



“Gheorghe Asachi” Technical University of Iasi, Romania



Sub-session 8.2.

Industrial exploitation of microbes from deep seas, arid/contaminated environments

Main lecture

**THE MICROORGANISMS FROM MARINE AND TERRESTRIAL
EXTREME ECOSYSTEMS: WHICH POTENTIAL FOR APPLIED
BIOTECHNOLOGY?**

Daniele Daffonchio

Department of Food Science and Microbiology, University of Milan, 20133 Milan Italy

Abstract

With the advent of the industrial era, soils, waters, sediments and the subsurface are facing a massive pollution by a large series of organic and inorganic compounds and by chemo-physical stresses. Remediation of such impacted sites is mandatory for improving the overall quality of the environment and for leaving a self-sustainable world. Microorganisms are the major players in counteracting such stresses and recycling elements by mineralizing or partitioning pollutants or facilitating ecosystem services, even in environments that are poor in nutrients or lack the availability of major electron donors and acceptors. In particular, microorganisms from marine and terrestrial extreme environments have properties that can be exploited to address environmental problems or improving industrial processes under stressing conditions. Here, two examples are given of microorganisms from extreme environments that can be used for improving industrial and environmental processes. The first example relies on halophiles from the Deep Hypersaline Anoxic Basins in the eastern Mediterranean Sea that can be source of novel enzymes for novel biotransformation processes. The second example regards microorganisms of arid and desert ecosystems that can be exploited for the plant growth promotion under water stress and determine water savings. It is concluded that the understanding of the microbial ecology of complex ecosystems is a necessary step for solving many global environmental problems.
