Microbially induced carbonate precipitation can improve coarse-grained, salty soil

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Microbially induced carbonate precipitation (MICP) is a cost-effective and environmentally friendly technology to improve saline soil. It aims to use urease generated by bacteria to catalyze urea hydrolysis and

produce carbonate, which combines with calcium ion in the cementation solution to form calcium carbonate precipitates and calcite crystal.

However, the impact of salt on urea hydrolysis and curing effect needs to be further studied to verify its feasibility for solidifying saline soils.

Recently, a research team from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences investigated the effect of chloride salt on urea hydrolysis in MICP and the effect of MICP on the engineering and mechanical properties of coarse-grained soils containing chloride salts.

Related results were published in *Journal of Cleaner Production*.

The researchers also analyzed the deterioration mechanism of chloride salt on reinforcement through micro-mechanical tests.

They found that, though curing effect of MICP is excellent, the negative effect of salt cannot be ignored. The rate of hydrolysis and precipitation efficiency decreased with an increase in salt concentration, which results in the deterioration of the mechanical properties of solidified soil.

In addition, the quantity of calcite was significantly more than vaterite, and the salt content, as a guiding agent, can promote the formation of calcite.

The study proves that it is feasible to applying biochemical process driven by microorganism activity for sustainably improving saline soil.

More information: Erxing Peng et al, Study of microbially-induced carbonate precipitation for improving coarse-grained salty soil, *Journal of Cleaner Production* (2022). DOI: 10.1016/j.jclepro.2022.132788

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