AQUAETREAT

Improvement and innovation of aquaculture effluent treatment technology

The Challenge

It is widely acknowledged that eating fish is beneficial to health, and fish consumption is increasing worldwide. However, effluents produced by fish farming activities still pose some risk to the environment. If these effluents, containing fish faeces and uneaten feed, etc., are not disposed of properly they can contribute to the pollution of water bodies. As the world population and economy continue to grow, water will become an increasingly important commodity. The European Union is therefore committed to promoting and encouraging the sustainable use and efficient management of water resources.

Project Objective

The core objective of this project is to develop and provide effective effluent water and waste treatment options, which are economically viable, for professional European aquaculture. AQUAETREAT looked at the need for fish farms to improve the management of wastewater and solids, to minimise pollution and optimise the recovery, disposal and reuse of solid waste.

Key Points

- Development and implementation of cost-effective systems for the treatment of aquaculture farm effluent and the valorisation and reuse of the products and by-products plus onsite testing of the new systems.
- Achievement of technological and knowledge-based results addressing common problems in the sector and strengthening of the technological base of European aquaculture.
- Development of new applications and skills which address and respond to the requirements for the sustainable development of the European aquaculture sector.
- Development of a specific training programme for SME managers, technicians and young researchers, accompanied by a capillary plan for the transfer of innovative skills and technology to European farmers.
- Investigation of the different multi-disciplinary aspects of the project's subject (technological, biological, physiological, ecological, environmental and economic).

Aquainnova

www.eatip.eu

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

Aquaculture, effluent, waste management, water quality

Project Information

Contract number:
500305
Contract type:
Collective Research Project
Action line:
SME Horizontal research activities involving SMEs
Duration:
45 months (15/05/2004 – 14/02/2008)
Coordinator:
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Updated: September 2010

Output Highlights

New technology
Developed effluent treatment systems, applicable to all types of land-based fish farms (open and closed systems, fresh water and marine operations) regardless of species. These treatment systems were tested at three sites and were supported by an Italian engineering SME with expertise in treating effluents. The systems designed were proven to be cost-effective and allowed efficient effluent removal and sludge thickening.

Water recycling
The composition of all flows were characterised and protocols and methods set up for the re-use and/or disposal of waste and by-products. The quality of the recycled water was tested by using it to rear sea bream larvae. Preliminary results showed higher growth rates and less mortality, as well as a comparable quality of the flesh, which was certified by a panel of experts. Parameters of welfare were also assessed. Fish farmers will now be able to produce cleaned water that can be safely discharged to the environment or recycled inside the process units thereby reducing their demand for water extracted from watercourses. A constant supply of clean water is essential for fish growth and health.

Sludge reuse
Although filters are currently employed to clean water in fish farms, there are no means of reusing waste products, and fish farmers must bear the cost of waste disposal. The effluent treatment systems developed during this project enabled fish farmers not only to reduce the amount of waste they produced, thereby lowering disposal costs, but also to create potentially commercial products. The solid waste could be used as a soil enhancer or compost for agriculture. An agricultural test whereby tomatoes were grown using marine stabilised sludge also showed promising results. In order to avoid high transport costs; it is advisable for fish farmers to reuse sludge inside or within the area of the fish farm.

Sludge composition
Nitrogen and phosphate may be limiting factors, but preliminary studies have excluded the presence of potential pollutants such as heavy metals, poly-aromatic hydrocarbons and Polychlorinated biphenyls (PCBs).

Manual on effluent treatment in aquaculture: Science and Practice
The manual is intended to be a practical tool for land-based aquaculture in the implementation of water treatment technology to improve their environmental efficiency and credentials.

Training
An extensive dissemination and training plan was foreseen within the work programme of the project and included four regional workshops and four training courses which focused on updating and upskilling managers and technical staff of

The Full Report:
For a description of the research project, visit www.aquaetreat.org

Next Steps – Suggested Actions/Follow On

RTD/SME

- Not only did the project produce technologies for efficient sludge removal and concentration, but also for re-use that could have added value in the development of new and diversified products for these types of fish farms. Further evaluation of this potential would be advantageous to the sector.

Enviroment

- Effluent treatment, recirculation system and related technology and techniques that can reduce the impacts of aquaculture on the environment are even more relevant now than at the start of the project and this on a worldwide basis, there is therefore the need to further develop these technologies.

Policy

- The AQUAETREAT handbook on effluent treatment is a simple and practical text that could support policy making at a national and European level.

Related Publications/Projects

The AQUAETREAT manual is available at http://www.aquaetreat.org/aquaetreat/manual_en.asp
Workshop presentations from AQUA 2006 are at http://www.aquaetreat.org/aquaetreat/aqua2006program_en.asp