



PHYSIOLOGICAL STAGES OF *Aspergillus niger* GH1 FOR THE PRODUCTION OF ELLAGITANNASE.

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Introduction. The ellagitannins are a class of polyphenols. They are hexahydroxydiphenic (HHDP) esters generally linked to a glucose core (1). The ellagitannins are phytochemical compounds with applications in food and pharmaceutical industries. The ellagitannins hydrolysis are carried out mainly by fungal enzymes. The result of ellagitannins hydrolysis is the releasing of ellagic acid that possess important biological activities. The ellagitannase, is the enzyme capable to hydrolyze the ellagitannins (2). The enzyme have been produced by *Aspergillus niger* strains. The measurement of CO₂ production of microorganisms in Solid State Fermentation (SSF) provide indirect information related to the growth stage (3).

The present investigation deals with the monitoring of the CO₂ production by *Aspergillus niger* GH1. In order to know physiological stages using the conditions for the production of ellagitannase.

Methodology. Purified ellagitannins provided by DIA-UAdC were used as carbon source for the production of ellagitannase. The culture conditions are described below: modified Czapek-Dox supplemented with 3% of ellagitannins, polyurethane foam (PUF) was used as support, packed density of 0.1 g/cm³, humidity of 70%, air flow of 0.5 vKgm and 30 °C. Fermentation was carried out using column bioreactors. The CO₂ production was monitored for 36 h and samples were withdrawn every 6 h. Ellagitannase activity was measured by HPLC. The CO₂ production was integrated. The lag phase was obtained from the logarithm of data. The CO₂ accumulation data were modeled using a logistic equation.

Results. The maximal CO₂ production rate was obtained at 13 h (Figure 1). The CO₂ production rate data was integrated in order to obtain the CO₂ accumulation (Figure 2). The adaptation of *Aspergillus niger* GH1 to the conditions for the production of ellagitannase had a period of 7.79 h and an exponential period of 10.42 h. The growth rate was 0.51 h⁻¹. The final accumulation of CO₂ was 3.79 mg/h*gidm (gram of initial dry matter). The ellagitannase activity is shown in figure 3. The maximal ellagitannase activity (523.43 ± 49.09 U/L) was obtained after 24 h of fermentation. However, there are no significant differences after 18 h of fermentation (438.90 ± 55.08).

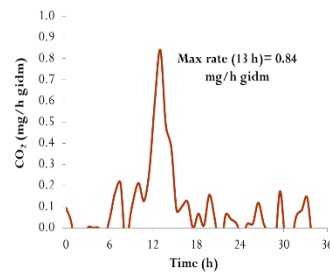


Fig. 1 CO₂ production rate

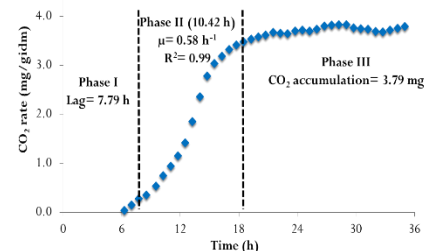


Fig. 2 Integral production rate of CO₂

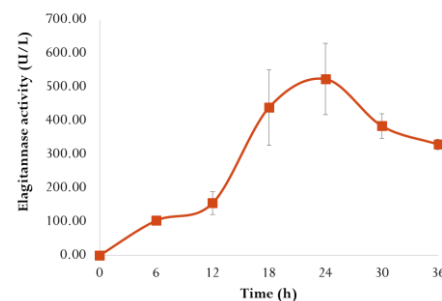


Fig. 3 Ellagitannase production by *Aspergillus niger* GH1.

Conclusions. The monitoring of CO₂ production by *Aspergillus niger* GH1 allowed to know the its growth process and physiological stages under stress conditions for the production of ellagitannase.

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