

I INTERNATIONAL SYMPOSIUM ON SCIENCE AND BIOTECHNOLOGY – RESEARCH AND DEVELOPMENT

I SIMPÓSIO INTERNACIONAL EM CIÊNCIA E BIOTECNOLOGIA PESQUISA E DESENVOLVIMENTO

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PROGRAMAÇÃO

13 de agosto de 2015

Abertura Oficial no Auditório Unoesc Videira, SC

Credenciamento: 18h30min às 19h10min

Painel de abertura: 19h15min com autoridades Unoesc/Financiadores

SESSÃO 1 – Conferência de abertura

A pós-graduação no Brasil – Biotecnologia

Dr. Odir Dellagostini – Coordenador Geral da Área de Biotecnologia da Capes – Brasília, DF

Horário: 19h30min às 20h15min

SESSÃO 2

Microbial interactions: starting from a tripartite symbiosis to complex plant microbiomes

Dra. Laila Pamela Partida-Martinez (México)

Horário: 20h30min às 21h15min

14 de agosto de 2015

SESSÃO MINICURSOS

Minicurso 1

Cultura de Tecidos e Biofábrica de Plantas

Dr. Rodrigo Kelsoon (UFGD-MS)

Horário: 8h às 12h

Local: Sala de pós-graduação 1

Minicurso 2

Fungos e Biotecnologia – Aplicações Biotecnológicas de fungos: da alimentação à biorremediação

Cássio Geremia Freire e Fernanda Megiolaro (Mestrados do Programa de Mestrado em Ciência e Biotecnologia – Unoesc)

Horário: 8h às 12h

Local: Sala de pós-graduação 2

Minicurso 3

Consultoria em Segurança Alimentar

Dr. Luis Severo da Silva Junior (UEFS-BA)

Horário: 13h30min às 17h15min

Local: Sala de pós-graduação 3

Minicurso 4

Técnicas de Biologia Molecular e Bioinformática Aplicadas à Biotecnologia

Dra. Adriana M. G. Ibelli (Embrapa Suínos e Aves – Concórdia, SC)

Horário: 13h30min às 17h15min

Local: Sala de pós-graduação 4

SESSÃO 1

VISITA TÉCNICA

Tarde – 14h

Visita técnica a vinícolas da região

Coordenação: Dr. Vinícius Caliarí

SESSÃO 2

MESA-REDONDA

Nanotecnologia

Data: 14 de agosto de 2015

Horário: 19h15min às 21h30min

Local: Auditório CDL

Endereço: Rua Jacob Gaio, 51

Bairro: Dois Pinheiros

Cidade: Videira, SC

Presidente da mesa-redonda

Dra. Claudriana Locatteli

Conferencista/Debateadores

Dra. Adny Henrique Silva | UFSC Florianópolis, SC

Dr. Luciano Avalone Bueno | Universidade de Sorocaba (UNISO)/Rede Nordeste de Biotecnologia (RENORBIO)/Universidade Federal Rural de Pernambuco (UFRPE)

