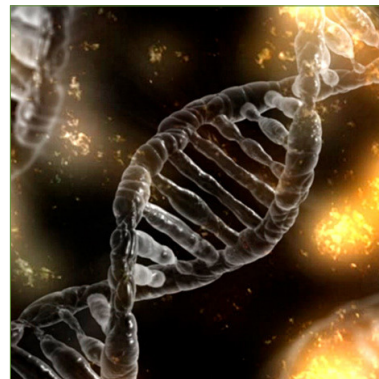


Poster Presentation

Food Technology 2018 *Biotechnology 2018*



3rd International Conference on
Food Science & Technology
World Congress on
Biotechnology & Medical Microbiology
October 25-26, 2018 | Frankfurt, Germany

Nanoencapsulated essential oils potency to extend dairy product shelf life

Mariam Ben Jemaa

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This work was focused on examining the ability of *Thymus capitatus*, *Rosmarinus officinalis*, *Juniperus oxycedrus* and *Callitris articulata* essential oils to extend the shelf life of a well-known dairy product "Ricotte" after their encapsulation at a nano-scale level. Essential oil encapsulation into a nanoemulsion based delivery system was made using high pressure homogenization and obtained nanoemulsions were subjected to physical characterization. The nanoencapsulation effect on the antibacterial efficiency of each essential oil was assessed against *E. coli* and *B. subtilis* bacteria. Only nanoemulsions with demonstrated antimicrobial efficacy were used to evaluate their potency to extend the shelf life of Ricotte. The effect of incorporating nanoencapsulated essential oils to resist Ricotte alteration was compared to negative control by enumerating the total viable count of each sample after 0; 7; 14 and 21 days of storage at 4°C. Finally, a sensorial hedonic test was conducted to evaluate the nanoencapsulation effect on consumer acceptability. Obtained results revealed that essential oil nanoencapsulation produced homogenous nanoemulsions with similar droplet diameters around 100 nm. Nanoencapsulated *T. capitatus* essential oil presented the highest antibacterial activity, with inhibition zone diameter

generated exceeding 14 mm, while other nanoemulsion were inactive. Thus, only nanoencapsulated *T. capitatus* essential oil was incorporated in Ricotte to seek its conservative potency. The total viable count of Ricotte exhibited that after 21 days of storage, Ricotte treated with *T. capitatus* essential oil presented the lowest bacterial load (<10 UFC/g of product). Moreover, the sensory evaluation revealed similar acceptances for control milk used for the preparation of Ricotte with the one treated by nanoemulsion, while milk supplemented with bulk essential oil was found unacceptable by panelist. In conclusion, results suggested that the supplementation of nanoencapsulated *T. capitatus* essential oil to Ricotte can present an alternative to preserve its quality and to extend its shelf life.

Speaker Biography

Mariam Ben Jemaa studied biology engineering at the National School of Engineers of Sfax, accomplished master's degree specialized in Food Science at National Agronomic Institute of Tunisia and completed her PhD at the laboratory of Aromatic and Medicinal Plants at the Center of Biotechnology of Borj Cedria Tunisia. In addition to over 20 publications specialized in food sciences, she is the author of the book "Food Preservation: Essential oil approach". Research areas: valorization of natural compounds in food Industries.

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Notes:

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Using traditional faiths and knowledge are secret of Science and Technology by Tamil community in Batticaloa, Sri Lanka

Thirumal Thayaruban

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Sri Lanka has been enriched with Traditional Knowledge (TK) on Medicines and Agriculture. After the arrival of western culture, traditional faiths & knowledge are gradually started eroding, because of which farmers now face lots of problems such as difficulty in accessing agriculture, unbearably high treatment costs etc. This paper is going to be remember and document our Inheritance patterns using in agriculture & food safety at Batticaloa, Sri Lanka. It is a qualitative research based on secondary data analysis. Primarily, it is intended to document the faiths & knowledge because existing researches of the country does not provide adequate protection for TK. While this study does not trial the efficacy of these methods, it provides an indication of what methods are being used and therefore a starting point for further researches in Sri Lanka.

The findings were classified into Spiritual Faith & Traditional Knowledge included traditional compost, pest control & food preservation methods which are used in Batticaloa, Sri Lanka.

