

SmartGeoFish - Innovative service for sustainable intensive aquaculture



CONSORTIUM

Campden BRI Hungary (Hungary) (<https://www.campdenbri.hu/en/en-magyarorszag.php>)

Geofish (Hungary) (<http://www.geofish.hu/>)

Seacon Europe (Hungary) (<https://www.seacon.hu/en/>)

SmartGeoFish DIH service will focus on improving the Hungarian intensive aquaculture system's resource efficiency and food safety by technology concept development and adaptation and ecosystem service elements. The project will demonstrate the opportunities of IoT tools for data collection and analysis at RAS to maximize feed utilization and minimize environmental impacts during production.

ROLES IN THE PROJECT

The consortium has all the important knowledge, experience and resources to develop the DIH service in industrial, food safety and water treatment segments.

CBHU

based on its expertise in food safety and technology as a DIH partner, develop a business model for services and provide networking opportunities for relevant players in the supply chain, develop a DIH strategy and facilitate the future success of new DIH services

GEOFISH

(fish farmer company) as customer provides all relevant data and ensures experiences for creating the DIH service

SEACON

(IT company) as technology provider will implement a food safety solution and build a database and control/information system

The results will be reflected in the domestic and international offerings of the DIH network.

PRIORITY OBJECTIVES

- reducing water usage while improving resource efficiency*
- reducing the involvement of human resources*
- eliminating waste through more intensive utilization of feed and lower water consumption*
- ensuring necessary transparency to meet food safety and quality requirements*

GENERAL PROBLEM

The water quality is a key factor in the efficiency of fish production and significantly affects fish flesh quality and resource management. The RAS technology enables the control of the most environmental conditions. Optimal water quality is achieved by the regulation of cascading biological processes.

Nitrogen compounds of fish and bacterial metabolism, like ammonium and nitrite, in elevated concentration can have adverse effects on the production

- The feed conversion ration declines, more feed is needed to reach 1kg weight gain;
- Environmental stressors can contribute to diseases leading to higher mortality;
- Insufficient water quality can affect fish flesh quality (safety, taste).

In addition, in the absence of measurement and control, the following difficulties are to be expected:

- water consumption increases, therefore, the production costs increase;
- the development of the fish becomes unbalanced, the weight gain will not be optimal;
- the supervision of the system requires too much human resources.

In the absence of proper data processing and decision support, it is almost impossible to set parameters and monitoring conditions adequately.

OBJECTIVES

SmartGeoFish will be a service package of technology concept development and ecosystem activities to answer to primary needs of the companies in relation to resource efficiency and food safety. SmartGeoFish will demonstrate its capability for technology concept development and adaption by using Geofish Ltd. as a test farm. Existing IoT solutions for water quality monitoring and improved transparency will be adapted and demonstrated to broader audience to enable to improvement of the digital uptake of the aquaculture sector.

The IoT based service enables the monitoring of some crucial water quality parameters via sensors and ensures continuous data collection, control and intervention to maintain optimal water quality. The template-based data recording together with the objective data gathering and novel data processing methods make possible the concatenation of data and the digitization of the fish production process.

Realizing the project the services of DIH will be extended for this areas improving transparency on the whole chain and following up where, when, how was the product produced. The store code of the packaged goods can be taken to a link where the information about the origin, fry, nutrients, fish rearing conditions is displayed. The consumer can be widely informed about the entire supply chain.

SOLUTION

For extending the DIH services intelligent data templates and specific sensors will be adapted and implemented to collect data and information on environmental parameters, like water quality and the farming procedure. Currently, the control of water supply and water exchange is based on the real-time measurement of temperature. However, monitoring of other components would also be essential to increase the efficacy of fish production. The defined parameters for an extended monitoring program are ammonium, nitrite, nitrate, dissolved oxygen and pH. Based on new water quality parameters, the automated control of feed dosage, water exchange and air blower intensity will be implemented.

Applying the proposed solution, it will be possible to follow the life cycle of the manufactured products based on digital monitoring, the management and evaluation of the parameters describing the quality and product characteristics will be transparent.

By implementing of the cloud-based smart monitoring/controlling system for the geothermal water fed RAS will available food-related information to a wider audience.