

عنوان مقاله:

Fouling mechanisms during protein microfiltration: The effects of protein structure and filtration pressure on polypropylene microporous membrane performance

محل انتشار:

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نویسندگان:

Mina Ahsani - Faculty of Chemical Engineering, Sahand University of Technology, Tabriz, Iran|Membrane Technology Research Center, Sahand University of Technology, Tabriz, Iran

Meisam Dabiri Havigh - Faculty of Chemical Engineering, Sahand University of Technology, Tabriz, Iran|Membrane Technology Research Center, Sahand University of Technology, Tabriz, Iran

Reza Yegani - Faculty of Chemical Engineering, Sahand University of Technology, Tabriz, Iran|Membrane Technology Research Center, Sahand University of Technology, Tabriz, Iran

خلاصه مقاله:

A polypropylene microporous membrane (PPMM) was fabricated by thermally induced phase separation (TIPS) method. The effects of protein size and structure as well as filtration pressure on the membrane performance and fouling mechanisms were investigated using two different proteins, bovine serum albumin (BSA) and collagen, in dead-end filtration setup. Obtained results showed that, for each protein filtration, increasing the operational pressure led to higher irreversible fouling ratio (IFR) and consequently lower flux recovery (FR). Moreover, in collagen filtration, the higher portion of the total fouling ratio (TFR) belonged to reversible fouling ratio (RFR) and the FR of membrane in collagen solution filtration was higher than that in BSA solution filtration at the same operational pressure. The FR values were about 42.48 and 56.32% at 2 bar, 52.28 and 64.53% at 1.5 bar and 65.97 and 75.83% at 0.75 bar for BSA and collagen solutions filtrations, respectively. Investigation of the fouling mechanisms using Hermia s models showed that the cake filtration mechanism of fouling turned to pore blocking mechanism in both proteins filtrations by increasing the operational pressure. Obtained results using combined fouling models for all filtration processes confirmed that the cake filtration-standard blocking model (CFSBM) was the prevailing mechanism, whilst the contribution of standard blockage increased by increasing the operational pressure.

کلمات کلیدی:

Polypropylene membrane, bovine serum albumin (BSA), collagen protein, Hermia s fouling models, combined fouling models

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