Speaker Biography

Thirumal Thayaruban did his graduation in BSc Biotechnology with first class as well as he successfully completed his master's degree on MSc Biotechnology at University of Madras, Chennai, India since 2006 to 2011. Now he is working as a District Environment officer (District in Charge) at Marine Environment Protection Authority, Ministry of Mahaweli Development and Environment since 1st August 2018 till now. Previously, he had been attached to National Aquaculture Development Authority, Ministry of Fisheries and Aquatic Resources Development, Democratic Socialist Republic of Sri Lanka as an Aquaculturist from 2nd May 2018 up to 31st July 2018. Before, he was working as an Assistant Lecturer at Department of Botany, Eastern University, Sri Lanka from 2011 up to 2017.

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 Notes:

***In vitro* regeneration of Pomegranate cv. Bhagwa through axillary and adventitious bud proliferation**

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Pomegranate (*Punica granatum L.*) is one of the oldest known fruit crops of the tropics and subtropics. It is regenerated through tissue culture directly by axillary bud or by callus mediated adventitious bud proliferation. But both the methods have pros and cons. The choice of the method specifically depends upon purpose, quality, economy, potency, and duration of the protocol. Keeping these facts in view, the present studies were carried out to optimize the protocol for rapid and efficient *in vitro* regeneration of Pomegranate cv. Baghwa. In axillary bud proliferation different explants, duration of mercuric chloride treatment, antioxidants and growth regulators were tried for improvising aseptic culture establishment. Among the various treatments, surface sterilization of double nodal explants containing IIIrd + IVth nodes with HgCl₂ 0.10 % for 3 minutes resulted in significantly better aseptic culture establishment (55 % aseptic culture, 15 % each bacterial contamination, fungal contamination and phytotoxicity) onto MS medium containing BAP 1 mg/l + AgNO₃ 1 mg/l + activated charcoal 2000 mg/l. Superior shoot proliferation (5 number of shoots/explants, 4.97 cm length of shoot and 18.23 number of leaves/shoot) was found onto the MS medium containing ancymidol 0.02 mg/l + AgNO₃ 1 mg/l + activated charcoal 500 mg/l. Among the various media combination, effective rooting (22 number of days taken for rooting, 48 % rooting, 4.30 cm length of roots and 5.50 number of roots/shoot) was observed on half strength MS medium supplemented with IBA 2 mg/l + AgNO₃ 1 mg/l +

activated charcoal 200 mg/l. Callus was induced with exogenous application of plant growth regulators for adventitious bud proliferation. The nodal segment was found superior for induction of callus (++++: Very good) when cultured on MS basal medium consisting of BAP 5 mg/l + NAA 0.4 mg/l. Early shoot initiation (17.06 days), a greater number of shoots per explant (8.13) and maximum shoot length (7.32 cm) was noticed when proliferated calli were cultured on MS basal medium containing BAP 2 mg/l + NAA 0.1 mg/l + GA3 0.5 mg/l. Early *in vitro* root initiation (20.25 days), highest per cent rooting (72.50) and maximum number of roots per plantlet (3.95) were recorded on full strength MS medium supplemented with IBA 3 mg/l.

Speaker Biography

Prabhuling Guranna has completed his PhD in Horticulture with specialization in banana plant tissue culture in 2011 from University of Agricultural Sciences, Bangalore, India. He participated in post graduate course on "Adapting to Climate Change: Biotechnology in Agriculture in a World of Global Environmental Changes" from 2.05.2011 to 30.06.2011 at Rehovot, Israel. Presently he is working as Associate Professor of plant biotechnology at University of Horticultural Sciences, Bagalkot, India. He has over 35 research publications that have been cited over 12 times, his RG score is 9.11 and H-index is 2 and has been serving as an editorial board member of reputed Journals viz., Research Journal of Biotechnology and European Journal of Medicinal Plants. He is MASHAV alumni, life member of International Society of Biotechnology, Karnataka Horticultural Society and Association for the Improvement in Production and Utilization of Banana. He received first best oral presentation award at National Conference on Production of Quality Seeds and Planting Material – Health Management in Horticultural Crops in 2010.

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E-Poster

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Public health concerns of *Legionella pneumophila* in District Faisalabad

Adnan Mehmood, Muhammad Shahid Mahmood, Mashkoor Mohsin Gilani, Zia-ud-Din Sindhu, Faisal Siddique and Tajamal Irshad
University of Agriculture Faisalabad, Pakistan

