

TITLE: HYDROLASES PRODUCTION BY BACTERIA ISOLATED FROM ANTARCTIC

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In the Antarctic continent, there are microorganisms classified as extremophiles, which are potential producers of metabolites of industrial interest. One class of the biomolecules produced by these microorganisms are the enzymes, which have great commercial value. This work aims the production of hydrolases by bacteria isolated in different Chilean Antarctic systems. Six strains previously selected as potential producers of these enzymes were used: *Curtobacterium flaccumfaciens*, *Rhodococcus cercidiphyllum*, *Arthrobacter phenanthrenivorans*, *A. sulfonivorans* and two strains not yet identified, coded as 18 and SE 26.01. First, each bacterium was reactivated in LB medium at 30 °C for 48h. After that, tests were carried out on selection media to check the production of enzymes: (i) amylase (starch medium); (ii) caseinase (casein medium); (iii) gelatinase (gelatin medium); (iv) cellulase (carboxymethylcellulose medium) and (v) lipase (tributyrin medium). All selected strains were grown at 30 °C for 72h. The enzyme production was verified by the presence of halos around the colonies, indicating that there was degradation of the substrates present in the culture media. The enzyme determination was expressed in Enzyme Index (EI). The most expressive EI values for lipase, gelatinase, caseinase and cellulase production were: 18 (EI = 2.1), *A. sulfonivorans* (EI = 5.7), 18 (EI = 2) and *A. phenanthrenivorans* (IE = 2.3). None of the strains studied showed positive results for amylase production. Submerged fermentations were carried out, containing substrates to produce lipase (olive oil) and peptidase (casein), in order to obtain the crude enzyme extract. The quantification of the enzyme activity was carried out using azocasein and p-nitrophenyl laurate (pNFL) as substrates to analyze the production of peptidase and lipase, respectively. Cultures aiming at lipase production were not satisfactory, since none of the selected strains showed production in the medium used. In contrast, all the microorganisms tested were peptidase producers, with the following microorganisms showing the best proteolytic activity: *C. flaccumfaciens* (1.86 U / mL), *A. sulfonivorans* (1, 71 U / ml) and *R. cercidiphyllum* (1.53 U / ml). The microorganisms isolated from the Antarctic environment were shown to be promising for the production of hydrolases. Assays aiming to deepen the best conditions of cultivation and characterization of the enzymes produced will be carried out.

Key Words: Antarctica; Enzymes; Hydrolases; Submerged fermentation; bioprocess

Development Agency: Conselho Nacional de Desenvolvimento Científico e Tecnológico -CNPq