



BIORETUR

– TURNING PROBLEMS INTO RESOURCES –

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Fish Sludge – The elephant in the fish farm

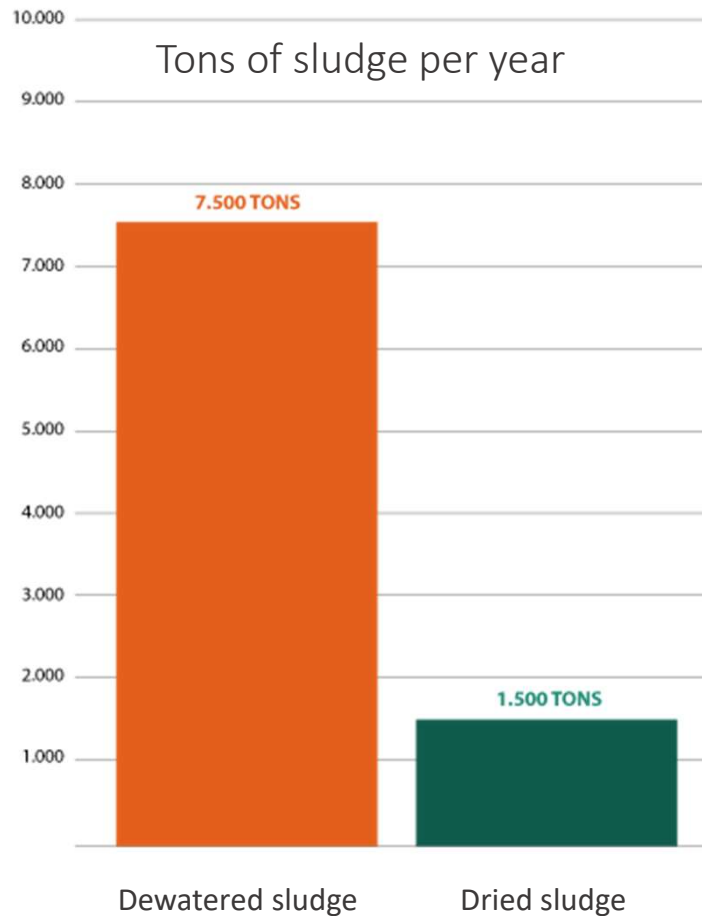


- Farmers must collect and dispose of waste – including the sludge.
- Stricter cleaning regulations from the county governors.
- Consumers demanding affordable and healthy yet sustainable food.
- This fish sludge in its raw form is not a fertilizer. The levels of heavy metals and risk of pathogens are too high to spread directly onto agricultural land. Salt is also an issue.
- Use of sludge in production of bio gas process still results in high volumes of excess bio rest material.



Amounts of sludge – Example

Typical fish farm with 10.000 tons biomass – disposal 500 km



Transportation costs and CO² emissions



150.000 transportation kilometers
375 tons CO₂ (SSB)
€ 970.000 in transport and disposal



20.000 transportation kilometers
75 tons CO₂ (SSB)
€ 150.000 in transport and disposal



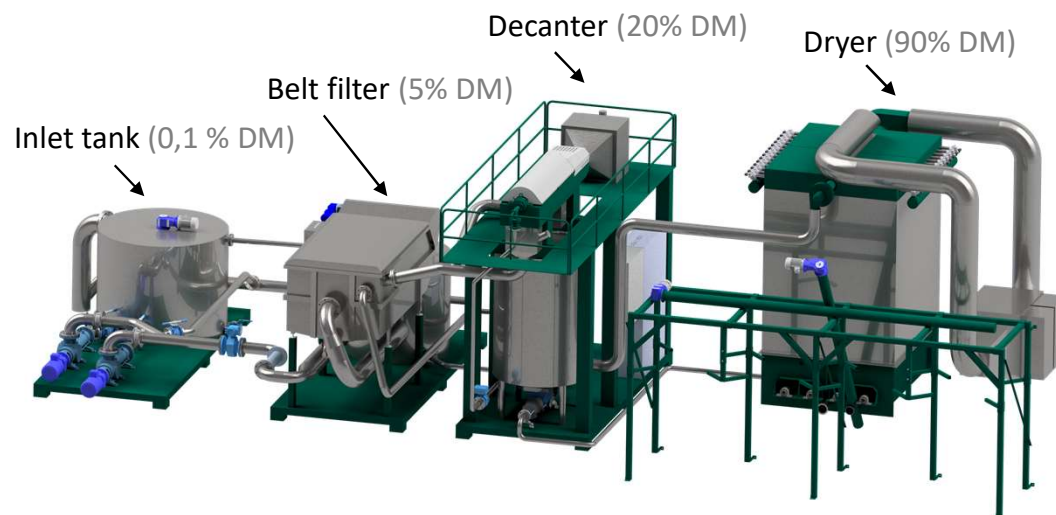
Sludge will be higher on the agenda moving forward



HOW DOES BIORETUR SOLVE THE PROBLEM?

The physical product

Bioretur sludge handling system



- Processes flushing water directly from drum filter. (*0,1% dry matter*)
- Hygienized and storage-stable sludge. (*>90% dry matter*)
- Step by step process using:
 - Belt filter
 - Decanter
 - Bioretur SHS-Dryer



The service

Bioretur agreement – one monthly fixed fee

TECHNOLOGY & EQUIPMENT



When you choose Bioretur you avoid the risk of investing in your own facility, all necessary equipment is covered in the agreement.

