

Synergistic Microbial Solutions for Sustainable Agriculture

Tuesday, May 14, 2024 3:45 PM (35 minutes)

Global nutrient demand, economic pressures, and declining crop prices drive fertilizer demand, necessitating sustainable solutions to safeguard soil, crop, and environmental health. To address these concerns, we aim to develop a microbial-based bio-fertilizer for the agricultural industry, mitigating chemical fertilizer's environmental and socio-economic impacts. The objective of the research is to bio-assemble synergistic interactions between microbial communities with complementary metabolic capabilities to replenish essential nutrients in agricultural soils and act as a carbon sink. The current ongoing work involves screening microbial populations with nitrogen fixation, carbon fixation, and phosphorus solubilization abilities from the agricultural fields. After confirming the metabolic capabilities via biochemical assays of the isolates, compatible microbial strains will be identified through cross-streaking assays. The next steps in the experiment would involve greenhouse trials to assess the effectiveness of the microbial fertilizer, and monitoring plant growth, soil health, and related ecotoxicity. This work, therefore, holds the potential to improve soil health, increase crop yields, and boost agricultural productivity through microbial fertilizers. Adoption can lead to higher revenues for farmers, stimulate economic activity in rural communities, and create new opportunities for agricultural biotechnology companies, driving innovation and job creation.

Keywords: Agricultural Biotechnology, Microbial Biofertilizers, Soil Health

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Session Classification: Poster Session

Track Classification: Biology