Legionellosis is one of the most life-threatening waterborne disease round the globe. *Legionella pneumophila* serogroup-1 is the causative agent of this night mare. In developing countries like Pakistan this disease remain underdiagnosed and underreported mainly due to the lack of clinical awareness, high cost of its diagnosis and technical reasons. The present study was conducted with the main objective of the isolation, identification and characterization of *Legionella pneumophila* (*L. pneumophila*) from clinical and water sources. For this purpose, a total of one hundred and sixty-two samples including sputum, swab and water samples were collected from different hospitals in district Faisalabad. *Legionella* in water samples was concentrated through filtration assembly by using a 0.22 μ m pore size filter paper and then heat treated at 50°C for selective inhibition of non-*Legionella* species. All samples were cultured on four different media plates Staph 110, Salmonella Shigella Agar, MacConkey agar and GVPC selective media (buffered charcoal yeast

extract agar with supplements). Cultural and morphological characteristics of colonies of bacteria were observed daily for seven days. Identification of the isolate was done by microscopy and biochemical tests. Nineteen isolates were positive for *L. pneumophila* analyzed by sodium hippurate hydrolysis test. Antibiotic sensitivity pattern against pure isolates were analyzed by the Kirby-Bauer's method. Greyish white colonies of *L. pneumophila* were resistance to ampicillin, amoxicillin and erythromycin while yellowish green isolates were resistance to ampicillin and gentamicin. All the isolated strains were sensitive to chloramphenicol, tetracycline and ciprofloxacin

Speaker Biography

Adnan Mehmood from Pakistan has completed his MPhil in Microbiology degree under the supervision of Muhammad Shahid Mahmood, Associate Professor, Institute of Microbiology in University of Agriculture Faisalabad. Adnan is proficient in using variety of lab equipments, isolate, identify organism from sample and implement measures to eradicate contamination and aware in depth about every type of microbiological test and knows how to control quality of products.

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Accepted Abstracts

Food Technology 2018 *Biotechnology 2018*



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October 25-26, 2018 | Frankfurt, Germany

Hidden hunger- A few examples of contemporary challenges

Weiguo Zhang

Independent physician-scientist, USA

According to Sustainable Development Goals (SDGs) of the United Nations, zero hunger should be realized by 2030. While this promises the intake of macronutrients (carbohydrates, protein and fat), inadequate/insufficient intake or bioavailability of micronutrients (vitamins and minerals) which is called hidden hunger, may be improved or unnecessarily improved consequently. Hidden hunger is caused by established risk factors and can be worsened by emerging factors that are specifically highlighted in this presentation. First, air pollution has become as a public health threat globally, as inhalation of airborne pollutants provokes body's pathophysiology including oxidative stress and inflammatory response. Investigation showed that although the nutrition intake profiles were almost indistinguishable - so was presumably the vitamin E intake, those who exposed to air pollution was with reduced circulating level of vitamin E (alpha-tocopherol) than those without. The vitamin E depletion phenomenon was because more alpha-tocopherol was consumed to counteract reactive oxygen species and chronic inflammation and was corrected

after the subjects received vitamin E and C supplementation. Second, carbon dioxide (CO₂) represents the most significant long-lived greenhouse gas in Earth's atmosphere. Increased CO₂ emission was accompanied by decreased contents of micronutrients including Zn, Fe, and B vitamins in the crops, making the nutritional values of these crops compromised. Third, the world has been continuously facing the threat of reduced population of pollinators that are not only important for agriculture output, but for the contents of micronutrients in the crops. If animal pollinators were completely lost, there would be additional 71 million people at risk for vitamin A deficiency and addition 173 million for folate deficiency. These few examples reflect the contemporary challenges for the efforts in the fight against hidden hunger. Given the irreplaceable roles of micronutrients in health and well-being as well as in the pathogenesis of non-communicable diseases (NCDs), it is warranted to understand the landscape of hidden hunger, to analyze all potential causes, and to take preventive actions accordingly from public health perspective.

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Zero waste sustainable food systems: Scenarios for the cities of the future

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Wastes at household level constitute 53% of total losses in EU and 60% in the USA. It is clear that that people living in towns and large cities tend to produce more waste. Prevention of food losses and bio-waste valorization are quite inefficiently managed. Urban bio-waste, despite their high nutrient value, are marginally recycled and returned to farm soil and therefore, does not contribute to closing bio-geochemical cycles and to supporting sustainable food production. A foresight approach was used to i) identify high potential socio-technological innovations in food waste prevention and valorization and ii) extract research questions contributing to fostering and accompanying cities' breakthrough strategies towards zero waste sustainable food systems, specific to different urban settings worldwide. The exploration of three

“food systems scenarios” in the context of “three urban scenarios” allows to highlight requirements and questions for the research which were grouped into five broad categories related to issues or types of impacts expected: i) society, ii) industries, food cycles and systems, iii) health and the environment (animal health, health public, safety and nutrition, environment), iv) technological processes, looping cycles and associated business models and finally v) the information and communications technologies (ICT), data processing and applied mathematics. High potential key measures and generic questions and perspectives for research on the link between cities and Zero waste sustainable food systems are discussed.

