

Diversity of Microbial Ground Improvements

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Abstract : Low cost, sustainable, and environmentally friendly microbial cements, grouts, polysaccharides and bioplastics are useful in construction and geotechnical engineering. Construction-related biotechnologies are based on activity of different microorganisms: urease-producing, acidogenic, halophilic, alkaliphilic, denitrifying, iron- and sulphate-reducing bacteria, cyanobacteria, algae, microscopic fungi. The bio-related materials and processes can be used for the bioaggregation, soil biogrouting and bioclogging, biocementation, biodesaturation of water-saturated soil, bioencapsulation of soft clay, biocoating, and biorepair of the concrete surface. Altogether with the most popular calcium- and urea based biocementation, there are possible and often are more effective such methods of ground improvement as calcium- and magnesium based biocementation, calcium phosphate strengthening of soil, calcium bicarbonate biocementation, and iron- or polysaccharide based bioclogging. The construction-related microbial biotechnologies have a lot of advantages over conventional construction materials and processes.

Keywords : ground improvement, biocementation, biogrouting, microorganisms

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