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Investigating the role of parameters in dairy wastewater treatment with *VSEP* ultrafiltration

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Protecting our natural environment has never been more urgent than nowadays. Population growth implies an increase in consumption which makes a constant threat for nature from various pollutants. Our drinking waters indirectly and living waters are directly exposed to the effect of various wastewaters from industrial activities. To treat these wastewaters effectively a proper method could be membrane filtration because it is a promising method in many ways though membrane fouling is still a limiting factor. In this study vibrational ultrafiltration and the operating parameters were examined in order to offer a solution for reducing membrane clogging.

Experiments were carried out monitoring operational parameters, vibrational amplitude ($A_{vibr.}$) and transmembrane pressure (*TMP*), with model dairy wastewater, for vibratory shear enhanced processing (*VSEP*) ultrafiltration. Both $A_{vibr.}$ and *TMP* were gradually adjusted at different levels, which were selected based on our previous research. Permeate fluxes, chemical oxygen demand, total dissolved solids, pH and electric conductivity were measured and membrane rejections were calculated. Analysis of variance was implemented in order to investigate the effects for efficiency of every individual operational parameter. Furthermore, calculations are made for clarifying the possible change in specific energy demand as an economic outcome of applied vibration.

Results show that membrane rejections could be maximised at a limiting pressure value, as a result, fine-tuning of operational parameters can eventuate much more efficient performance. Summarizing module vibration significantly decreased membrane fouling that is promising for an even wider use of the technology.

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Biography

Szabolcs Gyula Szerencses completed his BSc in 2019 as a Food Engineer and started MSc degree as Food Quality and Safety Engineer. Since 2017 his research topic is membrane filtration in the field of wastewater treatment and the investigation of operational parameters in order to decrease membrane fouling.