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LIBRO degli ABSTRACT

5° Meeting

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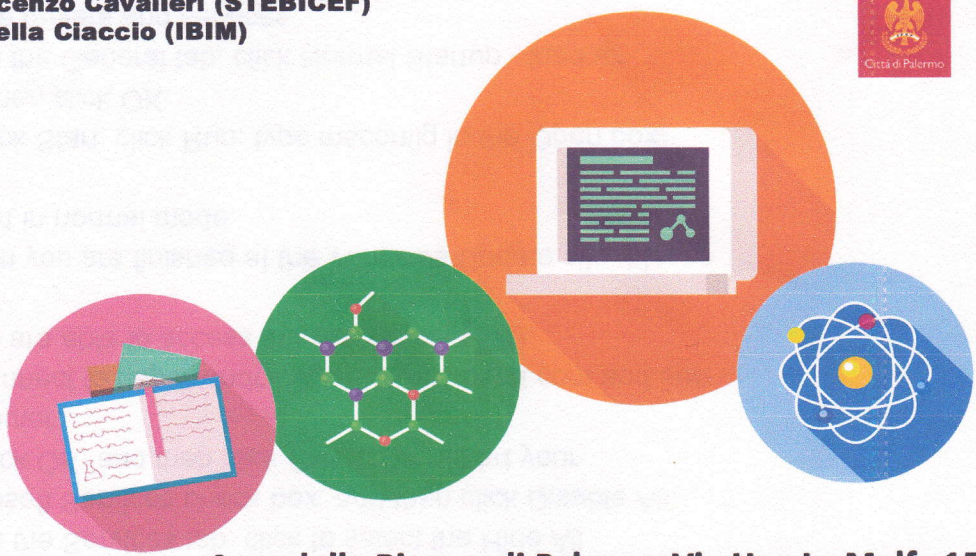

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Innovative *ready to use* carrier-bacteria devices for bioremediation of oil contaminated water

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Bioremediation, that uses microorganisms to remove environmental pollutants, is the best way of restoring the environment due to its low cost and sustainability. Immobilization of microorganisms capable of degrading specific contaminants significantly promotes bioremediation processes. An innovative *ready to use* bioremediation system to clean up oil-contaminated water was developed immobilizing highly performant marine and soil HC degrading bacteria, on biodegradable oil-absorbing carriers. Two soil Actinobacteria (*Gordonia* sp. SoCg, *Nocardia* sp. SoB) and two marine Gammaproteobacteria (*Alcanivorax sp. SK2, Oleibacter* sp.5), were immobilized on biopolymeric membranes prepared by electrospinning (polylactic acid, PLA and polycaprolactone, PCL). These carriers are characterized by high uptake capacity, oil retention, buoyancy, durability, reusability and recoverability of the oil absorbed. The morphology of the carriers and microbial adhesion and proliferation were evaluated using scanning electron microscopy (SEM). A high capacity of adhesion and proliferation of bacterial cells was observed on membranes after 5 days. The bioremediation efficiency of the carrier-bacteria systems was tested on crude oil by GC-FID analysis and compared whit planktonic cells. The bacterial immobilization on PLA and PCL membranes was a promoting factor for biodegradation, increasing hydrocarbon removal up to 20%, in respect to planktonic cells. Biofilm-mediated bioremediation is a versatile tool to be developed for *in situ* and *ex situ* bioremediation of aquatic systems. Several applications can be designed to exploit both the high oil uptake capacity of the carriers, and the biodegradation potential of autochtonous microrganisms and/or of selected microorganisms that are immobilized on the carriers before exposure to the contaminated site.