

Marine biotechnologies for the decontamination and restoration of degraded marine habitats

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Project Summary/Abstract

The recent awareness of the huge relevance of marine resources and ecological services is driving regulatory demands for their protection from overwhelming human pressures. Marine biotechnology is playing an increasingly important role in the protection and management of the marine environment. Achievements in this field have been less substantial than expected during the last decade and most of the results obtained nowadays still rely on traditional methods and approaches mainly based on chemistry and microbiology, without taking into account the complex network of biological and ecological interactions, and the potential of molecular approaches to identify detoxification pathways. This project through field and laboratory experiments aims at: 1) investigating the biodiversity and main metabolic functions of microbial (i.e. both bacteria and microalgae) assemblages inhabiting polluted marine ecosystems; 2) assessing the role of environmental factors (e.g. temperature, oxygen and nutrient availability), potentially influencing growth performance of key species identified in point (1); 3) analyzing the effects of main pollutants (e.g. heavy metals, hydrocarbons, halogenated organic compounds) identified in areas of interest (e.g. Bagnoli and other polluted marine sites) in laboratory experiments to study survival, growth rates and pollutant uptake rates; 4) transcriptome sequencing of key bacterial and microalgal species identified in the contaminated areas and successively cultured in the laboratory to identify potential enzymes involved in detoxification processes. The final goal is to identify strategies and tools for the restoration of degraded marine habitats with special focus on shallow soft bottoms.