Research line: Biofilm control

Research group: FEUP *(BEL – Biological Engineering Lab)*, Universidade do Porto

Objectives:

Development of a platform to study and validate antifouling compounds, that can have origin in sea resources and/or be applied in marine related industries.

Description:

Biofouling is a problem that represents huge resource losses in all sea related industries. The objective of this research line is to develop biofilm control strategies. We intent to develop an experimental platform that allows the study of compounds that exhibit antifouling activity. These compounds can have origin in marine organisms, a rich and yet unexplored system, or not. We will test extracts from cyanobacteria isolated from marine environment produced by one of the partners with evidences of antifouling activity. With our background knowledge on biofilms we will develop a protocol to determine the fractions of the extracts that display the wanted activity against several types of biofilm forming microorganisms. We will quantify the effect of these compounds on all stages of a biofilm life. We will also screen compounds for coating ship hulls to prevent biofouling and all its deleterious effects (biocorrosion and increased fuel consumption). We also intend to study and explore the bioactive compounds produced in multispecies marine biofilms, in order to use them to prevent biofilm settlement and development. The ultimate objective is to use bioactive compounds to prevent biofilm formation, not only in marine related applications but also industrial and biomedical applications.

Techniques:

Our group has already a very well established set of analytical techniques to study and characterize biofilms. We use: (i) conventional microbiology methods like colony forming units (CFUs), modified Kirby-Bauer method, minimal inhibitory and bactericidal concentrations (MICs and MBCs); (ii) staining assays such as DAPI, Crystal Violet (CV), fluorescein-di-acetate (FDA) and LIVE/DEAD BacLight assays; (iii) Resazurin and XTT as metabolic indicators; (iv) genetic assays (FISH-technique); and (v) several physical methods such as epifluorescence microscopy, contact angles and surface tension. When needed, we can also apply various types of biological reactors and flow cells that are available in our lab in order to mimic sea conditions.

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