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Effect of drench application of biocontrol preparations on tomato plants against *Botrytis cinerea* and *Oidium neolycopersici*

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Highlights

- Drench application of biocontrol products was evaluated for protection of tomato against *Botrytis cinerea* and *Oidium neolycopersici*.
- Powdery mildew was significantly reduced by the biostimulant EUCLID-1-ANT and slightly reduced by fructose.
- At a higher dose, EUCLID-1-ANT significantly reduced the development of both pathogens but had negative side effects on plant growth.

Introduction

Most fresh market tomato production in Europe is done in greenhouses equipped with drip irrigation systems. In such conditions, resistance-inducing preparations can be efficiently delivered to the root system to protect the aerial parts of the plants against pests and diseases. On tomato, two drench applications of *Trichoderma harzianum* or benzothiadiazole (BTH; Meller Harel *et al.*, 2014) or one of β -aminobutyric acid (BABA; Bruce *et al.*, 2017) were shown to reduce the development of *Botrytis cinerea* following its inoculation on detached leaves. These results raise interest in the use of such methods in greenhouse production for the protection of pruning wounds against *B. cinerea* and of the whole canopy against other foliar pathogens.

The objective of this study was to evaluate the protective potential of drench application on tomato plants in greenhouse conditions. Different preparations with putative resistance-inducing properties were tested for their effect against *B. cinerea* and *Oidium neolycopersici*.

Material and methods

Tomato plants var. Monalbo were produced during 7 weeks on rockwool cubes in a heated glasshouse. Plants were fertirrigated with a standard nutrient solution through a drip irrigation system. Sugars (fructose, sucrose, trehalose), plant extracts and microorganism-based products (Regalia, Serenade, Md-L13), a biostimulant (EUCLID-1-ANT) and a compost (EUCLID-2-ANT) were applied weekly as a drench (5 ml/treatment) for 5 weeks. Water was used as a control. Plant growth was assessed 7 weeks after sowing by measuring plant height, as well as stem and petiole diameters. To test the protective effect against *B. cinerea*, three leaves per plant were removed, leaving 10 mm petiole stubs on the stems. Petiole stubs were inoculated with 10 μ l of a spore suspension of strain BC1 adjusted to 10^6 spores/ml. Lesion expansion on the stem was recorded from the 4th to the 7th day after inoculation and AUDPC was calculated. To test the efficacy of treatments against *O. neolycopersici*, a spore

suspension adjusted to 2×10^3 spores/ml was sprayed on the plants. Disease severity (number of pustules/leaf area) was estimated 10 days after inoculation on two leaves per plant. Inoculated plants were randomly distributed in controlled growth chambers with climatic conditions conducive to the development of both pathogens (21 °C, HR > 80%). Five plants per replicate were evaluated for each treatment and the whole experiment was repeated three times.

Results and discussion

With the exception of the biostimulant EUCLID-1-ANT, applied at a high (3%) concentration, no protective effect against *B. cinerea* was observed with any of the preparations.

A slightly but consistent (up to 20%) reduction in *O. neolycopersici* development was observed with fructose and EUCLID-1-ANT applied at a low (0.1%) concentration. When applied at a high (3%) concentration, the efficacy of EUCLID-1-ANT reached 48% but strong negative side effects were observed on plant growth. No effect was observed with any of the other preparations.

Work is in progress to compare the efficacy of the preparations when applied as a foliar spray. Further experiments will also be carried out to explore possible differences among varieties in the efficacy of foliar- or drench-applied preparations against *B. cinerea* and *O. neolycopersici*, as well as the influence of N fertilisation of the plants. Field work is also needed to validate the present results for the biostimulant EUCLID-1-ANT and to evaluate possible effects on other diseases and pests, as well as on the yield and quality of the crop.

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