Maximizing protein yield during pH-shift processing of herring co-products combined with antioxidant-rich materials

Introduction
The pH-shift process is a promising tool to recover functional proteins from fish co-products, but lipid oxidation is a problem. We have developed a clean label processing concept, “Cross-processing”, which combines fish co-products with antioxidant-rich materials during the pH-shift processing to produce stable protein isolates. However, protein yield was reduced.

The present study was aimed to counteract this yield-reduction during the cross-processing of herring co-products with lingonberry press-cake, shrimp shells and green seaweed by four strategies.

Materials and Methods

Cross-processing papers:

- Optimization of solubilization and precipitation pH

Water addition: increased total protein yield for all three helpers.

High shear mechanical homogenization (HSMH): replace SST-HSMH by RD-HSMH

Ultrasonication (US): For +lignonberry, +Green seaweed: significant increase of total protein yield.

Results

Conclusions

- This study confirmed earlier findings that cross-processing hampered protein solubility and solubilization yields.
- With shrimp shells and green seaweeds, reductions in solubilization yield were larger for acid- than alkaline solubilization, therefore using the former principle, shrimp shells or green seaweed cannot be recommended as helpers.
- It is possible to compensate for the loss in protein yield induced by cross-processing if optimizing the solubilization and precipitation pH’s, slightly increasing the ratio of water to raw material, and by using RD-HSMH +/- US.
- Besides the effects on protein yield, the impacts of the process conditions on the structural and functional properties of the recovered protein isolates will be also investigated.

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Reference