MONOSACCHARIDES DEGRADATION AND ACCUMULATION DURING SOLID STATE FERMENTATION OF MANGO PEEL BY *Aspergillus niger* GH1

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Introduction. Bioconversion of agroindustrial waste using microorganisms and enzymes has made possible the synthesis of a series of compounds usefull for industrial applications (Pandey, 2000). The mango is a tropical fruit with an estimated worldwide production over 38 million tons along with mangosteens and guayabas. Mexico ranks fifth in production with more than one million tons (FAOSTAT, 2010). The mango peel is a major industry byproduct and constitutes 20-25% of the processing residue from the fruit (Srirangarajan and Shrikhand, 1976). The use of mango peel as a carbon source through solid state fermentation (SSF) using filamentous fungi is one strategy for waste bioconversion. Fungi of the genus *Aspergillus* are economically important and are used in numerous fermentations such as the production of bio-organic acids and surfactants, as well as in the production of enzymes (Haqa et al., 2003).
The objective of this work was to determine the degradation and accumulation of carbohydrates from mango peel during solid state fermentation using *Aspergillus niger* GH1.

Methods. Mango peel were obtained from fruits of *Mangifera indica L.* The fruits were washed, peeled, cut and peel was dehydrated. *A. niger* GH1 was cultured in PDA plates at 30 °C for 6 days. For fermentation 10 g of sterilized mango peel was inoculated with a spore suspension to a concentration of 2.21 x 10^6 spores/g. Upstream process was carried out at 30°C and was monitored every 12 hours for 3 days. The fermented medium was filtered and the supernatant was determined volume and pH. Subsequently the supernatant was microfiltered, heated, frozen and lyophilized. The insoluble material (SI) was dehydrated. The soluble and insoluble solids were analyzed by gas chromatography to determine the non cellulosic neutral sugars (Albersheim et al.,1967). Uronid acids were analyzed by the method described by Blumenkrantz et al.,1973. Spectral analysis by FT-IR of the insoluble solids and pectic polysaccharides from mango peel lyophilisates were performed using a computer infrared spectroscopy.

Results. The effect of fermentation time of mango peel by *A. niger*, on weight loss of substrate, fluid retention during the process and pH: the weight loss of the control sample (0 h) indicates 20%, this is because before SSF autoclaving solubilized sugars and partially hydrolyzed cell wall polysaccharides (Hellín et al., 2003). As time increases the weight of the fermentation substrate decreased to a total weight loss of 36% (72 h). Fig. 1 presents the effect of time of fermentation of mango peel by *A. niger* GH1 on the monosaccharide composition present in soluble solids. Carbohydrates such as glucose is metabolized and at the same time is consumed by the fungus. The rhamnose is concentrated during the fermentation process and is not degraded by the microorganism. Other monosaccharides during the process are also metabolized, released and were accumulated in this material.

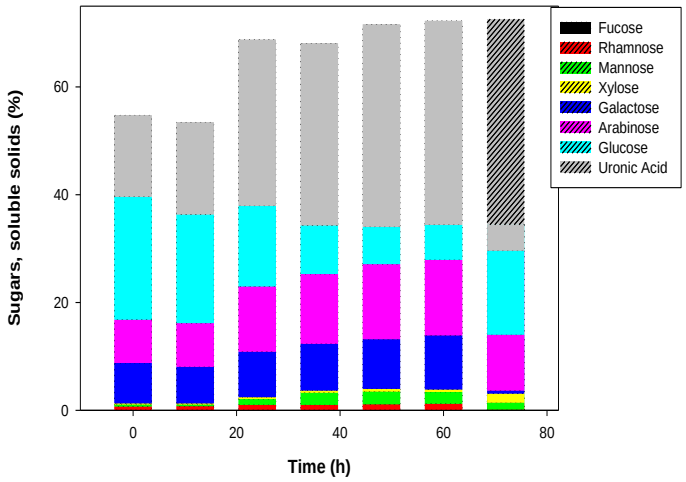

Fig.1 Effect of time during the solubilization of the sugar acids, sugar degradation and accumulation of neutral soluble solids (%) of the SSF.

Conclusions. *Aspergillus niger* GH1 accumulates and degrades carbohydrates present in mango peel during the fermentation process.

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