Abstract book

First EMBO Conference on Aquatic Microbial Ecology – SAME13

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PS-9.12. HYDROCARBONOCLASTIC BACTERIA FROM A POLLUTED HARBOUR IN SICILY (ITALY): ISOLATION, IDENTIFICATION AND CHARACTERIZATION OF THEIR BIOTECHNOLOGICAL POTENTIAL

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Metabolic specialization is a general biological principle that shapes the assembly of microbial communities. Hydrocarbonoclastic bacteria (HCB) are marine bacteria that are specialised in hydrocarbon degradation and use hydrocarbons almost exclusively as unique C and energy source. HCB become dominant in oil-impacted environments and are particularly adapted for removal of hydrocarbons from contaminated sites through bioremediation treatments. The petrochemical site of Priolo-Augusta-Melilli (Sicily, Italy), is a Site of National Interest (SIN) due to high levels of environmental contamination of the coastline and a specific "national program of environmental remediation and restoration" was developed in order to allow remediation and restoration of contaminated sites. In order to to identify the key hydrocarbon degraders and explore the natural bioremediation potential of the contaminated area, a total of six sediment and sea water cores were collected inside the Priolo Harbour (SR, Italy). After biological (bacterial population diversity, PCR-DGGE) and chemical-physical characterisation (quali-, quantitative measures of hydrocarbons and heavy metals) samples were used, separately, to set enrichment cultures on mineral broth containing different mixtures of linear (C_{16}, C_{18}, C_{20}) and aromatic (phenatrene, pyrene, biphenyl and dibenzothiophene) hydrocarbons and Crude Oil (Arabian Ligth Crude Oil). A total of 159 isolates (82 from seawater and 77 from sediments) were obtained. The sequencing of 16S rDNA showed the most of the isolates belonged to, *Alcanivorax* (44 %), *Marinobacter* (17%) and *Oleibacter* (9%) genera. Data obtained from assays of biodegradation revealed as more interesting bacteria present a very high potential of application in bioremediation techniques; furthermore data obtained give a deeper understanding of the biochemical causes of metabolic specialization and could serve as a foundation for the field of synthetic ecology, where the objective would be to rationally engineer the assembly of a microbial community to perform a desired biotransformation.