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CHITOSAN PRODUCTION BY *Syncephalastrum racemosum* USING LOW COST MEDIA

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Chitosan is an important constituent of fungi cells wall and, usually, the Zygomycetes Class shown higher amounts of chitin and chitosan in their cell walls when compared to other fungi (Campos-Takaki 2005). The literature suggests that different substrates can be used in the microbiological production of chitosan, however factors such as substrate concentration, pH, temperature and inoculum size are described as important variables to the production and properties of chitosan (Bartnicki-Garcia and Nickerson 1962, Campos-Takaki 2005, Amorim et al. 2006). In this work we evaluated different concentrations of industrial waste and the factors influencing the production and characteristics of microbiological chitosan. S. racemosum (UCP 0148) obtained from the World Federation of Culture Collection, was sub-cultured on PDA, from which was made a spore suspension of 10^8 spores.mL^{-1}. From the conditions proposed in Table 1 was evaluated the best condition for obtaining higher yields of microbiological chitosan. S. racemosum was grown in aired medium (150rpm/120h) containing only the industrial waste as a source of carbon and nitrogen. The experimental design was completely randomized. The whole experiment was conducted in Erlenmayers with 1L of capacity containing 400 ml of culture medium. The corn steep liquor, cassava wastewater and serum milk were kindly provided by local industries from processing of maize, cassava and milk, respectively. Chitosan was isolated by the method of Synowiecki & Al-Khateeb (4) and characterized regarding the degree of deacetylation and molecular weight. The results showed that the factors analyzed had a negative influence on the growth of biomass and production of chitosan, when used cassava wastewater and serum milk. However a positive influence was observed when used the waste corn steep liquor, reaching a production of ~ 60 mg of chitosan per gram of dry mycelium for assay 3 (Figure 1). The physical-chemical characterization of microbiological chitosan showed that it is of high quality. Due to the low cost of the procedure and methodology of isolation of the product with high added value, the chitosan produced by S. racemosum grown in corn steep liquor has great potential for application in various sectors such as health, pharmacy, and environmental area.

Table 1 Factorial design, 2^4 with four average value were performed to estimate the experimental error variance. The response of interest is biomass and yield of chitosan. Variants: A = concentration of industrial waste, B = initial pH, C = Temperature, D = size of inoculum.

Assay	*A*	*B*	*C*	*D*
1	-	-	-	-
2	+	-	-	-
3	-	+	-	-
4	+	+	-	-
5	-	-	+	-
6	+	-	+	-
7	-	+	+	-
8	+	+	+	-
9	-	-	-	+
10	+	-	-	+
11	-	+	-	+
12	+	+	-	+
13	-	-	+	+
14	+	-	+	+
15	-	+	+	+
16	+	+	+	+
17	0	0	0	0
-	[2%]	pH 4	25ºC	10^2
0	[6%]	pH6	31ºC	$5x10^5$
+	[10%]	pH 8	37ºC	10^6

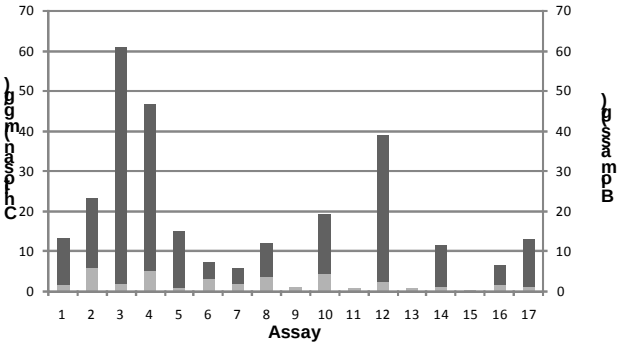

Fig. 1. Result of factorial design to biomass (light bar) and production of chitosan (dark bar) in different conditions.

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