

Effect of protein on membrane separation of oil from coconut water

Wastage of coconut water from desiccated coconut industries in Sri Lanka causes environmental pollution. The presence of oil in coconut water restricts its use as a source of food. Microfiltration is a method used for removing oil from emulsions. The effect of proteins on microfiltration of coconut water/ oil emulsion was investigated using Nitto Denko C40-B batch cell with PVDF 0.45 μm hydrophilic membrane.

Coconut water, oil and milk were emulsified to obtain emulsions of varying protein:oil ratios in the range of 14.8×10^{-2} - 19.05×10^{-2} . Samples were pasteurized at 71 °C for 30 min. Each emulsion was separated using the above membrane. The operating conditions were 30 °C and 2 bar.

The optimum protein:oil ratio for maximum flux was found to be 15.0×10^{-2} - 15.5×10^{-2} , while the oil % in the permeate was less than 0.04%. An increase in the temperature to 53 °C resulted in an increase in flux by 60%. There was about 5)% reduction in protein content due to filtration and a slight reduction in soluble solid content. The GLC analysis indicated that more than 90% of trace oil in the permeate consists of myristic and palmitic acids, indicating relatively low affinity for coconut protein.

The sensory evaluation data analyzed by Friedman test revealed that there was no significant difference in taste and odour between fresh coconut water and the permeate. Emulsification with coconut milk protein followed by microfiltration on a PVDF hydrophilic membrane could be recommended for successful separation of oil from desiccated coconut water.