PRODUCTION OF PROTEASES BY FILAMENTOUS FUNGI FROM ANTARCTIC SOILS

Vianna, M.V.[1] Duarte, A.W.F.[2] , Sette, L.D.[1]

[1]Departamento de Bioquímica e Microbiologia, Instituto de Biociências, Universidade Júlio de Mesquita Filho (UNESP).
[2]Divisão de Recursos Microbianos, Centro Pluridisciplinar de Pesquisas Químicas, Biológicas e Agrícolas (CPQBA), Universidade Estadual de Campinas (UNICAMP).

Proteases have a wide range of application in different industrial sectors (e.g. textile, cleaning products and hygiene, cosmetic, and pharmaceutical), as well as in agrobusiness and environmental processes. The production of these enzymes represent 60% of the global market. Cold-adapted enzymes (psychrophilic) have high specific activity and catalytic rates at low and moderate temperatures. Studies suggest that cold-adapted proteases have a promising future in the field of industrial biotechnology. In this context, the present study aimed to evaluate the proteases production by filamentous fungi isolated from different Antarctic soils (South Shetland Archipelago). The fungal isolates were cultivated on malt agar medium (MA 2%) and after 7 days of incubation two cylinders of agar + mycelium (5 mm diameter) from the edge of the colonies were placed in erlenmeyer flask containing 40 mL of Savitha medium. The pH was adjusted to 4 (acid proteases) and 8 (alkaline proteases). The assays were incubated for 7 days at 20 °C and 150 rpm. After this period, samples were filtered and the crude broth was used as enzymatic source. Protease activity was determined using azocasein as the substrate. Amongst 121 filamentous fungi, 10 showed capacity to produce at least 200 U/mL of proteases, being six alkaline proteases and four acid proteases. The highest value of alkaline proteases (357.5 U/mL) was obtained by the fungus 6_mp, (isolated from rotten wood soil, Deception island) and the highest acidic proteases (365.1 U/mL) was produced by the fungus 5 b1 (isolated from biofilm sample, King George island). Filamentous fungi from Antarctic soils showed to be a prolific source of proteases, stimulating new studies related to the optimization of enzimatic production. The best producers are being taxonomically characterised.

Keywords: microbial biotechnology, cold-adapted enzymes, Antarctic, proteases

Funding agency: FAPESP and CNPq