Dr. Anna Fricke (IGZ)
Sea vegetables at IGZ – developing urban cultivation and studying new applications

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In the food4future project we focus on the environmental controlled cultivation of edible marine macroalgae and halophytes (sea-vegetables), to enable the production of fresh and healthy biomass in urban environments. In this context a innovative brine based cultivation approach is developed at IGZ. Apart strongly interacting with their abiotic environment, sea vegetables are strongly affected by their associated microbiome, with marine fungi playing a crucial role. To better understand their role for the production and nutritional quality of envisaged sea-vegetable crops and foster the use of known and still unknown fungal compounds in cultivation further research is urgently required. Bringing together different experts from the field of marine fungal research, the present seminar aim to shed light on this interesting research field and shall allow the opening of further crosslinks and collaborations.

Prof. Hosana Debonsi (University of São Paulo – Brazil)
The biotechnological potential and diversity of endophytic marine fungi from algae collected in Antarctica

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The Antarctic continent, one of the most pristine and extreme ecosystems, hosts microorganisms that thrive due to unique adaptation strategies, such as distinctive secondary metabolites production, leading to discovery of novel bioactive compounds. Our research group focuses on studying natural products from Antarctic fungi isolated from seaweeds. Notable examples of these studied fungi include *Arthrinium* sp., *Epicoccum nigrum*, and *Penicillium purpurogenum* from algae *Phaeurus antarcticus*; *E. nigrum* from *Kallymenia antarctica*; *Aspergillus unguis* from *Palmaria decipiens*; and *Penicillium echinulatum* from *Adenocystis utricularis*. The metabolites produced by fungi showed promising antifungal, antibacterial, antibiofilm and antiparasitic activities; as well as photoprotective potential, including UV absorption, photostability, and antioxidant properties. Also, it was observed the nutritional importance of lipides from *Ascoseira mirabilis, A. utricularis, Desmarestia anceps, P. antarcticus* and their associated endophytic fungi *Aspergillus flavus, P. echinulatum, Microascus croci and P. purpurogenum.*

Dr. Paula Bueno (IGZ)

Metabolomics approaches unraveling the chemical space of marine organisms

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Metabolomics has the ultimate goal of providing a comprehensive view of the metabolites participating in the cellular processes of animals, plants, or microorganisms. It comprises the detection, annotation, and quantification of primary and specialized metabolites, which can be differentially distributed, up-, or down-regulated depending on the genetic background, growth environment, or biological state of the specimens, among others. For that, state-of-the-art analytical technologies and approaches can be used. The process includes (i) the standardization and validation of protocols for sample extraction, preparation, and data acquisition, as well as (ii) the use of algorithms, bioinformatics, chemoinformatics, and statistics tools for deconvolution and data analysis. This seminar seeks to present the recently established workflow using high-resolution mass spectrometry-based metabolomics in IGZ applied to the study of marine organisms

Márcia Lopes (University of São Paulo, Brazil)

Science on the ice – Metabolic diversity of Aspergillus unguis in relation to different macroalgal hosts and environmental stressors

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Antarctica, with its harsh and unique environment, is home to organisms that have developed extraordinary adaptive abilities. Our focus has been on the fascinating interactions between endophytic fungi and their macroalgal hosts, leading to the production of unique and commercially valuable metabolites like Micosporin and Nidulin. In our multifactorial study, we explored how the endophytic fungus Aspergillus unguis interacts with two different macroalgal hosts, the Rhodophyte Palmaria decipiens and the Phaeophyceae Ascoseira mirabilis. By exposing these strains to varying environmental factors, such as radiation regimes and salinity changes, we uncovered a rich diversity of metabolites. Join us as we delve into the dynamics of these interactions and their potential for targeted metabolite extractions, all analyzed through cutting-edge UHLPC-UV-DAD-MS/MS techniques. This presentation promises to be an enlightening and engaging experience, perfect for anyone passionate about mycology, marine biology, or biochemistry.

Dr. James Kennard Jacob (Isabela State University, Philippines) Leveraging genomic analysis of marine derived algicolous fungal endophytes for sustainable agriculture

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Endophytic fungi, residing within plant tissues without causing harm, offer significant ecological and practical benefits. These fungi promote plant growth and act as biocontrol agents, providing sustainable alternatives to chemical fertilizers and pesticides. Recent research highlights their role in enhancing plant health, enzyme production, bioremediation, and antagonistic properties. Advanced research methodologies promise new applications and breakthroughs. However, challenges such as cultivation difficulties and ethical considerations must be addressed. Continued interdisciplinary research and collaboration are essential to fully harness the potential of endophytic fungi for sustainable and innovative solutions across various applications.

Dr. Florencia Biancalana (CERZOS-CONICET, Argentina)
Marine fungi: A potential source of valuable marine polymers from the Bahía Blanca Estuary

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The Bahia Blanca estuary is covered by different marine macrophytes, like *Spartina alterniflora* (~ 150 m wide,) and *Sarcocornia* sp. Salt marsh provides a diverse associated fungal community, playing important roles in degrading organic matter debris and producing biopolymers. Chitin is a biogenic polymer whose study reveals the great importance of the recycling processes of carbon and nitrogen compounds that are produced in the oceans, as well as chitosan, a product derived from the deacetylation of chitin, which is actively involved in carbon and nitrogen fluxes in marine systems. Fungi produce both polymers and are engaged in their degradation process, which is essential for their recycling and incorporation into biogeochemical cycles. The talk will focus on organisms, particularly fungi as a potential source of those valuable biopolymers, associated with halophyte plants, sediments, and water columns, that produce and/or degrade the polymer chitin, chitosan and other biopolymers (lignin; cellulose, etc.) in Bahía Blanca Estuary.

Thaiz R. Teixeira, PhD (University of California San Diego, USA)
Bioprospecting antarctic algae and their endophytic fungi: Uncovering natural products for neglected tropical diseases

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Marine natural products, particularly those from the Antarctic continent, exhibit unique and diverse structures, making them valuable sources for drug discovery. Within this marine ecosystem, macroalgae and their associated fungi play a significant role. Herein we have performed the bioprospecting of Antarctic seaweeds, including Iridaea chordata, Ascoseira mirabilis, and Desmarestia antartica, as well as endophytic fungi such as Penicillium echinulatum, Epicoccum nigrum, and Aspergillus unguis. Standard techniques were employed to obtain extracts, fractions, and isolated compounds, which were chemically characterized using GC and LC-MS/MS. These samples were tested for their efficacy against several parasites responsible for Neglected Tropical Diseases (NTD). The findings highlight the promise of marine natural products in combating a variety of NTD, including malaria, leishmaniasis, and trypanosomiasis. The talk will focus on exploring the marine organisms from the Antarctic in the search for antiparasitic compounds.