

## Bacterial inoculation as a strategy to induce resistance against *P. infestans* on potato plants

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Master thesis in plant and microbial sciences

This project investigated the possible induction of resistance against the oomycete *P. infestans* by inoculating beneficial bacteria. A selection of bacteria to be tested *in planta* was carried out prior to the plant tests by *in vitro* experiments. Once the ability of the bacteria to inhibit the pathogen growth was defined, the production of siderophores, cyanide compounds and pyoverdines were tested for each bacterium to define its phenotypic characteristics. Following the careful development of a protocol for visualizing resistance induction, 8 selected bacteria (4 *Pseudomonas* and 4 *Bacilli*) were tested for their ability to induce resistance in the plant and to induce the expression of a defense protein (PR1-b). Once all the data on the abilities of the different candidates were obtained, correlation analyses were carried out in order to find possible correlations between the direct activity of the bacteria and their ability to induce defenses in the plant, in turn also correlating the three phenotypic traits. From this work, it was found that 50% of the bacteria in the initial collection were active *in vitro* against *P. infestans*, and that bacteria of the genus *Pseudomonas* had a greater ability to produce pyoverdine, siderophores and cyanide compounds than the other tested genera. It was also found that there is a positive correlation between these three phenotypic characteristics and direct activity *in vitro*. Regarding the *in planta* analyses, it was found that almost all bacteria were able to slightly protect potato plants, mainly at an early stage of infection development (two bacteria of the genus *Bacillus*, CHP14 and R54, were found to be the most interesting), as well as to induce PR1-b expression in the absence of infection. A comparative analysis (FAMD) on the entire set of experiments for the 4 bacteria of the genus *Bacillus* finally revealed that there was a correlation between direct activity *in vitro* and the ability to induce resistance in the plant, but these activities were not correlated with the induction of defense protein expression. However, repeating this analysis on the entire set of 8 bacteria (4 *Bacilli* and 4 *Pseudomonas*), it was observed that this correlation was poorly reproducible.

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