PO035

ANTIFUNGAL ACTIVITIES OF PGPR BACTERIA AGAINST *MACROPHOMINA PHASEOLINA*

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GENEVA Eurosoil 2021

Introduction

Charcoal rot caused by *Macrophomina phaseolina* (Tassi) Goid. is a widespread phytopathogenic fungus that infects over 500 plant species and can survive as a saprophyte in the soil for many years.
Considering that, due to the development of resistance, chemical fungicides often do not produce good results, as well as the negative effects of these compounds on the environment and human health, the potential of the microbiological activity of bacterial isolates to control *M. phaseolina* has been researched on sugar beet.

Material and methods

Three bacterial isolates (*Bacillus licheniformes*, *Bacillus subtilis* and *Lysinibacillus macroides*) are isolated from soil sample by the streaking method. These bacteria were cultivated in Tryptic soy broth (TSB) and grow under the aerobic condition at 32 °C with shaking at 200 rpm. After 48h, bacterial are tested for the optimal growth and production of plant hormone auxin by colourimetric analysis.
The bacterial isolates were first tested in vitro (antifungal activity) and then under greenhouse conditions. The sugar beet was transplanted into 5-6 leaves in transplanted pots with peat Klasmann, and then inoculum of *M. phaseolina* andbacterial isolates tested were placed near the roots. In control, beet plants were inoculated only with *M. phaseolina*. After 90 days, plant growth parameters (total plant biomass and root mass) were calculated.

Results

In the dual cultivation method, the highest percentage of inhibition (42.58%) was observed in the treatment with *B. subtilis* against *Macrophomina phaseolina* (Fig. 1.); then *B. licheniformis* (41.23%.) (Fig. 2.) and *Lysinibacillus macroides* (40.35%).

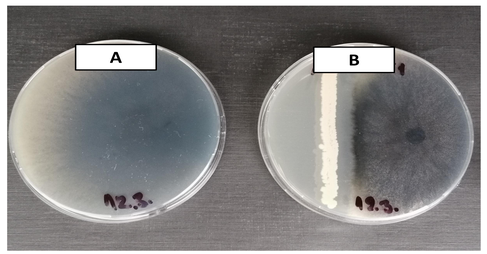

Fig. 1. A: Control treatment – *M. phaseolina*
B: *M. phaseolina* + *B. subtilis*

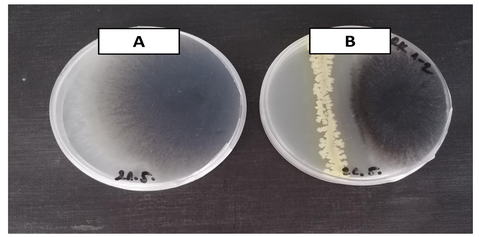

Fig. 2. A: Control treatment – *M. phaseolina*
B: *M. phaseolina* + *Lysinibacillus macroides*

These bacterial isolates were also found to have a positive effect on the growth of beet plants, with the highest average biomass (365.59 g) observed in beet plants treated with *Bacillus subtilis* (Fig. 3.) , followed by *Bacillus licheniformes* (342.80 g) (Fig. 4.) and *Lysinibacillus macroides* (317.86 g), while the lowest average biomass was recorded in control (269.58 g).

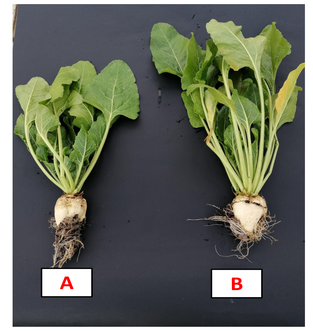

Fig. 3. Effect on the growth of beet plants:
A-control,
B-treatment with *Bacillus subtilis*

Fig. 4. . Effect on the growth of beet plants:
A-control,
B-treatment with *Bacillus licheniformes*

Discussion

Bacillus subtilis produces plant hormones: auxins and cytokinins, which have a stimulating effect on the development of the root and aboveground part of the plant. Biofilm formation and root colonization by *B. subtilis* prevents rooting of the root surface of *Macrophomina phaseolina* and consequently plant infection, increasing the resistance of plants to this pathogen. Also, the control and inhibition of soilborne plant pathogens including antagonistic activities such as the production of antifungal agents and induction of systemic resistance in the plants against diseases (Pratibha Prashar et al., 2013).

Conclusion

The aim of our future experiments is to determinethe efficacy of these bacterial isolates under field conditions.