

TITLE: AMYLASE PRODUCTION BY COLD-ADAPTED BACTERIA

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ABSTRACT

Many efforts have been done in the search for new enzymes and molecules produced by psychrophilic and psychrotolerant microorganisms found in samples from the Antarctic continent. The organisms present in these environments are adapted to extreme conditions, such as low temperatures, which can vary between -20 °C to -60 °C, as well as water hypersalinity, soil and permafrost nutrient availability, and incidence of UV rays in these high latitude regions. The aim of this study was to evaluate the amylase production by bacteria isolated from marine Antarctic samples including sediment and soil biofilm. Enzymatic assay was carried out with 40 isolates by using 50 ml of starch broth (1% starch, 0.5% peptone and 1.5% yeast extract, pH 7) in 250 ml flask using rotary shaker in a 150 rpm, at 10 °C for 7 days. Bacteria cells were separated from medium, 50 µl of the resulting enzyme extract were mixed with 1 ml of 1% starch solution, and mixture was incubated at 10 °C for 10 min. After incubation, 1ml of 0.1N HCl was added to stop the reaction and a new dilution was made by mixing 50 µl of this acidified solution with 1ml of 0.1 N HCl. At the end, 1 ml of iodine solution (0.05% iodine in 0.5% KI) was added to 50 µl of the solution and amylase production was measured. The assay was carried out based on the reduction in blue colour intensity due to enzyme hydrolysis of starch. The isolate 184 exhibited 78.95% of starch hydrolysis, with maximum yield of enzymatic production of 35.25 U dl⁻¹, followed by strains 226 (89.47%) and 227 (85.3%) of starch hydrolysis, showing maximum yield of 9.45 and 37.79 U dL⁻¹, respectively. Results from the present work encourage the development of subsequent studies related to the purification of amylase by psychrophilic microorganisms found in Antarctic continent for future biotechnological application, including pharmaceutical, textile and food industry.

Keywords: amylase, Antarctic samples, psychrophilic, cold-adaptation

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