



## Microbial exopolymers: A natural renewable biosolution

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### Abstract

Currently, the environmental pollution is a problem that threatens the sustainability of our planet which has led to increasing scientific research in several areas to obtain sustainable biotechnologies. In this sense, the exploitation of natural-derived and renewable biopolymers as a replacement for petrochemical-derived polymers, confining the use of synthetic polymers, has received visibility and interest for applications in biomedical materials and / or in bioremediation. Microbial extracellular polymeric substances (EPS) from cyanobacteria and bacteria have displayed a promising potential as alternative to synthetic resources. They can be used in numerous applications in the biomedical fields, such as scaffolds or matrices in tissue engineering, drug delivery and wound dressing, and in bioremediation fields for the removal of organic and metallic pollutants. However, the symbiotic association between cyanobacteria and cellulose-producing bacteria to obtain biofunctional materials has not been exploited. In this research work, these association will be study through two approaches: (i) bacterial cellulose will be biosynthesized in the presence of the cyanobacteria to include in situ the algal exopolymers and functional compounds in their network and (ii) obtain microcapsules and bioactive films through the inclusion of exopolymers and/or bioactive compounds in bacterial cellulose by bioencapsulation and 3D printing processes. These biomaterials can be used for future applications and for the design of sustainable biofunctional materials, capable of replacing the current synthetic materials.

### Biography

Marisa Faria has a degree in Biochemistry since 2010 and a Master's Degree in Applied Biochemistry since 2016 from the University of Madeira. Now, she is a PhD student in Chemistry at the University of Madeira. Her research focuses on exploring an effective natural source to replace current synthetic materials to minimize the negative impact on the environment, and the development of sustainable, biodegradable, and biocompatible biotechnological methodologies to obtain biomaterials from natural sources with biomedical potential. She is coauthor of nineteen scientific articles with international recognition and carries supervision functions of curricular internships at the University of Madeira. She collaborates with researchers from National and International Universities in the field of polymers. The financial support has been provided by the Foundation for Science and Technology with a PhD grant (BD/6615/2020), through CIIMAR (UIDB/04423/2020 + UIDP/04423/2020) and by the European Territorial Cooperation Programme PCT-MAC 2014-2020 through project REBECA-CCT (MAC/1.1.B/269).



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