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Use of *Trichoderma viride* filtrate on the biological performance of green peach, *Myzus persicae*

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***Abstract*---**The current study included a study of the effect of Trichoderma viride filtrate on the life performance of green peach, Myzus persicae, in the laboratory. The study included the effect of using different concentrations of T. viride infiltrate on the average death rate of nymphs and adults of green peach M. persicae in the laboratory, as the highest death rate reached 53.11% and 42.13% at 100% concentration, respectively, while the lowest death rate was 36.00 % 32.68% at 50% concentration, respectively, with clear significant differences.

Keywords*---Trichoderma viride*, *Myzus persicae*, green peach.

Introduction

Cucumis sativus L. is one of the most important summer vegetable crops in Iraq and the world and one of the most widespread. It belongs to the Cucurbitaceae family. Cucumbers are cultivated in Iraq in open fields in two (spring and autumn) plots. Likewise, they are grown in the protected environment under tunnels and greenhouses and glass houses, the statistics of the device indicated. The Central Bureau of Statistics indicated that the area planted with cucumbers for the year 2014 amounted to 82,218 dunums and a yield of 56,334 tons. The cucumber crop is affected by many pests, including the green peach insect *Myzus persicae* of the order Homoptera that infects this crop due to its direct feeding on it through its piercing and absorbent mouth parts by sucking the vegetable juices from leaves, buds and flowers, causing leaves to curl or twist and stop their growth, and to the secretion of aphids. Honeysuckle covers the surfaces of infected plants, on which black mold fungi grow (Al-Azzawi and Abdullah, 1980). The use of manufactured chemical pesticides at the beginning of their appearance in the fifties of the last century led to their effectiveness in controlling insect pests, but the repeated and wrong use of them caused great damages,

represented by the occurrence of poisoning cases and damage to the environment and non-target organisms such as bees and fish (Paoletti and Pimentel, 2000). In addition to the emergence of resistant strains of insects to these pesticides (Onstad, 2008). All of these previous reasons prompted researchers to find alternatives to these pesticides that are safe and environmentally friendly and have an efficacy no less than the effectiveness of manufactured pesticides. Among these alternatives, pathogens are used, including the fungus *Trichderma viride*. This fungus has received a great deal of interest in the field of biological control on a large scale (Intania and Chamswarng, 2007). The research aims to test the effect of *Trichoderma viride* in vitro control of green peach insect.

Materials and Working Methods

Collection, diagnosis and breeding of the insect

An insect of green peach, *Myzus persicae,* was collected from the cucumber crop in Babylon Governorate, Al-Musayyab project area on 15/11/2021. Leaves infected with green peach were taken in nylon bags and diagnosed by the Museum of Natural History, after which it was bred and multiplied on plates prepared for this purpose. They were also cultured in the laboratory according to the Jabri method (1985) in an incubator with a temperature of 25±1 °C for the purpose of obtaining the colony and using it in subsequent laboratory experiments.

The source of the fungus *Trichoderma viride*

The local isolate of *T. viride* was obtained from the Department of Bio-Resistant Technologies / Al-Musayyib Technical College / Al-Furat Al-Awsat University by Assistant Professor Dr. Kazem Zughair.

Potato Dextrose Agar (PDA)

39 gm of prepared PDA culture medium produced by (Himedia India) company was taken, dissolved in 1 liter of distilled water in a glass beaker with a capacity of one liter in a water bath. Its nozzle was sealed with a cotton plug and placed in the autoclave for sterilization at a temperature of 121°C and a pressure of 15 pounds/in2 for 20 minutes, then it was extracted from the purifier after it cooled down and kept in the refrigerator until use in preparing fungi farms to isolate the purification and propagation of fungi.

Potato Dextrose Broth (PDB)

Potato tubers were taken and washed from the dust, then peeled and cut into small pieces. Weighed 200 g. Dissolved in 500 ml of distilled water in a glass beaker volume of 1 liter for 20 minutes, then filtered with a dull cloth and 20 g of dextrose was added to the filtrate and completed the volume to 1 liter by adding Distilled water and the filtrate was distributed into 250 ml glass beakers at a rate of 150 ml to the beaker, which were previously sterilized in a water bath. The filtrate was taken and sterilized with a sterilization device for the purpose of

sterilization at a temperature of 121°C and a pressure of 15 pounds/ing2 for 20 minutes and then used in preparing fungi filtrate at later times.

Preparation of the leachate of *Trichoderma viride*

After the liquid nutritional medium was prepared in paragraph 3-5-2 and distributed in 250 ml beakers by 150 ml / beaker, and the antibiotic Tetracycline was added to it 250 mg / liter to the liquid nutritional medium, and three tablets were taken by means of a cork piercing from the side of the fungal culture of fungi At the age of seven days, the flasks were incubated at 25±2°C. The flasks were shaken every 3-4 days to distribute the fungal growth. After 28 days, the inoculum was filtered using Whatman No1 filter papers with a Buechner funnel and with the help of a vacuum device and re-filtered using a Millpore microfilter. The filtrate was placed in tubes and kept in the refrigerator until used in subsequent experiments. The filtrate of fungi and the fungal culture was prepared in the Department of Bio-Resistance Technologies / Al-Musayyib Technical College / Al-Furat Al-Awsat University under the guidance of Assistant Professor Dr. Youssif Dakhil and Assistant Professor Dr. Najha Mohamed and Assistant Professor Dr. Kazem Zughayer.