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Effect of hydrocolloid addition on properties of low-fat cheddar cheese


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Reduction in fat in low fat cheese (LFC) causes an adverse effect on the characteristics, such as texture, flavour, functional and sensory properties of cheese. Hence, fat replacers have been used improve the characteristics of LFC. Hydrocolloid was used as a fat replacer due to its ability to form gel particles in milk in situ in the presence of calcium ions. Four levels of hydrocolloid were added to LFC: 0.12 (LFCH1), 0.17 (LFCH2), 0.18 (LFCH3) and 0.23% (w/w) (LFCH4), with up to 92% fat reduction; and control full fat cheese (CFFC) and control LFC were also prepared. Cheese samples were examined for physical, chemical and biochemical properties. The yield of the cheeses ($P < 0.05$) was directly proportional to the fat and hydrocolloid level in milk, whereas the moisture and total protein were inversely proportional to the fat content ($P < 0.05$). The results of primary proteolysis (except pH 4.6 soluble nitrogen) showed that hydrocolloid added LFCs demonstrated higher level of proteolysis compared to CLFC and CFFC, whereas arginine

was found in highest level in hydrocolloid added LFCs. Volatile compounds were also varied with cheese treatment. TPA illustrated a significant improvement in texture of hydrocolloid added LFC ($P < 0.05$) compared to CLFC. The textural attributes of LFCH1 ripened for 30 days were comparable to CFFC ripened for 60 days and beyond. Scanning electron micrograph revealed that hydrocolloid added LFCs had smoother surfaces as compared to CFFC and CLFC. Confocal laser scanning microscopy suggested significant ($P < 0.05$) increase in fat globules' size, area and volume in CFFC as compared to LFCs during ripening. Hunter L, a and b values for hydrocolloid added LFCs indicated that they were whiter than CLFC and less yellowish than CFFC. Addition of hydrocolloid significantly improved the textural and microstructural properties of LFCs, affirming its potential as a promising fat replacer.

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 Notes:

Honey in halal nutrition

Mariam Abdul Latif

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The preservation of future generation and the protection of consumer welfare, as contained in the “Maqasid Shariah”, is a priority in view of the incremental negative behaviours existing in today’s societies at large. The World Health Organization recorded 54% of 56.4 million deaths were due to the top 10 causes in 2015 worldwide. Ischaemic heart disease and stroke are the world’s biggest killers, accounting for a combined 15 million deaths in 2015, which have remained the leading causes of death globally in the last 15 years (WHO, 2017). This qualitative research on halal nutrition focused on halal food consumed by the Prophet Muhammad s.a.w. and his eating practices. Honey is the favorite food of the Prophet Muhammad s.a.w. The Prophet s.a.w. said: ‘Honey is a remedy for every illness and the Qur’an is a remedy for all illness of the mind, therefore I recommend to you both remedies, the Qur’an and honey.’ Vallianou N.G.et al. (2014) reported that honey comprises predominantly of monosaccharides and oligosaccharides. The most abundant sugar in honey is fructose, while sugars in it are sweeter and give more energy than artificial sweeteners. Honey also contains several vitamins, especially

B complex and vitamin C, together with a lot of minerals. Honey contains at least 181 constituents. Many evidences confirmed the antibacterial properties and beneficial effects of medical honey on wound healing and clinically effective in the treatment of hemorrhoids and anal fissure. The biological actions of honey can be ascribed to its polyphenolic contents which, in turn, are usually associated to its antioxidant and anti-inflammatory actions, antitumor, antimetastatic and anticancer effects are mediated via diverse mechanisms, as well as to its cardiovascular, antiproliferative and antimicrobial benefits. The research concluded by recognizing the Halal Nutrition framework is in parallel with the food pyramid whereby it is actually a moderate and a healthy balanced diet, relevant and befitting the halal nutrition but the whole regime has to be without the haram elements which are blood, pork, carrion and liquor to provide proper nutrition guidelines for quality and better consumption of halal food for the future generation. This is in line with the Maqasid Shariah.

