

Biosurfactants and synthetic surfactants in bioelectrochemical systems: A mini-review.

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Abstract

Bioelectrochemical systems (BESs) are ruled by a complex combination of biological and abiotic factors. The interplay of these factors determines the overall efficiency of BES in generating electricity and treating waste. The recent progress in bioelectrochemistry of BESs and electrobiotechnology exposed an important group of compounds, which have a significant contribution to operation and efficiency: surface-active agents, also termed surfactants. Implementation of the interfacial science led to determining several effects of synthetic and natural surfactants on BESs operation. In high pH, these amphiphilic compounds prevent the cathode electrodes from biodeterioration. Through solubilization, their presence leads to increased catabolism of hydrophobic compounds. They interfere with the surface of the electrodes leading to improved biofilm formation, while affecting its microarchitecture and composition. Furthermore, they may act as quorum sensing activators and induce the synthesis of electron shuttles produced

by electroactive bacteria. On the other hand, the bioelectrochemical activity can be tailored for new, improved biosurfactant production processes. Herein, the most recent knowledge on the effects of these promising compounds in BESs is discussed.

Involved units

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