

SEPARATION OF XYLOSE FROM GLUCOSE USING PILOT SCALE SPIRAL WOUND COMMERCIAL MEMBRANE

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Article history

Received

24 August 2016

Received in revised form

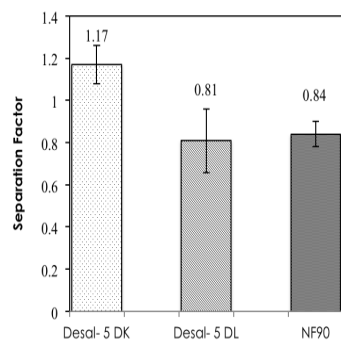
27 October 2016

Accepted

7 November 2016

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Graphical abstract



Abstract

Xylose is an intermediate product in xylitol production and glucose interferes in the process of separation. Thus the aim of this study is to investigate the performance of pilot scale commercial spiral wound NF membrane namely Desal-5 DK, Desal-5 DL and NF90 for separation of xylose from glucose. Separation of xylose and glucose model solutions was done in a pilot scale cross-flow system, using a commercial nanofiltration (NF) membrane with molecular weight cut off (MWCO) ranging from 150 to 1000 g/mol. The model solution consists of 1:1 ratio of xylose to glucose at 10 g/L each diluted in ultrapure water. The filtration was operated in total recycled mode at 10 bar. The sugar concentration was analyzed using high performance liquid chromatography (HPLC). From this study, the pure water permeability (PWP) of the Desal-5 DK membrane was considerably higher at 6.78 ± 0.06 than PWP of the Desal-5 DL and NF90 membranes at 1.28 ± 0.24 and 1.33 ± 0.05 , respectively. The Desal-5 DK also gave the higher xylose separation factor at 1.17 as compared to Desal-5 DL (0.81) and NF90 membranes (0.84). This indicates that membrane Desal-5 DK was the most selective membrane to separate xylose from glucose. Overall, it can be concluded that the spiral wound nanofiltration membrane offers cost-effective and easy-maintenance, which has a potential in xylose-glucose separation.

Keywords: Nanofiltration, spiral wound, separation, xylose, glucose