Portfolio of Project Factsheets (Feed)

A Horizon 2020 funded project
Full project title: ERA-NET Cofund on Blue Bioeconomy - Unlocking the potential of aquatic bioresources (BlueBio)

Website: www.bluebioeconomy.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817992
Project start date: 1 December 2018
Duration: 66 months

Overview

These factsheets outline the outputs and commercialisation needs for the 36 BlueBio funded projects as of November 2023. This includes 17 projects from the cofunded call (), 9 projects from the 1st additional call (), and 7 from the 2nd additional call ().

Each factsheet contains the following information:

- Project Name
- Brief description/tagline
- Relevant Blue Invest sectoral opportunity icon (see next page for description)
- Website (if applicable)
- Country flags of industry partners in the consortium
- Outputs (including Technology Readiness Level (TRL), brief description, Intellectual Property Rights (if provided)
- Commercialisation Needs or Next Steps

More information on the projects available on **www.bluebioeconomy.eu**

Blue Invest Sector Opportunities

Aquaculture

 Aquafeed

 Equipment

 Broodstock

 Rearing/ Harvesting

 Disease battling & fish welfare

Blue Biotechnology

 Biofuels

 Nutraceuticals

 Cosmetics

 Pharmaceuticals

 Food & Feed

 Waste Reduction

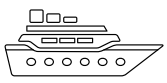
 General

Blue Biotechnology

 Fishery Services

 Fishing Gear

 Fishing

 Ship Equipment

From Blue Invest report: An Ocean of Opportunities available at https://blueinvest-community.converve.io/

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AquaTech4Feed

Portfolio of Outputs and Commercialisation Needs

Aquaculture technologies for the production of innovative feeds for improved fish stocks

https://aquatech4feed.atb-potsdam.de/de/project

Project consortium includes 3 companies:

Outputs

Biofloc cultivation

TRL 6

Optimised tank cultivation using aquaculture wastewater.

Duckweed cultivation

TRL 7

Optimised open pond cultivation, using aquaculture wastewater.

Insect Cultivation

TRL 6

Optimised cultivation of Black Soldier Fly using fish waste.

Micro and macro-algal cultivation

TRL 7

Optimised cultivation using aquaculture wastewater.

Commercialisation Needs

- **Upscaling and integration into real environments**
- **Development of standardised processes**
- **Case studies for social acceptance and feasibility**
- **HEU funded IMPRESS project to develop higher TRL (duckweed & microalgae)**
- **Hygiene and safety assessment of the produced biomass**

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InEVal

Increasing echinoderm value chains

https://www.awi.de/en/science/special-groups/aquaculture/aquaculture-research/projects/ineval.html

Project consortium includes 2 SMEs:

Portfolio of Outputs and Commercialisation Needs

Outputs

Sea cucumber technology

TRL 6

Sea cucumber aquaculture production system for fish farm site remediation.

Sea urchin technology

TRL 7

Land-based systems to ripen sea urchins on land and bespoke live urchin transport systems.

Sea star harvesting technology

TRL 8

Highly selective sea star harvesting systems for mussel farms and non-dredge/mop areas.

Sea star based shrimp feed

TRL 7

Optimised shrimp feeds incorporating low-cost sea star meal.

Commercialisation Needs

Linking biomass providers with users/processors

Moving to commercial scale

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SIDESTREAM

Secondary bio-production of low trophic organisms utilising side streams from the Blue and Green sectors to produce novel feed ingredients for European aquaculture

https://www.sidestream.info/

Portfolio of Outputs and Next Steps

Project consortium includes 2 large enterprises:

Outputs

Aquafeed ingredients from polychaete worms

TRL 4

Utilisation of solid phase waste materials to produce biomass containing omega 3 long-chain polyunsaturated fatty acids, proteins and functional ingredients.

Aquafeed ingredients from gammarid shrimp

TRL 5

Utilisation of solid phase waste materials to produce biomass containing omega 3 long-chain polyunsaturated fatty acids, proteins and functional ingredients.

