



SmartGeoFish

A solution to keeping fish in RAS safe from toxic nitrogen



Consistently good water quality supports fish that feed well and efficiently convert their feed to weight gain, which increases the profitability of RAS operations. The accumulation of toxic nitrogen compounds is one of the biggest operational concerns in such systems.

Recirculating Aquaculture Systems (RAS) are used worldwide to produce many fish species in a more efficient controlled environment. A recirculating aquaculture system is an almost completely closed circuit. The culture water is purified and reused continuously. The produced waste products: solid waste, ammonia, and CO₂, are either removed or converted into non-toxic products by the system components.

One of the critical elements of the RAS system is the biofilter that allows water to be recycled. It converts toxic ammonia, first to nitrite, then to nitrate using different sets of bacteria. The presence of ammonia in the culture water is the result of fish metabolism. It can cause gill and organ damage in fish.

Nitrogen enters the system as protein in the feed. Depending on the feed conversion efficiency, some of this accumulates in the animal tissues; the rest is excreted as ammonia and organic nitrogen through the fish gills or as urine. Uneaten food can also be a source of ammonia.

Besides ammonia, the intermediate product, nitrite is also toxic to fish, and it limits the ability of the blood to carry oxygen, which means that fish can suffocate. The fish species have different sensitivity to nitrite concentration. It is close to zero for salmon and trout.

SmartGeoFish project aims to empower RAS managers to supervise better and manage the nitrogen cycle. The project aims to demonstrate that its technical solution allows real-time monitoring to avoid water quality issues, high water exchange rates or other system failures that stress fish and reduce feeding. The system can be configured to provide warnings and alarms when desired levels are exceeded, which can flag any operational problems with the biofilter.

More on SmartGeoFish: <https://campdenbri.hu/en/palyazatok/en-smartgeofish.php>



Digital Innovation Hub

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Project Coordinator

www.campdenbri.hu/en/en-magyarorszag.php



Fish producer SME

www.geofish.hu



Technology service provider

www.seacon.hu/en/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 818182

Source of picture: www.geofish.hu