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Webinars

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Plants and the Environment: Between Therapeutic Potential, Contamination, and Plant Resilience

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Plants are constantly exposed to a wide range of biotic and abiotic stressors, being a reflex of the environmental conditions in which they grow. At GRAQ, we study plants from multiple and complementary perspectives, recognizing their dynamic interaction with the surrounding environment. Environmental conditions, such as soil composition, climate, water availability, and exposure to pollutants, strongly influence the production of bioactive compounds and can significantly alter a plant's chemical profile. These compounds can be exploited for diverse applications, namely, in the food and pharmaceutical sectors. However, can we ensure that the same plant species produces always a standardized chemical composition, despite its growing conditions? Sometimes, the same species collected or cultivated in different locations may exhibit distinct chemical profiles due to environmental variations, resulting in different chemotypes. These chemical variations can lead to differences in therapeutic efficacy. Moreover, even when a plant displays valuable functional properties, its safety for human consumption needs to be guaranteed. Environmental contamination

may lead to the accumulation of harmful substances, and in some cases, contaminant levels in plant materials exceed legally permitted limits, restricting their use. Why does this occur? Because plants can also absorb and accumulate contaminants present in soil and water. Interestingly, this same capacity makes plants valuable tools for phytoremediation scenarios and certain plant species can be used to remove or degrade pollutants in contaminated soils and waters.

In addition, plants can also be used as bioindicators to evaluate the success of soil remediation strategies. Seed germination and seedling development can be monitored in non-contaminated, contaminated, and remediated soils. By assessing germination rates and physiological growth parameters, we can determine the impact of contaminants and evaluate the effectiveness of remediation processes, and, at the same time, to ensure if these plants are safe for future consumption.

Short Bio

Clara Grosso is Invited Professor at ISEP and Assistant Researcher at the Grupo de Reação e Análises Químicas (GRAQ; www.graq.isep.ipp.pt), a research group of the Associated Laboratory for Green Chemistry (LAQV) of REQUIMTE, based at ISEP. Her field of research focuses on natural products from plants and seaweeds, regarding aspects like extraction optimization using green extraction methodologies, identification of secondary metabolites and assessment of in vitro bioactivities with emphasis on oxidative stress and neuroprotection. Additionally, she explores how environmental factors influence plant physiology and metabolite production.

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