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EFFECT OF *ROSMARINUS OFFICINALIS* ON THE FEMALE ADULTS AND NYMPHS OF *BEMISIA TABACI* (ALEYRODIDAE)

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Abstract

This study included the impact of the different concentration of *R. officinalis* oil on the female adults and nymphs from *B. tabaci* after 24 and 48 hours from the treatment. The result showed the effect of all concentrations on giving a ratio of death in the female nymphs and adults of *R. officinalis* in the field and laboratory. The results also showed that the higher significant difference among the treatments was at concentration (100%), where the ratio of death in this insect was (80%, 92%) after 24, 48 hours of treatment. The lowest ratio of death in this insect at concentration (25%) was (10%, 25%) after24, 48 hours of treatment respectively. In the nymphs the higher significant difference among treatment was at concentration (100%), Where the ratio of death in nymphs reached (95%, 100%) after 24, 48 hours of the treatment. The lowest significant difference among the treatment was at concentration (25%). after 24, 48 hours where it reached (15%, 45%) respectively.

Key words: *Rosmarinus officinalis*, nymphs *Bemisia tabaci*

Introduction

The Chemical alternatives (biological pesticides) are natural materials included microcode's weed killers, biocides and micro-bio-pesticides. These pesticides used the microorganism like as bacteria and fungi, for example, positive for on species of herbs and insects. This species of fungi can effect on one species of herbs but has no effect on the rest species of herbs (Abbas, *et al.,* 2013). The bio-pesticides that, means the materials which controlled on the pests through the nontoxic techniques without using (the traditional chemical-pesticides) They included pheromones as well as the various plant extracts that attracted the insects to the traps and killed them (Shaukat, 1982). The entire kinds of biocides had immense applications using to kill the pests directly, due to the dangerous pollution issued from these traditional pesticides by their direct negative effect on the human being and environment, it is necessary to invest all kinds of the bio-chemical to kill all different species of pestes and protect the human being and environment from the dangers (Abdu-Al- Hussien, 2019). After the large using of the biological pesticides the list of demand for the bio-chemical declined and minimize because of their bad effect on the habitats and because of the reliance on the biological pesticides that proved their spontaneous analysis without any negative or toxical effects as well as they were efficient in killing the target posts (Muter & Mohammed, 2017). *B. tabaci* is a small insect of the Homopterous order and classified under sternorrhyncha group and from (Aleyrodidae) family (Triplehorn, & Johnson, 2005). That contained (1556) species attributed to (161) genus all over the world (Matin, & Mound. 2007), This insect is similar to the scale insects (coccoid) except the imago phase. It has pair of wings covered with a white powder in both genders and passes by four nymph phases, the first three phases are oval round, the first phase mobile but the other phases sticking on the leaves. Some species of this insect obtains waxen outgrowth (appendix) on the body edge, but its legs and antennas were hidden. The fourth nymph, instar is immobile, called the pupa, and is similar to the small scale having range of colors from white and brownish yellow to black. Its body covered with waxen material. The *B. tabaci* characterized by a vasiform orifice on the last abdominal ring in which it existed the open of anus and from which it distinguished the *B. tabaci*, from the other Hemipteran orders as in the picture (1) (Ismaeil & Dabdoub, 2016).

It appeared on the wood and herbal plants. H. infested the farm crops, vegetables, fruit and the decoration plants. It sucked the plan juice caused the plants yellow and

deformed the plant tissues as well as transported the fungal, bacterial and viral diseases; it produced the honey dew These insects spread in all parts of the world (Al-Malo, 1988 ~ Duffus, & Flook, 1982 ~ Sundarraraj, 2003).

The aim of the study ovulation of various dilutions of the *R. officinalis* on the female adults and nymphs of the first time of *B. tabaci* (Aleyrodidae) in field and Laboratory.

Materials and methods

Method of gathering the insect samples:-

1- The samples of the female adults and nymphs of the first nymph period for *B. tabaci* have gathered from the green cabbage forms in Al- Hewish Region in Samarra city in 13/11/2018.

2- The dilutions (25%, 50%, 75%, 100%) prepared from the *R. officinalis* oil. The oil concentrations used in experiments, and put into a 500 m/l spray and they used in treatment of the insect instars in field and laboratory.

Evaluating the toxicity

The impact of *R. officinalis* oil, (50) samples of the *B. tabaci* adults and nymphs were taken from each concentration: ((25%,50%,75%, 100%)and added 5 ml of each concentration and then accounted a number of the killed adults and nymphs in each concentration and counted the percentage of killing.

Statistical Analysis:-

The data analyzed using (ANOV) Analysis one way variation by Minitab and the mathematic means of the treatment were Compared by using Duncan's Multiple Range test at level of probability $P<0.05$ (Al-Rawi & Abdul-Aziz, 1980).

The field – experiment

The field - experiment designed on the green cabbage plant or crop in some cultural farms in Al – Hewish region in Samarra city for autumn season, 2018- The test is done on the (60 days) Cabbage plant for (16) plants distributed in the Farm at four lines with average (4) plants in each line. The distance is (40 cm) between one line.

Picture 1: *B. tabaci* life cycle from (Ismaeil & Dabdoub, 2016).

Table 1: the materials and tools used in the experiment.

S.	Name of material and devices	Quality
1-	Screw cap	24
2-	Plastic Spray	4
3-	Anatomy microscope	1
4-	Slide & cover slide	1 packet

The plants were spared by the concentrations of the oil extract (25%, 50%, 75%, 100%) directly by the (500ml) plastic spray. The (4) plants of cabbage were limited at another side of the farm and spared only with water Comparison , and then counted the number of whiteflies in each repetition before treatment and after , 24, 48 hours of the sprayed operations for all the treatments included the treatment control that spread only with distilled water.

