

TITLE: PRODUCTION AND PARTIAL BIOCHEMICAL CHARACTERIZATION OF A POLIGALACTURONASE OF THE FILAMENTAL FUNGUS VI2R3M COLLECTED IN THE ATLANTIC MATA OF THE WEST OF PARANÁ

AUTHORS: PAGNONCELI, J.; RASBOLD, L.M.; ROCHA, G.B.; SILVA, J.L.C.; SIMÃO, R.C.G.; KADOWAKI, M.K; MALLER, A.

INSTITUTION: UNIVERSIDADE ESTADUAL DO OESTE DO PARANÁ, CASCAVEL, PR (RUA UNIVERSITÁRIA, 2069, CEP 85819-110, CASCAVEL – PR, BRAZIL)

ABSTRACT:

Pectinases constitute a unique group of enzymes that catalyze the degradation of pectic polymers present in plant cell walls. These enzymes are of great industrial importance, being applied in the extraction and clarification of fruit and wine juices, extraction of oils and degumming of textile fibers. Polygalacturonase (PG) produced from microbial sources, such as fungi, is the main depolymerising pectinase and most used in industries. PG degrades the pectin molecule by acting internally and randomly in the chain, releasing oligosaccharides (Endo-PG) or by attacking the non-reducing end of the chain, releasing monosaccharides (Exo-PG). Most fungal polygalacturonases are mesophilic and exhibit optimal activities at 30-55 °C and pH 3.5 - 5.5. The fungus VI2R3M was previously collected in the Atlantic Forest and stored in the Laboratory of Biochemistry of Microorganisms of Unioeste/Cascavel - PR. The microorganism was inoculated in Khanna medium, supplemented with 1% pectin and incubated at 30 °C for 72 hours at 100 rpm, followed by vacuum filtration on Whatman filter paper nº 1 to obtain the crude enzyme extract. The enzymatic activity was determined by the method of Miller (1959) and subsequently, the optimal temperature and pH were verified, as well as the stability of both for polygalacturonase activity. The enzyme had the highest activity at 50 °C at pH 5.0. The results showed that the enzyme was very stable in a range from pH 3.0 to 5.0 maintaining 95% of its activity. Further, the enzyme maintained about 80% activity at pH 6.0 and 40% at pH 10.0. The effect of temperature on the thermal stability of PG showed that at 50 °C the enzyme remained more than 90% stable for 45 min. In addition, the enzyme maintained 50% activity for 10 min at 60 °C and totally inhibited the activity after 5 min incubation at 70 °C. These results demonstrated good enzymatic activity at slightly elevated temperatures and slightly acidic pH. The pH found is within the pH of many fruit juices, ranging from 3.0 to 5.5. These biochemical characteristics are interesting for the feasibility studies of enzymatic application in several biotechnological processes, such as juice and food manufacturing.

Keywords: enzymes, polygalacturonase, microorganism

Development Agency: Fundação Araucária, CAPES, CNPq, Unioeste