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Detection of extra-virgin olive oil adulteration mixed with refined seed oils by using chromatographic and spectroscopic analytical techniques**Hazem Jabeur**

Université de Sfax, Tunisia

Extra-virgin olive oil (EVOO) is characterised by one of the highest economic value in comparison with other vegetable oils, thanks to its well-known nutritional and sensory qualities. Unfortunately, EVOO is also easy to falsify; because of its prestige, it has always been illegally mixed with cheaper or low-quality oils, especially to obtain EVOO sold in supermarkets and discount stores at low cost. Detection of EVOO adulteration is a difficult and challenging analytical problem since olive oil consists of complex mixtures of triacylglycerols (TAGs), partial glycerides, fatty acids, hydrocarbons, tocopherols, pigments, sterols, aliphatic alcohols, triterpene dialcohols, waxes, alkyl esters and phenolic compounds. A large number of analytical methods have been developed to detect and quantify other vegetable oils in olive oil. These analytical methodologies comprising mainly the use of chromatographic techniques,

namely Gas Chromatography (GC), High Performance Liquid Chromatography (HPLC) and Gas or Liquid Chromatography coupled with Mass Spectrometry (GC-MS, LC-MS). Recently some researchers have proposed new methodologies more rapid and non-destructive advantages will be required with suitable sensitivity, selectivity and accuracy to detect those fraudulent practices based on Fourier Transform Near-Infrared (FT-NIR) Spectroscopy, Nuclear Magnetic Resonance (NMR) Spectroscopy, Differential Scanning Calorimetry (DSC) and Total Synchronous Fluorescence Spectroscopy (TSyFS). This study is meant to detect adulteration of EVOO by lower cost refined seed oils. Consequently, various blends of EVOO and soybean, corn or sunflower oil were prepared and analyzed for fatty acid, triglyceride and sterol compositions.

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 Notes:

Annotation of the *kytocooccus sedentarius* genome from DNA coordinates 1060198 to 1066421

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K*ytocooccus sedentarius* is a gram-positive, free-living, non-motile and strictly aerobic organism. It is originally isolated from marine environment and occurs in tetrads. *Kytocooccus sedentarius* belongs to a poorly studied family of Dermacoccaceae and has a high GC content of 72%. Studying about *Kytocooccus sedentarius* is important as it is an opportunistic pathogen causing pitted keratolysis, endocarditis and hemorrhagic pneumonia. *Kytocooccus sedentarius* also produces antibiotics known as oligoketides (Sims et al., 2009). Ksed_RS13525, Ksed_RS13530, Ksed_RS05075, Ksed_RS05080, Ksed_RS05085, Ksed_RS05090, Ksed_RS05095. GENI-ACT was used to annotate the sequences. Basic information module,

sequence based similarity data, structure based similarity, cellular localization data, alternate open reading frame, enzymatic function, duplication and degradation, horizontal gene transfer, RNA. Three of the given genes (*Kytocooccus sedentarius*_RS13525, Ksed_RS13530, Ksed_RS05090) were annotated by the computer as hypothetical proteins and require further research. The rest of the four genes appeared to be correctly annotated in the computer database. *Kytocooccus sedentarius*_RS05095 has a strong evidence of horizontal gene transfer.

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Malignant hyperthermia: Possible diagnostic tool by electromyography**Charles H Williams**

The Williams Research Laboratory, USA

The evaluation of the action potential at the myoneural junction in several muscles of the Malignant Hyperthermia susceptible pig shows that the amplitude of the action potential voltage is increased dramatically at the myoneural junction. The duration of the amplitude of the action potential is also significantly increased. These data, along with our other findings lead us to develop a hypothesis that the sodium channels at the myoneural junction were leaky in that they did not close as quickly as normal pig sodium channels and thereby allow an influx of sodium ions into muscle cells that had to be pumped out by the Na-K ATPase. The pumping is an energetic process that requires the expenditure of ATP energy sources and simultaneously produced heat. The flow of sodium ion into muscle cells was a concentration dependent process that dis

not expend energy. We observed core temperatures up to 118°F. core temperature over 106°F are highly lethal. Other high body temperatures may be caused by the same heat generating mechanism during other disease states. The sodium channel futile cycle provides a mechanism for generation heat to maintain a normal body temperature in warm blooded animals. We would not expect to find this heat generating mechanism in cold-blooded animals. It would be nice to have a detector that would measure sodium ion flow during the action potential. The changes in sodium ions at the membrane of the muscle are designed to maintain the -90mv charge across the membrane. Loss of the membrane charge leads to a lethal situation and the death of the organism.

