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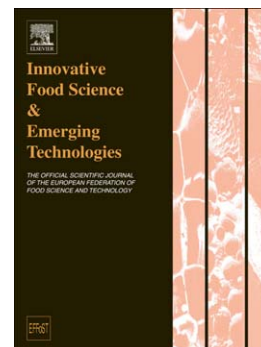
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Improvement of a sustainable hybrid technology for caseins isoelectric precipitation (electrodialysis with bipolar membrane/ultrafiltration) by mitigation of scaling on cation-exchange membrane

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Abstract

Electroacidification of milk by electrodialysis with bipolar membranes (EDBM) can be performed to produce isoelectric precipitated casein. In spite of advantages of EDBM, a problem of fouling hampers the industrial application of this technology. There are two types of fouling occurring during milk electroacidification such as protein fouling inside the EDBM stack and scaling on cation-exchange membrane (CEM). Recent studies demonstrated that protein fouling can be avoided by coupling an EDBM module with an ultrafiltration (UF) module. The present study aims the mitigation of scaling on the CEM. In order to attain this goal, two approaches were tested: 1) addition of KCl in the milk reservoir and 2) use of an UF membrane allowing higher permeate flux and consequently higher flow rates of solutions in the EDBM stack. Results of this study demonstrate the reasonableness of both approaches resulting in the significant decrease of CEM scaling (more than 30%).

Key words

Milk acidification, casein, membrane fouling, electrodialysis, hybrid technology

Abbreviations

BP – bipolar membrane

CEM – cation-exchange membrane

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