

## Isolation of fungi from tomato rhizosphere and evaluation of the effect of some fungicides and biological agents on the production of cellulase enzymes by *Nectria haematococca* and *Pythium ultimum* var. *ultimum*

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Forty-five species and two species varieties belonging to twenty-six genera of fungi were isolated from 30 soil samples from the rhizosphere of tomato plants. The fungi most frequently isolated were *Aspergillus flavus*, *A. fumigatus*, *A. niger*, *A. terreus*, *Gibberella fujikuroi*, *Nectria haematococca* and *Rhizopus stolonifer*.

Ridomil and Vitavax-captan (10, 50 and 100 ppm) had no significant effects on the activity of  $C_1$  and  $C_x$  enzymes of *Nectria haematococca*.  $C_x$  enzyme activity was slightly increased at 10 and 50 ppm, but slightly decreased at 100 ppm. Vitavax-captan (10, 50 and 100 ppm) significantly decreased  $C_1$  enzyme activities of *N. haematococca*.  $C_x$  enzyme activity was slightly increased at 10 and 50 ppm, but at 100 ppm it showed a slightly inhibitory effect. Ridomil caused a slight increase in the activity of  $C_x$  and  $C_1$  enzymes by *Pythium ultimum* var. *ultimum* at low and moderate doses but the highest dose of Ridomil caused a slight reduction. Vitavax-captan slightly increased the activity of  $C_x$  and  $C_1$  enzymes in *P. ultimum* var. *ultimum*.

Normal and sterilised filtrates of *Myrothecium verrucaria*, *Penicillium oxalicum* and *Trichoderma harzianum* induced a small decrease in  $C_1$  enzyme activity of *Nectria haematococca*. The sterilised filtrates of the three fungi tested caused greater inhibition compared to the normal filtrate. The production of  $C_x$  enzyme was slightly increased with normal and sterilised filtrates of *Penicillium oxalicum* and *Trichoderma harzianum*, but was significantly increased by both types of filtrates of *Myrothecium verrucaria*. The two types of filtrate of all fungi tested did not significantly affect the activity of  $C_1$  and  $C_x$  enzymes by *Pythium ultimum* var. *ultimum*.

Production of extracellular protein by *Nectria haematococca* was not significantly affected by any dose of the tested fungicides. It was slightly increased by the two types of filtrate of the three tested fungi but significantly increased by the normal filtrate of *Myrothecium verrucaria*. The normal filtrate of all the fungi tested enhanced extracellular protein production to a greater extent than the sterilised filtrate. Extracellular proteins of *Pythium ultimum* var. *ultimum* were slightly increased by all doses of Vitavax-captan and low doses only of Ridomil, also two types of filtrate of all tested fungi caused a slightly increasing effect.

**Key words:** Biological control, root-rot, fungicides, *Nectria haematococca*, *Pythium ultimum* var. *ultimum*.

Gherbawy Y. A. M. H. and Abdelzاهر H. M. A. (1999): Izolace hub z rhizosféry rajčat a hodnocení účinku některých fungicidů a biologických agens na produkci celulózykových enzymů druhů *Nectria haematococca* a *Pythium ultimum* var. *ultimum*. - Czech Mycol. 51: 157-170

Z rhizosféry rajčat bylo izolováno 45 druhů hub, z nichž se nejčastěji vyskytovaly druhy *Aspergillus flavus*, *A. fumigatus*, *A. niger*, *A. terreus*, *Gibberella fujikuroi*, *Nectria haematococca*

a *Rhizopus stolonifer*. U druhů *Nectria haematococca* a *Pythium ultimum* var. *ultimum* byl hodnocen účinek fungicidů Ridomilu a Vitavaxu – captanu na aktivitu celulázových enzymů; u druhů *Nectria haematococca* nebyl zjištěn žádný významný účinek těchto fungicidů na produkci  $C_1$  a  $C_x$  enzymů. Nižší dávky (10 a 50 ppm) spíše zvyšovaly aktivitu enzymů, vyšší dávky (100 ppm) měly spíš inhibiční efekt. U druhu *Pythium ultimum* var. *ultimum* pouze Vitavax způsoboval slabé zvýšení aktivity  $C_1$  a  $C_x$  enzymů. Studium účinku filtrátů hub *Myrothecium verrucaria*, *Penicillium oxalicum* a *Trichoderma harzianum* bylo zjištěno, že tyto způsobily zvýšení aktivity  $C_x$  enzymu a snížení aktivity  $C_1$  enzymu druhu *Nectria haematococca*, ale neměly žádný významný účinek na aktivitu celulázových enzymů druhu *Pythium ultimum* var. *ultimum*.