PRACTICE ABSTRACT NO. 63

Understanding the value of freshwater aquaculture and fish processing byproducts through agro-innovative approach & technological solutions

Main results / outcomes

CAVIAR PIRINEA and some research partners are making available an extended catalogue of side streams characterization, which are routinely sold to waste managing companies with no valorisation income derived. The technological approaches developed herein by BETA are revealing that within a private aquaculture production scenario of 3.100T fish/year (i.e., rainbow trout (*O. mykiss*) and sturgeon (*Arcipenser sp.)*) and 1.902T of fresh processed products/year (i.e., fish, roe and caviar) => 69m^3 fish sludge, 96T fish viscera and 200T of non-conforming fish/year could respectively be evaluated through some of the current research techniques in progress. Likewise, the project could show that every increased productivity derived from intensification in aquaculture and/or fish processing practices will not only lead to a subsequent huge but also economically recoverable production of agro-innovative byproducts. The solutions developed are expected to reduce the soil nutrient imbalance in Europe.

Practical recommendations

Sludge produced from freshwater aquaculture systems can be successfully valorized by a portfolio of technologies to recover nutrients on a dry basis, as follows for example: (i.) Solid fraction of freshwater sludge: 7.0% TKN, 0.4% TP, and 0.1% K. and (ii.) Liquid fraction of freshwater sludge: 0.33 g N/L, 0.02 g TP/L, and 0.02 g K/L. Dead fish is being valorized as a co-substrate during the treatment of the solid fraction from freshwater aquaculture sludge. The specific use of trout as a co-substrate is showing to be very potential because it presents high organic matter content and valuable and recoverable nutrients as N (4.4% TKN) and P (0.4% TP) on a dry basis.

Likewise, 26 private and public stakeholders involved in 8 technical work-packages and with expertise in the fields of agriculture, aquaculture, fisheries and fish processing from all over Europe, will continue developing through the end of 2024, comprehensive data sets relating to (i.) agriculture and fertilization; (ii.) side-streams characterization and technology development; (iii.) food waste and circular economy; (iv.) environmental performances and constraints; (v.) sustainability assessment and business models.

Fig. 1: Facilities and activity of Caviar Pirinea Slu.

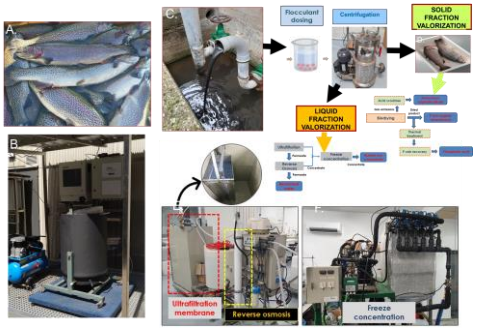

Fig. 2: A. Rainbown Trout from Caviar Pirinea SLU; B. Biodrying pilot unit for the valorization of fish sludge and dead fish set in BETA. C. Fish Sludge from the processing plant. D. Dead fish as co-substrate. E. Mechanical process and osmosis. and F. Freeze concentrator

Further information

The physicochemical characterizations herein are making evident the **feasibility of recovering nutrients from dead fish and sludge produced in aquaculture companies** and it could represent a promising option for the production of bio-based fertilizers (BBF) from aquaculture by-products (further details on freshwater vs. marine, in progress). Furthermore, the potential application of **these BBF could reduce the costs associated with sludge management**, bringing both cost reduction a new market opportunity, for the aquaculture sector.

About this abstract

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SEA2LAND project is a collaborative Innovation Action(IA) funded by the EU in the frame of the Horizon 2020 programme. The project aims to provide solutions to help overcome challenges related to food production, climate change and waste reuse. Based on the circular economy model, SEA2LAND promotes the production of large-scale fertilisers in the EU from own raw materials. This solution is expected to reduce the soil nutrient imbalance in Europe.
The project is running from January 2021 to December 2024.
Website: www.sea2landproject.eu

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