



EFFECT OF CHANGES OF NUTRIENTS IN KINETICS PARAMETERS CALVATIA EDIBLE MUSHROOM

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Introduction. Edible mushrooms are Basidiomycetes Lycoperdaceae family and where is located the *Calvatia* genus, which is especially important because it produces metabolites of interest as calvatic acid and calvasterone¹. Calvatic acid has been studied and has antibiotic and anti-tumor effects³. The calvasterone is a dimeric steroid with antibiotic activity; furthermore, this genus was used for the synthesis of more complex molecules in the area of pharmaceutical applications². The primary purpose of this study is to determine biomass production, glucose consumption, calvasterone and calvatic acid production at different concentrations of glucose in continuous agitation with a strain of fungus Lyc 30 of the family Lycoperdaceae.

Methods. The Lycoperdaceae used for this study was isolated in the region Xicotencatl, Tlaxcala in Mexico. This was subjected to stress conditions by stirring to promote the production of biomass, calvatic acid and calvasterone. The strain was cultured in liquid Kirk, modifying the concentration of glucose with respect to target. The mycelium was developed during 45 days at 30 °C with shaking at 120 rpm and various glucose concentrations (1.0, 5.0, 10.0, 12.0 and 18.0 g/L). The parameters measured were the production of biomass, calvatic acid and calvasterone, which is detected by spectrophotometry at 314 and 420 nm, respectively.

Results. In conducting studies kinetic parameters were obtained in strain specific growth rate (μ) and the metabolic

performance (Y) relative to the white treatment, which were compared the five concentrations as shown in table 1. On the other hand, treatment with the concentration of 18 g/L glucose, favored in producing calvatic acid and calvasterone with absorbance units of 0.039, 0.011, respectively and with respect to other glucose concentrations.

Table 1. kinetic parameters for Lyc 30 at different glucose concentrations.

Parámetros cinéticos	Concentraciones de glucosa (g/L)				
	1	5	10	12	18
μ (1/h)	0,003	0,004	0,004	0,004	0,005
Yx/s	0,823	0,752	0,837	0,780	0,790

Conclusions. We established a model of mycelial growth in liquid Kirk stirring for strain Lyc 30 and its kinetic parameters of importance. Furthermore it was observed that affects the carbon source in the production of calvasterone and calvatic acid, because the concentration which showed increased production of these metabolites was to 18 g/L of glucose, so that not only affected by the source carbon, but the stress of agitation is also important.

References.

- Johannes C., Coetzee, Abraham E. and van Wyk. (2009). The genus *Calvatia* ('Gasteromycetes', Lycoperdaceae): A review of its ethnomycology and biotechnological potential. *African Journal of Biotechnology*. 8 (22): 6007-6015.
- Kawahara. (1993). a Novel dimeric steroid, calvasterone from the fungus *Calvatia cyathiformis*. *National Institute of the Hygienic Sciences*. Tokio, Japón.
- Umezawa H, Takeuchi T, Iinuma H, Ito M, Ishizuka M, Kurakata Y, Umeda Y, Nakanishi Y, Nakamura T, Obayashi A, and Tanebe O. (1975). A new antibiotic, calvatic acid. *J. Antibiot.* 28: 87-90.