



Fungal biodegradation of pomegranate ellagitannins

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Introduction. At this time, there is scarce information about ellagitannins biodegradation. Several authors mention that it is necessary to carry out further studies to elucidate the mechanism of ellagitannins biodegradation (Scalbert, 1991; Vivas *et al* 2004). There are some studies that describe the ellagitannins biodegradation by fungal enzymes, such as, tannase enzyme (Yoshida *et al* 1999), β -glucosidase (Vattem & Shetty, 2002, 2003), polyphenoloxidase (Shi *et al* 2005). In 2009 Aguilera-Carbó *et al* suggested the existence of an enzyme responsible for the ellagitannins degradation, produced by *Aspergillus niger* GH1, by solid state culture. The authors established the existence of the enzyme by electrophoresis analysis (SDS-PAGE), which had a molecular weight around 200 kDa. It is suspected that this enzyme, recently reported, is responsible for the ellagitannins degradation, however, it is necessary to generate new information in order to understand the ellagitannins degradation mechanism, therefore, the aim of this study was to associate an enzyme produced by *Aspergillus niger* GH1, by solid state culture, with the ellagitannins degradation and to identify the intermediate compounds of this degradation.

Methods. A solid state culture was carried out using Pontecorvo media culture (Aguilera-Carbó *et al* 2009), *Aspergillus niger* GH1, pomegranate ellagitannins and PUF as support at 0 h to 36 h in 250 mL reactors. The enzymatic extracts were recovered with citrate buffer (pH 5.0, 50 mM) and centrifuged in Nanosep® tubes (1.5 mL) for the partial purification. After, the ellagic acid accumulation was measured by HPLC, the ellagitannase enzymatic activity was determined (Mireles-Ramírez *et al* 2008), and the intermediate compounds was identified by LC/MS.

Results. The obtained results are showed in the following figures.

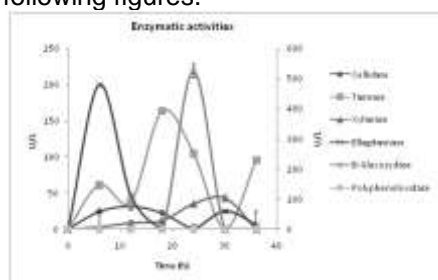


Fig.1. Enzymatic activities evaluated.

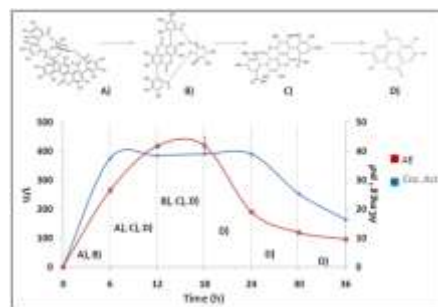


Fig.2. Enzymatic activity (blue), ellagic acid accumulation (red), punicalagina (A), punicalina (B), gallagic acid (C) and ellagic acid (D).

Conclusions. It was demonstrated that *Aspergillus niger* GH1, under solid state culture using ellagitannins as substrate, was able to produce an enzyme related with the pomegranate ellagitannins degradation.

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