



Nature-inspired bioactive polymeric materials

Place of work/: The work will be performed at BioISI Laboratories 8.6.42 and 8.4.41

Supervisor:

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Abstract / MSc thesis project proposal

This project aims to develop alternative non-toxic solutions to control biofouling on industrial systems. It concerns the design of bioactive natural-based coatings for the protection of (un)structured surfaces, which in turn are applied in various applications, such as air/water circuit systems, or in healthcare facilities. The production pattern used, in agreement to Goal 12 of Sustainable Development Goals (SDG), will address the use of natural resources and environmental-friendly strategies, aimed at answering concerns often associated to other antifouling products, mainly human and environmental toxicity and costly cleaning processes (e.g., life cycle and energy/cleaning efficiencies of filters).

Two main approaches will be followed. In the first, polymeric bioactive coatings will be developed through the immobilization of novel natural antifoulant (NAF), as the extracted and identified phenolic-based molecules in previous work (BioMol4Health project). In addition, for comparative purposes and to find potential synergistic effects, commercially available NAF agents showing efficacy, will be immobilized, and combined with the bioactive prior and newly NAF. In a second approach, ceramic/polymeric filters will be coated with the developed bioactive coatings for proof-of-concept. The bioactive systems produced will be assessed in terms of physicochemical/mechanical properties, ecotoxicity, and cytotoxicity in human cell lines. Proof-of-concept of the developed systems will be performed at a lab/prototype scale.

