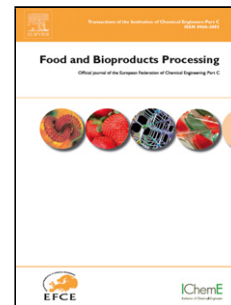


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The use of a micro- and ultrafiltration cascade system for the recovery of protein, fat, and purified marinating brine from brine used for herring marination

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Highlights

- Marinating brines were high concentration of inorganic and organic compounds.
- Membrane separation has not change the pH, NaCl and acetic acid in permeate
- Membrane separation decreased of protein and fat and eliminated of microflora.
- Turbidity measurement can be used as a monitoring tool for a purifying system.

Abstract

In this study we analyzed the composition of post-production marinating brines (MB) from the marination of fresh and frozen herring in marinating brines comprising 6-10% NaCl and 3-4% acetic acid. After 7 days of marination in a 1-step or 2-step marinating process, NaCl levels in MB decreased by ~33% and acetic acid by ~60% compared to fresh marinating brine. The post-production marinating brines contained NaCl (37-43 g/dm³), acetic acid (14-18 g/dm³), total dry matter (64-73 g/dm³), fat (5-27 g/dm³), and protein (14-26 g/dm³). Their turbidity was in the range of 307-2427 NTU, while pH<4.7. Psychrophilic, mesophilic, acetic, and lactic acid fermentation bacteria were found.

The recovery of protein, fat, and purified marinating brine was tested in a cascade membrane system, using microfiltration (polypropylene bag 25 µm) and ultrafiltration (UF) performed with ceramic membranes with cut-offs of 150 kDa and 1 kDa. In the permeate we observed no changes in pH, NaCl and acetic acid levels; it was clear (turbidity at 1 NTU) and sterile. The permeate recovery coefficient was 0.50, and its reuse can reduce the use of NaCl and acetic acid in the production of marinating brines by about 20-25%. The highest rejection coefficient for protein content (average 0.30) and fat content (from 0.66 to 1.00) was observed for the membrane with a cut-off of 150 kDa. Overall recovery after both stages of UF was 0.60 for total protein and 0.40-0.69 for total fat.

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