ANALYSIS OF THE EFFECT OF CARBON SOURCE AND PH ON POLYSACCHARIDASES PRODUCTION BY *ASPERGILLUS FLAVUS*

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Introduction. *Aspergillus flavus* is a phytopathogenic saprofitic fungus who grows and infects a wide range of crops, because of its ability to produce polysaccharidases as pectinases and xylanases[1]. Although crops infection by *A. flavus* has a great impact at economical level[2], highlights the fact that there are not systematic analyses about the effect of several conditions on the production of these polysachharidases. In fact, the specific effect of pH on the regulation of these enzymes has not been studied in detail for *Aspergillus* genere[1]. The objective of this work was to evaluate the effect of carbon source and the initial pH on the production of pectinases and xylanases by *A. flavus* CECT-2687 on submerged batch cultures.

Methods. Three initial pH conditions (3.5, 6.0 or 8.0) in combination with several monomers (glucose, xylose or galacturonic acid), polysaccharides (Xylan or pectin) and agroindustrial residues (corn cobs, wheat bran or lemon peel) were used. In all the cases 1% (w/v) of carbon source was combined with mineral medium[3], and the initial pH was adjusted with 2M NaOH or H_2SO_4. All the experiments started with $1X10^6$ spores/mL from five days old cultures of *A. flavus* CECT-2687, and were incubated at 37°C and 200 rpm, during 72 h, obtaining samples every 24 h. Extracellular production of exopectinases[3] and xylanases[4] were quantified for each sample. Statistical analysis was developed using SAS® program.

Results. The highest pectinases productions were obtained using polysaccharides as carbon source, meanwhile for xylanases production, agroindustrial residues seemed to be the best substrate. In reference to the effect of pH, is worth to note that high pectinases activities were obtained at the highest pH values (Table 1), which is remarkable considering the acidic nature of polygalacturonases of *Aspergillus* species[3]. The statistical analysis revealed that pH only have a significant effect on pectinases when they are produced using monosaccharides as carbon source, meanwhile for xylanases both factors have a great effect when polysaccharides were used. The significant effect of the interaction among factors observed for pectinases produced on monomers and polymers, as much as for xylanases obtained on polysaccharides must be mentioned too.

Table 1. Maximum polysaccharases activities produced by *A. flavus* CECT-2687 at several experimental conditions.

Carbon source	pHi	Maximum activity (U/mL)	
		Pectinases	Xylanases
Glucose	3.5	4.5 ± 0.23	0.05 ± 0.003
	6.0	0	0.5 ± 0.03
Xylose	3.5	1.2 ± 0.06	0.3 ± 0.02
	6.0	0	0.6 ± 0.03
Galacturonic acid	3.5	0.8 ± 0.04	0
	6.0	0	0.65 ± 0.03
Xylan	3.5	0	1.0 ± 0.05
	8.0	3.5 ± 0.18	63 ± 3.15
Pectin	3.5	1.8 ± 0.09	0
	8.0	9.5 ± 0.48	2.0 ± 0.1
Corn cobs	3.5	6.2 ± 0.31	10 ± 0.5
	6.0	5.8 ± 0.29	65 ± 3.3
	8.0	3.0 ± 0.15	78 ± 3.9
Wheat bran	3.5	6.1 ± 0.31	52 ± 2.6
	6.0	6.0 ± 0.3	63 ± 3.15
	8.0	0.5 ± 0.03	71 ± 1.42
Lemon peel	3.5	8.0 ± 0.4	0.30 ± 0.002
	6.0	6.8 ± 0.34	15.0 ± 0.8
	8.0	8.2 ± 0.41	12.0 ± 0.6

Conclussions. *A. flavus* CECT-2687 can produce pectinaes and xylanases on alkaline pH values, as much as on acidic. Polysaccharidases production may be regulated by pH. High activities were obtained when agricultural residues were used as substrates, which indicate the potential of this strain for developing specific bioprocesses.

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