



AP-16: Characterization of fungal proteases produced from organic waste

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Abstract

Protease is an enzyme that carries out the proteolysis of proteins. The global market for industrial enzyme sales exceeds 3 billion dollars, and proteases account for around 60% of total sales. This class of enzymes finds applications in waste treatment, bio-remediation processes, detergents and the leather industry. However, the search for microbial sources of proteases is arousing the curiosity of researchers, but fungal proteases remain the key tools of biotechnology and increasingly reflect the importance and infinite role of molds in different applications, presenting many advantages such as: substrate specificity, ease of genetic manipulation, stability under unfavorable conditions, separation of mycelium by simple filtration. The aim of this research work is to characterize the crude extract of fungal proteases in terms of temperature, PH, metal ions, substrate specificity, inhibitors and surfactants. Filamentous fungi were isolated from soil samples taken from various locations in the Adekar wilaya region of Bejaia. The strains identified and isolated were tested for their ability to produce proteases, then various waste products such as wheat bran, soybean meal, poultry feathers, orange peel and potato peel were tested by solid and submerged fermentation. Significant results were achieved with wheat bran, poultry feather and potato peel. Preliminary tests, however, were carried out on wheat bran, as the best yields were obtained with the latter. Experiments were carried out on two fungal strains A₀₅ et A₂₂. Thanks to the results of the enzymatic extract characterization, we were able to set a temperature of 45°C - 40°C respectively, and a pH of 7 for strain A₀₅ and 12 for strain A₂₂. Both stimulating and non-stimulating effects were recorded at metal ion level for the strains. With regard to substrate specificity, strong proteolytic activities were reported with casein for both filamentous fungi. Positive and negative effects were observed for inhibitors and surfactants.

Key words: Characterization, proteases, filamentous fungi, organic waste