

MARIGREEN

November, 2023

E-Newsletter N°6

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Valorization of BlueBio mass for promoting plant growth!

The emerging European market for organic fertilizers: Is there an unexplored market for organic fertilizers produced using marine residues?

The European market for organic fertilizer

Both in certified organic farming and conventional farming, growers are interested in applying organic fertilizers.

The MARIGREEN project aims at valorizing residual materials from the BLUE sector, in different horticultural crops (fruits, vegetables, flowers, etc.).

In certified organic farming, synthetic nitrogen fertilizers are not allowed, and mineral fertilisers such as rock phosphate and potassium salts only when a demand is justified. Hence, animal manure and other biodegradable products are the main fertilizer options. In addition to manure produced on or close to the farms, certified organic farmers rely on commercial fertilizers produced from residual materials from conventional animal husbandry such as poultry manure, meat and bone meal, blood, horns, feathers etc. Many plant-based fertilizers are also applicable in certified organic growing.

Cod

Rockweed (*Ascophyllum nodosum*), commonly harvested from wild populations and applied for production of fertilizers and bio-stimulants

Dried sediments from cod residues (heads, backbones etc.) after grinding, acidification and removal of liquid fractions (hydrolysis). The main component is bone residues

Residues from rockweed after chemical extraction of liquid fertilizer products, a sludge with about 30% dry matter

Organic fertilizer made from dried and pelleted poultry manure may be enriched with blue materials such as cod bones and seaweed residues

Figure. Life-cycle of organic fertilizer produced on marine residues.

Being dependent on manure and fertilizers produced with residuals from conventional farming may impact the integrity of organic farming. Consumers may opt out of choosing organically grown products if they are not perceived to be sufficiently organic. Hence, organic farmers may be interested in fertilizers derived from recycled materials from other sectors. One option could be materials sourced from the sea. Currently, significant amounts of marine organic materials are wasted.



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The EU Farm to Fork strategy aims to increase the proportion of organic farmland from the current 9.4 % to 25 % by 2030. This is expected to substantially increase the demand for processed organic fertilizers. This underlines the importance to answer the question: where should the increasing amounts of raw materials required for fertilizers come from?

In conventional farming, mineral fertilizer is used to increase production outcomes. There is, however, an increasing interest among conventional farmers in soil health and the importance of soil organic matter. Organic and organo-mineral fertilizers are increasingly popular in conventional farming as well. Moreover, materials such as dried sludge and dead fish from aquaculture, are not permitted for use as fertilizers or soil amendments in certified organic farming. Instead, they may be valuable in organic or organo-mineral fertilizers applied in conventional farming. Demand for organic fertilizer in conventional farming is, therefore, also expected to increase.

Is there room for an organic fertilizer originating from blue residues?

Pot and field trials in Norway in which cod bones were applied have shown rapid and highly significant increases in plant growth, e.g. in leek, oats and ryegrass. The cod-bone based organic fertilizer gave better yields than the positive control, which was a commercial organic fertilizer made from poultry manure. Applying the same amount of total nitrogen from residues of the brown algae rockweed ("algae fiber") gave no yield increase in the year of application but a significant yield increase over several years subsequent to the application (residual effect).

A trial with table-top cultivated strawberries in a peat substrate amended with mineral fertilizers, conducted in Romania, showed that cod bones could replace mineral N fertilizer applied during the growing season. Bones from cod and other whitefish species, such as saithe, pollack, hake and haddock are available in significant quantities, and may be a promising material for producing a solid fertilizer that can be supplied to the increasing certified organic sector. The material is for example permitted for use in certified organic farming in Norway.

In the MARIGREEN project, we study what organic farmers in Denmark are willing to pay for organic fertilizer produced from marine residues and what characteristics organic farmers prefer in terms of pellets or granulation. The project is still in progress and results not yet available, but costs and benefits will be analyzed to reveal whether the marine based organic fertilizer is economically viable. The economic analysis will reveal whether the promising results for growth also can be transferred onto an economically attractive product for farmers.



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