LOGISTICS & HANDLING



We ensure that sludge from the plant is handled in a responsible, rational and sustainable manner. Transport is challenging and requires prudent and well planned solutions.

OPERATION & MAINTENANCE



Daily operation and regular maintenance of the facility is carried out by our specialised personnel and ensures quality of service, stable operation and longevity of the equipment.

SUSTAINABILITY



Sustainable utilization of fish sludge that meets both fertilizer regulations and cleaning requirements as well as environmental concerns. The products benefit consumers, society and the environment.

Samples – outlet water

Lab tests from our locations shows good results

	Influent	Effluent	% Caught	% Released
TSS	1533 mg/L	166.7 mg/L	89%	11%
Nitrogen	78.4 mg/L	12.7 mg/L	84%	16%
Phosphorus	42.7 mg/L	5.9 mg/L	86%	14%
TOC	403.3 mg/L	33.3 mg/L	92%	8%

TERRAMARINE & BIORETUR

FERTILIZER PRODUCTION BASED ON RAW MATERIAL FROM
THE FISH FARMING INDUSTRY
ICELAND



TERRAMARINE

Terramarine & Bioretur offer

Terramarine AS is a Norwegian company, specialized in producing organic fertilizer from the fish farming industry, with an international sales network. Terramarine is owned by Hima Seafood – a large producer of rainbowtrout at landbased plants. Terramarine & Bioretur has been co-operating for many years.

FERTILIZER PRODUCTION



Terramarine can use fish sludge from Bioretur's processing facility at X location as an ingredient in a mineral organic fertilizer.

MARKET ACCESS



Terramarine have built substantial markets for export and sales of our mineral organic fertilizers.

PROCESSING PLANT



We have vast experience in designing processing plants, and create business opportunities and economics of scale.

CIRCULAR ECONOMY



We use valuable nutrients that otherwise would go to waste in production of fertilizer used in food production.

From sludge to Fertilizer



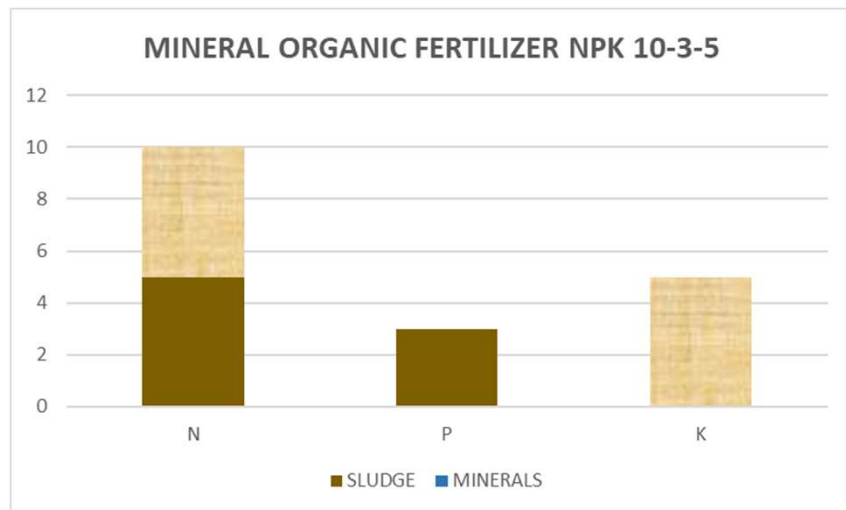
Fish sludge can be converted by to a mineral-organic fertilizer that can replace chemical fertilizer.

The product must be comparabel with ordinary chemical fertilizers in the market when it comes to:

- Particle size
- Smell
- Technical characteristics
- Storage stability
- Nutrient value
- Easy to use by farmers

Nutrient Value

- ✓ Sludge from smolt production will typically have 4-5% Nitrogen and 3-4% Phosphorus. The product lacks Potassium. The organic content is high (>70%).
- ✓ We can upgrade the sludge and make a mineral-organic fertilizer that is fully compatible with mineral fertilizers.



Processing Plant

The design of the processing plant depends mostly on the available volume of dried fish sludge. Terramarine are designing several fertilizer factories – all between 4.000 – 30.000 tons of organic /mineral organic fertilizer. There are definately some economies of scale.



Market Access

- There might well be a good local market for organic and mineral organic fertilizers in Iceland. Market research need to be done.
- If not, Terramarine have built a substantial market also in South East Asia, with a daughter company in Vietnam, giving possibilities of export or using Vietnam as a clearing market in low seasons in Iceland.



Circular Economy

- Our soil is worldwide threatened by overuse of chemical fertilizers, pesticides and insecticides
- We are saving valuable nutrients and organic material when we collect the sludge from the fish farming industry – and use it in new production of fertilizer and food.
- Organic fertilizers improve soil quality and stimulate the microbial life that is necessary for plant growth.
- By using organic fertilizers, its possible to reduce the use of pesticides and increase the farmers yields.



An increasing number of farmers let Bioretur take care of the sludge.



.. so that they can focus on producing quality fish!

An award winning concept

CHAMBER OF COMMERCE AND INDUSTRY



BERGEN CHAMBER & FANA SPAREBANK
SUSTAINABILITY AWARD 2021



SUSTAINABILITY INTERNATIONAL



ENVIRONMENT AWARD



HONORARY AWARD

