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FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Chemistry Department

Antimicrobial polymeric 3D structures for water treatment

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PhD Program in requimte rede de química e tecnologia Sustainable Chemistry

FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

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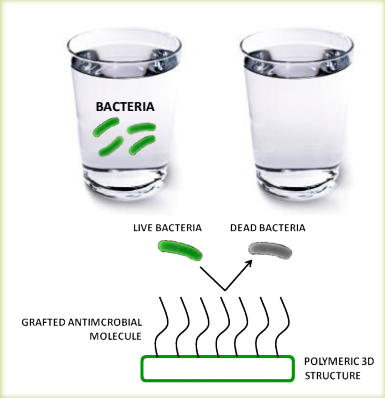
Objectives

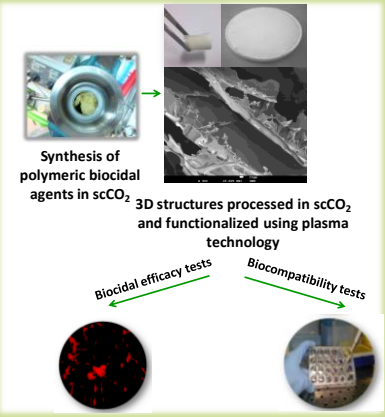
The main goal is to produce and characterize low cost antimicrobial (AM) structures with the ability to inactivate common water infecting microorganisms upon contact using sustainable technologies that will reduce both water purification costs and energy demand.

For that, 3D porous structures will be produced with different synthetic and natural polymers in order to achieve an ideal support. Subsequently, AM agents will be immobilized in polymeric 3D structures by blending the AM molecules in the casting solution or by covalently binding them on surface using plasma technology.



Methodology

- Preparation of 3D porous structures with controlled morphologies using supercritical carbon dioxide ($scCO_2$) assisted processes and freeze drying techniques;
- Functionalization of 3D structures with AM polymers by physical immobilization or chemical grafting using plasma technology;
- Detailed characterization of mechanical and morphological properties of 3D structures;
- Characterization of the killing activity of the AM agents;
- Evaluation of 3D structures performance through application to real case studies: sterilization of water.

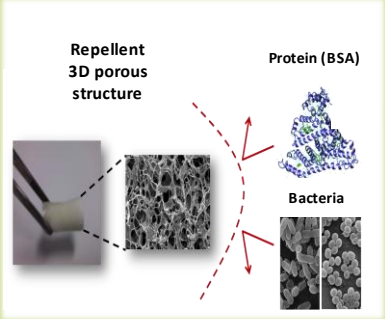


Expected Results

Design and production of antimicrobial 3D supports with:

- high porosity and interconnectivity allowing suitable water fluxes;
- ability to repel bovine serum albumin (BSA) as proteins constitute the first step of bacterial adhesion;
- ability to kill upon contact and repel common water infecting bacteria by a temperature triggered process enabling the support reuse.

Novel, affordable and sustainable biocidal 3D porous structure to purify water.



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