SIMGBM
Società Italiana di
Microbiologia Generale
e Biotecnologie Microbiche

Microbiology 2017

XXXII SIMGBM Congress

Palermo, September 17-20, 2017

Programme & Abstracts

B17. Blue biotechnology: oil bioremediation using hydrocarbon-degrading bacteria immobilized on biodegradable membranes

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A novel bioremediation system to clean up oil contaminated water was developed combining hydrocarbon (HC) degrading bacteria immobilized and polylactic acid (PLA) or polycaprolactone (PCL) membranes prepared by electrospinning. The bioremediation efficiency was tested on crude oil using highly performant HC degrading bacterial strains isolated from marine and soil environments. The membrane morphology, the microbial adhesion and proliferation were evaluated using scanning electron microscopy (SEM). The SEM analysis highlighted that the fibers of the electrospun mats were in nanoscale with a similar diameter size distribution. The electrospun membranes exhibited high oil absorption capacity (q): approximately q = 40 g/g for PLA and q = 20 g/g for PCL. The bacterial strains were able to attach to the PLA and PCL membranes after 48h, reaching high proliferation and biofilm formation within the whole structure in 5 days. The biodegradation efficiency of the bacteria-membrane systems was tested by GC-FID analysis and compared with planktonic cells after 5 and 10 days incubation. The bacterial immobilization is a promoting factor for biodegradation and a new tool to be developed for bioremediation of aquatic systems.

B18. Bacteria from extreme environments: analysis of bacterial communities from the Acquarossa River (Viterbo, Italy)

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The Acquarossa river (Viterbo, Italy) is an extreme environment due to its high iron and arsenic concentrations. Red and black biofilms grow on the rock surfaces along the river course, maintaining a defined borderline. Samples of black and red biofilms were collected on July 2016 to characterize the bacterial communities inhabiting epilithons. Culturable bacterial communities analysis revealed a dominance of *Acinetobacter* sp. (56%) in black epilithon, and a dominance of *Pseudomonas* sp. in red epilithon (53%). NGS analysis partially confirmed these data reporting a different microbial assemblage in different biofilm types. *Acinetobacter* strains (77 out of 191) and *Pseudomonas* strains (44 out of 191) were divided respectively into 12 and 19 RAPD haplotypes; in both cases, none of the detected haplotype was shared between red and black epilithon suggesting that the community's structure is different in the two biofilms. Cross-streaking experiments revealed that strains of a given genus don't have any inhibitory activity both vs other strains from the same samples and strains from different samples.

Resistance patterns towards heavy metals and antibiotics revealed different phenotypic characteristics of the strains, suggesting that two distinct bacterial communities characterize the two kinds of epilithic biofilms along the whole river course.