Composited organic mobilizing agents enhance cadmium accumulation in sorghum

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Biodegradable organic materials, such as low-molecular-weight organic acids (LMWOAs) and dissolved organic fertilizers, are usually used as heavy metal-mobilizing agents. Increasing their effects on the absorption of cadmium (Cd) by crops is important in a limited degradation cycle.

Phytoremediation exhibits vast potential in soil Cd remediation.

However, several defects, such as low biomass and slow growth, cause less feasibility for large-scale application.

To further enhance the efficiency, the combination of phytoremediation and heavy metal-mobilizing agents has been advocated and attracted research interests in recent years.

Researchers from the Institute of Subtropical Agriculture (ISA) of the Chinese Academy of Sciences investigated the enhancement effect of composited organic agents on Cd accumulation in shoots at different growth stages of sorghum.

They conducted a pot experiment with two composited organic agents (oxalic acid or citric acid + dissolved organic fertilizer (OA+DOF and CA+DOF)) and four application periods (seeding, jointing, flag leaf and heading stages) of sorghum (Sorghum bicolor L.).

The results showed that application of the two composited agents increased soil DTPA extractable Cd by 7.31-49.13%, and Cd contents in roots and shoots by 21.49-72.10%, respectively.

The effects of CA+DOF was largely greater than the OA+DOF. The application periods significantly impacted the Cd bioaccumulation in sorghum, resulting in the maximum Cd bioaccumulation quantity for the heading and the minimum for the flag leaf.

The main mechanism of the two composited organic agents enhancing phytoremediation was to reduce soil pH and increase soil DOC concentration, thereby increasing the soil Cd availability and the Cd absorption of sorghum. The results are expected to provide novel insights for optimization phytoremediation of Cd-contaminated soils.

The study was published in *Chemosphere*.

More information: Bo Li et al. Effects of composited organic mobilizing agents and their application periods on cadmium absorption of Sorghum bicolor L. in a Cd-contaminated soil, *Chemosphere* (2020). DOI: 10.1016/j.chemosphere.2020.128136

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