Are Calcite Dissolving Bacteria a new player in the soil calcium cycle?

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Microbial communities play critical roles in mobilizing soil nutrition and, consequentially, shaping plant growth. Soluble calcium in the pegging zone is essential for peanut yield. Calcium starvation may lead to seed abortion and increased incidence of disease, such as pod rot. Currently, gypsum or lime are often used to supplement calcium in the pegging zone. Calcite dissolving bacteria isolated from lime mine or animal wastes can dissolve insoluble calcite into calcium. Here, we report the isolation and characterization of calcite dissolving bacteria from a peanut field in Tifton, Georgia. We identified 65 CDB isolates, representing 17 unique strains belonging to 10 different genera. Six CDB strains increased soluble calcium levels ranging from 11% to 91% when applied to soil. Some of the CDB strains when coated on seeds promoted germination rate. In a survey of CDB in soils with different crop histories, we found that CDB abundancy was negatively associated with a soluble calcium level. In summary, we conclude that CDB has the capacity to influence calcium availability in soil, and the abundance of CDB in a bacterial community may respond to calcium levels.