

Technology solutions for the aquaculture sector

Carlos Mazorra, Director of Innovation and Enrique Amaré, CEO of SMARTWATER PLANET share with us their thoughts on affordable technology solutions for the aquaculture sector

SMARTWATER PLANET, S.L. provides affordable technology solutions for water quality, health monitoring, zero waste & circular economy in the aquaculture sector.

SMARTWATER PLANET is a relatively young company; however, it gathers the expertise of a multidisciplinary team, with more than 20 years of experience in the sector. What sector? Definitely, aquaculture!

“At SMARTWATER PLANET we believe in an aquaculture sector with zero waste and circular economy circuits. We develop affordable technology solutions within an eco-aware and environment integrative framework. Our goal is to contribute to efficient production, water quality monitoring & management solutions, fish health monitoring, and effluent re-utilisation,” says CEO Enrique Amaré.

The company's main office is located in Madrid, with agents also based in Northern Spain. The main output of SMARTWATER PLANET are technology products and an array of applications derived from them.

Technology solutions for the aquaculture sector

MEDUSA is an autonomous, rechargeable plug and play multifunctional IoT device continuously measuring real-time water quality, physicochemical parameters. “MEDUSA is a small —



“Tests of MEDUSA v2.0 Prototype at Molino de Cega Aquaculture Centre - January 2021”

20cm diameter — floating platform that can be deployed in a pond or tank, or any other kind of body of water, collecting real-time water quality data, and sending them to SMARTWATER's cloud servers for data management and machine learning model optimisation. There are options for 85 different parameters, with a current configuration of five sensors in the platform (O₂, Temperature, Conductivity, NH₄ and pH),” says Amaré.

SmartWater has also developed an IT suite for optimising fish farm production, sustainability and business potential, which combines the advanced sensors of MEDUSA, with a business and production management system (called SMARTWATER CLOUD) enhanced with machine learning capabilities (AI-based software based on smart fish models, and active learning), developed in close cooperation with farmers to ensure user's requirements are met.

EU projects in aquaculture

“We are involved in a number of EU projects, developing and applying our technology to data management, benchmarking, AI and prediction tools,” Carlos Mazorra, Director of Innovation notes. “Our R&D is always aiming at putting new products or applications in the market, to offer new solutions to current and persistent production problems, often with a disruptive approach. Take PathoGelTrap, for instance,” he adds.

In this EU project, PathoGelTrap, SMARTWATER PLANET coordinates and joins efforts with the scientific expertise of CSIC (Consejo Superior de Investigaciones Científicas, Spain), IZSV (Istituto Zooprofilattico Sperimentale del Venezie, Italy), IFPAN (Instytut Fizyki Polskiej Academi Nauk, Poland), UCD (University College Dublin, Ireland), and VerTech (France). [PathoGelTrap](#) is founded under the European Framework Programme for

R&I, Horizon 2020. Through a pioneering technology based on bio selective hydrogel-forming proteins, the idea is to transform the future of aquaculture with a disruptive pathogen-trapping technology capable of targeting and removing specific pathogens from water in fish farms, without affecting the fish and avoiding the use of antibiotics.

Preventing pathogen infections in intensive aquaculture

Strategies followed to control and prevent pathogen infections in intensive aquaculture have important drawbacks, turning the future sustainability of global fish production into a great challenge. Sustainable solutions for preventing and controlling pathogen hazards are used in organic aquaculture (quarantine, lower fish density, better health management, etc.). However, these solutions are difficult to transfer to intensive farming. In this context, new models to control and prevent pathogen infections are urgently needed for ensuring the longevity and sustainability of the so-called "Blue Revolution".

"PathoGelTrap's envisioned technology proposes a new fish health management model that allows prevention and control of infectious diseases by selectively blocking the pathogens directly in the water, complementing and surpassing the current technological paradigm that focuses on disease prevention through the direct action over the fish by vaccines or broad-spectrum antibiotics which could affect the environment microbiota. Besides, this technology opens the door for a disrupting way for future pathogenic disease control," argues Mazorra.

The application of LLPS is a very innovative field, and the project will integrate computer-based (in silico), in



Carlos Mazorra, Director of Innovation

vitro and in vivo methods to design and test PathoGelTrap technology to cover the knowledge gap in self-assembling LLPS biomaterials engineering. PathoGelTrap technology targets two types of pathogens, one virus and one bacterium, to cover a spectrum of pathogens and reduce the risk.

"We will offer two formulations: PathoGelTrap Liquid (flocculant) and PathoGelTrap Filter (gel). These two strategies allow us broad flexibility: PathoGelTrap Liquid could be used in closed farms while the PathoGelTrap Filter could be used also in open farms, in the form of mobile filters," declares Enrique Amaré.

Affordable and intelligent technology solutions

The company is also designing a trout farm near Segovia in central Spain. It will combine several technologies in a holistic approach to procure a low water footprint such as recirculation modules, hydro and geothermal resources, water re-utilisation for vegetable crop production, and the production of organic-certified trout. The farm will be partially supplying trout to a fishery, also part of the business plan, and eventually, organic-certified eyed eggs.

The company is certainly projecting internationally, as the aquaculture market is a global one. "We have



Enrique Amaré, CEO

recently won a competitive bid for a contract in Italy, on an intelligent solution for the monitorisation and management of the migration of fisheries populations in a natural lagoon," Enrique Amaré points out.

"SMARTWATER PLANET aims to deliver accessible, affordable and intelligent technology solutions," says Amaré; "We are ready to lead the leap from personal-experience traditional Aquaculture to AI-supported eco-friendly and economically efficient fish farming. Every aspect of it, from efficient production to water quality management, fish health monitoring, and effluent re-utilisation, is within our interests."



PathoGelTrap (no. 899616) and Medaid (no. 727315) have both received funding from the European Union's HORIZON 2020 Research Programme

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