Dr. Francisco Noe Fonseca | Embrapa Concórdia Suínos e Aves Concórdia, SC

Dra. Carine Dal Pizzol | Grupo Boticário – Curitiba, PR

MICROBIAL INTERACTIONS: STARTING FROM A TRI-PARTITE SYMBIOSIS THROUGH COMPLEX PLANT MICROBIOMES

INTERAÇÕES MICROBIANAS: PARTINDO DA SIMBIOSE TRIPARTITA ATÉ OS COMPLEXOS MICROBIOMAS DAS PLANTAS

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Microorganisms are the most versatile and abundant living organisms on the earth. They shape the biogeochemical cycles and constantly interact among them and with most, if not all, eukaryotes including plants¹, animals and human beings. Recently, the importance of the microbiome in the fitness of their eukaryotic hosts has been revealed and new terms such as the *holobiont*, *hologenome* and *symbiogenesis* had gained evidence and interest. In this seminar, examples generated in our research group of how symbiosis between plants, fungi and bacteria influence the fitness of plants will be presented. First, we will start discussing a tripartite symbiosis between *Oryza sativa* (rice), *Rhizopus* (fungi) and *Burkholderia* (bacteria). In this system, our work has shown that endofungal bacteria are the actual producers of the “mycotoxins” rhizoxin and rhizonin^{2,3}, and that the presence of bacteria is required for the asexual reproduction of their host⁴. This dependency assures the vertical transmission of the endosymbionts and opens further questions about the implications of the symbiosis for the involved partners⁵. Second, we will address more complex systems as our studies of the microbiome of CAM plants (Agave and Cacti) had revealed⁶. These studies suggest the potential of using microbiome-based knowledge to improve the productivity and sustainability of agriculture in arid and semi-arid regions of the world.

REFERENCES

- ¹ Partida-Martinez LP & Heil M. (2011). The microbe free-plant: fact or artifact? *Frontiers in Plant Science* 2, 100.
- ² Partida-Martinez LP y Hertweck C. (2005). Pathogenic fungus harbours endosymbiotic bacteria for toxin production. *Nature* 437(7060), 884-888.
- ³ Partida-Martinez LP, de Looß CF, Ishida K, Ishida M, Roth M, Buder K and Hertweck C. (2007). Rhizonin, the First Mycotoxin Isolated from Zygomycota, Is Not a Fungal Metabolite, but Is Produced by Bacterial Endosymbionts. *Appl. Environ. Microbiol.* (2007) 73(3): pp.793-797.

⁴ Partida-Martinez LP, Monajembashi S, Greulich KO, Hertweck C. (2007) Maintenance of a bacterial-fungal mutualism through endosymbiont-dependent host reproduction. *Curr. Biol.* 17(9), 773-777.

⁵ Partida-Martínez LP. (2013) A model for bacterial-fungal interactions. LAP LAMBERT Academic Publishing. Pp. 109. ISBN: 978-3-659-40707-9.

⁶ Desgarnes D, Garrido E, Gomez-Torres MJ, Peña-Cabriaes JJ, Partida-Martinez LP*. (2014) Diazotrophic potential among bacterial communities associated with wild and cultivated agaves. *FEMS Microbiol Ecol* 90: 844-857. DOI: 10.1111/1574-6941.12438.

Mini cursos
August, 15th, 2015

TISSUE CULTURE AND PLANTS BIOFACTORIES

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The plant biotechnology combines several different tissue culture techniques and molecular biology searching for better quality products. The tissue culture comprises a set of techniques, in which an explant may be a cell, a tissue or an organ, isolated and grown under aseptic conditions on artificial nutritive medium. Tissue culture shows numerous applications in the micropropagation (fast cloning) of plants in genetic breeding programs, conservation and exchange of germplasm, production virus-free plants and genetic transformation of plants. Micropropagation is the technique of wider use of tissue culture and its commercial application is already a reality for many fruitful species, oleraceous, ornamentals, forestry and medicinal in several countries, including Brazil. The advantages are numerous as the maintenance of the mother plant characteristics; high yield due to the size of the propagules; full control of operations and environmental conditions of propagation; intensive production; cloning; preservation and direct contribution to genetic improvement. Seeking the commercial exploitation, the control of production techniques is essential, but needs to be complemented by appropriate business practices to ensure the success of the activity. Usually micropropagated plants, have some advantages like greater vigor, productivity, homogeneity and multiplication capacity on those formed by conventional processes; however, for users, mainly specialized producers, these benefits need to be constantly confirmed as the agronomic and financial aspects. The installation of biofactories, like any business activity, requires detailed planning; in the choice of plant species is necessary to clearly define the relevant problems to be solved and the advantages offered by micropropagated plants; it is need also analyze and to plan the market to be achieved in order to establish appropriate action operational strategies.

Keywords: Biotechnology. Micropropagation. Biofactories.

BIOTECHNOLOGICAL APPLICATIONS OF FUNGI: FROM FOOD FOR BIOREMEDIATION

FREIRE¹, C. G.; MEGIOLARO², F.

