

DETERMINING THE BEST CONDITIONS FOR SIMULTANEOUS PRODUCTION OF ACETIC ACID AND BACTERIAL CELLULOSE BY *Komagataeibacter* sp. V-05 USING SOYBEAN MOLASSES

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Palavras chave

Acetic Acid Bacteria, fermentation, CO-PRODUCT, BOX BEHNKEN

The bacterial genus *Komagataeibacter* comprises mesophilic microorganisms, Gram negative, catalase positive, strictly aerobic and in rod-shaped form. They belong to the family *Acetobacteraceae* presenting high capacity in oxidizing ethanol to acetic acid, being therefore used in the production of vinegar. These bacteria are also used in the production of bacterial cellulose, a polymer with biomedical applications. The soybean molasses is an industrial co-product, generated in the production of soy protein concentrate from defatted soybean meal. It is a brown syrup that contains a high percentage of carbohydrates (about 70% soluble solids), as well as lipids, proteins, fibers and minerals. The objective of this work was to determine the best conditions for the simultaneous production of acetic acid and bacterial cellulose by an acetic acid bacteria previously isolated from a vinegar industry and identified as *Komagataeibacter* sp. V-05, using as a fermentation substrate the co-product soybean molasses. Box Behnken factorial design with three factors and three levels (X1 - °Brix: 15, 20 and 25; X2 - ethanol concentration (%): 1, 3,5 and 6; X3 - fermentation time (days): 6, 10 and 14), was used, totaling 15 randomly distributed experiments. At the end of the fermentation time, the acidity was measured by titration with 0.1 M NaOH and expressed as % acetic acid. The membranes formed on the surface of each medium were heated at 80 ° C / 30 min. with alkaline solution (1M NaOH) and then, rinsed to neutral pH with distilled water. The membranes were dried at 105 ° C for determination of the respective dry weight (g/L). After the experiments, it was observed that the production of acetic acid was favored in higher concentrations of ethanol (6%) and lower °Brix (15), occurring increase until the 12th day of fermentation. Under these conditions, the maximum acidity yield (3.65%) was obtained. On the other hand, bacterial cellulose production was favored in lower concentrations of ethanol (1%), longer fermentation time (14 days), being indifferent in relation to the °Brix of the soybean molasses. A maximum yield of 11.4 g L⁻¹ was achieved. It was concluded that soybean molasses can be reused as a culture medium for the production of acetic acid and bacterial cellulose. However, the fermentation parameters such as °Brix, ethanol concentration and fermentation time should be taken into consideration separately for a better yield of each microbial metabolite.