

Author's Accepted Manuscript

Separation of major and minor lipid components using supercritical CO₂ coupled with cross-flow reverse osmosis membrane filtration

Karina Araus, Feral Temelli



PII: S0376-7388(17)32310-4
DOI: <https://doi.org/10.1016/j.memsci.2018.01.014>
Reference: MEMSCI15868

To appear in: *Journal of Membrane Science*

Received date: 10 August 2017
Revised date: 22 December 2017
Accepted date: 8 January 2018

Cite this article as: Karina Araus and Feral Temelli, Separation of major and minor lipid components using supercritical CO₂ coupled with cross-flow reverse osmosis membrane filtration, *Journal of Membrane Science*, <https://doi.org/10.1016/j.memsci.2018.01.014>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Separation of major and minor lipid components using supercritical CO₂ coupled with cross-flow reverse osmosis membrane filtration

Karina Araus and Feral Temelli*

Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton,
Alberta, Canada T6G 2P5

*feral.temelli@ualberta.ca

ABSTRACT

A reverse osmosis polyamide membrane was used to test the feasibility of concentrating triacylglycerol (TAG) and α -tocopherol/ β -sitosterol from model mixtures (Oleic Acid (OA)/TAG and OA/ α -tocopherol/ β -sitosterol, respectively) solubilized in SC-CO₂ using cross-flow filtration regime. SG membrane was used for up to 26 h at pressures of 120 and 280 bar and temperature of 40°C and its performance was measured in terms of CO₂ flux and separation factor at a transmembrane pressure of 10 bar. Increasing the pressure to 280 bar resulted in a higher reduction in CO₂ flux in comparison to that at 120 bar, which was attributed to fouling. CO₂ flux was reestablished after cleaning with pure SC-CO₂. Feed pressure of 120 bar showed the best separation factors, where the OA separation factor was higher than 1 and those for TAG and α -tocopherol/ β -sitosterol were less than 1. The preferential permeation of OA through the reverse osmosis membranes in comparison to TAG and α -tocopherol/ β -sitosterol could be attributed to the higher diffusivity of this smaller molecular weight compound and the effect of plasticization and swelling of the membrane upon exposure to SC-CO₂. The cross-flow regime efficiently reduced the extent of fouling and subsequent decline of permeate flux. The findings demonstrate the potential to separate bioactive components present in vegetable oil deodorizer distillate and/or to deacidify vegetable oils using coupled supercritical and membrane technologies.

Key words: Cross-flow; lipids; reverse osmosis membrane; separation factor; supercritical CO₂

Download English Version:

<https://daneshyari.com/en/article/7020112>

Download Persian Version:

<https://daneshyari.com/article/7020112>

[Daneshyari.com](https://daneshyari.com)