Isolation and characterisation of a bioflocculant M-2 produced by *Galactomyces* sp

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Microbial flocculants are biodegradable and their degradation products are harmless to the ecosystem. Some of the microbial flocculants have advantages over other types of flocculants and can be produced economically in large scale culture.

A bioflocculant, M-2, was produced from a strain of bioflocculant-producing microoganism isolated from activated sludge and identified as *Galactomyces* sp.. M-2 had a good flocculating capability and could achieve a flocculating rate of 95% for kaolin suspension at a dosage of only 0.3 ml/l. Bioflocculation microorganism also had high turbidity and color removal ratio when treating in wastewater and soil suspension. The flocculating activity was observed most highly at pH 6.0 and markedly enhanced by the addition of Ca^{2+}. The production of bioflocculant by *Galactomyces* sp. was approximately parallel to the cell growth. The isolate produced the polysaccharide during the late logarithmic growth phase. The bioflocculant was purified to homogeneity by ethanol precipitation. The major component of M-2 was found to be polysaccharide Infrared spectrum analysis showed the presence of carboxyl and hydroxyl groups in the bioflocculant, and the S.E.M. studies showed that the polymer has a porous structure with small pore-size distribution indicating the compactness of the polymer. The bioflocculant is thermo-stable and 90% of its activity remains after heating at 100°C for 20 min. M-2 is nontoxic and can be used in food industries for suspended solids (SS) recovery.

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Interfacial properties of alkali halide brines in confined nanopores

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Bridging aqueous geochemistry and battery science, we are studying the properties of aqueous alkali halide brines in contact with a family of carbon electrode geometries using classical molecular dynamics simulations. These simulations will focus on issues of capacitance and transport within these different environments. The selection of electrolytes from within two atomic groups of elements, allows us to look at size specific trends within those specific geometric environments. The advantage of using carbon, despite its poor geochemical relevance, is its importance in battery chemistry, as well as its ability to control the shape of the interfacial region without loosing topological realism or site-specific atomic information. We intend to study planar graphite sheets, carbon nanotubes of various sizes, and a variety of schwarzite forms to represent the variety of surfaces that may be encountered with a real porous-graphite electrode. By controlling the geometry, we hope to be able to determine fundamental properties of electric double layer behavior at an atomic scale and be able to compare those results with continuum physics models of interfacial properties.