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*Notes:*

APC-100, a novel pharmaceutical neuroregeneration therapy for the Alzheimer's disease**Kiminobu Sugaya**

University of Central Florida, USA

One of the primary hurdles of Alzheimer's disease (AD) therapy is that it requires more than one solution to successfully stop or reverse it since the disease degenerates many different types of cells as compared to the other neurodegenerative diseases. That is why stem cells could be useful to treat AD since they could produce those different types of cells according to the environments. However, to use stem cells, influences from the pathological environment of AD must be addressed. The AD brain overproduces amyloid precursor protein (APP), which then results in amyloid plaques, one of the hallmarks of AD. We found that the pathological level of APP prevents neural stem cells (NSCs) to differentiate into neurons. Our approach is to combine small molecule

therapeutics for both modifying the pathological condition of AD and increasing endogenous NSCs. With phenserine, a drug that reduces APP production, we were able to control the APP to a normal level, which allows NSCs to differentiate into neurons. Then we combined KS-217, a pyro pyrimidine derivative, which passes through the blood brain barrier to increase endogenous NSCs at a significant level, eliminating the need for NSC transplantation. This combination therapeutic approach (APC-100) has proven effective in improving cognition and increasing neuroregeneration in AD mice models. APC-100 will introduce a totally new concept to AD stem cell therapy, which does not require any transplantable cell materials.

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Genome sequence of *Mycobacterium yongonense* RT 955-2015 isolate from a patient misdiagnosed with multi-drug resistant tuberculosis: First clinical detection in Tanzania

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Background: *Mycobacterium yongonense* is a recently described novel species belonging to *Mycobacterium avium* complex, which is the most prevalent aetiology of non-tuberculous mycobacteria associated with pulmonary infections, and poses tuberculosis diagnostic challenges in high-burden, resource-constrained settings.


Methods: Whole genome shotgun sequencing and comparative microbial genomic analyses were used to characterize the isolate from a patient diagnosed with multidrug-resistant tuberculosis (MDR-TB) after relapse.

Results: The genome sequence of the first case of *M. yongonense* (*M. yongonense* RT 955-2015) in Tanzania is presented. Sequence analysis revealed that the RT 955-2015 strain had a high similarity to *M. yongonense* 05-1390(T) (98.74%) and *Mycobacterium chimaera* DSM 44623(T) (98%). Its 16S

rRNA showed similarity to *Mycobacterium paraintracellulare* KCTC 290849(T) (100%), *Mycobacterium intracellulare* ATCC 13950(T) (100%), *M. chimaera* DSM 44623(T) (99.9%), and *M. yongonense* 05-1390(T) (98%). The strain exhibited a substantially different *rpoB* sequence to that of *M. yongonense* 05-1390 (95.16%), but closely related to that of *M. chimaera* DSM 44623(T) (99.86%), *M. intracellulare* ATCC 13950(T), (99.53%), and *M. paraintracellulare* KCTC 290849(T) (99.53%).

Conclusions: In light of the OrthoANI algorithm and phylogenetic analysis, it was concluded that the isolate was *M. yongonense* Type II genotype, which is an indication that the patient was misdiagnosed with TB/MDR-TB and received inappropriate treatment.

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Socio-environmental factors and diarrheal diseases in under five-year old children in the state of Tocantins, Brazil**Volmar MF**

State University of Tocantins, Brazil

Diarrhoea is a waterborne disease that affects children, especially those under 5 years of age. The objective of this study was to identify the spatial patterns of distribution of diarrheal disease in under 5-year-old children in the State of Tocantins, Brazil, from 2008 to 2013. Geoprocessing tools were used to carry out an epidemiological study, to prepare thematic maps in the TerraView 4.2.2 software based on secondary data. General indicators of the disease, presence of spatial dependence through the Global Moran's Index (I) and the Spatial Association Index (LISA) were described. There were 3,015 cases of under 5-year-old children hospitalized for diarrhoea, with an average annual rate (AAR) of 4.10/1,000 inhabitants (inhab.). Among the main characteristics were: increasing rates in under 1-year-old children (6.16 to 9.66/1,000 inhabitants);

children aged 1 to 4 full years (63%); males (55%); 8 deaths of under one-year-old children (75%); county of Araguaína (67%); incidence in the county of Nazaré (63.97/1,000 inhab.); prevalence and incidence in the Araguaína microregion (45%, AAR 9.38/1,000 inhab.). The presence of a cluster with spatial autocorrelation was found in the Araguaína microregion, which was statistically significant ($I = 0.11$, p -value < 0.03), with priority of intervention (Moran Map). There was an increase in the number of hospitalizations for diarrhoea in under 5-year-old children in the state of Tocantins. The spatial analysis identified clusters of priority areas for measures of maintenance and control of diarrheal diseases.

