

## “INTELFISHTANK”

### Development of an “intelligent fish tank” for cost-effective aquaculture production

*European aquaculture production has increased substantially over the last decades. However, overall production growth in Europe over the period 1994-2003 was 5,5% less than the global trend over the same period. In addition, the overall price trend was negative vs. positive global development. The aquaculture sector has experienced increasing competition from non-EU countries, especially Asia and South America, making it imperative to increase research and development in this sector.*

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.

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.

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.

Other system requirements are:

- An efficiency of at least 95% with respect to oxygenation of the water must be ensured;
- A homogenous water quality has to be created 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 with at least 10%;
- The water current should be adjustable within a range of

**Project acronym:**

INTELFISHTANK

**Full title of Project:**

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

**EU contract number:**

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**Web-site:**

[www.intelfishtank.com](http://www.intelfishtank.com)

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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; and

- The 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.

Moreover, the manufacturing of the technology must be done at a price of less than 75€ per m<sup>3</sup> water for a tank with a diameter of 8m and a height of 2,5m.

The INTELFISHTANK project began in January 2006 and will run for two years. So far, prototypes of the oxygen gas diffuser, water streamer and control system have been built and installed in a full-scale fish tank under operation for validation testing. The results from the tests are expected by the end of 2007.

**“THE PRINCIPLE  
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