Asian J. of Bio Sci. (April, 2008) Vol. 3 No. 1 : (137-139)

Induction of higher tolerance in *Trichoderma harzianum* against pesticides

M.A.SUSHIR*, R. T. GAIKWAD, S.T.AGHAV AND R.S. BHADANE
Oilseeds Research Station, Mahatma Phule Krishi Vidyapeeth, JALGAON (M.S.) INDIA

(Accepted : February, 2008)

Trichoderma harzianum was subjected for induction of higher tolerance against fungicides (metalaxyl MZ, benomyl and propiconazole), nematicides (carbofuran and phorate) and weedicides (diuron and atrazin) at different concentrations. The higher tolerance in the bioagent was recorded against metalaxyl MZ upto 0.5 per cent. While, benomyl was found to be most toxic to the bioagent where tolerance could be induced upto 0.025%. Similarly for propiconazole the tolerance could be induced upto 0.025%. However, *Trichoderma harzianum* possessed tolerance against carbofuron 0.05% was further developed for higher tolerance of the same at 0.2% concentration. But in case of phorate tolerance could be induced upto 0.05%. Likewise, the isolates of the bioagent were developed to possess higher tolerance against diuron and atrazin each at 0.2%. Therefore, these fungicides, nematicides and weedicides can be integrated with *Trichoderma harzianum* for the integrated management of diseases, nematodes, weeds and soil borne plant pathogens, simultaneously.

Key words : *Trichoderma harzianum*, Fungicide

INTRODUCTION

The variable effects of pesticides mostly affect the bioagent by inhibiting its growth and sporulation. The need of hour is to develop tolerant strains against most commonly used pesticides. Abd-El Moity *et.al*. (1982) reported that tolerance could be developed in the antagonist *Trichoderma harzianum* against fungicides by prolonged and repeated exposure serially from lower to higher concentrations of fungicides.However, Papavizas (1987), Papavizas *et.al*. (1982) and Abd-El Moity *et.al*. (1982) reported the genetic manipulation for improving the effectiveness of the biocontrol agent for plant disease control.

MATERIALS AND METHODS

The sensitivity of *Trichoderma harzianum* against pesticides was evaluated by testing there effect on its radial growth with food poison technique (Grover & Moore, 1962). Further the isolates of *Trichoderma harzianum* having tolerance to sub-lethal doses of pesticides were subjected to a series of higher doses of the pesticides so as to develop even more tolerant isolates.

Pesticides *viz*., metalaxyl MZ (2000, 3000, 4000 and 5000µg ml^{-1}), benomyl (5, 10 and 25 µg ml^{-1}), propiconazole (25 and 50 µg ml^{-1}), carbofuran (500, 1000 and 2000 µg ml^{-1}), phorate (250, 500 and 1000 µg ml^{-1}), diuron (500, 1000 and 2000 µg ml^{-1}) and atrazin (500, 1000 and 2000 µg ml^{-1}) were used with PDA as basal medium for inducing higher tolerance in *Trichoderma harzianum.*

The tolerant isolates of *Trichoderma harzianum* against metalaxyl MZ (2000 µg ml^{-1}), benomyl (5 µg ml^{-1}), propiconazole (25 µg ml^{-1}), carbofuran (500 µg ml^{-1}), phorate (250 µg ml^{-1}), diuron (500 µg ml^{-1}) and atrazin (500 µg ml^{-1}) were selected as parent isolates for further enhancing the tolerance against higher doses of the chemicals. Mycelial disc of 5 mm diameter was taken from such tolerant culture and subjected to higher dose of the same chemical.

The isolates found growing well after 7 days of incubation were again transferred on higher graded concentration of medium. Gradual transfer of the isolate after 7 days of incubation up to 4-5 generations. Finally, the tolerant isolates developed were subjected at the same concentration to allow them to stabilize at the higher tolerance.

RESULTS AND DISCUSSION

Trichoderma harzianum was exposed to graded concentrations of seven selected pesticides so as to induce higher toleance. The isolate was subjected to increasing concentrations of metalaxyl MZ, benomyl, propiconazole, phorate, carbofuran, diuron and atrazin for 4-5 successive generations. The results are given in the Table 1.

* Author for Correspondence