

3<sup>rd</sup> International Conference on  
**MASS SPECTROMETRY,  
PROTEOMICS AND POLYMER  
CHEMISTRY**  
May 20-21, 2019 | Rome, Italy

MASS SPECTROMETRY CONGRESS 2019



**POSTER**

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

Ferko M et al., J Chem Tech App 2019, Volume 3

## PROTEOMIC ANALYSIS OF MITOCHONDRIAL PERMEABILITY TRANSITION PORES IN RELATION TO CARDIOPROTECTION INDUCED BY METABOLIC PRECONDITIONING

Ferko M<sup>1</sup>, Anđelová N<sup>1</sup>, Szeiffová Bačová B<sup>1</sup> and Waczulíková I<sup>2</sup>

<sup>1</sup>Slovak Academy of Sciences, Slovak Republic

<sup>2</sup>Comenius University, Slovak Republic

**Introduction:** Mitochondrial permeability transition pores (mPTPs) are associated with cell death regulation, but also perform physiological role during calcium homeostasis, bioenergetics and redox signalling of cardiac mitochondria. Metabolic preconditioning (MPC) is an experimental cardioprotective model that has demonstrated sufficient protection to compensate for the mitochondrial energy of the heart under pathological conditions.

**Aim:** The purpose is to clarify regulatory components of the mPTP complex by means of proteomic analysis and using mass spectrometry. We have focused also on mitochondrial creatine kinase (mtCK) as one of the proposed mPTP regulators.

**Materials & Methods:** Proteomic analysis was performed using nano high performance liquid chromatography and mass spectrometry (ion mass spectrometer configured with electrospray ionization source (ESI)). Mitochondrial proteins were separated by 1D gel electrophoresis and in-gel trypsin digestion. Male Wistar rats were used for this study. Heart mitochondria were isolated by means of differential centrifugation. MPC was induced for 8-days using single dose of streptozotocin (65 mg/kg b. wt.). At the level of using proteomic analysis, we have focused on proteins currently considered as structural and regulatory components of mPTP. The abundance of the investigated proteins as a whole was significantly lower in the MPC affected group ( $p = 0.048$ ), expressions of individual proteins expressed by fold change parameter were maintained (analysed using TREAT (t-tests relative to a threshold) procedure). An important outcome in terms of cardioprotective regulation is that remaining identified mPTP proteins retained expression at the level of healthy mitochondria without significant change. MPC has been able to preserve the activity of mtCK, one of the key enzymes in the energy metabolism.

**Results:** The results of proteomic analysis under MPC conditions indicate the positive effect of mPTP regulated mechanisms present in the state of increased calcium influx into the mitochondria, thereby contributing to the maintenance of the energy of the pathologically affected myocardium.

## BIOGRAPHY

Ferko M is a researcher who is working at the Department of Biochemistry, Centre of Experimental Medicine SAS as an in charge of the mass spectrometry and fluorescence spectroscopy laboratory. He has 23 publications on the topics like heart mitochondria and cardiac adaptation, endogenous cardioprotection and mitochondrial proteomic analysis published in various journals that have been cited 100 times and his H-index is 11. He is expertise in heart mitochondria proteomic analysis, LC/MS, heart mitochondria function, bioenergetics, heart failure and cardiovascular physiology.

usrdmife@savba.sk

3<sup>rd</sup> International Conference on

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

## MASS SPECTROMETRY CONGRESS 2019



# E-POSTER

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

Mamdouh I Nassar et al., J Chem Tech App 2019, Volume 3

## ASSESSMENT OF NATURAL BIORATIONAL EXTRACTS FROM *IPOMEA CARNEA* (JACQ.) AGAINST *SPODOPTERA LITTORALIS* (BOISD.)

**Mamdouh I Nassar, Mohamed T Taha, Hala M I Mead and Mohamed G M Salama**  
Cairo University, Egypt

The cotton leaf worm, *Spodoptera littoralis* (Boisd.) is a highly polyphagous insect that causes serious damages to more than 112 plant species belonging to 44 different families in Africa. The toxic effect of *Ipomea carnea* extracts against fourth instar larvae of *Spodoptera littoralis* was evaluated under laboratory conditions. Based on LC50 and LC90 values, *Ipomea carnea* extracts were recorded (24.622 and 164.947 ppm respectively) for the most potent one (acetonic extract) followed by hexane (232.677 and 15377.590 ppm respectively) and finally the alcoholic extract which doesn't reveal any toxicity until five days post treatment. Ultra structure sections were made for the epithelial cell of midgut and muscles for 4th instars larvae treated with LC25 and LC50 of acetonic extract of *I. carnea* which caused vacuolization in the cytoplasm, degeneration of organelles and destruction of the plasma membrane according to the ultrastructure studies on *S. littoralis* larvae.

