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POTENTIAL ROLE OF EXTREMOPHILIC HYDROCARBONOCLASTIC FUNGI FOR EXTRAHEAVY CRUDE OIL BIOCONVERSION AND THE SUSTAINABLE DEVELOPMENT OF THE PETROLEUM INDUSTRY

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Formato Articulo

Estado publishedVersion

Descripción This book chapter contributes to identifying some core areas inside the oil industry as potential targets for biotechnology, motivated by the increasing global demand of fuels in addition to the reduction of conventional crude oil reserves that have produced a greater interest on the exploitation of unconventional crude reserves. In parallel with enlarged global environmental concerns, it is mandatory the developing and improving clean-alternative fuel technologies with enhanced bioremediation strategies for unconventional crude. These efforts include the application of petroleum biotechnology with promissory microorganisms, especially extremophilic hydrocarbonoclastic fungi, a broad group of cultivable fungi which live optimally under extreme conditions and are characterized by having a high ability to grow using hydrocarbons as sole carbon source and energy. Few publications are focused on petroleum biotechnology and applications of fungal degradation or bioconversion of extra-heavy crude oil (EHCO), a type of crude that contains elevated amounts of asphaltenes, high-molecular-weight compounds with low bioavailability, and limited susceptibility to being biotransformed. We have included an enriching discussion on the biotechnological strategies applied to the study of cultivable fungal biodiversity inhabiting extreme environments to obtain powerful biocatalysts, following a simple and fast screening to determine both their hydrocarbonoclastic abilities and tolerance of growing in the presence of high concentrations of EHCO and hydrocarbons polycyclic aromatics compounds (HPAs). The potential applications of these promissory extremophilic hydrocarbonoclastic fungal strains in mycoremediation and EHCO-biouprading processes to promote the sustainable development of the petroleum industry will be discussed.

Año de Publicación 2019

Lenguaje

Tópico Asphaltenes
Biotransformation
Bioremediation
Petroleum biotechnology
Polycyclic aromatic hydrocarbons

Repository Repositorio Universidad Regional Amazónica

Enlace del recurso http://repositorio.ikiam.edu.ec:8080/jspui/handle/RD_IKIAM/301
https://doi.org/10.1007/978-3-030-19030-9