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A polysaccharide isolated from *Dictyophora Indusiata* promotes recovery from antibiotic driven intestinal dysbiosis and improves gut epithelial barrier function in a mouse model

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Despite the tremendous biological activity of polysaccharides from the mushroom *Dictyophora indusiata*, its role in the restoration of gut microbiota has not yet been explored. The present study aimed to investigate whether *Dictyophora Indusiata* promotes polysaccharide (DIP) could modulate the recovery of gut microbiota composition and intestinal barrier function after broad-spectrum antibiotic-driven dysbiosis. Alteration and restoration in the microbial communities were elucidated by the Illumina MiSeq platform. Colon histology, expression of tight-junction associated proteins, and serum/tissue endotoxin and cytokine levels were evaluated. Two-week daily oral administration of clindamycin and metronidazole resulted in reduced bacterial diversity and richness, and perturbed the microbial flora at various taxonomic levels (altered *Firmicutes/Bacteroidetes* ratio and increased relative abundance of harmful flora (*Proteobacteria*, *Enterococcus* and

Bacteroides), whereas DIP administration reversed the dysbiosis and increased beneficial flora, including Lactobacillaceae (lactic acid-producing bacteria), and Ruminococaceae (butyrate-producing bacteria). In addition, it resulted in the reduction of endotoxemia (through lipopolysaccharides (LPSs)) and pro-inflammatory cytokine (tumor necrosis factor alpha (TNF- α), interleukin 6 (IL-6), and interleukin 1 β (IL-1 β)) levels, with the increased expression of tight-junction associated proteins (claudin-1, occludin, and zonula occludens-1). These findings not only suggested a comprehensive understanding of the protective effects of a DIP in the restoration of gut microbiota but also highlighted its role in the enhancement of gut barrier integrity, reduction of inflammation and lowering of endotoxin levels in mice.

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Enhanced bioH₂ and Poly-hydroxyalkanoates production by a co-culture of *Syntrophomonas wolfei* and a photoheterotrophic mixed consortium using a dark-fermentation effluent as substrate

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Nowadays, the pollution by oil-based derivatives such as gasoline, polyethylene, etc is getting problematic. One possible way to overcome this issue is by developing alternative green technologies. The bio-plastics production seems to be a promising method to reduce the plastics production. Polyhydroxyalkanoates as the copolymers of PHB and PHV have similar characteristics of the polyethylenes, therefore many applications. *Syntrophomonas wolfei* (*S. wolfei*) and some photoheterotrophic bacteria are able to produce this polymer from the effluents of organic residues treatment. Moreover, these microorganisms may produce bioH₂ depending on the culture conditions. However, the production of biopolymers based on the bacteria metabolism is nowadays still more expensive than synthetic production. This condition motivates the research to optimize the biological process to make it competitive compared to the regular oil-based method. The purpose of this study was to develop the syntrophic consortium composed by *S. wolfei* and a photoheterotrophic

mixed consortium named C-4. This strategy would allow to improve the simultaneous production of bioH₂ and PHA. The dark-fermentation effluent was used as substrate during the photoheterotrophic process. This effluent consists of a complex mixture of volatile fatty acids including acetic, butyric, lactic, propionic and some others. The data demonstrated the syntrophic activity between *S. wolfei* and C-4 based on the comparison of PHA and H₂ productions from the individual and co-culture fermentations. The individual cultures showed that consortium C-4 and *S. wolfei* can use the effluent as a carbon-nitrogen source. *S. wolfei* produced higher concentration of bioH₂ but lower PHA production compared with C-4. The co-culture produced this bioproducts simultaneously, with 25% PHA and 90 mmol v/v H₂ at 100 and 75 hours respectively. The profile of volatile fatty acids consumption explained the interaction between C-4 and *S. wolfei* suggesting a mutualism.

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A novel immobilized method for isolation of phage display library-derived scFv antibody specific to *Listeria monocytogenes***Xuan-Hung Nguyen**

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We developed a novel simple and cost-effective immobilization method for bio panning of a phage-display library. We used Light Expanded Clay Aggregate (LECA) as biomass support matrix to isolate phage display library-derived scFv antibody specific to *Listeria monocytogenes*, a bacterium causing serious illness in human and animal. Four rounds of positive selection against LECA-immobilized *L. monocytogenes* and an additional subtractive panning against *L. innocua* were performed. This panning scheme in combination with our novel immobilization method allowed us to isolate the phage clones bind to *L. monocytogenes* without cross-reactivity toward ten

other non-*L. monocytogenes* bacteria. One of the selected phage clones was able to specifically recognize three major pathogenic serotypes (1/2a, 1/2b and 4b) of *L. monocytogenes* and 11 tested *L. monocytogenes* strains isolated from foods. This scFv antibody has potential use in development of immunoassay-based methods for rapid detection of *L. monocytogenes*. In addition, the LECA-immobilization method described here offers an efficient, simple, and cost-effective bio panning strategy to isolate specific monoclonal antibodies against any given species of pathogenic bacteria from phage-display libraries.

