

PRODUCTION OF ETHANOL FROM CAROB POD EXTRACT IN A BIOFILM REACTOR

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In this study, repeated-batch fermentation was evaluated using a biofilm reactor for ethanol production by *S.cerevisiae*. Biofilm reactor was constructed with solid support called Plastic Composite Support (PCS). In order to determine the best biofilm material, four different PCS materials were used as following SH¹-SF²-YE³-SALTS⁴, SH-SF-YE-BA⁵-SALTS, SH-SF-SALTS and SH-SF-YE-RBC⁶-SALTS. The highest ethanol production was obtained from SH-SF-YE-BA⁵-SALTS and the yield was found to be 46.64%. In bioreactor, PCS was sterilized at 121°C for 30 minutes in water and then decanted. After sterile medium was added aseptically, seven runs were performed to establish biofilm formation on PCS supports at 30°C for 24 hours with inoculation of *S.cerevisiae* (1% v/v). Once a stable biofilm was formed, repeated-batch fermentation was started with fresh medium. To optimize three factors in biofilm reactor using response surface design, initial sugar concentration (4-10°Bx), pH (5.0-6.0) and agitation (100-200 rpm) were selected. Optimum conditions were found to be 8.35°Bx, 5.26 pH and 101 rpm. The yield and production rate were determined to be 44.46% and 2.15 g/L/h. Overall, this study demonstrated that a biofilm reactor can be successfully implemented to decrease fermentation time and to increase productivity in ethanol production.

Note: ¹Soybean Hull, ²Soybean Flour, ³Yeast Extract, ⁴Mineral Salts, ⁵Bovine Albumin, ⁶Red Blood Cells

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