

TITLE: EXTRACELLULAR PROTEASE BY FUNGI FROM ANTARCTICA LICHENS

AUTHORS: SILVA, M. K.¹; PUTZKE, J.²; OLIVEIRA, V.M.³; ROSA, L.H.⁴; DUARTE, A. W.¹

INSTITUTION: 1. UNIVERSIDADE FEDERAL DE ALAGOAS, CAMPUS ARAPIRACA, AL (AVENIDA MANOEL SEVERINO BARBOSA – CEP 57309-005, ARAPIRACA – AL, BRAZIL); 2. UNIVERSIDADE FEDERAL DO PAMPA (RUA ALUÍZIA BARROS MACEDO, S/N, BR290, KM423. CEP 97307-020, SÃO GABRIEL, RS, BRAZIL); 3. CENTRO PLURIDISCIPLINAR DE PESQUISAS QUÍMICAS, BIOLÓGICAS E AGRÁRIAS (RUA ALEXANDRE CAZELLATO, 999, CEP 13148-218, PAULÍNIA – SP, BRAZIL); 4. UNIVERSIDADE FEDERAL DE MINAS GERAIS (AV. PRES. ANTÔNIO CARLOS, 6627, CEP 31270-901, BELO HORIZONTE – MG, BRAZIL).

ABSTRACT:

Proteases are enzymes that act in the hydrolysis of peptide bonds and have been frequently used in varied biotechnological processes, which range from clinical applications in the treatment of thromboses to industrial applications in food processing, especially proteases produced by microorganisms from cold environments, since they can have action in cooling temperatures. Among these, the fungi isolated from Antarctica lichens have been studied for their ability to produce these enzymes. This study aimed to evaluate the potential of Antarctic fungi isolated from lichens to produce extracellular proteases. The fungi were cultured in YMA solid medium at 8.0 ± 2.0 °C and cryopreserved in 20% glycerol at -80 °C. Subsequently, they were submitted to screening in culture medium plus skimmed milk (2%) as the inducing substrate for the production of proteases and incubated for 7 days at 15 °C. The positive proteolytic activity was confirmed by the presence of hydrolysis halos around the colonies of the tested isolates and was measured the enzymatic index (IE) corresponding to the ratio of the halo diameter to the colony. From the isolation, 400 fungi were obtained from lichen samples, of which about 165 were tested for enzymatic screening and 66 (40%) of them were positive for extracellular protease production. Of these, 14 were isolated from lichen *Lecania brialmontii*, followed by *Usnea aurantiacoater* lichen with 13 positive isolates, 7 isolates of *Caloplaca regalis* and *Cladonia metacoralifera* with 6 protease positive isolates. There was a variation of IE between 1.12 and 2.44 cm with positive isolates 9.L35 (from *Usnea aurantiacoater*) and 2.L4 (from *Xanthoria candelaria*), respectively. In view of this, it was verified that the different Antarctic lichens are sources of extracellular protease producing fungi that can be used in various industrial processes.

Keywords: Yeasts, extracellular enzymes, biotechnology, Antarctica.

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