

CONNECTING THE DOTS FOR A CIRCULAR BLUE BIOECONOMY

From science to policy and regulatory solutions 30 JANUARY 2024



MARIGREEN

Sustainable utilization of MARIne resources to foster GREEN plant production in Europe

Barriers in the valorization of BLUE residues for the production of fertilizers and biostimulants



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GENERAL OBJECTIVE

OBTAINED RESULTS

□ BARRIERS







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□ Upgrading poorly used residual materials from the BLUE value chain (*i.e.*, from fish capture, organic aquaculture, and seaweed industry)



fish heads and backbones from clipfish industry



sludge from organic fish farming



seaweed residues from extraction processes

by treating them using appropriate technologies to produce fertilizers and biostimulants for GREEN agriculture





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□ Selected BLUE residual materials based on their chemical composition, especially the content of macro- and micronutrients, fatty acids, amino acids:



fish (cod, common ling, cusk) heads and backbones



rockweed
(Ascophyllum
nodosum) residues
from extraction
processes

Maroulis, M., Matsia, S., Lazopoulos, G., Pârvulescu, O.C., Ion, V.A., Bujor, O.-C., Cabell, J., Løes, A.-K., Salifoglou, A. (2023) *Chemical and biological profiling of fish and seaweed residues to be applied for plant fertilization*. Agronomy, 13(9), 2258, 1–32.



fish sludge from recirculating aquaculture systems (RAS)





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- ☐ Selected methods/technologies for treating BLUE residues:
 - > drying
 - > grinding
 - > pelletizing
 - > composting
 - > extraction
 - compost fermentation to obtain compost tea (CT)
 - impregnation of biochar with CT







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- **□** Selected BLUE residue-derived fertilizers/biostimulants:
 - > dried and ground fish (cod, common ling, cusk) heads and backbones
 - pellets obtained by mixing cod bone powder and rockweed (Ascophyllum nodosum) residues
 - ➤ BLUE residue-based compost (BRC) obtained by thermophilic composting of marine residual materials (fish bones and rockweed residues) with LECA (lightweight expanded clay aggregate) or woodchips
 - > compost tea (CT) obtained by fermentation of BRC
 - biochar (obtained by pyrolysis of wood residues) impregnated with CT
 - Filter cake from fish sludge resulting from recirculating aquaculture systems (RAS)
 - > rockweed residue-based biostimulant





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☐ Testing BLUE residue-derived fertilizers and biostimulants

for plant cultivation

Moloşag, A., Pârvulescu, O.C., Ion, V.A., Asănică, A.C., Soane, R., Moţ, A., Dobrin, A., Frîncu, M., Løes, A.K., Cabell, J., Salifoglou, A., Maroulis, M., et al. (2023) Effects of marine residuederived fertilizers on strawberry growth, nutrient content, fruit yield and quality. Agronomy, 13(5), 1221, 1–19.

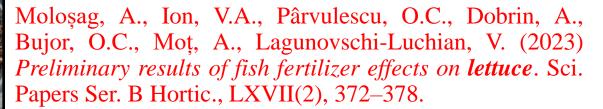






- cod and common ling bone powder
- pellets obtained by mixing cod bone powder and rockweed residues
- **compost** based on **fish and rockweed residues**
- rockweed residue-based biostimulant

had positive effects on plant growth/development and can be more efficient and eco-friendly options





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	30.14	NUARY 2024	y solutions
			Component material categories
		EU Organic	(CMCs)
Material	EU Fertilising Products	Farming Regulation	CMC2. Non-processed or mechan
	Regulation (FPR) 2019/1009	2021/1165	nrocessed plants plant parts or pl

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Fish meal

Fish product

aquaculture

sludge

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BARRIERS

processes Can be used as such under the conditions of CMC2 (plants and plant parts) and as inputs to CMC3 (compost), CMC5 (digestate), CMC13 (ashes), Seaweed CMC14 (pyrolysis or gasification materials), waste subject to the composting/digestion/combustion/ pyrolysis/gasification processes, if

Can be used as inputs to

composting/digestion/combustion

the processing of the seaweed was

performed only by the means

specified in these CMCs

CMC3 (compost),

CMC5 (digestate),

CMC13 (ashes),

subject to the

Authorised

(Annex II)

Use as input to composts is authorised

Authorised as far as are directly obtained by:

- (i) physical processes including dehydration, freezing and grinding
- (ii) extraction with water or aqueous acid and/or alkaline
- solution
- (iii) fermentation only from organic or collected in a

sustainable way

anically processed plants, plant parts or plant extracts CMC3. Compost

CMC5. Other digestate than energy crop digestate

CMC13. Thermal oxidation materials or derivates (including ashes)

CMC14. Pyrolysis or gasification materials

REGULATORY BARRIERS

- for fertilizers to be applied in **organic growing** - there is no regulation on acceptable additives and processing methods
- dead fish and manure from aquaculture and filter cake from fish **sludge** resulting from RAS - represent significant sources of nutrients, but are currently not allowed in **organic** production (except for fish sludge **based-compost**)

Collaboration between decision-makers and research and industry units is essential to develop/implement appropriate strategies to support the adoption of these new organic fertilizers and biostimulants



THANK YOU FOR YOUR TIME AND ATTENTION!



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