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Investigation of the separation of carboxylic acids from aqueous solutions using a pilot scale membrane unit

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Abstract

Separation of carboxylic acids from aqueous solutions using synthetic membranes has been investigated within the context of this study. Formic, glycolic, malic, and citric acid aqueous solutions were prepared in the experiments as mixtures to be separated. Nanofiltration (NF) and reverse osmosis (RO) membranes were used for the separation of acid solutions. The experiments were carried out on a pilot scale membrane unit allowing the use of membranes with a surface area of 140 cm². Experiments were performed by using different initial acid concentrations (5-15 % w.) at 10, 20, 30 bar and 20 °C. Thus, the effects of pressure, the type of membrane and acids were analysed on the separation performance by using single acid solutions, and model equations were formed with the help of response surface methodology (RSM) in the case of citric acid, which has the highest rejection ratio. As a result of the experimental studies carried out, very high rejection values (max. 98.36 %) were obtained and it was seen that the carboxylic acids were successfully separated from the aqueous media.

Keywords: Membranes, Carboxylic Acids, Response Surface Model (RSM).

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