Insights: Publications

Extracellular Electron Transfer Mechanisms in a Moderately Halophilic Bacterium from the Great Salt Lake for High Salinity Heavy Metal Biosensing

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High saline contamination events are a growing problem due to the increase in frequency and severity of hurricanes and the accompanying torrential rains. Storms affecting coastal areas can flood Superfund sites, which are designated hazardous waste sites managed by the Environmental Protection Agency (EPA), and other dangerous industrial waste sites. These events can result in the release of harmful pollutants into the environment, including heavy metals. The dimension of the contaminated area, as well as the cost and labor intensive approaches utilized, make the monitoring through standard laboratory methods complicated. Accordingly, a comprehensive screening of a community after a contamination event is not feasible. In this contest, biosensors offer a cost-effective alternative. Microbial biosensors are of particular interest for environmental monitoring due to their stability, wide range of analytes, and the ability to report on physiological toxicity. However, high salinities pose stress on the cellular membrane of bacteria cells, and few microbes can survive in salinities higher than the ocean (~3.5% NaCl). Such salinities can frequently occur after a natural disaster, due to stagnant water and subsequent evaporative water loss, demonstrating a need for a halophilic microorganism that can report on toxic contaminants.