

## New Cost-Effective Stabilization Technology Enables Upgrading of Fish Side-streams into Food Ingredients

**There are many incentives to use our landed seafood resources in a more complete manner for food production, instead of just taking out the fillet, and sending the rest to low value use such as feed production. In fact, side-streams from fish filleting, such as heads and backbones often contain a lot of prime quality muscle, which is rich in proteins and valuable omega-3 fatty acids.**

Today there are techniques available for upgrading these side-streams to food ingredients such as minces, protein isolates, hydrolysates and oils. However, a challenge when producing food ingredients from side-streams is that their unsaturated fatty acids are very sensitive to oxidative degradation, which prevents storage between the side-stream generation, and their subsequent upgrading into food ingredients. This is because fish side-streams also are rich in blood, which contains the protein haemoglobin, a molecule that can accelerate the reaction between oxygen and the unsaturated fatty acid, resulting in rancidity and lower the nutritional value. Consequently, the rancid taste and odour will reduce the sensory impression of both the raw material and final products.

In a recent study conducted by Dr Haizhou Wu and Prof Ingrid Undeland at Chalmers University of Technology in the frame of a European project called WaSeaBi, a new dipping technology for herring filleting side-streams has been investigated. The dipping technology is built on a solution containing among others rosemary extract and citric acid. Results showed that if dipping herring filleting side-streams in the solution prior to their storage at 0 °C or 20 °C, the time until rancidity developed was extended significantly. More specifically, the time could be extended from less than half a day to more than 3 and a half days at 20°C, and from less than 1 day to more than 11 days at 0 °C.

To make the technology cost-effective, the possibilities to re-use the solution was also investigated. Results revealed that even after re-use of the solution up to 10 times, rancidity was completely inhibited at 0 °C. In addition, it was found that the solution kept the fish haemoglobin in a more stable form that is less reactive with the fatty acids, which thereby prevents oxidation.

- The new technology gives a valuable window of time for seafood producers to store or transport the side-streams prior to further upgrading into food ingredients, says Ingrid Undeland, professor at the Food and Nutrition Science division at Chalmers University of Technology.

- Also, since the dipping covers the side-stream surface with a thin layer of antioxidants, these are carried over to the next process step, providing more high-quality mince, protein- or oil-ingredients, Ingrid Undeland continues.

The study, which has been [published with open access in the journal Food Control](#), was based on herring side-streams from Sweden Pelagic, however, results obtained with cod-side streams from Royal Greenland



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also confirm that rosemary-based antioxidant mixtures are good at protecting against oxidation. This means that the solution can be used to prevent rancidity of different kinds of fish side-streams.

### About the project

WaSeaBi is a four-year project that aims to optimize the utilization of seafood side-streams by developing new methods to produce nutritional ingredients. The project brings together an interdisciplinary team of 13 partners from five European countries, which include Technical University of Denmark, Food & Bio Cluster Denmark, Chalmers University of Technology, AZTI, EIT Food, Sweden Pelagic, Royal Greenland, Alfa Laval, Pescados Marcelino, Jeka Fish, Barna, Nutrition Sciences, Ghent University

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### Picture:

Herring side-streams are dipped in a solution to extend time until rancidity develops



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