

# Improving Frying Oil Quality by Using Membranes Modified with Plasma Polymerisation

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Frying is the most commonly used cooking technique in the world. However repeated use of same frying oil causes formation of compounds like aldehydes, ketones, dimeric, polymeric and cyclic compound etc. reported as a potentially toxic compound for human health.

So far Membrane filtration has been the most favorable technique in dealing with such components owing to lower energy requirement, and no necessity for using additional chemicals. The biggest weakness of such technique, is that low permeate flux prevent effective usage of membranes. It's known that membranes modified by plasma polymerisation affects the permeate flux in a positive way.

In this paper, a different approach to improve frying oil quality and permeate flux is presented. As a first step, hexamethyldisiloxane (HMDSO) was used for modification of hydrophobic polyethersulphone (PES) membrane with low temperature radio frequency plasma system. Subsequently, different possible time and discharge power combinations were analyzed. PES membranes modified at 20 Watt 10 min, 60 Watt 5 min and 75 Watt 5 min were selected. Selection is done based on the physical and chemical analysis of membrane surfaces with a contact angle and FTIR-ATR measurements. The analysis produced several interesting observations. Firstly, PES membrane modified at 75 W 5 min resulted in differences not only for permeate flux, but also for frying oil quality. This membrane gave permeate flux up to 24% more than those obtained with unmodified PES membrane. Secondly, filtration of frying oil through this membrane provided 32% of reduction in free fatty acid, 38% of reduction in total polar compound, 7% of reduction in viscosity, 13% of reduction in conjugated dien value and 21% of reduction in TOTOX value compared to those achieved by an unmodified PES membrane.