A pilot-plant test on desalination of soy sauce by nanofiltration

A pilot-plant test on desalination of soy sauce was performed with spiral-wound nanofiltration (NF) membrane modules. NF270 was found to be the most suitable for desalination of soy sauce due to its high permeate flux, though the rejection of amino nitrogen slightly decreased with increasing operation temperature. Soy sauce permeate was further concentrated to yield light-color soy sauce by Desal-5 DK, another membrane with higher rejection of organic matter but lower permeate flux than those of NF270. Glutamic acid and aspartic acid in soy sauce had highest retention by NF270 while glycine passed through membrane most easily. Under constant transmembrane pressure (TMP) condition, the mode that diluted soy sauce was directly concentrated to eligible product was found to be the most suitable one in terms of processing time and operation cost. Productivity for low-salt soy sauce decreased significantly in the early stage of operation and then kept constant for a long-term operation. With application of a composite cleaning agent containing alkali, surfactant and enzyme at a low concentration for a short duration, the flux of the severely fouled membrane could be completely recovered, suggesting that it could be feasible to produce low-salt soy sauce by NF technology.

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