Northern Periphery and Arctic Programme 2014–2020

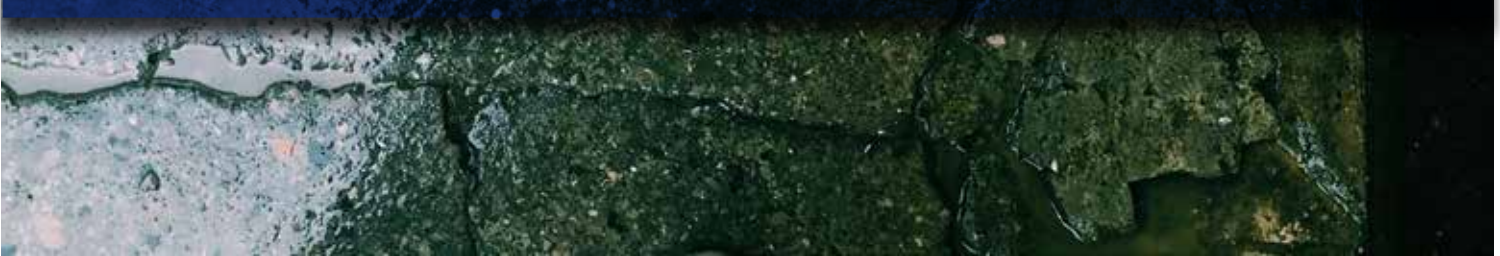
EUROPEAN UNION
Investing in your future
European Regional Development Fund

SYMBIOMA

Technology Innovations and Business Models for Valorisation of Industrial Waste Biomass in Sparsely Located Enterprises

Circular economy cases and their business models in Swedish fish industry

Dr. Wiebke Reim, Dr. Daria Sas



Contents

1 Existing circular economy cases and their business models

Bergman (2015)[1] has presented the study which showed that around 30,000 tons of seafood co-products are generated each year in the Swedishseafood processing industry based on interviews with processors. Following the report from Bergman (2015), the main waste utilization route was as feed for minks and production of fish meal and oil for animal feeds. Discard of fish at sea is another source of fish that could be used for human consumption or for other purposes. Guts that are discarded could potentially be used more. It was reported that cod catches, which have their guts removed and discarded at sea in the Swedish fishery sector, could be landed ungutted without decreasing the quality of the fish or the co-products as long as it was gutted within 12 hours after the catch (Akse et al., 2002 in Bergman 2015).

Fish and crustaceans smaller than the minimum allowable size that are mandatory to land should however not be included in the efforts to find valuable uses but should instead not be caught at all if not intended to be landed. The aim of the landing obligation (Regulation (EU) No 1380/2013 of the European Parliament and of the Council)is to encourage the utilization of more selective fishing gear that catches only the targetspecies of allowable size, and therefore it should not be profitable to land fish of unallowable sizes.Precise data on the amounts and types of seafood co-products that arise in the Swedish processing industry is lacking today. A complete picture of the present utilization of co-products isunknown as well (Bergman, 2015).

1.1 Case: Fish company 1

The history of the company begins in 1992 by two fishermen fishing together. Now it is an SME with 17 employees, an ambitious vision, and innovative technologies. The most common caught fishes are herring in the spring and pike in the summer, vendace in autumn starting in the middle of September,and lastsforfour to five weeks. The vendace season is short and very intensive. From vendance comes the production of Kalix vendace caviar.Herring is caught mainly for producing the Swedish specialty "surströmming", fermented herring. The most common ways to handle generated fisheries by-products are sending it for dog food production (dryfood), export as mink food to Finland as well as production of fish steaks for human consumption.

1.2 Case: Fish Company 2

This company is one of Norrbotten's oldest companies formed on the Gulf of Bothnia over 90 years ago. As early as 1928, two professional fishermen joined forces to form a fish sales association with the aim of selling members' products and at the same time developing the geographical market in Norrbotten.The company in its most recent incorporated form was founded in 1990 and is now owned by professional fishermen in Norrbotten. Today the company conducts its operations with head office, production, warehousing, and sales in Luleå and production in Nyborg. The company has about 22 full-time employees, sales of about SEK 100 million per year and produces about 900 tonnes of fish.Their market is divided into two main segments: restaurant and large kitchen and Grocery. The most common ways of handling fisheries wastes are by sending it to a dog food producer (wet food, fresh sausages),bio-gas, and some of organic waste goes to the combustible waste.

1.3 Case: Fish Company 3

A small fishcompany with 3 employees. They fish herring, salmon, whitefishduringsummerin the High Coast whichis a part of the coast of Sweden on the Gulf of Bothnia,and during autumn they fish vendace. In numbers, annually they usually fish around 20 tonsof herring, 18 tons of salmonand vendacearound 40tons. This year (2020) it has been allowed to fish vendace just for 12 days. Commonly, the company exports fishwaste for a mink food production in Finland, or transports to a local dog food producer (wet food, fresh sausages). However, they expect that that mink farming in Finland will reduce significantly in a near future and new ways of waste handling will be needed.

