

C\*

#### **Eurofish International Organisation**

#### For the Development of Fisheries and Aquaculture in Europe

#### Valorisation of by-products: MARKET OPPORTUNITIES OF SEAFOOD PRODUCTS

#### Søren Espersen Schrøder, PhD

Market Advisory Council - Working Group 3: EU control and sanitary issues, consumer rules

05TH June 2025



## CONTENT

- 1. A growing population
- 2. Side and waste stream from the sector
- 3. From linear to zero-waste
- 4. Successful stories
- 5. Conclusion





#### A GROWING POPULATION







#### WASTE IN THE SEAFOOD INDUSTRY



Opportunities for increased valorization and recovery of lost material can be implemented at numerous stages of the supply chain.

> Waste products from the seafood industry vary for example: **seafood side streams**, **shell waste**, packaging and tubs, sludge, nets...



#### FROM LINEAR





#### TOWARDS ZERO-WASTE



Source: 100% FishBook



#### TOWARDS ZERO-WASTE



Source: 100% FishBook



#### SEAFOOD SIDE STREAMS

Backbon

Skin

3.3 ± 1.6%

Fillet, skinned

36.9 ± 8.6%

Gut

123.300

Head

Fins

81.7 × 5.7

Roo

1 ± 2.5%

21.5 ± 4.3%

Liver

5.1±1.9%

We live in a filletbased economy where the not fillet parts go to low valuable animal feed, landfill and compost.

Seafood side-stream waste or by-product waste consists of cut-offs from processing, heads, fins, guts, skin, and liver

We need other ways to support new sources of income rather than just increase catch to drive more value.



#### SEAFOOD PRODUCTS FROM SIDE STREAMS



Over the last 30 years, the utilization rate of the Icelandic cod's biomass has increased from 40% to **90%** resulting in high-value food and non-food products.



## THE PRODUCT VALUE PYRAMID

ATLANTIC COD



Source: Icelandic Ocean Cluster, 2023, Cooney et al., 2023



### CASE STUDY: ATLANTIC COD



Iceland has successfully transformed a single Atlantic cod from around \$12 to \$5000/fish by find value creation opportunities.

Source: Icelandic Ocean Cluster, 2024



## CASE STUDY: FISH SKIN

The worldwide fish leather industry is projected to grow from **USD 103 million in 2023** to **USD 133 million by 2032** with a CAGR of 2.9%. Fish leather currently accounts for less than **1%** of global leather sales.



**CAGR** = Compound annual growth rate is the mean annual growth rate of an investment over a period longer than one year.



Price: 21,60€



Price: 119,95€



Price: 425€



Price: 137€

Source: Casteig cuir, Woden, Manuel-dreesmann, Craft collective Copenhagen, 7oceanties



## CASE STUDY: FISH SKIN

Kerecis develops, innovative medical products from fish skin, that helps in healing burns, wound and is used during surgeries.





#### Source: Kerecis.com



## HIGH-VALUE PRODUCTS: COLLAGEN















Source: Verified Market Research



## HIGH-VALUE PRODUCTS: COLLAGEN













The pricing for marine collagens is estimated to be between **\$5** and **\$50 per gram** for medical and healthcare applications and to be approximately **\$100 per kilogram** of food applications.



#### MOLLUSKS SHELL



Over **10 million tons** of mollusks shells are produced each year, of which over **70%** is represented by oyster, clam, scallop and mussel shells



## CALCIUM CARBONATE



The global calcium carbonate market size was estimated at **USD 47.53 billion in 2023** and is expected to grow at a CAGR of **6.6%** from 2024 to 2030.

Shells are made from 92 to 99.9% calcium carbonate, with a small amount of organic matrix.

Source: Yang et al., 2019, Verified Market Research



#### CASE STUDY: MUSSELS SHELL IN DENMARK



Source: Danshell, Vilsund shells



## CASE STUDY: 2024 OLYMPIC GAMES



The 2024 Olympic track, composed of **50% recycled materials**, is made from fine powder derived from Mediterranean sea shells. The cost ranged between **2 and 3 million €**.





Source: Mondo worldwide, Niedittas



## **CRUSTACEANS SHELL**



8 million tons of waste crab, shrimp and lobster shells are produced globally every year.



Source: Ashai



## **CRUSTACEANS SHELL**





## HIGH VALUE PRODUCT: CHITIN

Chitin market value of USD 42.29 billion in 2020, which is projected to reach USD 69.3 billion in 2028, while growing at a CAGR of 5.07 % from 2021 to 2028













Source: Vidal et al., 2022



### CASE STUDY: PANDALUS BOREALIS



Price range: 18.5€ - 69€

Price range: 75€ - 142€

Source: ChitoCare Beauty, PreCardix

## CASE STUDY: HAILIA

New products made from Norwegian salmon parts left on processing belts after filleting.





Ready-made salmon product extracted from frames and bones of Norwegian salmon.

Once implemented at an industry wide scale the utilization rate of Norwegian salmon could rise to over 90% from the current 70%.

#### CASE STUDY: HAILIA







Pulled rainbow trout meat to use in sauces, pasta etc. Available in 500 supermarket stores in Finland.

2.95 € ~ 16.95 €/kg

Salmon sandwich made with the salmon sidestream product

"Fish processors are finally given tools to upcycle side-streams to food in their own factories. This broadens their core business and product portfolio with more affordable and convenient food product concepts." Michaela Lindström, CEO of Hailia (TR).



## CHALLENGES AND RISKS

•Consumer acceptance







•Supply chain stability

•Regulations and compliance





# **OVERALL CONCLUSION**

•Advances in processing technologies and product development can facilitate the access to the market of highvalue products from byproducts.



 Increasing awareness about the benefits of seafood byproduct products can drive acceptance and demand, opening up new market segments.







# Thank you for your attention! soren@eurofish.dk

