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OPTIMIZATION OF SOLVENT RECOVERY IN THE PRODUCTION OF BUTANOL BY FERMENTATION

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Abstract

The current energetic scenario has revived the interest for Acetone-Butanol-Ethanol (ABE) fermentations. The recovery process of ABE from the fermentation broth is still an open issue because it is extremely expensive being the concentration of ABE quite low. Indeed, the product inhibited kinetics of the ABE fermentation limits the ABE concentration in the bioreactor at values smaller than 20 g/L. The present paper reports on the assessment of a cost-effective flow-sheet for the recovery of butanol produced by fermentation. The study was based on approximated cost-estimation methods integrated with the simulation software Aspen Plus®. The recovery line investigated included gas-stripping, absorption of butanol in a selected liquid buffer, distillation to separate the butanol from the selected buffer. The design variables were selected to correspond to the degree of freedom of the process. A determination of plausible values of the venture profit of the process was attempted as a function of operating conditions.

Key words: butanol, *Clostridium acetobutylicum*, cheese whey, economic optimization, downstream, Venture profit

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