Mixotrophic Phytocleaners: A new technology for the recycling of Aquaculture RILs

DESCRIPTION

FDM Biofilters are a new technology for the treatment of RILs for Aquaculture. In just one stage they manage to provide dissolved oxygen and purify eutrophication agents such as ammonium, nitrite, nitrate, phosphate, CO2, and trace metals such as iron, copper and zinc, increasing from 2 to 9 the contaminants purified from the aquaculture RIL, avoiding costs of aeration, degassing and pH stabilization. FDM Biofilters can be implemented by renovation or conversion kits, replacing standard plastic biomedicals with organic biomedical (biodegradable) rich in carbon, proteins, and Omega 3 and Omega 6 fatty acids, which can be reused for the sustainable production of fertilizers, food, fuels, oils or pigments. In addition to reducing the size of the Biofilters 50 times or speeding up the hydraulic retention and maturation times 50 times. Managing to improve salmon production by minimizing start-up times and increasing feeding rates.

OPPORTUNITY

In Chile there are latent zones and zones saturated by environmental contamination. In the Araucanía region, an area characterized by its wide distribution of fish farms, Lake Villarrica is in the process of being decreed a Saturated Zone (MMA, 2017), which disables the growth of the aquaculture industry throughout the area and increases socio-environmental conflicts that have been occurring in recent years around aquaculture production.

For this reason, the industry requires the incorporation of technologies and innovation to comply with the demanding national and international certifications in the areas of quality, food safety and the environment, which allows to continue generating exponential growth in production and continue to be a benchmark for world level.

APPLICATIONS

Although the FDM Biofilters are in the validation phase in the aquaculture industry, the perspectives of use are diverse, involving industries that in their production process require the use of water such as the sanitary, textile, fruit and mining industries, among others.

▲ Year after year the socio-environmental conflicts that have been occurring in recent years around aquaculture production increases.

ADVANTAGES

1. Unique Biomedical in the market: FDM Biofilters have an organic biomedical, with a filter area of 120,000 m2 / m3 with respect to the plastic biomedical commonly used in aquaculture that has a filter area of 600m2 / m3.
2. Smaller Size: FDM Biofilters are 50 times smaller than the competition, allowing them to be incorporated in a modular way, reducing investment costs in installations with large structures.
3. Higher Efficiency: FDM Biomedicals reduce Ammonium, Nitrite, Nitrate, Phosphorus, Carbon Dioxide, Copper, Iron and Zinc simultaneously quadrupling the number of pollutants purified.
4. 3 in 1: FDM Biofilters combine 3 processes in 1 (Oxygenation, Degassing and Biofiltration) Reducing costs in the use of pumps and basifying agents.
5. Greater sanitary control: FDM Biofilters prevent the appearance of pathogens by stabilizing the pH, in addition to being a modular RAS, it prevents cross-contamination of diseases in swimming pools.

INVESTIGATOR

Sergio Rodríguez Leal
Engineering in Marine Biotechnology and Aquaculture, Development of Oceanographic Instruments and Biotechnology.

Universidad de Concepción
Linkedin: fdm-biofilters

INTELLECTUAL PROPERTY

- Technology owners:
  - Ingeniería y Bionegocios FDM SpA
  - COPEC-UC Foundation
- In process of Patenting
- Available for licensing

