

Recirculating Aquaculture Systems (RAS): Potential test sites for effluent solids retrieval and waste valorisation for agricultural use

Main results / outcomes

RAS production systems re-use 85-95% of rearing water in constant circulation, thus technologies for collection and rapid removal of waste products are essential to prevent the accumulation of toxic metabolites. Suspended solids and dissolved nutrients originate from uneaten feed, metabolism (faeces), micro-algae and bacteria, and correspond to ~17-25% of the feed input.

Turbulence of water turnover in RAS is a challenge for solids collection as it causes the disintegration of large particles into smaller fractions which are more difficult and time consuming to settle and remove. Additionally, for the smooth operation of the best practice mechanical filtration (drum filters) the backwashing of the filter dilutes the outputted suspended solids concentration while increasing discharge volume. Very low concentration of dry matter (0.7-6.3g TSS/L) evidenced that it is not viable to use sludge directly from the drum filter. Coagulants can increase settlement rates but reduces valorisation potential as phosphorus will become tightly bonded and unavailable for uptake in agricultural settings.

Practical recommendations

Settlement and filtration increases complexity and costs for producers. There is a need for technological solutions that primarily dewater sludge (70-80% solids) to support low-cost transport to biodrying facilities integrate seamlessly with daily operation procedures. Sea2Land project provides optimal opportunity to explore these options and ensure relevance to aquafarmers



Fig 1: RAS as a closed system provides opportunities for wastes valorisation in an already high-tech environment, but space and operator time are at a premium.



Fig 2: Vacuum filtration can achieve needed TSS in pre-concentration small scale for shipping, but is labour and time intensive

Further information

Johansen, et al. (2019) Innovative methodologies for reusing aquaculture side streams [\(Link\)](#)

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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