Final Report Summary - CRAB (Collective Research on Aquaculture Biofouling)

The antifouling sector progressed significantly during the past years; however none of the developed novelties can be directly applied in aquaculture to reduce the implementation of toxic antifouling strategies. The CRAB project utilised the existing knowledge base and performed research at the European level in order to develop innovative, sustainable approaches to solve existing problems and provide feasible biofouling prevention and management strategies for the aquaculture industry. In this context, CRAB overall objectives were to define the problem of biofouling in economic and scientific terms, identify and promote promising techniques and supply stakeholders with best practice solutions.

The issues which had to be addressed included biofouling on infrastructure as well as on farmed species. Training and dissemination activities were of high priority throughout the project to ensure that CRAB proposals would be directly applicable within the industry and that the farmers would have the knowledge and skills required for optimal selections.
The project was structured in seven interrelated work packages which undertook the following activities:

1. **assessment of requirements and selection of strategies.** Desk studies were conducted and a questionnaire targeting end users was prepared to estimate the effects of biofouling in aquaculture.
2. **development and modification of existing technology in the fields of interest.** The analysed techniques included biological control of critical species, protective materials and coatings, enzyme-based treatments, husbandry and cleaning practices, electrochemical antifouling and colour treatment.
3. **laboratory tests to evaluate the efficacy of the selected strategies under controlled conditions and to assess them in terms of material performance on critical aquaculture surfaces.**
4. **farm trials to evaluate actual biofouling pressure on different sites and to verify the acceptability of the proposals under working conditions.**
5. **environmental and economic risk assessment of existing and alternative technologies, including potential economic impacts, effects on stock and health and safety issues.** The cost and benefit estimates were based on questionnaire responses which were provided by small and medium enterprises (SMEs).
6. **dissemination of the acquired knowledge in the form of a biofouling manual and best practice guidelines which were accessible via the project website.** In addition, the project was presented in various international conferences and scientific events and articles were published based on CRAB outcomes.
7. **presentation of the guidelines in local training events in the participating countries and preparation of an electronic training tool.** The organised workshops highlighted the options that were relevant to the event's region and the prevailing aquaculture activities.

The design of a standard protocol was necessary to conduct a baseline study that would result in homogeneous outcomes for different locations, conditions and materials. As a result, fouling evolvement was monitored on standardised panels and information on salinity, temperature and turbidity was regularly collected. The different fouling species were identified and analysed with regards to their dispersion, temporal variability and effects.

The adoption of best practices focused on the low cost margins, priorities and operating conditions of the aquaculture sector, which imposed the development of practical and affordable methods. Numerous performance criteria were developed, based on an extensive literature review, to allow for the assessment of large scale solutions during different test stages. The criteria included antifouling efficacy, application methods, coating integrity, durability, economic efficiency, sustainability and compatibility with other methods. Finally, the project evaluated proposals which were not yet developed for large scale applications, such as enzyme options for shellfish cleaning, colour exploitation to prevent the installation of fouling species and electrochemical antifouling methods.

**Related documents**

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