

TITLE: STABILITY PROFILE OF SERINE PROTEASE OBTAINED FROM *Mucor Subtilissimus* UCP 1262 IN THE PRESENCE OF VARIOUS COMMERCIAL DETERGENTS

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ABSTRACT:

The use of proteases in cleaning products compositions has increased the cleaning process efficiency, becoming widespread and accounting for at least a quarter of all protease sales throughout the world. Industrially-used proteases are produced by a wide range of microorganisms. Filamentous fungi are specially used in many industrial processes with numerous advantages such as: faster growth rate and enzyme production, easy recover of the product and activity in a wide range of pH. Considering the application of proteases for detergent industry and the importance to search for new stable enzymes, this study aims to evaluate the stability of serine protease obtained from *Mucor subtilissimus* UCP 1262 against commercial detergents. The serine protease produced by solid fermentation and purified by ion exchange chromatography using DEAE-Sephadex A50. The enzyme stability in various solid (7 mg/mL) and liquid (1%, v/v) detergent formulations was evaluated by incubating the enzyme with the detergents for 1 h at 25°C. The residual enzyme activity was determined under standard assay conditions. The activity of serine protease of a control sample (without detergent), incubated under similar conditions, was considered as 100%. The solid detergents tested were: Ala (Procter & Gamble, Cincinnati, Ohio, USA); Bem-te-vi (ASA, Recife, Pernambuco, Brazil), Omo Multi-Ação (Unilever, London, UK). The liquid detergent tested was Ariel (Procter & Gamble, Cincinnati, Ohio, USA). The serine protease from *M. subtilissimus* UCP 1279 showed 100% of stability in the presence of all the commercial powder detergents and liquid at 25°C after 30, 75 and 120 minutes. In the presence of the powder detergent ALA the enzyme had its protease activity increased over time: 98.73±0.09% (30 min), 112.99±1.50% (75 min) and 125.24±2.45% (120 min). In the presence of detergent Bem-te-vi the protease increased 173.82±4.61% with 30 minutes of incubation, however it was decreasing over time 155.79±1.22% (75 min) and 108.38±4.71% (120 min). In the presence of the liquid detergent Ariel the enzyme was practically stable over time: 111.11±5.27% (30 min), 110.53±0.65% (75 min) and 102.73±3.67% (120 min). The fungal enzyme studied has potential for application in detergents and cleaning compositions, the improvement in the formulation of these products are promising, generating benefits for the environment by reducing industrial rejects and allowing the generation of high efficiency cleaning products.

Keywords: Serine protease, *Mucor subtilissimus*, detergents.

Development Agency: FACEPE, CNPq, CAPES