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Hydrocarbon oxidizing microorganisms: Their isolation and study of colonization capacity for the use in rhizoremediation processes of contaminated soils

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Abstract

© 2016, International Journal of Pharmacy and Technology. All rights reserved. Developing methods to clean up the environment from oil and oil sludge contaminations is a priority area of the environmental biotechnology. Despite significant advances in the field of studies, the issue of expanding the methods of soil purification from oil contamination remains open. In our studies, we, first of all, obtained a hydrocarbon oxidizing bacteria capable of the active colonization of plant rhizosphere and the oil degradation at the same time. Among the isolated strains, the strains belonging to the *Pseudomonas* genus had the greatest capacity to colonise plant roots and oil degradation. Identification of the main strains with high colonization capacity via biotyper and 16S rRNA gene analysis has shown that *Pseudomonas putida* and *Pseudomonas fluorescens* relate to the species that constitute a high priority for rhizoremediation. These microorganisms colonized the rye (*Secale cereale*) roots with an average density of $1.1-2.0 \times 10^6$ cells per centimetre of root length. Furthermore, at inoculation of germinated rye seeds and rye seeds treated with hydrocarbon bacteria, distribution of the bacteria degrading oil was observed over the entire area where the plant roots are growing. The total number of bacteria on the plant roots did not only maintain, but increased. Therefore, the isolated and identified strains of *Pseudomonas putida* and *Pseudomonas fluorescens* bacteria can be recommended for the use in rhizoremediation methods.

Keywords

Colonization, Microorganisms, Oil degradation, Rhizoremediation, Rye