

Demineralization of natural sweet whey by electro dialysis at pilot-plant scale

Hana Šimová^{a*}, Vladimír Kysela^a, Aleš Černín^b

^aMemBrain s.r.o., Pod Vinicí 87, CZ-471 27 Stráž pod Ralskem, Czech Republic
Tel. +420 487 888 305; Fax +420 487 888 302; email: hana.simova@membrain.cz

^bMEGA a.s., Pod Vinicí 87, CZ-471 27 Stráž pod Ralskem, Czech Republic

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ABSTRACT

Demineralization of sweet whey was performed in a pilot electro dialysis unit EWDU-P1 provided with EDR stack with 50 membrane pairs of membranes RALEX CMH-PES and AMH-PES. Experiments were carried out at 15°C, which was chosen to reduce microbial growth and to minimize microbial degradation of organic components with nutritional value (especially lactose). Batch process of whey demineralization was ended when the conductivity of diluate decreased of 90% (87% decrease of ash content). During the process constant outer voltage was kept. The influence of different outer voltage and spacer thickness (0.8 mm and 1 mm) on the velocity of salt transport and energy consumption was studied. At higher outer voltage 90% demineralization was reached earlier, but energy consumption increased too. The spacer thickness did not have significant effect on the length of the process and energy consumption. The transport of individual salts and losses of organic components were studied too. Removal of chloride (up to 99%) and potassium (95%) was the most effective; the lowest cut appeared for magnesium (75%) and calcium (80%). Losses of lactose were negligible; decrease of crude protein content was maximally 5%. Decrease of titratable acidity was observed too.

Keywords: Whey; Demineralization; Electro dialysis; Ion exchange membranes; Ion transport

* Corresponding author.