

Abstract

This work concerns the use of gas-liquid two-phase flow to reduce whey proteins and particle membrane fouling in hollow fibre dialyzer by injecting air directly into the whey feed stream. The effects of air bubbles on the permeate flux of the air sparged ultrafiltration system were studied experimentally. In comparison to single phase flow, over the range of operating conditions studied, the gas-liquid two-phase flow increases the ultrafiltration flux by 15% to 87%. The highest gas injection ratio $F_{\text{gas}}/(F_{\text{liq}}+F_{\text{gas}})$ was found to be in the range of 0.4 to 0.5. Within this range, the bulk concentration of whey proteins increases to approximately 210% after 3 hours, in comparison to a value of less than 100% for the single phase operation. Dimensionless numbers were introduced and a correlation was suggested to model the flux enhancement.