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Mycological studies are extremely relevant for current society. Despite this, knowledge in this area is still largely related only to the economic damage and health problems that fungi can cause. Due to this, the presented short course aims to characterize the various biotechnological potentialities of fungi and to evidence its incipient exploration in several knowledge areas. This theoretical and practical short course aims to develop knowledge based on lectures, laboratory techniques and discussions on the selected theme. Contents: Morphological, physiological and metabolic knowledge of the main taxa of fungi; Biotechnological importance of fungi: methods and culture media for isolating of different fungi; endophytic fungi and their agricultural and ecological potential; mycorrhizal fungi and their application in the timber and environmental sectors; Mycology in the food industry: fermented food products and derivatives; direct feeding: edible mushrooms and their nutraceutical potential; Mycology in the pharmaceutical industry: secondary metabolites and their potentialities; Mycology in environmentally appropriate agricultural pest control: biocontrol of insects, arthropods and nematodes of agronomic interest through entomoparasitic fungi or predators; Mycology in the decontamination of polluted environments: biosorption of heavy metals and bioremediation of toxic compounds, hydrocarbons, pesticides and industrial effluents. Laboratory techniques: macro- and microscopic characterization and differentiation of fungal isolates; Determination of enzymatic activity by spectrophotometry and chromogen medium fungal extracts. The objective is to improve the mycological knowledge about the main groups of fungi, in addition to instigate the participants to build and develop ideas on scientific research related to the numerous biotechnological applications of these microorganisms.

FOOD SAFETY CONSULTING

SILVA JÚNIOR¹, L. S. da.

¹ Departamento de Tecnologia. Universidade Estadual de Feira de Santana

1. Consulting objectives on food safety; 2. Frequency of consulting; 3. Considerations consulting; 4. Programming consulting x lead time; 5. Planning and execution; 6. Plan consulting, preparation, team organization, consulting activities; 7. Consulting activities: meetings and development; 8. Consultant and Company; 9. Expected behavior of the company for consultancy; 10. Case Study: Technical preparation of proposed deployment of Good Manufacturing Practice and Hazard analysis and critical control points; 11. Development of a trade consulting proposal.

MOLECULAR BIOLOGY AND BIOINFORMATICS APPLIED TO BIOTECHNOLOGY

IBELLI¹, A. M. G.

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In the 19th and 20th centuries, many advances were obtained in the genetics and biochemistry fields, such as, the heredity mechanisms, the genetic code, the DNA, enzymes and proteins compositions, the concept of gene, and others. These discoveries led to the beginning of molecular biology, in the 1950s and 1960s, which provided the understanding of the molecular mechanisms of organisms. Therefore, those insights have been caused a revolution in several areas, since nowadays it is possible to use molecular biology methods in any study related to biology, biotechnology, medicine, veterinary and so on. In the following decades, dideoxynucleotide chain-termination sequencing methods, the polymerase chain amplification (PCR), cloning and the transgene have been developed being widely used until now. The most of those approaches enables to study one or few genes at the same time. However, in the early 2000s, sequencing by synthesis techniques have been emerged and allowed an unprecedented high-throughput, scalability and speed sequencing. These methodologies were called next generation sequencing (NGS) are becoming widely used, generating until one terabase of data in a single run and therefore producing complex data files to be analyzed. In this way, this short course aims to present the main advances in the molecular biology techniques applied to biotechnology. The course will provide more detailed view of: PCR, real time PCR, interference RNA and DNA and RNA sequencing, as well as, an introduction to bioinformatics analysis.

