



Experimental study and cost evaluation for ethanol separation from fermentation broth using pervaporation

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Received 29 April 2011; Accepted 15 January 2012

ABSTRACT

In this work, the separation of two types of mixtures, ethanol–water mixture and fermented sweet sorghum, was investigated using cellulose acetate supported polyvinyl alcohol composite membranes. The pervaporation (PV) performances of the two mixtures under different operating parameters (ethanol concentrations, operating times and temperatures) were studied. PV performances using sweet sorghum fermentation broth, under all operating parameters, were significantly lower compared to separating ethanol from binary mixtures. Preliminary economic analysis shows that cost of producing 1 l of ethanol from the broth is about 0.9 \$/l which is about 1.1 times higher than from the pure binary system.

Keywords: Ethanol–water mixture; Sweet sorghum juice; Pervaporation; PVA; Membrane unit; Economic assessment

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