P-116 - NEUTRAL LIPID PRODUCTION FROM HYDROCARBON-CONTAMINATED CORK SORBENTS USING RHODOCOCCUS OPACUS B4

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Background

Several oil spillages have been reported both in land and aquatic systems, with tremendous negative impacts for human health and ecosystems [1,2]. Cork, used as oil biosorbent, can be a sustainable alternative to other conventional remediation techniques [3]. Management of the subsequent residue involves a significant cost associated to its treatment/disposal, since no economic valorization is currently performed. In this work, a biological, environmental friendly solution is proposed to valorize hydrocarbon-contaminated cork sorbents.

Method

After growth, *Rhodococcus opacus* B4 was cultivated in nitrogen-limiting conditions using two types of cork (natural and regranulated) previously impregnated in hexadecane (C16). Neutral lipids profile was evaluated by thin-layer chromatography (TLC). Fatty acid content and composition, C16 concentration and biochemical methane potential from *R. opacus* B4 lipid-rich biomass were determined using a gas chromatograph with a flame ionization detector.

Results & Conclusions

R. opacus B4 was able to degrade up to 96 % of the hexadecane impregnated in natural and regranulated cork sorbents after 48 h incubation. *R. opacus* B4 produced 0.59 ± 0.06 g of triacylglycerol (TAG) g^{-1} of C16 consumed (60 % TAG:cellular dry weight (CDW)) and 0.54 ± 0.05 g TAG g^{-1} of C16 consumed (77 % TAG:CDW), after growing on C16-contaminated natural and regranulated cork sorbents, respectively. TAG was mainly composed by fatty acids of 16 and 18 carbon chains, demonstrating the feasibility of using it as raw material for biodiesel production. Whole cell lipid-rich biomass, obtained from *R. opacus* B4 cultivated on C16-contaminated cork, was efficiently converted to methane at a yield of about 0.4 L g^{-1} (CDW).
The obtained results support a novel approach for the management of oil-spill contaminated cork sorbents, through its valorization by production of bacterial lipids that can be used as raw materials for biofuels production, minimizing economical costs and environmental impacts, when compared to conventional treatment technologies

References & Acknowledgments

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