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Notes:

Predictive value of microRNAs for decreasing CD4 T cell count among HIV-1-infected patients who spontaneously control viral replication (HIV controllers)

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Background: A small group of HIV-1-infected individuals (5-15%) control disease progression for several years in the absence of any antiretroviral therapy. Among this group, elite controllers spontaneously control HIV-1 replication (below 50 HIV-1 RNA copies/ml); nevertheless, they are still susceptible to have several aspects of the immune response deregulated, especially elevated immune activation and inflammation. Homeostatic factors contribute to maintain a stable pool of T cells in this situation where T cell apoptosis is enhanced. This situation promotes the release of micro vesicles, such as exosomes that are released by the cells and are present in blood, urine, and saliva. This content includes miRNAs, small non-coding RNA capable of recognizing specific mRNA and inhibiting its translation into proteins. These molecules may thus promote hematopoietic stem cells and regulate the immune system and inflammatory processes that could influence the homeostasis cell equilibrium. HIV could interfere with the exosomal pathway. The direct influence of exosomal miRNAs on the cells of the immune system during HIV infection is a topic that is still poorly understood. Since exosomes can modulate immune responses and may affect HIV pathogenesis, we conducted this cross-sectional study of quantification of selected miRNAs in HIV elite controllers. We also investigated the association of plasma-derived exosome miRNA levels with

both soluble cytokine levels and cellular immune activation.

Methods: Two groups of elite controllers were analysed, i.e., those that during the follow up had stable or increasing CD4 T cell count (SEC, N=21), and those who had significant decline of CD4 T cell count (DEC, N=11). Plasma-derived exosomes were used to determine the expression of miRs and determine their association to soluble cytokine markers and cellular immune activation.

Results: Plasma exosome-derived miR-16 and miR-21 are downregulated in DEC group, while miR-221 was upregulated compared to SEC group. Only miR-21 was independently associated with CD4 T cell decline in elite controllers ($p=0.049$; odds ratio 0.369, IC95 [0.137-0.994]). On the other hand, negative correlation between plasma exosome-derived miR-21 and MCP-1 was found ($p=0.020$). No correlation between expression of miRs and cellular immune activation markers was found.

Conclusion: Exosome-derived miR-21 might be used as a valuable prognosis soluble biomarker to define HIV-1 elite controllers who will have significant decay in their CD4 T cell counts.

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Molecular characterization of antibiotic resistant *Escherichia coli* isolates recovered from food samples and outpatient clinics**Hassan A Hemeg**

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Multidrug-resistant *Escherichia coli* is one of the most important public health concerns worldwide that can be transferred through the food of animal origin to human being causing serious infection. The genetic responsibility of such resistant genes (plasmids, integrons, and transposons) can be easily transmitted from the resistant strain to another. Therefore, the main objectives of the study is the molecular characterization of the resistant *Escherichia coli* isolates recovered from food samples and human isolates collected from outpatient clinics, KSA especially the resistance strains against aminoglycoside resistance genes which are responsible for the resistance against gentamicin and the resistance caused b-lactamases genes. Examination of food samples revealed 120 *Escherichia coli* isolates (22.22%) (30 strains O26: K60, 28 strains O128: K67, 20 strains O111: K58, 18 strains O126: K58, 10 strains O55: K59, 9 strains O86: K61 and 5 strains O157: H7). All the strains were highly resistance to penicillin,

amoxicillin-clavulanic and erythromycin with a percentage of 100%, while the resistance to gentamicin, ampicillin, oxytetracycline, chloramphenicol, norfloxacin, trimethoprim, and nalidixic acid were 83%, 75%, 65.3%, 55.8%, 36.5%, 30.7% and 26.9% respectively. On the other hand, 59.6% of tested strains were sensitive to ciprofloxacin. Positive amplification of 896 bp fragments specific for aacC2 genes were observed by PCR designated for the detection of the aminoglycoside resistance genes. Meanwhile, multiplex PCR designed to detect the ampicillin and amoxicillin-clavulanic acid resistant *E. coli* isolates revealed positive amplification of 516 bp fragments specific for BlaTEM gene with all the resistant strains to ampicillin and amoxicillin-clavulanic acid. Moreover, positive amplification of 392 bp fragments specific for BlaSHV resistant gene were observed with (60.52%) of *E. coli* isolate. While all the tested strains were negative for amplification of BlaOXA₁.

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