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Investigation of microfiltration for pretreatment of whey concentration

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ABSTRACT

Whey, which contains large amount of food protein, is the liquid residue of cheese and casein production. Direct discharge of whey means nutrition waste and environmental pollution. Recently, the membrane technology has great applications in milk industry field. The current studies are focused on the study of the concentration process applying ultrafiltration (UF) membranes for whey recovery. How to pre-treat whey effluent is key point for whey preparation by the UF method. In this study, the application of microfiltration for pre-treatment of whey protein concentration was studied in details. Two types of microfiltration hollow fibre membranes, polyethersulfones (PES) and Polyvinylidene Fluoride (PVDF), were investigated. It was found that the application of microfiltration helped to obtain an enhanced flux for whey ultrafiltration process. No fat and microorganisms were found in the permeate of microfiltration. The filtration characteristics were obviously influenced by the operation parameters, such as pressure, temperature, recycling flow rate, pH and concentration factor. In addition, a preferable cleaning method was proposed. The cleaning method with order of 0.1% NaOH, 200 ppm NaClO and 0.5% NaOH was more efficient for the PES membrane and PVDF membrane.

Keywords: Whey protein; Pre-treatment; Microfiltration; PES; PVDF; Membrane cleaning

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