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Biodepollution of contaminated seawater based on the use of bacterial biofilms and their metabolites

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Abstract

Due to mega industrialization and technological development, pollution has become an uncontrollable problem affecting our environment and especially, seas. In fact, the real problem is the exposure to pollution as well as the climate changes that are beginning to spread to affect the coastline. A simple observation of the sea and the coasts shows the presence of different pollutants, plastic, glass, metal elements, hydrocarbons, paper, etc. Pollution has required measures at all levels, and this prompts the authorities to find solutions. According to our study that is based on the use of indigenous marine bacteria in the depollution of the seas.

First, bacterial biofilms are cellular aggregates adhered to biotic or abiotic surfaces, and coated with a polymeric matrix. The biofilm organization allows the bacteria to establish a good physiological adaptation to overcome a given stress. As a result, our marine strains have shown an ability to form biofilms strongly under different conditions. This ability is accompanied by a monitoring of the production of polysaccharides. It should be noted that we tested the effect of several parameters for an optimization of this production. Then we targeted this biomolecule in order to test its hydrocarbon remediation capacity, the strains of *Pseudomonas ssp* showed a rather important biodegradability under certain conditions. Two strains showed a remarkable emulsifying activity towards crude oil. This aptitude makes them a good candidate for use in bioremediation of oil-polluted seas.

These results suppose the possibility of using these strains to maintain the notion of sustainable development while improving the quality of waters, and especially in sites polluted by hydrocarbons thanks to their bioremediating power.

Keywords: Biofilms, Seas, Pollution, Hydrocarbons, Bioremediation.