

Popular scientific project description for project funded by Ekhagastiftelsen

Popular scientific project description is to be submitted within 2 months of project grant.

Application number:	2025-79
Project title:	Multifunctional microorganisms for increased crop yield and quality – Using fungi to prevent cadmium uptake in wheat
Receiver of grant (name, address):	Mukesh Dubey, Magnus Karlsson Department of Forest Mycology and Plant Pathology, Swedish University of Agricultural Sciences (SLU), Box 7026, Uppsala-75007, Sweden. Therese Bengtsson, Department of Plant Breeding, Swedish University of Agricultural Sciences (SLU), Växtförädling, Box 190, 234 22 LOMMA
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Project start (yyyy-mm-dd): *	2026-03-01
Project end (yyyy-mm-dd): *	2029-02-28
By Ekhagastiftelsen granted sum:	1815 000 SEK

Project description: (200 - 300 words)

Cadmium (Cd) is a toxic heavy metal that naturally occurs in soil. Its concentration can vary greatly across different geographical regions and soil types. Plants absorb Cd from soil through their root systems and transfer it to the shoots and kernels, where it is stored in the bran and germ. The accumulation of Cd in plants threatens their health, leading to reduced water and nutrient uptake, decreased photosynthetic activity, increased reactive oxygen species, and chlorosis. These effects result in stunted growth and development and lower crop yields. Moreover, Cd build-up in kernels reduces grain quality. Consuming food contaminated with Cd can cause kidney dysfunction and failure, neurotoxicity, impairments in the lungs, brain, and heart, sterility, cancer, and osteoporosis. Therefore, preventing Cd accumulation in crops is crucial to mitigate its toxic effects on both plants and humans. In this study, we aim to identify naturally occurring plant-beneficial *Trichoderma* fungi from wheat rhizosphere with elevated Cd concentrations and assess their potential to prevent Cd accumulation in wheat under greenhouse and field conditions. First, native *Trichoderma* strains from wheat rhizosphere fields with high Cd levels in southeastern Skåne will be isolated and identified. The ability of these strains to prevent Cd uptake in wheat will then be tested in a greenhouse using field soils with elevated Cd levels. Finally, a field trial will be conducted to evaluate the practical application of these *Trichoderma* strains to promote plant health and reduce Cd contamination in wheat, thereby enhancing wheat quality. In summary, this study is expected to harness the beneficial effects of *Trichoderma* fungi to prevent Cd uptake in wheat, improve wheat production quality, and reduce its harmful impact on human health.

* Dates for project start and end should be the dates for which the grant is received (Not dates for total project if longer than period for which grant is received)