

Recovery of Bioactive Compounds from Corn Water Stream by Grape Marc Hydrogel as Pre-treatment Before Membrane Processes

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Abstract

Corn steep water (CSW) is an agro-industrial stream obtained in the wet steeping process of corn (Vecino et al., 2014). CSW is a complex stream composed mainly by water, solids, carbohydrates, amino acids, polypeptides, fatty acids, lactic acid, antioxidants, minerals, vitamins, ashes, heavy metals, inorganic ions, fibers and fats, among other compounds (Hull et al., 1996). Additionally, CSW could be used as a source of biosurfactants, which are obtained after the spontaneous fermentation of corn during the steeping process (Vecino et al., 2014). Therefore, before membrane process application for biosurfactant recovery, it is necessary to pre-treat the CSW. In this work, CSW was treated with bio-oxidize grape marc entrapped in calcium alginate beads. The adsorption by using grape marc hydrogel was carried out as pre-treatment step for lactic acid and sugars removal. CSW was provided from FeedStimulants company (Lot No. CSL-0003-1217) diluted up to 50 g/L and then centrifugated for solids removal (5000 rpm, 30 min, 4 °C). The ratio between beads and CSW, containing initially 4 g/L of lactic acid and 2 g/L of glucose, was 1:1 (v/v) at room temperature during 24 h in an orbital shaker at 150 rpm. Results showed that it was possible to recover 97.1 ± 0.4 and 69.0 ± 2.2 of glucose and lactic acid, respectively, under the operational conditions mentioned. For that, adsorption by means of grape marc hydrogel could be a suitable process to purify CSW.

Keywords: corn stream, pre-treatment, adsorption, resource recovery, membrane technology

References

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