Testing the efficacy of *Trichoderma viride* on adults and nymphs of green plum *M. persicae*

Plastic bottles were used, in each of which a sterile filter paper was placed on top of the filter paper. The leaves of the cucumber plant were wrapped with sterile cotton pieces in order to keep the cucumber leaf moist to feed the insect. 10 adults and nymphs were placed in each repeater, with 3 replicates for each concentration (100, 75, 50) %. The replicates were in filtrate concentrations, the comparison treatment was sprayed with sterile distilled water at the rate of 1 ml bis, then the bottle mouth was covered and surrounded by a rubber band to prevent the exit of the treated aphids and transferred to the incubator at a temperature of 25±2°C and a relative humidity of 65±5% (Jabri, 1985).

Statistic Analysis

The results of the study were analyzed according to the factorial experiment model and with a completely randomized design factorial for laboratory experiments, the Least significant difference (L. S. D.) test was used under the probability level of 0.05 to test the significance of the results The percentage of fatalities for killing was corrected according to the Abbott Formula (Abbott, 1925).

Results and Discussion

Effect of using *Trichoderma viride* filtrate on the rate of mortality of green peach nymphs *Myzus persicae* in vitro The results of Table (1) showed the effect of using different concentrations of the *T. viride* filtrate on the average mortality rate of green peach nymphs, *M. persicae* in the laboratory, where the highest mortality rate reached 53.11% at 100% concentration, while the lowest mortality rate was 36.00% at The concentration is 50% with clear significant differences, and the results in the table showed that the highest rate of destruction of the interference

reached 63.00% at the concentration of 100% after 120 hours, while the lowest death rate reached 27.67% at the concentration of 50% after 24 hours . The reason may be due to the presence of enzymes that degrade the insect body wall (Boucias and Pandland, 1991).

Table (1) The effect of using *Trichoderma viride* filter on the rate of mortality of green peach nymphs *Myzus persicae* in vitro

Concentrations %	time periods/hour			Concentration rate
	24	72	120	
50	27.67	35.33	45.00	36.00
75	40.33	46.33	50.67	45.77
100	44.33	52.00	63.00	53.11
Comparison	0.33	3.00	3.33	2.22
average days	28.16	34.16	40.50	
L.S.D	For concentrations 1.53 for time periods1.32 2.65 to interfere			

Al-Jubouri (2007) also showed that the death rates increase with the increase in the concentration of the fungal infiltrate, the effect of the Trichoderma species. spp spp in insects is due to its ability to degrade the muscles of the insect's body, making it unable to carry out the vital work of movement, feeding, breathing and then death. Also, the fungus *T.viride* has the ability to produce toxic metabolic compounds such as Pyrone and 6-Pentyl Pyrone, and the cause of injury to nymphs More than adults, it may be due to the different thickness of the cuticle layer, as it may be less thick in nymphs than in adults, and the defense cells are more in complete than in nymphs, and therefore their resistance increases. This laboratory experiment agreed with what was mentioned by Hatim (2020), as it showed that the increase in concentration with the increase in the time period of the used filtrate, including *Alternaria alternata*, *Penicillium oxalicum* and *Cladosporioides Cladosporium* gives the highest killing rate of nymphs and adults of the insect M. persicae. The effect of using *Trichoderma viride* filtrate on the mortality rate of green peach adults *Myzus persicae* in vitro.

The results of Table (2) showed the effect of using different concentrations of *T. viride* filtrate on the rate of death rate of adults of green peach *M. persicae* in the laboratory, as the highest death rate reached 42.13% at 100% concentration, while the lowest death rate reached 32.68% at The concentration is 50% with clear significant differences, and the results in the table showed that the highest rate of destruction of the interference reached 51.00% at the concentration of 100% after 120 hours, while the lowest death rate was 27.67% at the concentration of 50% after 24 hours. The reason may be due to the presence of enzymes that degrade the insect body wall (Boucias and Pandland, 1991).

Table (2) Effect of using *Trichoderma viride* filtrate on the rate of laboratory fatality of green peach adults, *Myzus persicae*

Concentrations %	time periods/hour			Concentration rate
	24	72	120	
50	27.67	30.36	40.01	32.68
75	30.36	35.34	45.67	37.12
100	35.33	40.06	51.00	42.13
Comparison	0.33	2.33	2.67	1.78
average days	23.39	26.52	34.83	
L.S.D	For concentrations 1.72 1.49 for time periods 2.98 to interfere			

Al-Jubouri (2007) mentioned that most of the isolated fungi belonging to the Imperfect Fungi phylum have the ability to attack the insect in varying proportions. This discrepancy is due to their ability to secrete enzymes that decompose the insect's body wall, such as Chitinase, Lipase and Protease, or the failure of some of them in the processes of germination and penetration into the body wall of the pest. These results are in agreement with what was mentioned by Hatem (2020). The effectiveness of the effect of the concentrations of the fungus filtrate *T. harzianum* in increasing the death rate of adults of green peach was clear with the increase of that effect with the increase of the concentrations to reach 28.8% at the highest concentration of 100% after 24 hours to reach 37.2% after 72 hours compared to 6.1 in the comparison treatment. And Al-Shuili (2010) indicated that the concentration of the filtrate of the fungus *B.bassiana* had an effect on the adults of the black bean *Aphis fabaei*, as the concentration of 100% gave the highest death rate of 54.10%. It leads to the explosion of the cells of the host's body and thus increases the rates of death rates. The mortality in the current study can be explained by the fact that the secondary metabolites of the fungus have the ability to interfere with the immune system and cause changes in the behavior of the host such as reduced activity, insect paralysis, nutritional reduction and changes in tissue structures and thus rapid death of the host (Charnley, 2003).

Conclusions

1- The fungi infiltrate showed its effect on the different stages of the insect.
2- Increasing the effectiveness of the fungal filtrate on the different stages of the insect by increasing the concentrations and the time period.

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