

TITLE: ISOLATION OF THERMOPHILIC BACTERIA FROM POLAR GEOTHERMAL SITES OF ANTARCTICA

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ABSTRACT:

Antarctica is a continent of superlatives. It is a mosaic of extremes, including different habitats, such as Deception Island, an active polar volcano, where its activity can be observed by soils and warm waters, and constant fumaroles, with temperatures varying from 0 to 150 °C. Therefore, this cold and thermophilic environment provides unique conditions capable of selecting a wide variety of microbial adaptations. Given this unique environment, the present study aimed to isolate thermophilic bacteria from two geothermal sites of the polar volcano – Fumarole Bay and Whalers Bay, where temperatures ranged from 50 to 100 °C. Soil samples were collected from Antarctica at 4 °C and analyzed in the Laboratory of Molecular Microbial Ecology (LEMM-UFRJ). For the cultivation of thermophilic bacteria, six different culture media were used: Lysogeny broth, Marine Agar, Glucose Yeast Malte, heterotrophic medium for *Bacillus* - DSMZ 260, Calcium Phytate and National Botanical Research Institute's phosphate, these being chosen to provide the highest possible number of bacteria with different metabolisms. The duplicate plates were incubated at 60 °C and after the incubation period, isolations were performed until pure colonies were obtained. Morphological analysis and Gram staining were performed in order to characterize the isolates. By this isolation, 245 bacterial isolates that grew under thermophilic conditions were obtained. Of these, 139 are Gram-positive and 106 Gram-negative bacteria, and all were characterized as being bacilli, with some short and spore forming. In relation to the morphological analysis of the colonies, the isolates had very different morphologies, such as transparent, orange, rose and brown colonies, microaerophilic and agar degrading. The isolates can be found at the Antarctic Bacteria Collection (LEMM-UFRJ) and the molecular identification of the isolates is currently being carried out, as well as the biosurfactants production and verification of the capacity of these isolates to degrade petroleum and its derivatives.

Keywords: Extremophiles; Geothermal environment; Thermophiles; Volcano; Antarctica.

Development Agency: National Counsel of Technological and Scientific Development (CNPq), Brazilian Antarctic Program (PROANTAR).