Bio-based and eco-friendly products as efficient alternatives to commercial biocides for the production of sustainable sol-gel based antifouling coatings **SI-MARE**



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BACKGROUND

Biofouling represents a major economic concern for marine industry. In the last years, many efforts have been made to tackle this issue, leading to the development of antifouling (AF) coatings, applied directly on the ship hull. Nowadays, commercial paintings mainly consist of toxic and harmful compounds (copper-based), which have increased health and environmental concerns.

The stricter regulations have pushed marine industries to look for alternative AF strategies.



Antifouling coating

Among them, these days biocide-release coatings based on natural products are gaining attention, since they are eco-friendly and harmless both to the environment and human health.



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Biological test results using marine diatom strain Navicula sp.



METHODS

Sol-gel solution (GPTMS/TEOS) Biocide compound **Bio-based product**

RESULTS







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- issues phenomenon.

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CONCLUSIONS

Chemical-physical characterization of both treated and untreated surfaces have shown the successful adhesion of the sustainable sol-gel based coatings on the substrate,

Microbiological experiments have demonstrated that B and C systems are able to largely reduce the rate of adhesion of selected diatoms through biocide-release mechanism,

The proposed approach represents an eco-friendly strategy to tackle the biofouling related to