

# > ISHS Young Minds Award winner summaries

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## Seed treatments for the control of *Colletotrichum lindemuthianum* and *Pseudomonas savastanoi* pv. *phaseolicola* in organic production of bean: establishing test prerequisites



> Carlo Gamper Cardinali

The poor quality of organic seeds due to pathogen contamination is a main challenge for the development of organic farming. In conventional agriculture, chemical seed treatments can effectively manage this issue. In organic agriculture, however, only limited seed treatments are available. The goal of our project was to evaluate seed treatments compatible with organic farming against two bean diseases, anthracnose caused by the fungi *Colletotrichum lindemuthianum* and halo-blight caused by the bacteria *Pseudomonas savastanoi* pv. *phaseolicola*.

Because sourcing seed with adequate and homogenous natural pathogen infection is difficult, seed inoculation methods were established to obtain high infection rates. For *C. lindemuthianum*, a satisfactory infection rate for the seed treatment investigation was only obtained when seeds were scarified prior to inoculation in a spore suspension. After pathogen inoculation, pathogen detection and quantification tests were performed. We confirmed the efficacy of the incubation method for *C. lindemuthianum* detection established by the International Seed Testing Association. Moreover, we tested molecular detection methods, which required DNA extraction from bean seeds. We initially encountered difficulties when isolating DNA from bean seeds. We used a DNA extraction kit with a reduced sample amount with increased lysis level. This technique allowed us to molecularly detect *C. lindemuthianum* in infected and inoculated bean seeds.

The effect of the seed treatments on the germination of the seeds was evaluated in pathogen-free seeds of 'Maxi' bean. No statistical difference was observed between treatments and the negative control (not treated), however, when working on scarified seeds, the acetic acid treatment, one microbi-

al formulation treatment, and the chemical treatment (used as control) decreased germination. Our study indicated that several challenges restrain the development of seed treatments in organic bean production, from obtaining seeds with adequate pathogen infection to pathogen detection. The next steps of our research will be to fine-tune the detection and quantification of seed borne pathogens in treated seed lots and finally to validate successful treatments on naturally infected seeds.

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Carlo Gamper Cardinali won the ISHS Young Minds Award for the best oral presentation at the International Symposium on Quality Seeds and Transplants for Horticultural Crops and Restorative Species at IHC2022 in France in August 2022.

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