## BIOGRAPHY

Mamdouh I Nassar is a Professor of Bio-active Natural products, Bioinformatics, Biological and Toxicological Sciences, Faculty of Science, Cairo University, Egypt. He is the Dean Faculty of Science, Cairo University; Vice Dean of Postgraduate studies and Research; Visitor exchange of International Program member staff, University of Maryland College Park, USA and Environmental System Service (ESS), Beltsville Maryland USA. He did his PhD Degree (Channel system) in University of Maryland College Park, USA and Cairo University, Egypt. He is the author of 10 Biological Scientific books published at German Share House Lambert 2015, Introduction to invertebrates AlHandasa publisher, Jazan University, Book College of Entomology Alfagala publisher and Book of General Biology. Currently he is Editorial Board and evaluator of many specialty scientific Journals in USA, India, South Africa, Bulgaria, Saudi Arabia and Iraq.

[mmnassar2002@yahoo.com](mailto:mmnassar2002@yahoo.com)



Note:

3<sup>rd</sup> International Conference on

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

MASS SPECTROMETRY CONGRESS 2019



## ACCEPTED ABSTRACTS

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## SYNERGISTIC ERADICATION OF BACTERIAL BIOFILM USING NITRIC OXIDE-LOADED ANTIMICROBIAL POLYMER

**Rashin Namivandi-Zangeneh**

University of New South Wales, Australia

The formation of bacterial biofilms on the surface of body tissues and medical devices is considered as a critical healthcare issue causing chronic and recurrent infections. In biofilm mode bacteria cells are enclosed in a polymeric self-secreted matrix which makes them highly resistant to hostile environmental conditions and antibiotic treatments. Co-administration of two mechanistically different antimicrobial agents seems to be a potential approach to overcome challenges in treatment of biofilm-related infections. In this study, Author reports the synthesis of a novel antimicrobial/antibiofilm agent that consists of biocompatible antimicrobial polymer and nitric oxide (NO)-releasing functional groups. The NO-loaded polymer has dual-action capability as it can release NO which triggers the dispersion of biofilm whereas the polymer can induce bacteria cell death via membrane wall disruption. Synergistic antimicrobial activity was observed in biofilm dispersal, planktonic and biofilm killing activities against *Pseudomonas aeruginosa* upon the incorporation of (NO)-releasing functional groups into the structure of the antimicrobial polymer. The NO-loaded polymer results in 80% reduction in biofilm biomass and kills >99.999% of planktonic and biofilm *P. aeruginosa* cells within 1hr of treatment at a polymer concentration of 64 µg/ml. To fulfil this synergistic effect, NO donors and antimicrobial polymer should necessarily exist as a single compound, instead of a cocktail physical mixture of two individual components.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## NEW MATERIALS AND POLYMERS FROM SOFTWOOD KRAFT LIGNIN: CARBON FIBERS, HEAT STABLE THERMOPLASTICS

**Dimitris S Argyropoulos**

North Carolina State University, USA

The complexity of native softwood lignin when coupled with the complexity of the kraft pulping process is known to lead to a rather heterogeneous material that has eluded us to date. During this lecture a new structural constitutional scheme will be proposed for Softwood Kraft Lignin. This effort attempts to unify and rationalize our current knowledge of kraft pulping chemistry with a series of focused NMR and Chromatographic measurements. This effort will thus introduce the foundations for describing our systematic efforts in the following areas aimed at arriving at practical applications for an otherwise intractable raw material. More specifically the lecture will cover our efforts in: Refining technical kraft lignin, so as to expose its potential as a source for reactive polyphenols of well-defined molecular weight polymers and oligomers. We will then demonstrate that a continuum of narrow fractions can be isolated from softwood kraft lignin, common to a variety of such sources irrespective of the manufacturing details of the pulping process. Such consistently homogeneous lignin streams from technical lignins offer significant commercial ramifications; creating heat stable kraft lignin copolymers with heat stabilities approaching 3000; creating novel blends with polyolefins; creating new thermoplastic lignin polymers and precursors to carbon fibers by applying propargylation derivatization chemistry followed by thermal treatments. This approach offers a versatile novel route for the eventual chain extension and utilization of technical lignins with a significant amount of molecular control.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## PROTEOMIC PROFILE, BIOLOGICAL ACTIVITIES AND ANTIGENIC ANALYSIS OF THE VENOM FROM BOTHRIOPSIS BILINEATA SMARAGDINA ("LORO MACHACO"), A PIT VIPER SNAKE FROM PERU

