

# INTELFISHTANK

**Development of an intelligent fish tank for cost effective aquaculture through control of water quality in each different fish tank**

## The Challenge

The implementation of higher restrictions on the placement of ocean-based fish cages (due to environmental constraints) calls for the need to research technologies that make land-based fish farming more successful, both with respect to fish quality as to economical incentives.

Water quality, with oxygen being the most important water quality parameter, is the most critical factor in aquaculture and is essential for the survival rate as well as growth rate of fish in the different phases of their life cycle. An efficient oxygenation (i.e. the addition of oxygen to a system) and water distribution is therefore of utmost importance for a fish farm's productivity.

## Project Objective

The aim of the INTELFISHTANK project is to develop a cost effective, high efficient system for oxygenation and water distribution in an integrated aquaculture tank system for land-based fish farming, enabling control of water quality in each different tank in an aquaculture plant. Such a system should enhance the productivity per m<sup>3</sup> effective tank volume by increasing density of fish in aquaculture tanks as well as increase the growth rate, hence improve productivity, reduce costs and improve cost/efficiency and competitiveness of land based fish farming in Europe.

## Key Points

- The principle innovation in this project is the development of an oxygen micro-bubble diffuser and a stream generator controlled by a sensor- and control system for oxygenation and water flow. The technology is intended for production of different types of fresh- and saltwater fish – both bottom fish and free-swimming species – in the land-based fish farming industry in Europe.

### EATiP Thematic Area of Relevance

**TA1:** Product Quality, Consumer Safety and Health  
**TA2:** Technology and Systems  
**TA3:** Managing the Biological Lifecycle  
**TA4:** Sustainable Feed Production  
**TA5:** Integration with the Environment  
**TA6:** Knowledge Management  
**TA7:** Aquatic Animal Health and Welfare  
**TA8:** Socio-Economics and Management

### Key Words

RAS, recirculation, tank, water quality, land-based

### Project Information

**Contract number:**  
017977  
**Contract type:**  
FP6 SME Measures  
**Duration:**  
24 months (July 2005 – June 2007)  
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## Output Highlights

INTELFISHTANK identified key requirements for such systems:

- An efficiency of at least 95% with respect to oxygenation of the water must be ensured
- Homogenous water quality in the tank, whereby oxygen saturation should vary with less than 10%, regardless of height and diameter of the tank, making it possible to increase the normal density of the biomass in the tank by at least 10%
- Water current should be adjustable within a range of 8 to 25cm/s with a variation of less than 20% in 95% of the tank volume for self-cleaning effects and transportation of organic matter to water outlet
- Oxygen saturation can be controlled and adjusted within the range of 50 to 120%, based on requirements of the different species and different phases of the life-cycle.
- This should all be possible with an energy consumption of less than 4,1 W per unit inflow (in cubic meter per hour) of seawater (with a salinity of 33 ppt); and less than 15,0 W per unit inflow (in cubic meter per hour) of freshwater.