Asthaxanthin from bacteria

TRL 5

Conversion of liquid waste streams into important pigments and proteins.

Sidestream Circular Model

TRL 6

Evidence of sidestream circular model sustainability for further upscaling actions.

Next Steps

- **Engagement with industry**
- **Upscaling of biomass production**
- **Regulatory aspects of circular aquafeed ingredients**
- **Upscale studies for pigment production via bacteria bioconversion process**
- **Feed production and commercial exploitation**

Portfolio of Outputs and Commercialisation Needs

Seaweeds for Novel Applications and Products

https://tinyurl.com/ye28268y

Project consortium includes 1 Small and 1 Large Enterprise:

Outputs

Biorefinery methodologies

TRL 5

Isolation of high-quality polysaccharides such as alginates, cellulose, fucoidans, carrageenans, laminarins.

Upgraded & modified polysaccharides

TRL 4-6

Seaweed based foams and seaweed microsheets.

Seaweed cellulose based biomaterials

TRL 4-6

Novel biopolymer modifying enzymes. Enzymatically and chemically tailored polysaccharides.

Alginate based biomaterials

TRL 4-5

Novel hydrogels for cell cultivation.

Cellulose alginate composite biofibres.

Commercialisation Needs

- **Establish of sustainable and economically feasible supply chains for raw materials**
- **New infrastructures for sustainable processing of biomass**
- **Regulatory framework for seaweed derived products for use in food, feed, and pharma.**
- **Scalable processes for biorefining of seaweed**
- **Engagement with industry on further projects to realise innovations**

BlueBioChain

Novel biorefinery supply chains for wastewater valorisation and production of high market value bio products using microalgae

https://www.bluebiochain.eu/

Project consortium includes 1 SME & 1 LE:

Portfolio of Outputs and Commercialisation Needs

Outputs

Microalgae cultivation in wastewater

TRL 5

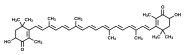
Optimised valorisation of waste water by cultivation of microalgae.

Skin cream

TRL 5

Production of cosmeceuticals from microalgae.

Food colouring agents



TRL 5

Production of food additives from microalgae.

Aquafeed

TRL 5

Production of aquaculture feeds from microalgae.

Commercialisation Needs

- **Upscaling**
- **Continue to monitor resource efficiency impact**
- **Further develop market analysis, projection scenarios, value chains**
- **Environmental impact mapping**
- **Networking with industry** (e.g. feed and cosmetics companies, aquaculture farms)

BlueBio COFUND

MICROALGAE IN IT

Microalgae based, safety-tested and optimised fish feed value chain by using interdisciplinary R&D and IT solutions

https://www.poweralgae.eu/microalgae-in-it

Project consortium includes 1 SME:

Portfolio of Outputs and Commercialisation Needs

Circular model for microalgae cultivation

Carbon dioxide from flue gas to enhance microalgae growth	Agri-food residues to provide cheaper nutrients for microalgae	Information and communications technology (ICT), sensors, and algorithms for efficient bioprocess management	Chemical testing for product safety
TRL 5/6	TRL 5/6	TRL 5/6	TRL 5/6

Commercialisation Needs

- **Validation of aquafeed producers' needs**
- **Validation of fish farmers' needs**
- **Microalgae components users in the food sector**
- **Microalgae components users in the cosmetics sector**
- **Retail channels for food & nutraceuticals (physical & online)**

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MuMiFaST

Mussel mitigation feeds and supply system technological development

https://bluebioeconomy.eu/mussel-mitigation-feeds-and-supply-system-technological-development/

Portfolio of Outputs and Commercialisation Needs

Project consortium includes 1 SME and 3 large enterprises:

Outputs

Commercial mussel meal

TRL 5

Bioprocessing of waste material from mussel production, including optimisation of raw product and industrial-scale processing of meals.

Waste stream byproducts

TRL 4

By-products generated from waste streams of mussel production and processing of mussel meals.