**Carolina Rego Rodrigues**

Universidade Federal de Minas Gerais (UFMG), Brazil

In Peru, snakebite is a public health problem, especially in the rain forest, as a result of progressive colonization of this geographical area. This country is the second in Latin America, after Brazil, to exhibit the largest variety of venomous snakes. *B. atrox* and *B. b. smaragdina* snakes are sympatric species in Peruvian Amazon region and are responsible for approximately 95% of the envenomings reported in this region. *B. b. smaragdina* may cause a smaller share (3 to 38%) of those accidents, due to its arboreal habits, that make human encounters with these snakes less likely to happen. Despite *B. b. smaragdina* recognized medical importance, its venom composition and biological activities have been poorly studied. In order to determine *Bothriopsis bilineata smaragdina* venom (BbsV) composition, proteomic approaches were performed. Venom components were analyzed by RP-HPLC, SDS-PAGE and nano LC on line with LTQ Orbitrap XL. Results showed a total of 189 identified proteins, grouped into 11 different subgroups which include snake venom metalloproteinases (SVMPs, 54.67%), snake C-type lectins (Snaclecs, 15.78%), snake venom serine proteinases (SVSPs, 14.69%), cysteine-rich secretory proteins (CRISP, 2.61%), phospholipases A2 (PLA2, 1.14%), phosphodiesterase (PDE, 1.17%), venom endothelial growth factor (VEGF, 1.06%) 5' nucleotidases (0.33%), L-amino acid oxidases (LAAOs, 0.28%) and other proteins. *In vitro* enzymatic activities (SVMP, SVSP, LAAO, Hyal and PLA2) of BbsV were also analyzed. BbsV showed high SVSP activity but low PLA2 activity, when compared to other *Bothrops* venoms. *In vivo*, BbsV induced haemorrhage and edema in mice and showed intraperitoneal median lethal dose (LD50); 92.74 ( $\pm$  0.15)  $\mu$ g/20 g of mice. Furthermore, BbsV reduced cell viability when incubated with VERO cells. Peruvian and Brazilian bothropic antivenoms recognize BbsV proteins, as detected by ELISA and Western Blotting. Both antivenoms were able to neutralize *in vivo* edema and haemorrhage.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## ANTIMICROBIAL AND DETOXIFYING EFFECTS OF AN EDIBLE BIOPOLYMER POLY( $\gamma$ -GLUTAMIC ACID)

**Bing-Huei Chen**

Fu Jen Catholic University, Taiwan

Owing to an increase in antibiotic-resistant microorganisms and side effects associated with conventional detoxification chelation therapy, the potential of an edible and biodegradable biopolymer poly( $\gamma$ -glutamic acid) (PGA) was explored as an alternative antimicrobial and detoxifying agent. The PGA-based magnetic nanoparticles (PGA-MNPs) were synthesized by co-precipitation of ferric chloride and ferrous sulfate using ammonium hydroxide, followed by without coating (bare MNPs) and 8% coating with sodium salt of PGA (NaPGA) or 11.8% with calcium salt of  $\gamma$ -PGA (CaPGA). Evaluation of both NaPGA- and CaPGA-MNPs for their antimicrobial activity by agar dilution assay showed a lower minimum inhibitory concentration in *Salmonella* Enteritidis SE 01 than the commercial antibiotics linezolid and cefaclor, but the former was effective against *Escherichia coli* ATCC 8739 and *Staphylococcus aureus* ATCC 10832, whereas the latter was effective against *Escherichia coli* O157: H7 TWC 01. As a detoxifying agent, PGA showed a rapid adsorption of lead and cadmium at pH 5-8 with a Langmuir adsorption capacity (LAC) of 98.70 and 31.13 mg/g in deionized water and 147.71 and 23.15 mg/g in simulated gastrointestinal fluid respectively. Interestingly, the LAC remained unaffected in the presence of several essential metals such as Cu, Fe, Zn, Mg, Ca and K. Lead and cadmium removal by only PGA also showed similar results with a LAC of 213.58 and 41.85 mg/g at pH 5.5 respectively. In *in vivo* study, the lead-induced intoxication of mice treated with PGA was evaluated by comparing with a standard drug meso-2, 3-dimercaptosuccinic acid. Administration of 200 and 400 mg/kg of PGA reduced the accumulation of lead in liver, heart and testis with the latter dose being effective in decreasing the lead content in kidney and spleen. Also, the PGA at both doses reduced TBARs in kidney and brain, elevated  $\delta$ -aminolevulinic acid dehydrase activity in blood and decreased the activities of both pyruvic transaminase and lactic dehydrogenase in serum.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## NEW MATERIALS OBTAINED FROM BLENDING TECHNOLOGY FOR FIRE PROTECTION APPLICATIONS

