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Influence of Biopreparations on the Bacterial Community of Oily Waste

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Abstract

© Published under licence by IOP Publishing Ltd. Oil pollution is reported to be one the most serious environmental problems nowadays. Therefore, methods of remediation of oily polluted soils and oily wastes are of great importance. Bioremediation being a perspective method of sanitation of oil pollutions, includes biostimulation of the polluted sites' indigenous microflora, and in some cases additional introduction of active strains able to decompose hydrocarbon. The efficacy of introducing such biopreparations depends on the interactions between the introduced microbes and the indigenous ones. In this study, the influence of bacterial consortium (Rhodococcus jialingiae, Stenotrophomonas rhizophila and Pseudomonas gessardii) introduction on the bioremediation of an oily waste sampled from a refinery situated in the Mari El region (Russia) was estimated. Single and multiple inoculations of the consortium in addition to moistening and aeration were compared with a control sample, which included only aeration and moistening of the waste. It was shown, that two of the three introduced strains (Rh. jialingiae and Ps.gessardii) gene copy numbers were higher in the inoculated variants than in the control sample and with their initial counts, which meant that these strains survived and included into the bacterial community of the wastes. At the same time, bacterial counts were significantly lower, and the physiological profile of waste microflora slightly altered in the inoculated remediation variants as compared with the control sample. Interestingly, no difference in the degradation rates of hydrocarbons was revealed in the inoculated remediation variants and the control sample.

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