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A potential exopolymer produced by *Cyanocohniella calida*: Extraction, purification, and characterization

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Abstract

Currently, the environmental pollution threatens the sustainability of our planet leading to the proliferation of scientific research in several areas to obtain sustainable biotechnologies. In this sense, the exploitation of biopolymers from natural and renewable origins to replace polymers derived from petrochemical, limiting the use of synthetic polymers, has received visibility and interest for applications in bioremediation and/or biomedical materials [1, 2]. Extracellular polymeric substances (EPSs) have been displayed as a promising potential alternative to synthetic sources. They can be used in numerous applications in biomedical fields, such as scaffolds and drug delivery [2] or as agents with high valuable biological activities (e.g., antiviral, antimicrobial, anticoagulant, antitumor) [4] and in bioremediation fields for the removal of organic and metallic pollutants [4, 5]. EPSs productivity and physicochemical properties depend of the cyanobacteria species and the cultivation conditions. It is utmost important to achieve and explore new cyanobacteria with the ability to produce exopolymeric substances with bioactive properties. In this research work, the cyanobacteria Cyanocohniella calida was evaluated as a potential source of EPS under static and aerated culture. Different EPSs molecular size fractions (100, 12-14, 10 and 5 kDa) were obtained and characterized through morphological, structural, and surface techniques. C. calida proved to be a promising producer of EPSs at under-aeration growth conditions with a yield of 280 mg L-1 in Spirulina medium and a viscosity of 26.76 cP in culture medium. EPSs monosaccharide profile indicates a heteropolysaccharide composition. C. calida EPSs have an anionic fibrillar structure making them suitable for biotechnological/biomedical applications.

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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

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