J. Plant Prot. and Path., Mansoura Univ., Vol.10 (2): 111 - 113 , 2019

Effect of some Materials for Controlling Green Peach Aphid, *Myzus persicae* (Sulzer)

Afaf A. El-Wahab[1]; Horia A. Abd El-Wahab[2]; Neama A. Abdel- Hameed[1] ; Eftkhar E. S. Abohatab[2] and Manal M. A. Hager[1]

[1]Faculty of science, Al- Azhar University (for Girls), ARE

[2]Plant Protection Research Institute- Agriculture Research Center, ARE

ABSTRACT

Myzus persicae (Sulzer) is one of major insect pests which infest many vegetable crops especially potato plants. Some natural materials such as, neem oil, menthol oil and nano chitosan were used in controlling *M. persicae.* The results showed that, neem oil was the most effective compound in controlling *M. persicae* with LC_{50} 63.60 ppm, followed by menthol oil then nano chitosan with LC_{50} 100.26 and 101.62 ppm, respectively.

INTRODUCTION

Potato, *Solanum tuberosum* L. is a crop of outstanding importance in Egypt and all over the world on account of its great value for local consumption and export. It is most popular solanaceous crop used as food in Egypt and it occupies the second exported crop to foreign countries (Hala, 2008). Under field condition, potato plants are under attack by a large number of insect pest such as aphids, leafhoppers, and lepidopterous insect pests (Khafagy and AboHatab, 2013).

Green peach aphid, *Myzus persicae* which consider as the main insect vector transmitting potato leaf roll virus and potato virus Y, it sucks the plant juices and reduces yield and grade, and in many instance, plants grown from infested tubers become non reproductive Marco (1990) (Robert *et al.*, 1990). reported that, both diseases were aphid transmitted viruses. *Myzus persicae* started on potato plants in February and reached its peak in March and April.

The efficiency of plant extracts as promising source of safe and cheap insecticides were studied by several authors (Feng and Isman, 1995; Berlandier, 1996; Sharma *et al.*, 1997; Moawad *et al.*, 1998,Gripwal, 1999; and Mariy *et al.*, 2000b).

Some plant extracts have an insect repellent effect (Lal, 1987; Raman *et al.*, 1987). Also some plant extracts have insecticidal, antihormonal and antifeedant effects.

Therefore the present study aimed to evaluate the effect of neem oil, menthol oil and chitosan oil in controlling *M. persicae*.

MATERIALS AND METHODS

1- The pest breeding:

Potato leaves carrying *M. persicae* were collected from the unsprayed farm of Awish El - Hager, Mansoura district, Dakahlia Governorate. The leaves were kept in jars at 27±2^{O}C and 65±5% RH. The colony was maintained for two generations before the beginning of the tests. Then, newly born nymphs of *M. persicae* were placed, separately, on potato leaves in plastic Petri dishes (10 cm. in diameter). Each dish was covered with muslin for aeration and the potato leaves were put on the bottom of the dish (Madahi and Sahragard, 2012). Whenever leaves appeared discolored, they were replaced with fresh ones.

2. Tested compounds:

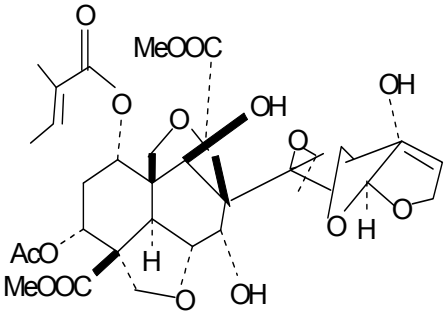
1. Botanical compounds:

- **Neem seed oil:** It was bought from national research center.

Effective material: Azadirachtin

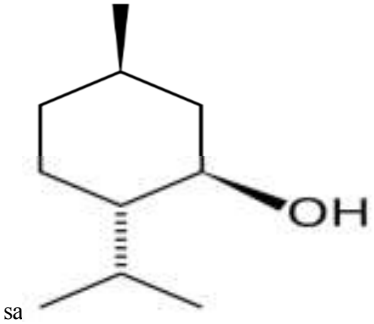
Natural product extracted from seeds of neem tree (*Azadirachta indica*).

Chemical formula of Azadirachtin:



Menthol oil: it was bought from national research center.

Effective material: Natural product extracted from peppermint plant



sa

Menthol formula (Opender *et al.*, 2008)

-Non botanical material.

- Chitosan Nanoparticles.

