the various ways CRISPR is used in infectious disease control; the present control measures used in the control of Lassa fever; and suggestions on how CRISPR could be used in Lassa fever control. First described in 1969 from a case in Nigeria's northeastern region, Lassa fever is endemic to Nigeria and the West African region, where it records 300,000 to 500,000 cases leading to about 5,000 deaths annually. Sanger (viral) sequencing, Endonuclease mutation detection assays, RNA guided gene splicing, knockdown activation of foreign gene, viral vector and non-vector gene delivery systems, gene drive, and other methods associated with the CRISPR-Cas genome engineering have been considered. The study also looked at cases of target-specificity and off-target cleavage; bioethical/biosafety concerns regarding the environmental release of organisms with edited genes; effects of gene derive on the eco-system, technical and financial constraints in Nigeria; and other problems that could affect this technology in Nigeria.

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Nano-cellulose based biopolymer using plant biomass: An innovative biodegradable nano-biomaterial

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Biomass is organic matter derived from living plant or animal. It can be used as a source of bioenergy, biomaterials and mostly refers to plants or plant-based materials that are specifically called cellulosic and ligno-cellulosic biomass. Bio-plastic-like biopolymer biomaterials can be naturally organic and biodegradable. The biopolymer based bio-plastic biomaterial can be used for wrapping cosmetics, medical, biomedical, bioengineering, pharmaceutical and sanitary products. This study has been highlighted as one of the strategy producing biomass based nano-bioplactic biomaterials to solve dependency on petroleum and environment pollution because of non-degradable plastic. The study was carried out to investigate the nano-biopolymer based definite biomedical materials from corn leaves, banana peel and date palm leaves biomasses with mixture of chemicals. Leaves biomasses and banana peel were used to produce nano-bioplactic biomaterials like nanobiofiber, bio-nanofilm, bio-nonoglove, bio-nanocoating, bio-nanoscrew for bone joint, bio-nanobumper, bio-nanosolvent etc. for medical, biomedical, pharmaceutical, bioengineering and other industrial uses. However, different kinds of test like absorption, odor, tensile, fitness, firmness, energy, dying and chemical have been evaluated.

The results seemed that organic based nano-bioplactic biomaterial was better than synthetic based plastic materials depending upon its different properties identified by ASTM (American standard for testing and materials) and EN (European Norm) standard. Therefore, it can be concluded that both organic (cellulose and starch) based nano-bioplactic can be used for biomaterial as biomedical, medical bioengineering and laboratory components in the pharmaceutical industries.

Biomass and Biogas for Sustainable Energy Generation: Recent Development and Perspectives

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Bio gas from biomass appears to have potential as an alternative energy source, which is potentially rich in biomass resources. This is an overview of some salient points and perspectives of biogas technology. The current literature is reviewed regarding the ecological, social, cultural and economic impacts of biogas technology. This article gives an overview of present and future use of biomass as an industrial feedstock for production of fuels, chemicals and other materials. However, to be truly competitive in an open market situation, higher value products are required. Results suggest that biogas technology must be encouraged, promoted, invested, implemented, and demonstrated, but especially in remote rural areas. There is an unmistakable link between energy and sustainable human development. Energy is not an end in itself, but an essential tool to facilitate social and economic activities. Thus, the lack of available energy services correlates closely with many challenges of sustainable development, such as poverty alleviation, the advancement of women, protection of the environment, and jobs creation. Emphasis on institution-building and enhanced policy dialogue is necessary to create the social, economic, and politically enabling conditions for a transition to a more sustainable future. On the other hand, biomass energy technologies are a promising option, with a potentially large impact for Sudan as with other developing countries, where the current levels of energy services are low. Biomass accounts for about one third of all energy in developing countries as a whole, and nearly 96% in some of least developed countries.

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Effect of Fe % on the corrosion behavior of newly fabricated nanocrystalline aluminum-iron alloy produced by mechanical attritor

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In this study, nanocrystalline aluminium-iron alloy were produced from metallic powders with addition of 2wt. %Fe, 5wt. %Fe and 10wt. %Fe processed using mechanical alloying (MA) technique. The initial powders were processed in an attritor for 4 hours at room temperature in an inert Ar atmosphere. The processed powders were consolidated and sintered using a high frequency induction heat sintering (HFIHS) machine to form bulk samples.. The crystallize size of the bulk samples was calculated from the peak profile obtained through X-Ray diffraction (XRD). The corrosion behavior of sintered samples were investigated at room temperature in 3.5% NaCl solution through two well-known techniques, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization resistance. The results show that the addition of the Fe particles into the Al matrix the hardness and mechanical properties as well as the corrosion resistance enhanced.

Peripheral tissue engineering via silk Nan fibrous mat as a nerve guide

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The aim of this study was to modify a nanofibrous silk mate with a chemically cross linker. The nanofibrous mats designed by electrospinning method, then were modified using chemically cross linker of 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide (EDC) in the presence of N-hydroxysuccinimide (NHS). The samples evaluated by microscopic, mechanical analyses, and cell culture assays with Schwann cells. Results of analyses were showed a good resilience and compliance with to chemically cross-linker. Cellular experiments showed a suitable cell adhesion and growth for the cross-linked mats without any toxicity. This modified mat appears to have the right organization for testing in vivo special nerve tissue regeneration.