113° Congresso della Società Botanica Italiana

V International Plant Science Conference (IPSC)

Fisciano (SA), 12 - 15 September 2018

ABSTRACTS

KEYNOTE LECTURES, COMMUNICATIONS, POSTERS

ISBN 978-88-85915-22-0

Mycological characterization of extreme environments and substrates as first step for sustainable remediation technologies

Grazia Cecchi[1], Simone Di Piazza[1], Giuseppe Greco[1], Ester Rosa[1], Mauro Mariotti[2], Mirca Zotti[1]
DISTAV – Department of Earth, Environment and Life Sciences, University of Genoa, Corso Europa 26, 16132, Genova.
[1]Laboratory of Mycology; [2]Laboratory of Plant Biology

Fungi are pioneer microorganisms able to survive in extreme conditions and to colonize every kind of habitat. Many studies have demonstrated how they have developed specific strategies and tolerance mechanisms against limiting factors (e.g. salinity, pH, T, nutrients), and toxic organic and/or inorganic compounds (1, 2). These adaptation strategies generally involve fungal metabolism. Thanks to their enzymes, pigments, organic acids, and secondary metabolites, microfungi can change the microenvironment parameters, degrade or inactivate contaminants, induce chemical reactions, and solubilise insoluble compounds for their advantage (3). The study of extremophile fungal communities allows not only the selection of fungal strains potentially employable in biotechnological processes of remediation, but also the selection of important fungal metabolites usable in a number of sectors, such as medicine, natural science, engineering, etc. In bioremediation context, native fungi can represent a promising answer to the metals and hydrocarbons remediation. Many researchers have shown that fungi isolated from extremely compromised sites are the best to be employed in the restoration processes of the same sites (4, 5, 6). Mycological characterization consists of the isolation of vital fungal strains from various matrices (both solid and liquid), in their cultivation, identification, and analysis in order to select a pool of stronger fungal species exploitable in mycoremediation protocols of contaminated soils and waters.
In this context, our studies have faced the mycological characterization of numerous extreme environments, such as soils contaminated by Zn, Ni, Cd, and PAHs, or extreme substrates, such as organic waste, composting waste, diesel fuel, port sediments, port seawaters, and industrial sewages. Until now we have isolated about 800 fungal strains belonging to 70 morphotypes from 40 samples. This allowed selecting several strains that appear promising in some mycoremediation tests and fruitfully exploitable in biotechnologies.