



# IMMOBILIZATION OF PECTINASES AND XYLANASES PRODUCED BY *Aspergillus flavipes* FP-500 FOR THE TREATMENT OF FRUIT JUICES

Karla Monserrat Meza Ruiz y Guillermo Aguilar Osorio\*.

Fungal Physiology Group, Department of Food Science and Biotechnology, Faculty of Chemistry, UNAM, Conjunto E, Ciudad Universitaria, México City, ZC 04510 Tel.56225306

e-mail: [gao@unam.mx](mailto:gao@unam.mx)\*, [ruizkmonse@yahoo.com.mx](mailto:ruizkmonse@yahoo.com.mx)

**Key words:** *Aspergillus*, pectinases, immobilization

**Introduction.** Among the enzymes produced by the filamentous fungus *Aspergillus*, are the plant cell wall degrading enzymes<sup>1</sup>. This complex group of enzymes includes pectinases and xylanases, which are extensively used in the food industry, especially in the treatment of fruit juices<sup>2</sup>.

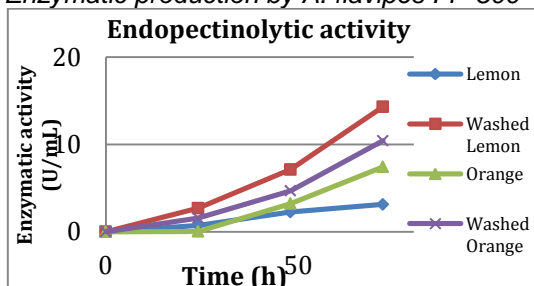
Despite excellent catalytic properties of pectinases and xylanases, the native enzymes as biocatalysts always present some drawbacks, such as poor stability under operational conditions, difficulty of product recovery, and impossibility of multiple reuses in an industrial process<sup>3</sup>. To overcome these problems, enzyme immobilizations have been involved to improve the catalytic features of enzymes.

The aim of this work was to produce a concentrate of pectinases and xylanases by *Aspergillus flavipes* FP-500 and immobilize it in alginate sodium beads for its use in the clarification of fruit juices.

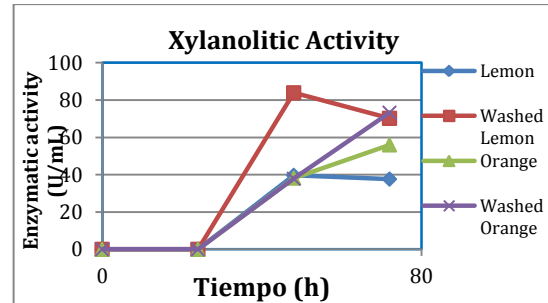
**Methods.** Enzyme production by *Aspergillus flavipes* FP-500 on four fruit residues (citric peels) was compared. Immobilization of enzymes in alginate sodium beads was performed as described by Smidsrod, 1990. Exopolygalacturonase and xylanase activities were determined by quantification of released reducing sugars. Endopolygalacturonase activity was measured by viscosimetric assay<sup>4</sup>.

## Results.

### Enzymatic production by *A. flavipes* FP-500



**Fig 1.** Endopectinolytic activity produced by *A. flavipes* FP-500 in the 4 substrates used.

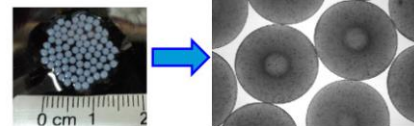


**Fig 2.** Xylanolytic activity produced by *A. flavipes* FP-500 in the 4 substrates used.

After the production on the 4 different substrates, the washed lemon peel was the one which favored the endopectinolytic activity. Therefore, we used this residue for the production of an enzymatic concentrated.

### Immobilization of enzymes

**Immobilization optimal conditions:**  
4% alginate, CaCl<sub>2</sub> 100 mM and 0.15 mm



**Fig 3.** Microscopic and macroscopic features of the alginate beads obtained under the optimal condit.

The alginate beads had a residual activity of 50.4% for endopectinases, 47.3% for exopectinases and 1.3% for xylanases.

**Conclusions.** Washed lemon peel was a very good substrate for endopectinase production (14.3 U/mL) and the enzymatic concentrated obtained was immobilized in alginate beads which retained pectinolytic activity but no xylanolytic activity .

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