MESA-REDONDA

Nanotecnologia

August 14th, 2015

Presidente da mesa-redonda

Dra. Claudriana Locatteli

Conferencistas

Dra. Adny Henrique Silva | Universidade Federal de Santa Catarina (UFSC) – Florianópolis, SC

Dr. Francisco Noe Fonseca | Embrapa Concórdia Suínos e Aves Concórdia, SC

Moderadores

Dr. Luciano Avalone Bueno | Universidade de Sorocaba (UNISO)/Rede Nordeste de Biotecnologia (RENORBIO)/Universidade Federal Rural de Pernambuco (UFRPE)

Dra. Carine Dal Pizzol – Pesquisa Tecnológica Grupo Boticário – Curitiba, PR

NANOTECHNOLOGY APPLIED TO THE AGRIBUSINESS: FROM THE FARM TO THE KNOWLEDGE FRONTIER

FONSECA¹, F. N.

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Nowadays Brazil has a notorious position in the world agribusiness, being leader in the production and exportation of many agricultural products. In order to guarantee its competitiveness, many areas of knowledge have been explored and applied in the sector, not only the traditional ones linked to the animal and vegetal production and sanity, but also the emerging sciences, as nanotechnology. So, regarding the advance in the knowledge and the possibility of manipulating materials in the nanometric scale (10^{-9}m), a lot of benefits have been obtained with the use of nanomaterials. They confer improvements in the quality of the agricultural products and processes, as well enable the development of new inputs and their application in the agricultural-based products. In this context, the "RedeAgronano", constituted by different units of Embrapa and others research centers of Brazil, has focused efforts in the discovery and application of nanotechnological solutions for the Brazilian agribusiness in different areas of activity. The main research fields are the development of sensors and biosensors for environmental and clinical analysis, the elaboration of edible coatings and packages from biodegradable raw materials, as well smart, the obtainment of nanocomposites from renewable sources and also nanocarriers for controlled release of actives (pesticides, drugs, antigens, etc.), and the safety evaluation of the use of nanostructured products, including the intake, occupational and environmental ones. Therefore, the present speaking will bring an overview of the application of nanotechnology in the agriculture, as its perspectives and challenges, focusing in the biotechnological products and processes.

NANOTOXICOLOGY AND MODELS FOR ASSESSING TOXICOLOGICAL EFFECTS OF NANOSTRUCTURED SYSTEMS

Silva¹, A. H.

¹ Universidade Federal de Santa Catarina

Nanotechnology is considered one of the future technologies and comprises the manipulation and application of structures or systems with at least one dimension that is less than 100 nm in length. The development of this technology resulted in the identification of unique properties, inherent to structured materials, which increases their use and application in several areas. The unusual physicochemical properties of nanostructured systems are attributed to the small size, chemical composition, surface assembly, shape, solubility and aggregation. When the particle size is reduced to nanosize, the resulting material exhibits different properties of bulk material, even produced with the same substances and methods. With the development and application of nanotechnology in several areas, there is also an increment of the products number containing nanoparticles, and consequently, their production. Human skin, lungs, and the gastro-intestinal tract are in constant contact with the environment. These three ways are the most likely points of entry for nanoparticles in the body, as well as implants and injections. It is known that characteristics such as size and shape can promote or facilitate the movement of nanoparticles in the circulatory and lymphatic system, or may trigger irreversible damage in tissues and organs. Therefore, nanotoxicology was proposed as a new branch of toxicology to address the adverse health effects produced by nanoparticles, effects considered unusual and unidentified when it comes to larger particles with size above 1000 nm. It is still unclear the consequences of prolonged exposure to the nanoparticles, to humans and to the environment, even if some studies consider some nanostructured systems safe from the biological point of view. Therefore, the mechanisms of nanoparticles toxicity is a very challenging task, since particles made of the same materials but with a difference in a physicochemical properties such as size and shape, may have completely different behavior with respect to living cells and organisms.

PANORAMA E ASPECTOS GERAIS DA NANOTECNOLOGIA

Luciano Avallone Bueno
Universidade de Sorocaba – UNISO
Universidade Federal Rural de Pernambuco – UFRPE
Rede Nordeste de Biotecnologia – RENORBIO

A presente palestra visa abordar o panorama e aspectos gerais da Nanotecnologia tanto do ponto de vista de ciência como de tecnologia, inovação e empreendedorismo. A palestra visa também apresentar as tendências do setor com seus aspectos positivos e contrários.