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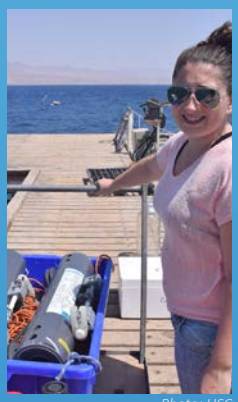
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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 612717

Project rationale, approach, and objectives

News: 1st International Symposium on Quorum Sensing Inhibition & Satellite Meeting on Anti-fouling Strategies http://www.usc.es/en/congresos/isqsi/

Biofouling has profound effects on maritime activities, being the major cause for maintenance expenses of submerged man-made surfaces (ship transport, buoys, aquaculture, membrane bioreactors and desalination units, power plant cooling water systems, pipelines). Settlement of organisms on ship hulls results in increased erosion, reduction of speed, increased fuel consumption and, therefore, increased CO_2 production. The main goal of the BYEFOULING project is to design, develop and upscale novel low-toxicity, cost-efficient, environmentally-friendly antifouling coatings with enhanced performance compared to currently available products. It will tackle the biofouling process using innovative antifouling agents (surface-structured materials, protein adsorption inhibitors, quorum-sensing inhibitors, natural biocides, microorganisms with antifouling properties). Encapsulation of the innovative compounds in smart nanostructured materials will be implemented to optimize coating performance and cost throughout their life cycle. A proof-of-concept for the most promising candidates will be developed and tested in the field.

The specific objectives of BYEFOULING are to:

- obtain coatings with extended service life
- reduce VOC content in coating formulations
- educe fuel costs due to drag reduction in maritime transportation and fishing vessels
- increase operation life of floating devices
- reduce fish-mortality resulting from conventional biofouling processes
- reduce maintenance costs

BYEFOULING work-packages:

The project, organized in 8 work packages (WP), runs from December 2013 to November 2017. Its multidisciplinary consortium involves 19 partners (SMEs, large companies, research organisations, universities), developing a full production line for new antifouling coatings. WP1 coordinates and directs the project. WP2 studies novel compounds, development of interfacial microstructures, preparation and growth of antifouling microorganisms. WP3 employs different tools to incorporate the new antifouling approaches into coating formulations, including encapsulation to protect compounds from the coating matrices and enable controlled release of active species, preparation of functional fillers with hydrophobic and biocide-active functional groups, and development of waterborne coating formulations. WP4 assesses antifouling performance and benchmarks the obtained systems with commercial and state-of-the-art technologies. Ecotoxicity measurements examine the effect of the developed materials. WP5 tests parameters for application of coating formulations in subsequent stages and studies adhesion of fouling organisms and effects of fouling on biocorrosion. WP6 develops methods for evaluating drag resistance of hull coatings and the application of holistic and comprehensive assessment tools such as Life Cycle Assessment (LCA). WP7 performs demonstrations for ships, aquaculture and buoys, implementing up-scaling of the most promising technologies. WP8 disseminates and utilises the results, including a user-friendly website (www.byefouling-eu.com), training activities and workshops.


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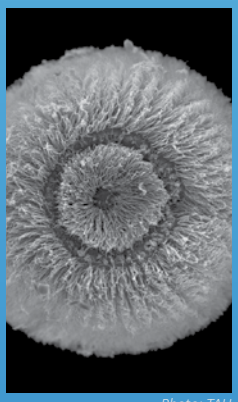
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Expected results and potential impacts

The project addresses high-volume production of low-toxicity, environmentally-friendly antifouling coatings for mobile and stationary maritime applications. The technology will fulfil coating requirements through incorporating novel antifouling agents and a new set of binders into coating formulations for maritime transportation and fishing vessels, floating devices and aquaculture. Readily available low-toxicity and cost-effective antifouling coatings will increase the maritime industry efficiency, and present the technology to realize new products. SMEs and industrial partners will in particular use the developed technology to address new market areas.

Academia

Academic partners (universities, research institutes) in BYEFOULING will introduce young researchers into an interdisciplinary field, combining biology, marine sciences, chemistry, physics, materials science and engineering, and coating technology to generate both environmentally friendly and high-performance products. This is a strong point when considering higher education and job competitiveness. The generated knowledge will be published in high-impact journals.

Industry

From an industrial perspective, the involved SMEs and large industries have a unique opportunity to establish trans-national networking, developing high-level products for the global market. In ship transport, BYEFOULING offers more efficient, less toxic antifouling coatings, with operation and life-cycle costs thus significantly reduced, increasing the efficiency and competitiveness of the ship transport industry. The project will reduce negative impacts on the marine environment and gaseous emissions. BYEFOULING products will improve the performance of marine operations, with better growth rates, improved water quality and better control of disease vectors, reducing costs associated with waste disposal, enabling lighter structures, improving resistance to extreme weather, and contributing to an enhanced approach to more stringent biocide regulations.

Significance

The BYEFOULING project offers new societal insights, encompassing future national and trans-national objectives within the EU. Specifically, it pertains to several aspects of what is termed 'blue growth'. BYEFOULING thereby targets the generation of new materials produced directly from marine, renewable resources. Concomitantly, the antifouling coatings generated by BYEFOULING will profoundly impact industrial activities directly related to the marine environment.

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