1 Bergman, K. (2015). Co-products in the Swedish Seafood Processing Industry

2 Future opportunities for waste handling

- More food production for human consumption
- Fish oil as dietary supplement
- Biogas production

3 Bottlenecks / challenges for efficient waste handling

- In case of further food production for human consumption, there is a lack of social acceptance of eating various sort of fish
- Lack of business supporting opportunities / projects
- Tough requirements for fish products lead to high prices on the market
- Lack of innovative ways for keeping fish fresh after catching since some sorts could very sensitive and lose its quality.

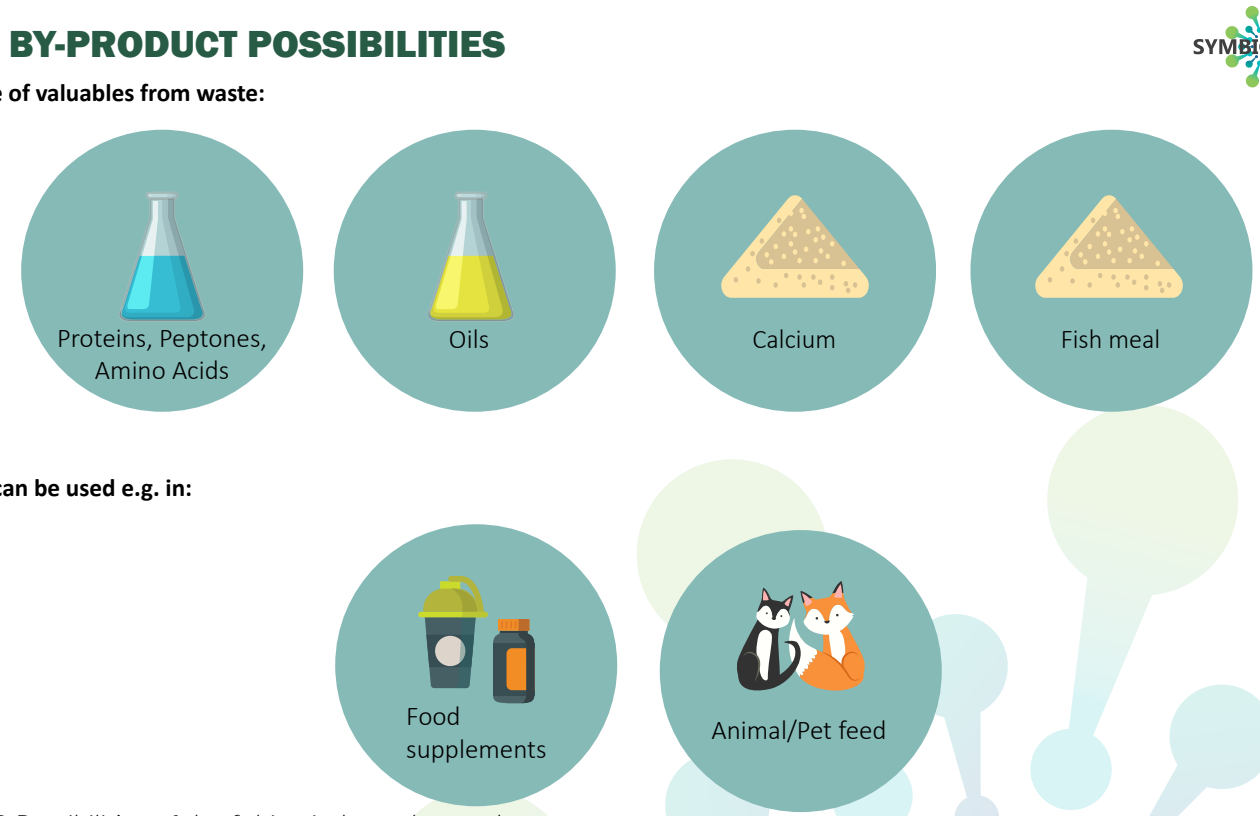


Figure 2 Possibilities of the fishing industry by-products

Acknowledgements

This report is produced with part funding of the European Union (EU) Northern Periphery and Artic (NPA) Programme under the programme priority Axis 1- Innovation.
This is in the report for the WP 1 deliverable T 1.1.1 of the SYMBIOMA project (Technology Innovations and Business Models for Valorisation of Industrial Waste Biomass in Sparsely Located Enterprises. Case: Industrial Symbiosis for Valorisation of Waste Biomass from Food and Beverage Industries) (Project No. 352)

The project partners:

Lead partner

Centria University of Applied Sciences, Finland (CENTRIA)

Other partners

Institute of Technology Sligo, Ireland (ITSligo)

Norwegian Institute of Bioeconomy Research, Norway (NIBIO)

Bottenvikens Bryggeri Ab, Sweden (Bottenvikens)

Luleå University of Technology, Sweden (LUT)

Hermanni Winery Ltd, Finland (Hermanni)