

TITLE: OIL DEGRADING BACTERIA FROM ANTARCTIC ACTIVE VOLCANO

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ABSTRACT:

Increasingly, natural environments are being affected by anthropic actions, such as oil spills. This threat also affects the Antarctic continent, a severe, remote and sensitive ecosystem. One of its impacted environments is Deception Island, an active volcanic island, which contrasts a predominantly icy environment with geothermal sites. To date, the bacterial potential in degrading petroleum hydrocarbons in this polar volcano has not been reported in the literature. Therefore, this pioneering work had the objective of realizing the bioprospection of bacteria capable of degrading petroleum under thermophilic conditions. Bioprospecting was performed on soils from two polar geothermal sites, Whalers Bay and Fumarole Bay, where temperatures ranged from 50 to 100 °C. Two culture media supplemented with oil, Bushnell-Hass with 2% crude oil, and Bushnell-Hass with addition of 2% yeast extract and 2% crude oil were used for the selection of thermophilic petroleum degrading bacteria, and the Petri dishes in duplicate were incubated at 60 °C at 24-48h. Grown colonies were isolated and analyzed for Gram staining and morphology. In order to test the ability of the isolates to degrade oil, as well as to verify the most promising ones degradants of this contaminant, they were submitted to the drop test on 24-well plate. From the bacteria selection, 81 isolates capable of degrading oil were obtained and presented distinct morphologies, such as transparent, orange, rose and brown colonies, and microaerophilic and agar degrading. By Gram staining, 55.6% were gram positive and 44.4% gram negative, and all isolates were characterized as bacilli, with some short bacilli and spore forming. In relation to the drop test, of the 81 isolates capable of degrading oil, 19 showing a high degradation rate, with a visual difference significantly higher than the others isolates and negative control (test without microbial cells). It can be concluded that Deception Island presents thermophilic bacteria with high oil degradation capacity, which is a novel information for this environment, shown to be an important source of beneficial resources with application in bioremediation processes. For this reason, new analyzes are being carried out by the group, aiming to elaborate a thermophilic bacterial consortium capable of degrading crude oil and its derivatives.

Keywords: Extremophiles; Geothermal environment; Antarctica; Crude oil; Contamination.

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