

# The effect of Process Parameters on Membrane Degumming of Crude Soybean Oil

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## Abstract

Undesirable impurities present in crude oils are eliminated as a result of series of operations called as refining. Physical refining consists of degumming, alkali neutralisation, bleaching and deodorisation operations. Physical refining involves degumming, bleaching and steam distillation operations where neutralisation and deodorisation steps are combined. Refining technology brings out certain drawbacks such as high energy cost, usage of chemical agents, considerable waste production, loss in nutritive value due to the use of elevated temperature levels for prolonged times. The use of membrane technology as an alternative processing technique to conventional refining of oils presents various advantages which are diminished energy consumption and minimized amounts of waste water production, elimination of increased temperatures and contacts with chemical agents, etc.

In this study, it is aimed to investigate the effects of process parameters such as temperature, transmembrane pressure and feed velocity on permeate flow rate and phospholipid rejection. For this purpose, a fractional factorial (Plackett-Burman) experimental design is used to collect the required data for statistical analysis. Membrane degumming experiments were conducted by using Polyvinylidene fluoride (PVDF) membranes in a reverse osmosis/ultrafiltration equipment (Armfield FT-018). Also, the changes in quality parameters of degummed oil such as color, peroxide value, phosphorus, and free fatty acid content were determined.