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SHELLPLANT

Development of a novel production system for intensive and cost effective bivalve farming

The Challenge

The shellfish farmers and the technology and service providers in the aquaculture industry are experiencing increasing non EU-competition, especially from Canada, New Zealand, Australia and Japan with regards to shellfish aquaculture technology. These high technological countries are focusing on innovation and product development to reduce shellfish production costs and increase the quality, and are increasingly focusing on the European market demand for seafood. In Europe, the fundamental issue is therefore the improvement and maintenance of competitiveness, productivity and durability of the aquaculture sector as a whole. Further development of the industry must take an approach where farming technologies, socio- economics, natural resources use and governance are all integrated to achieve sustainability.
The ShellPlant project will focus on improving the profit of European shellfish sector and initiate the process of enhancing the level of innovation and exploitation of technology, in order to dissolve the obstacles of today's challenges of intensive shellfish production.

Project Objective

The ShellPlant project aims to develop a plant for closed production of bivalves (primarily high valued scallops and oysters). The plant will include a cultivating system for bivalves in an innovative rack system, an algae photo bioreactor and a feeding and water exchange system with intelligent controls. The coordinator company Bioframe has done several tests with a floating closed system for the nursery phase and grow-out of bivalves and the project will build on this promising early technology developments.

Key Points and new knowledge generated

Biological requirements and standards for bivalve shellfish farming
A reference document identifying specific biological requirements and standards concerning bivalve shellfish farming, focusing on scallops (Pecten maximus), oysters (mainly Ostrea edulis) and carpet shell (Ruditapes decussates, Ruditapes philippinarium, Venerupis pullastra).The report includes data on the European bivalve market, including a case study of the Portuguese market showing customers' preferences related to type of commodity and quality parameters.

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

Bivalve production, closed production, shellfish, feeding system, water exchange system

Project Information

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SME-1 Research for SMEs
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24 months (01/01/2010–31/12/2011)
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SEVENTH FRAMEWORK PROGRAMME

Updated: September 2010

Requirements of the Shell Plant system
Technical requirements of the foreseen ShellPlant system, especially focusing on technical requirements for the microalgae productionmethods, cultivation systems and design considerations are reviewed, and the report also considers effects of lighting (light/dark cycles), gas liquid mass transfer (CO2 transfer systems, oxygen removal), hydrodynamic stress, and temperature effects. Furthermore, nutrients and nutrient supply, nutritional value of microalgae, growth dynamics, quantification of algal biomass, batch, continuous and semi-continuous culture methods are discussed.

Design for production unit and water flow system
Evaluating the different tank designs for a closed aquaculture system for intensive production of scallops, oysters and clams. Different shapes and configurations of bivalve production units have been compared and evaluated, and recommendations are provided. Moreover, the development process of the ShellPlant holding units is described in detail and includes theoretical studies, design evaluations and a material study.

Potential Impacts

SME

- Reduce shellfish production costs.
- Increase shellfish quality.
- Improve and maintain the competitiveness, productivity and durability of the aquaculture sector as a whole.