



Increasing Field Vegetable Yield and Resilience to Abiotic and Biotic Stresses Through Soil Microbial Engineering

LEAD RESEARCHER

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This research activity is working to develop, validate and implement bacterial inoculum to improve field vegetable yield and plant diseases while reducing fertilizer and pesticide inputs. Two proprietary bacterial strains, *Pseudomonas sp.* and *Bacillus sp.*, from Agriculture and Agri-Food Canada (AAFC) have shown plant growth promotion and increased plant drought resistance capabilities. These bacterial strains will be used to fast-track microbial consortia development, field evaluation and validation for the research activity.

The research team is currently planning lab and greenhouse experiments. Only small-scale field experiments have been done to date. Field experiments were conducted to test the effect of the bacterial strains on lettuce growth in 2024. The bacterial strains were found to increase plant growth – specifically in the early stages of lettuce growth.

Researchers also found that among the 1,200 bacterial strains extracted from soil samples collected from organic fields in southern Quebec and at AAFC experimental farms, 45 strains are showing promising plant pathogen inhibitory potential (biocontrol). The strains have been tested against four plant pathogenic *Pythium* species and *Sclerotinia sclerotiorum*. Thirty-three of these strains showed deterrence effects and were further tested against the same five plant pathogens in vitro. Eighteen of these *Pseudomonas* strains have been shown to be effective against *Pythium* species, while 10 strains had an inhibitory effect on *S. sclerotiorum*.

KEY TAKEAWAYS:

- Two proprietary bacterial strains from AAFC have shown plant growth promotion and increased plant drought resistance capabilities. These are being used to fast-track microbial consortia development, field evaluation, and validation.
- Tests of the bacterial strains on lettuce growth found that the strains increased plant growth, specifically in the early stages of lettuce growth.
- Researchers have found that among the 1,200 bacterial strains extracted from soil samples collected, 45 strains are showing promising inhibitory potential.

