USE OF COMPOST EXTRACT TO CONTROL POSTHARVEST FRUIT ROTS OF PEACH

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Abstract

Postharvest fruit rots are very serious diseases of peaches in Greece. The tendacy of agriculture in reducing chemical inputs and the request of consumers for organic products have made important the use of biological methods to control postharvest diseases. In this study, the effectiveness of compost extracts to control postharvest fruit rots of peaches, caused from fungi of the genus Monilinia, Penicillium και Rhizopus, was investigated.

Two compost extracts were used: Posidonia oceanica and Cofuna 3. Application of these extracts was made by using different concentrations before or after the artificial inoculation of peaches (cv Andross).

The results showed that both compost extracts reduced significantly the percentage of fruit rots on peaches inoculated with one of the fungi tested, with higher concentration of extracts to be more effective.

This is a preliminary study on the possible effect of compost extracts to control fruit rots of peaches. More investigation should be conducted in other aspects such as the effect of microbial population (containing in the extracts) in the human health.

Keywords: Cofuna 3, *Monilinia,* P. oceanica, *Penicillium, Rhizopus*

INTRODUCTION

Postharvest fruit rots are of the most important problems of peaches worldwide. These diseases have been more serious in the last few years because of the policy of European Union to reduce the chemical inputs in Agriculture. Thus, methods such as the dipping of fruits in fungicides before storage can not be used. In addition, spray applications should be stopped at least 14 days before harvesting. The result is, in some cases, postharvest diseases to damage even the 30-40% percentages of total production. Therefore, new biological methods should be investigated for their effectiveness to control pathogens causing postharvest diseases.

Fungi of the genus *Monilinia, Penicillium,* and *Rhizopus* are the mainly cause for postharvest diseases of peaches in Greece. Compost extracts have been previously used to biological control of different pathogens such as *Plasmopara viticola, Uncinula necator, Pseudopeziza tracheiphila*, *Botrytis cinerea* (Weltzien 1989; Zmora-Nahum et al., 2008). However, there are not alot of reports for the possibility to use compost extracts against pathogens causing postharvest fruit rots.

The main aim of this study was to investigate the effectiveness of two compost extracts (P. oceanica και Cofuna 3) against postharvest fruit rots of peaches caused from fungi of the genus *Monilinia, Rhizopus* and *Penicillium*.

MATERIALS AND METHODS

All the experiments were conducted at the Alexander Technological Education Institute of Thessaloniki, Department of Crop Production, Laboratory of Phytopathology. Compost extracts from P. oceanica and Cofuna 3 were produced following the method described by Zmora-Nahum et al. (2008). The extract was diluted with steralized distilled water at rates of 1 : 4 and 1 : 8.

Fruits (cv Andross) were collected at harvesting date and immediately transferred to the laboratory. They were disinfected by dipping in a 10% domestic blench (4.86%) solution for 10 min, washed with sterile-distilled water and dried at room temperatures and then dipped in solution containing one of the tested extracts. Fruits were sprayed with conidia suspension (containing conidia of *Monilinia* sp., *Penicillium* sp. or *Rhizopus* sp. at a concentration of 20000 per ml) by a hand-held sprayer. Half of the fruits were sprayed with conidia before dipping of fruits in extractions and half after. In addition, in one treatment for each compost, sterilized extract was used. Fruits inoculated with *Monilinia* sp. or *Penicillium* sp. were placed in refrigarator (4ºC), while fruits inoculated with conidia of *Rhizopus* were placed at room temperatures. Data were collected 10 days later for *Monilinia* sp. and *Penicillium* sp. and 3 days later for *Rhizopus* sp. by recording the resulting rot using a rate of 0 = no symptom – 100 completed rotted.

The experimental design was completely randomized block. There were 5 replications of 10 fruits for each treatment. Non-inoculated fruits, fruits treated with the fungicide iprodione and inoculated fruits without extract application were used as control

RESULTS AND DISCUSSION

The results showed that compost extract application was reduced significantly the percentage of fruit rots for all pathogens used with higher concentrations to be more effective (Table 1). Fruits treated with the extract from cofuna 3 showed relatively less symptoms of rots for all fungi used than P. oceanica. Applications of compost extracts before inoculation showed higher effectiveness in comparison to applications after inoculation. The effectiveness of compost extracts was significantly reduced after sterilization. The fungicide iprodione was not effective against *Rhizopus*. In contrast, it was very effective to control fruit rots caused by the fungi *Monilinia* sp. and *Penicillium* sp.

This study showed that both compost extracts possibly had an antimicrobial activity against *Monilinia* sp., *Penicillium* sp. and *Rhizopus* sp. Brown and Tworkoski (2004) reported that compost extracts from poultry, added in potato dextrose agar, reduced significant the mycelial growth of the fungus *M. fructicola.* In other works, Chakroune et al., (2008) found that natural compost extracts from palm were very effective in management of the fungus *Fusarium oxysporium* f. sp. *albedinis*.

This is a preliminary study on the possible effect of compost extracts to control fruit rots on peaches. More investigation should be conducted in other aspects such as the effect of microbial population (containing in the extracts) in the human health.

Table 1.

Effect of two compost extracts to control postharvest fruit rots of peaches caused from fungi of the genus *Penicillium, Monilinia* and *Rhizopus*

	Percentage of Fruit Rots (%)					
Treatments	*Penicillium* sp.		*Rhizopus* sp.		*Monilinia* sp.	
Control	26.42[1]	a[2]	58.63	d	85.46	e
Iprodione (pr)[3]	5.17	bc	50.75	cd	0.47	a
Iprodione (cur)	2.98	bc	38.81	bcd	1.51	a
Cofuna 3 (pr) 1:4	3.50	bc	17.69	ab	8.74	abc
Cofuna 3 (pr) 1:8	6.57	b	26.06	ab	19.57	bc
Cofuna 3 (cur) 1:4	0.79	c	9.77	a	1.73	a
Cofuna 3 (cur) 1:8	4.11	bc	22.86	ab	9.36	abc
P. oceanica (pr) 1:4	4.29	bc	24.13	ab	17.05	bc
P. oceanica (pr) 1:8	5.44	bc	34.31	bc	24.81	c
P. oceanica (cur) 1:4	2.07	bc	11.33	a	1.60	a
P. oceanica (cur) 1:8	4.41	bc	20.42	ab	6.52	ab
Cofuna 3 (sterilized) 1:4	28.85	a	19.03	ab	48.70	d
P. oceanica (sterilized) 1:4	36.72	a	26.06	ab	60.99	d

[1] Values are the mean of two experiments

[2] Values in the same column followed by different letters were significantly different at P=0.05 according to the Wald Test.

[3] (pr) = application before inoculation, (cur) = application after inoculation

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