

TITLE: BIOCHEMICAL CHARACTERIZATION OF POLYGALACTURONASE PRODUCTION BY *Penicillium* sp. (FX21) USING ORANGE PEEL AS A SUBSTRATE

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ABSTRACT:

Polygalacturonases are enzymes that hydrolyze the α -1,4 bonds of the glycosidic bonds of polygalacturonic acid. They are used industrially for the extraction, clarification and reduction of the viscosity in juices. Aiming to reduce the costs of enzymatic production, new microbial strains capable to produce enzymes at high levels have been studied, using agro industrial wastes in the production. The present study aimed to characterize biochemically the polygalacturonases produced by *Penicillium* sp. (FX21), isolated from Araucaria Forest soil. For this, the respective fungus was kept in Vogel's solid medium for seven days at 28 °C, and later used as a source of spores. Conidial suspensions were inoculated in 25 mL of Vogel's liquid medium containing 2% of orange peel, pH 5,5, grown in stationary condition at 30 °C. After six days of cultivation, the cultures were vacuum filtered, being the obtained filtrate used as source of enzymes. The determination of polygalacturonase activity was accomplished through quantification of reducing sugars released, using the acid reagent 3,5 dinitrosalicylic. The optimum temperature of the polygalacturonases was evaluated through the determination of the activity in temperatures of 40 °C to 60 °C with intervals of 5 units. The optimum pH of the produced polygalacturonases was inferred through the quantification of the activity in pH values from 3.0 to 7.0 with a range of 5 units. The thermal stability of the enzymes produced was estimated by quantifying the residual activity after incubation of the culture filtrate at 45 °C for different periods, in the absence of the substrate. The polygalacturonases produced by *Penicillium* sp. (FX21) were more active at 45 °C (5.75 ± 0.21 UmL⁻¹), at pH 4.5 (13.73 ± 0.48 UmL⁻¹). These enzymes were stable in the temperature range of 45 to 50 °C. At 45 °C the half-life was 60 minutes. Great stability was also verified in the values of pH 3.5 and 4.5, when more than 80% of its initial activity was verified. The results obtained provide important information to be considered, in order to employ these enzymes in industrial processes.

Keywords: Fermentation, pectinolytic enzyme, optimization, filamentous fungus

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