**Mauricio Vásquez-Rendón** and **Mónica Lucía Álvarez-Láinez**

Instituto Tecnológico Metropolitano, Medellín, Colombia

According to recent studies an average of 60,000 fire-fighters were injured every year only in the United States and from all those cases 126 are fatalities. Materials play a crucial role in human protection, in particular polymeric materials. However, due to their chemical composition polymers have very poor fire resistance and normally flame retardant additives need to be used increasing the production costs and decreasing their mechanical performance. High-performance polymer blends (HPPB) appear as an attractive solution to obtain outstanding properties into a single material. However, HPPB technology deals with issues related to the materials high costs, the lack of fundamental studies between polymers interaction and the degradation caused by the elevated processing temperatures. In one of our most recent work, author's aim to study blends obtained from three high-performance polymers and presents for the first time, the relationship between processing conditions, viscoelastic properties, interfacial tension, and composition with the morphology and final performance for this kind of systems. All blends were obtained from a conventional melt processing technique, and our next challenge is to take our work to an industrial processing scale.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## SYNTHETIC POLYMER COMPOSITES AND CLIMATE CHANGE

**Kamani K K**

Department of Higher Education-Government of Karnataka, India

The physical and chemical properties of a polymer needed for specific application may be obtained by adding or doping like metal salts, Polystyrene, PMMA and PVA play an important role in the family of polymers because of its applications in a variety of engineering and biomedical areas. The metal salts, plant saps, natural proteins, many chemical complexes, compounds, halides with polymers form the composites and many complexes. CuSo<sub>4</sub>, Agno<sub>3</sub>, doped Polystyrene films were prepared in the lab. These films subjected to UV visible absorption and dielectric properties study suggests that the formation of charge transfer complexes. Although the conduction mechanism is unclear, it is generally accepted that the dissociated metal cat ions contribute to DC conductivity by achieving mobility through the micro Brownian motion of polymer. These ion-values parallel to the flow direction. The degree of orientation of the polymer chains is affected by the moulding thickness. Within the limits of decomposition temperatures, higher moulding temperatures lead to higher orientation and consequently to higher strengths and module. The experimental reports of these thickness and observed properties are new changes in the CuSo<sub>4</sub> doped Polystyrene polymer. Conduction polymers have extensively importance in industrial applications such as a polymer battery. That is why most studies to date have focused on the motion of ions. The degree of orientation of the polymer chains is affected by the mouldings thickness. Thin mouldings are more highly oriented and therefore give the highest strength and moduli matrix.

# MASS SPECTROMETRY, PROTEOMICS AND POLYMER CHEMISTRY

May 20-21, 2019 | Rome, Italy

J Chem Tech App 2019, Volume 3

## PECULIARITIES OF GAS CHROMATOGRAPHIC MASS SPECTROMETRIC DETERMINATION OF O-PHTHALIC ACID ESTERS IN ALCOHOLIC BEVERAGES AND ETHANOL COUPLED WITH EMULSION LIQUID-PHASE MICROEXTRACTION PRE-CONCENTRATION

**Krylov V**

Nizhny Novgorod State University, Russia

Dialkyl o-phthalates are very dangerous compounds. In this study the high sensitive gas chromatographic-mass spectrometric determination of phthalates in wines (sparkling, red and white wine), strong alcoholic beverages and ethanol coupled ultrasound-assisted emulsification-microextraction was developed. In the case of pre-concentration of impurities from alcohol dilution was carried out with purified water. N-Octane, n-hexane and m-xylene were used as extractants. De-emulsification of extracts was carried out by centrifugation and flotation. The sources of possible systematic errors were investigated: leaking of o-phthalates from chromatographic septum; contamination of phthalates in solvents; influence of macro components of wines (sugar, alcohol and anthocyanin's); the hydrolysis of o-phthalates and others. For the first time it is shown that the impact of these factors can lead to an overestimation or underestimation of the actual concentration of impurities by 1-2 orders of magnitude. The methods of accounting or elimination of systematic errors are proposed. Purification of solvents by Rayleigh distillation method allows obtaining samples with impurity content lower than  $(1-4)10^{-3}$  mgL<sup>-1</sup>. Containers for sampling and storage of samples to be analyzed should be made of borosilicate glass or quartz. The limits of detection of esters of o-phthalic acid are at the level of  $10^{-6}$ – $10^{-5}$  mgL<sup>-1</sup> and are highly competitive with the best world results. The content of o-phthalates in wines and strong alcoholic beverages was 0.03-1, in ethanol –0.01-30 mgL<sup>-1</sup>. The relative expanded uncertainty of the determination of toxicants is at the level of 13-30%.