TITLE: OPTMIZATION OF POLYGALACTURONASE PRODUCTION BY THE FUNGUS *Penicillium* sp. FX21 ISOLATED FROM THE SOIL OF ARAUCARIA FOREST

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ABSTRACT:
The agro industrial wastes such as fruit peels are usually thrown away in a wrong manner, creating environmental problems. These wastes may be rich in polysaccharide, such as pectin, cellulose and hemicellulose, which may be used for new processes, as well as the enzymatic production. Pectin constitutes a family of complex polysaccharides, being characteristically composed of neutral sugars, acid sugars and polygalacturonic acid. Polygalacturonase is an enzyme that catalyzes the hydrolysis of polygalacturonic acid, being used industrially for the clarification and reduction of juices viscosity. This study had as objective to evaluate the influence of chemical and physical factors on the polygalacturonase production by a lineage *Penicillium* sp. (FX21), isolated from Araucaria Forest soil. For it, the respective fungus was maintained in Vogel's solid medium, for seven days, at 28 ºC, being subsequently used as a source of spores. Conidial suspensions were inoculated in 25 mL of Vogel's liquid medium, varying its constitution of each factor tasted, each of them being analyzed separately. Initially the peels of orange and passion fruit, were evaluated as inductive substrates. After the establishment of the best inductor waste, the influence of its percentage in medium was tested, followed by the evaluation of production kinetic in stationary conditions, and also, after it, the effect of pH and temperature of cultivation on polygalacturonase production. The cultures were vacuum filtered, whereas the filtrate obtained, was used as a source of enzymes. The determination of polygalacturonase activity was accomplished through the quantification of reducing sugars released, using the 3,5 dinitrosalicylic acid. The waste that best induced the enzymatic production was the orange peel, with a production correspondent to 1,70 ± 0,01 U mL^{-1}, and its best concentration was 2% (3,59 ± 0,21 U mL^{-1}). Regarding the growing time, higher levels of polygalacturonases were observed in the sixth day of growing, corresponding to the value of 5,01 ± 0,57 U mL^{-1}. Yet, higher levels were observed when the pH of culture medium was adjusted to 5,5 (5,23 ± 0,59 U mL^{-1}), and the incubation temperature was 30 ºC (5,9 ± 0,52 U mL^{-1}). The use of orange peel on the processes of enzymatic production will make possible the reduction of the cost, besides contributing to the decrease of deposition of these wastes into nature.

Keywords: Agro industrial wastes, fermentation, pectinolytic enzyme, filamentous fungus

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