REVERSE OSMOSIS FILTRATION OF HAWTHORN FRUIT EXTRACT (*CRATAEGUS MONOGYNA* JACQ.): OPTIMIZATION FOR BIOACTIVE COMPOUND CONCENTRATES, PERMEATE FLUX AND FOULING INDEX BY RESPONSE SURFACE METHODOLOGY

Areej Alsobh, Gyula Vatai, Szilvia Bánvölgyi

Department of Food Process Engineering, Institute of Food Science and Technology, Hungarian University of Agriculture and Life Sciences, H-1118 Budapest, Hungary
e-mail: areejalsobh@gmail.com

ABSTRACT

Reverse osmosis depends on several parameters, including the osmotic agent type, the membrane pore size, the concentration, the flow rate, the feed and osmotic agent temperature, and the applied pressure, which affect the permeate flux and the concentration of total soluble solids. In this study, the response surface methodology (RSM) was applied to evaluate the effects of reverse osmosis filtration parameters and optimize various conditions for different responses. Central composite design (CCD) was studied using two numeric factors (temperature 25-45 °C and TMP 20-40 bar) on three levels. The results showed that the highest amount of recovered TPC, TFC, and their Antioxidant activity by FRAP, DPPH, and ATBS are (1057.65±32.57 mg GAE/g_{dw}), (176.89±3.97 mg QUE/g_{dw}), (575.67±22.58 mg AAE/g_{dw}), (187.76%), and (667.98%) respectively, as well as the highest permeate flux (6.64±0.52 L/m^2·h) were found at (T= 35°C and TMP= 40 bar), while the lowest fouling index (27.71%) was found at (T= 45°C and TMP= 40 bar). Meanwhile, the calculated amounts of the respective values via the RSM model were TPC:1073.69 mg GAE/g_{dw}, TFC: 176.89 mg QUE/g_{dw}, FRAP:589.97 mg AAE/g_{dw}, DPPH:187.05%, ATBS:655.46%, permeate flux: 6.28 L/(m^2·h), fouling index: 29.77%.

Keywords: Reverse Osmosis, Response Surface Methodology (RSM), Central Composite Design (CCD), Permeate Flux, Fouling Index

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