INVENTORS

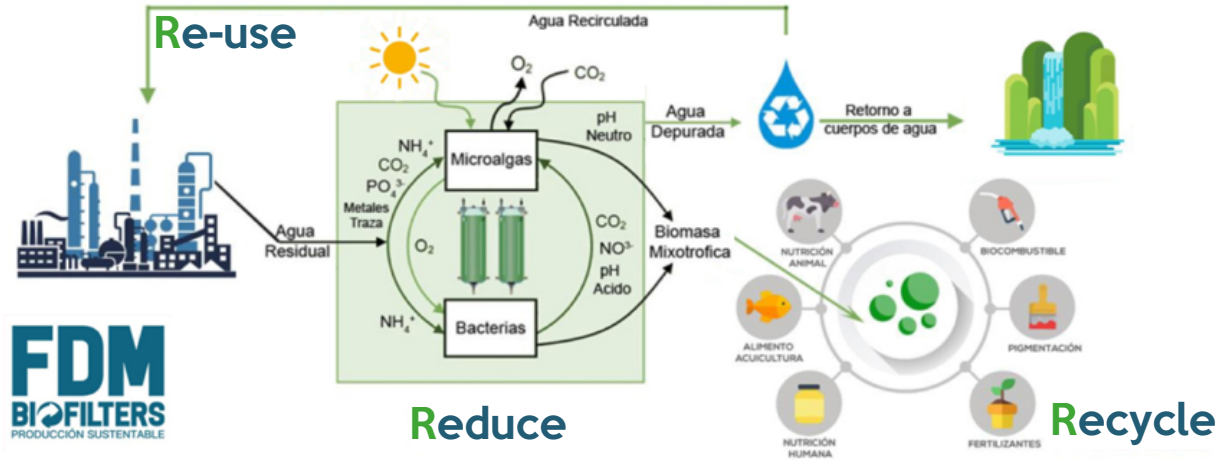
Ingeniería y Bionegocios FDM is a start-up dedicated to conducting research, development and innovation (R + D + i) in the aquaculture sector. We have developed a technology for the purification of wastewater from fish farms, based on micro-algal-bacterial consortia linked to organic nanoporous media (FDM Biofilters). During the short but intense working time of our company we were winners of the Apply your Idea 2017 award, Brain Chile 2018, Young Researchers COPEC-UC 2018 and Join to innovate 2019. Our company differs in that we believe in sustainable production, developing friendly processes with the environment.

Business Name: Ingeniería y Bionegocios FDM SpA
Legal Representative: Sergio Rodriguez Leal
RUT: 76.950.495-8
Address: Aurelio Manzano 594, Concepción, Bío Bío, Chile
Course: Research and experimental development in the field of natural sciences and engineering.

STATE OF DEVELOPMENT OF TECHNOLOGY

Through the CORFO funds, Apply your idea COPEC-UC and BRAIN Chile, we managed to develop an innovative technology that allows the sustainable treatment of aquaculture RILs, which we have called Mixotrophic Phyto-Debugging or "FDM", for its acronym in Spanish, being able to Abate about nine pollutants in wastewater, mainly nitrogen and phosphorous, stabilize the pH of the water and provide oxygen to the water, converting the aquaculture RIL into biomass of commercial interest. Today we have completed the validation process of this technology outside the TRL 5 laboratory in a prototype of the FDM Biofilter scaled to a 100 L reactor in a 3000 L pilot aquaculture recirculation system with a salmon density of 30 Kg / m3 obtaining successful results. In addition, market prospecting and strategic alliances have been carried out with entities such as INTESAL, five salmon farms interested in the development of technology (Sociedad Comercial Agricola Forestal Nalcahue LTDA., INVERMAR, Salmones Austral, Australis Seafood and Salmones Aysen), and it was achieved that the company Sociedad Comercial Agricola Forestal Nalcahue LTDA. will become our Early Adopter and Third Party Provider for this project.

Our interest in this project is to be able to carry out the tests in a real environment (TRL6) allowing us to obtain exact data for the scaling (dimensioning) and modeling of a commercial FDM treatment plant, together with a modeling system for future treatment plants of FIL aquaculture RILs. A small-scale industrial plant mobile prototype will be built that includes 3 reactors that will allow all tests to be carried out with replicates in triplicate, thereby reducing systematic errors. An automatic system for harvesting and sowing biomedical SSC will be designed and built in line with the reactors that will allow validating the biomedical life span and defining the time of change of plant inputs, as well as validating the operation at scale in an industrial operating environment (TRL 7).



FOR MORE INFORMATION

Fundación Copec-UC
Atilio Ziomi
Commercial Manager
aziomi@uc.cl
+56 2 2354 1942

FDM Biofilters
Sergio Rodríguez Leal
Biofilters CEO
Linkedin: fdm-biofilters
www.fdmbiofilters.cl