It was bought from Naqaa Foundation for scientific Research. Chitosan material is mainly biopoly amino saccharide, and derived from chitin of shrimp wastes or crustacean shells fungus biomass. Then the chitosan was produced in the nano –form followed by characterization by transmission electron microscopy (Osama and Diaa, 2018).

Method of application:

Spray method:

The adults of the aphid were used for application. Four concentrations were used as well as four replicates for each concentration. 10 individuals of aphids for each replicate were applied to estimate the mortality line. Different concentrations were sprayed directly on the aphids. The concentrations used were 50, 100, 200 and 300

ppm. The percentage of mortality was recorded after one, three, five and seven days and the data were corrected relatively to control mortality (Abbott, 1925). LC_{50} values were determined using probit analysis statistical method of Finney, (1971).

RESULTS AND DISCUSSION

Results

Data obtained showed that a positive correlation between mortality rates of *M. persicae* and concentration of each material (neem oil, menthol oil and nano chitosan), whereas increasing of concentration for each extract caused increasing mortality rates. Mortality was collected after 1 day, 3 days, 5 days and 7 days.

The results obtained in Table (1) cleared that the total mortality was 43.3, 63.3, 83.3 and 93.2% for neem oil, 36.7, 43.4, 66.7 and 76.6 % for nano chitosan treatment and 30.01, 43.3, 73.3 and 86.7 % for menthol oil.

Table 1. Mortality rate % of *M. persicae* treated with different materials after different days

Treatments	Conc. ppm	Mortality % after				Total
		1st day	3rd day	5th day	7th day	
Neem oil	50	0	20	36.7	3.3	43.3
	100	3.3	20	40	3.3	63.3
	200	3.3	36.7	40	3.3	83.3
	300	3.3	43.3	43.3	3.3	93.2
Nano	50	0	20	10	6.7	36.7
	100	0	26.7	10	6.7	43.4
	200	3.3	36.7	20	6.7	66.7
	300	3.3	46.7	23.3	3.3	76.6
Menthol oil	50	0	6.67	16.67	6.67	30.01
	100	0	16.67	6.67	20	43.3
	200	6.67	26.67	13.33	26.67	73.3
	300	13.33	26.67	20	26.67	86.7

These results were in agreement with Ghada, 2007 who proved that neem oil had high effect on larvae of *Pieris rapae* L.

Data presented in Table (2) reveald that LC_{50} was 63.60, 101.62 and 100.26 ppm for neem oil, nano chitosan and menthol oil, respectively. LC_{90} was 269.45, 816.43 and 406.38 ppm, respectively. Slope for each material is 2.04, 1.42 and 2.11 for neem oil, nano chitosan and menthol oil, respectively. Toxicity index for LC_{50} was 100% for neem oil, 62.58% for nano chitosan and 63.43% for menthol oil. Ghada and Amal, 2015 proved that menthol was less effective than camphor in control of *Spodoptera littoralis*. Also, Ghada *et al.* 2017 proved that *Aphis gossypii* had affected by extract of tomato leaves.

Table 2. Efficiency of some materials against *M. percicae*

Treatment	Conc. ppm	Corrected mortality %	LC_{50}	LC_{90}	Slope ± S.D.	Toxicity index LC_{50} %	P	R
Neem oil	50	43.3	63.60	269.45	2.04± 0.25	100	0.663	0.994
	100	63.3						
	200	83.3						
	300	93.2						
Nano chitosan	50	36.7	101.62	816.43	1.42 ± 0.22	62.58	0.314	0.975
	100	43.4						
	200	66.7						
	300	76.6						
Menthol oil	50	30.01	100.26	406.38	2.11 ± 0.236	63.43	0.235	0.985
	100	43.34						
	200	73.33						
	300	86.67						

REFERENCES

Abbott, W.S. (1925). A method of computing the effectiveness of an insecticide. J. Econ. Entomol., 18 : 265-267.

Khafagy I. F. and Eftkhar E. AboHatab (2013)Comparison between some chemical insecticides and bio-insecticides to control the potato tuber moth (PTM) *Phthormaea operculella* (Zeller) and their side.

Berlandier F.A. (1996). Alkaloid level in narrow leafed lupinus influences green peach aphid reproductive performance. Entomologia Experimentalis Applicata .79(1):19 – 24.

Feng R. and M.B Isman (1995). Selection for resistance to azadirachtin in the green peach aphid , *Myzus persicae* . Exprientia ,51(8):831 – 833.

Finney D.J. (1971).Probit analysis. Cambridge univ., London pp 333.

