Enhanced oil spill bioremediation with Corksorb PC 84

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Abstract

Regranulated cork particles are by-products of cork stopper production, which present very high hydrophobicity and oil sorption capacity after thermal treatment [1]. These thermally treated granules have been used as absorbents in the remediation of oil spills under the commercial brand Corksorb (Corticeira Amorim, S.G.P.S.). Once saturated with oil, cork should be regenerated for cyclic reuse. For that, hydrocarbonoclastic bacteria can be applied to degrade the oil components. Here, we hypothesize that Corksorb granules can potentially stimulate the activity of these bacteria, due to their unique chemical composition, structure and properties [2], thus improving *in situ* bioremediation of oil spills. To test this hypothesis, bacterial growth and hydrocarbons biodegradation were assessed in pure cultures of *Alcanivorax borkumensis* SK2 or *Rhodoccocus opacus* B4 incubated with a mixture of alkanes, and compared with incubations in which the alkanes were sorbed in corksorb. Growth of *Alcanivorax borkumensis* SK2 in alkanes was 1.5 times higher in the assays with corksorb, relatively to the assays without corksorb. Moreover, 72% of the added alkanes were biodegraded in the presence of corksorb, while in its absence only 47% were removed. For *Rhodococcus opacus* B4, hydrocarbons consumption reached 96% and 88% in the presence and absence of corksorb, respectively, although no significant effect could be detected on growth. These results show that corksorb stimulates the activity of hydrocarbonoclastic bacteria, therefore presenting a high potential for improving *in situ* bioremediation of hydrocarbon-contaminated environments by combining absorption with stimulated biodegradation. The mechanisms underlying this stimulatory effect are currently under study.

Bibliography

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