Commercialisation Needs

- **Upscaling of raw product and processing lines**
- **Informed regulatory framework for expanding industry**
- **Valorisation of ecosystem services**
- **Raising Awareness**
- **Product development for sidestream fermentation**

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Portfolio of Outputs and Commercialisation Needs

Preservation of underutilized fish biomasses for improved quality, stability and utilization

https://profius-project.com/

Project consortium includes: 2 SMEs & 1 Large Enterprise

Outputs

Preservation methods

TRL 5/6

Lumpfish Roe and Carcass, no relevant IPR

Processing to production of gelatin and collagen

TRL 6

BioPol IPR

Processing to production of FPH

TRL 5

Fish feed from tuna side-stream

TRL 5

Work in Malta for use by Maltese tuna industry

Commercialisation Needs

- **Testing in controlled RAS systems (ABT)**
- **Production facilities for gelatin and collagen production**
- **Lumpfish biomass e.g. from salmon farms**
- **Use of sidestreams from gelatin and collagen production**
- **Networking with industry e.g. feed companies, RAS designers**

SuMaFood

Sustainable preservation of marine biomass for an enhanced food value chain

https://sumafood.eu/

Portfolio of Outputs and Commercialisation Needs

Project consortium includes 3 enterprises:

Outputs

Demonstration cases

TRL 6

Two cases (salmon slaughter & seaweed) established waste reduction, product range extension, enhanced product quality & stability, and provision of unique products.

Marine biomass powders

TRL 6

Production of fish and seaweed powders to be used as food, ingredients or feed.

Optimised processes

TRL 6

Optimised techniques for separation and fractioning of fish residues and preservation techniques for marine biomasses.

Food Products

TRL 6

Bakery products, instant soups, pasta, and sauces with fish protein hydrolysate or seaweed.

Drying technology

TRL 7

Optimised novel drying technologies applied to marine biomass.

Commercialisation Needs

- Venture capital to scale up hydrolysis process of marine residual raw materials
- Close collaboration with fish processing industry
- Inquire into regulations pertaining to novel marine powders
- Increase impact and market readiness of marine ingredients
- Promotion of new ingredients for enhanced consumer acceptance

Blue BIO COFUND

BlueGreenFeed

Synergy of blue and green sectors for resilient biomass production and processing to develop sustainable feed ingredients for European aquaculture

Portfolio of Outputs and Commercialisation Needs

https://www.sintef.no/en/projects/2022/bluegreenfeed/

Project consortium includes 5 enterprises:

Outputs

Methodologies for pre-treatment & processing

TRL 4-6

Optimised methodologies for pre-treatment and processing of feathers and grass pulp to increase digestibility and bioavailability for use in feeds.

Feed ingredients

TRL 2-5

Feed ingredients from feather and grass pulp for low trophic animals (crickets, meal worms) & aquatic invertebrates (gammarid shrimps, polychaete worms).

Methodologies for processing & stabilisation

TRL 5-6

Optimised methodologies for processing and stabilising valuable ingredients from low trophic species.

Aquafeed Ingredients

TRL 5-6

Production of high value proteins and lipids for feed industry from low trophic species.

Commercialisation Needs

- **Upscaling**
- **Commercial trials**
- **Market analysis**
- **Regulatory issues**

Blue BIO COFUND

Portfolio of Outputs and Commercialisation Needs

European fisheries enhancement through "Omic" characterisation and innovative seafood production from underutlised fish species

https://www.plumtri.org/Project_EuFish-SustainableGrowth

Project consortium includes 1 large enterprise and 1 SME:

Outputs

Underutilised fish database

TRL 8

Collation of data on ecology, biogeography, molecular species identification, microbiota composition, nutritional and sensorial properties , and chemical contamination.

Innovative seafood products

TRL 7

Innovative seafood products from underutilised fish species and rest raw materials achieving zero waste.

Aquafeed

TRL 7

Novel aquaculture feeds produced by using recovered fish waste achieving zero waste.

Web portal

TRL 8

Platform for sharing information with stakeholders, SMEs, and consumers to promote underutilised fish species.

Commercialisation Needs

- **Market analysis**
- **Upscaling**
- **Stakeholder engagement**
- **Additional feeding trials (more species)**