Ghada (2007). Effect of some plant extracts on *Pieris rapae* L. (Order :Lepidoptera, Family : Pieridae). Ms Thesis, Fac. Sci., Al- Azhar Univ. 133 pp.

Ghada E. A. and E.M. Amal (2015). Efficacy of certain compounds of plant extracts for controlling cotton leaf worm, *Spodoptera littoralis* (Boisd.). Egypt. J. Agric. Res., 93 (1 A), 1- 15.

Ghada E. A., E. A. Elshaier, E.M. Amal and E. M. Hala (2017). Application of tomato leaves extract as pesticide against *Aphis gossypii* glover (Hemiptera: Aphididae). Int. J. Adv. Res. 5(4), 286: 290.

Gripwall , E.(1999). The effects of neem – based insecticide on three important greenhouse pests. Bull. OILB/SROP. 22(1):97-100.

Hala E. A. (2008). Ecological and Biological studies of some pests associated with Potato Plants at Dakhlia Governorate (A. R. E). Ms Thesis, Fac. Sci., Al-Azhar Univ. 187 pp.

Lal, L. (1987). Studies on natural repellents against potato tuber moth, *Phthorimaea operculella* (Zeller) in country stores. Potato Research. 30(2): 329-334.

Mahdi, K.and A. Sahragard (2012).Comparative life table of *Aphis pomi* (Hemiptera: Aphididae) on two host plants *Malus pumila* L. and *Chaenomeles japonica* under laboratory conditions. J. Crop Prot. 1(4): 321-330.

Marco. S. (1990). Possible modes of action of whitewash in reducing virus incidence in potato. Potato Res. (Netherlands). ISSN 0014-3065. 33 (1): 138-139.

Mariy, F.M.A.; ,G.B. El-Saadany; M.S.A. Abdel-Wahed and M.Y. Ibrahim (2000b). Efficacy of some biocides, plant extract and mass trapping on potato tuber moth .Ann. Agric. Sci. Cairo. 4(Special): 1511-1519.

Moawad,G.M.; H.K. Bekheit; A.M. Mabrouk ; R. El-Bedewy and A. Legnaui (1998). Potential uses of neem and insect pathogens for control of potato tuberworm, *Phthorimaea operculella* (Zeller) in storage.

Opender K., W. Suresh and G. S. Dhaliwal (2008). Essential oils as green pesticides: potential and constraints. Biopestic. Int. 4(1): 63–84.

Osama M. Darwesh and Marrez A. Diaa (2018). Bio-evaluation of crustacean and fungal nano chitosan for applying as food ingredient. Sci. direct, 5, 348-345.

Raman, K.V., R.H. Booth and , M .Palacios (1987). Control of potato tuber moth *Phthorimaea operculella* (Zeller) in rustic potato stores .Tropical-Science. 27(3): 175-194.

Robert, Y.; E. Fily and J. Rouze-Jouan (1990). Influence of aphid number of transmission of PLRV isolates to potato cultivars. Potato Res. (Netherlands). ISSN 0014-3-65, 33 (1): 135.

Sharma, D.C.; S. Rani and N.P. Kashyap (1997). Oviposition deterrence and ovicidal properties of some plant extracts against potato tuber moth, *Phthorimaea operculella* (zeller). Pesticide Research ,J. 9(2):241 – 246.

تأثير بعض المواد في مكافحة من الخوخ الأخضر

عفاف عبد الوهاب عباس[١]، حورية على عبد الوهاب [٢]، نعمه عبد الحميد[١]، افتخار أبو حطب[٢] و منال محمد عطيه حجر[١]

[١]كلية العلوم- جامعة الأزهر (فرع البنات)- جمهورية مصر العربية

[٢]معهد بحوث وقاية النباتات- مركز البحوث الزراعية- جمهورية مصر العربية

يعد من الخوخ الأخضر واحد من أهم الآفات الحشريه التى تصيب محاصيل الخضر خاصة نباتات البطاطس، فبعض المواد الطبيعية مثل زيت النيم وزيت النعناع والنوكيتوزان تم استخدامهم فى مكافحة من الخوخ الأخضر وقد أثبتت النتائج أن زيت النيم كان له التأثير الأعلى فى المكافحة حيث كان التركيز النصف مميت ٦٣.٦٠ جزء فى المليون يليه زيت النعناع ثم النانوكيتوزان بتركيز نصف مميت ١٠٠.٢٦ و ١٠١.٦٢ جزء فى المليون، على التوالى.