Results and Discussion

In the table 2, the results indicated that the *R. officinalis* oil had a high efficiency in killing the *B. tabaci* female adults on the green cabbage.

The table 3 gave the treatment results of oil after 24 hours, reaching (173) and after 48 reaching 22 whereas the strength of killing increased in the treatment control. These results reached (1039) after 24 hours and (1238) after 48 hours. These results can be used in the Programmed of killing the isolated *B. tabaci* from the green cabbage.

The results in table 4 indicated that the ratio of killing in the concentration of the *R. officinalis* was (10%) at concentration (25%) after 24 hours of treatment whereas

Table 2: Shows the results of *R. officinalis* oil after 24, 48 hours on the *B. tabaci.*

After24 hours from the Treatment	After24 hours from the Treatment	Before the Treatment	Treatment
279	110	260	Control distilled water
200	288	25	
26	325	100	
113	66	30	
208	6	28	
97	47	189	
101	9	285	
214	188	7	
0	2	30	Oil without any Additives
0	0	68	
0	34	78	
0	1	131	
22	106	240	
0	7	188	
0	8	335	
0	15	18	

the ratio of death was (25%) at the Same concentration after 48 hours of treatment compared to the control sample being without any ratio of adult death. At concentration (50%) the ratio of death was (18%) after 24 hours of treatment, whereas the ratio of death was (35%) after 48 hours of the treatment for the same concentration. At concentration (75%) the ratio of killing (45%) after 24 hours of treatment whereas the ratio of death was (65%) after 48 hours of treatment. At the (100%) concentration ratio of death was (80%) after 24 hours of treatment whereas the ratio death was (92%) after 48 hours of treatment respectively.

The study conclude that the greater the concentration of oil was the greater the percentage killing was. The accumulative effect of the toxically materials for oil in the insect digestive system led to disturb and damage the enzymes. Responsible for removing the toxicity named (mixed function Oxidase (MFO). The duration of exposing to oil had an impact on the studied insect generation. To expose *B. tabaci* to the various oil concentration led to shorten and disturb the insect flying due to the Mechanical damage issued from breaking the wing Veins. To expose this wing to the oil concentrations led to make an isolated layer between the wing and the aerial current and led to make the wings too heavier to fly successfully. Our Study results are compliant with that of (Al-shukri, 2000), that concluded the continuous exposure of the *Culex pipiens* to the plant extracts led to accumulate their toxically materials in the insect digestive system. Our study results are also consistent with that of (Al-Tikriti, 2001 ~ El-Nahal, *et al.*, 1989) It showed that the factor of the exposing duration to the active material has a greater influence than the used dose. This is compliant with the recent result that emphasized that the longer the duration that the insect exposed to the various concentrations of *R. officinalis* oil , the higher the killing ratio happened. This is consistent with the study of (Alwan, 2017).

Table 3: shows the average of *R. officinalis* oil efficiency after 14, 48 hours on the *B. tabaci* female adult.

After 48 hours of treatment	After 24 hours of treatment	Total insect rate treatment	Treatment
155	130	116	Control
3	22	136	Oil without any Additives

Table 4: Effect of the various concentrations of *R. officinalis* oil on the *B. tabaci* adults after 24, 48 hours of treatment.

Concentration	Percentage of adults mortality		Average
	After 24 hours of treatment	After 48 hours of treatment	
25%	10Aa	25Ba	17.5aC
50%	18Ab	35Cb	26.5bB
75%	45Ac	65cD	55cB
100%	80Ad	92Bd	86Cd
Average	38.25Aa	54.25Bb	0.0

The Salhih's study indicated that the *R. officinalis* and its oil contained many acids and the analyzing enzymes out in our study observed that the various concentrations of the *R. officinalis* oil analyzed the body wall and the insect adipose layer .This proved it contains the lipase enzyme and some acids killing parasitic insects and that transported the viruses. Our study emphasized that the oil concentration had an activity in killing the white fly that transported plenty of the real diseases to the cultural crops included this green cabbage crop- this study also affirmed the eating of the various oil concentrations from the adult. Instar of this insect led to disturb the balance of ions into organisms, and ted to malfunction in the insect execratory system and then led to die the organisms. This result is consistent with (Chandegara, 2005) who indicated that the taking the cactus leaves extract and its gel led to imbalance the ions into the organisms which led to defect the secretory system and thus caused the organism death .That is proven by our study.

The results in the table 5 showed that the ratio of Killing of *R. officinalis* at concentration (25%) was (15%) after 24 hours of treatment where as it was (45%) after 48 hours of treatment compared to the control sample which had no ratio of death for the nymphs. At concentration (50%), The ratio of death arrived at (36%) after 24 hours of treatment where it was (55%) after 48hours of treatment. At concentration (75%) the ratio of death was (72%) after 24 hours of treatment. Whereas it reached (100%) after 48 hours of treatment we concluded that the increasing in the concentration accompanied an increasing in the ratio of killing and the accumulative effect of the toxical material of oil in the insect digestive system led to damage the enzymes responsible for clearing the toxicity that called (MFO) (Mixed Function Oxidase). The duration of exposing to the extract had an effective impact on the studied insect generation. To expose *B. tabaci* in nymph instar to the various oil concentrations led to disturb in molt operation and then the first period nymph couldn't transform to the second period nymph and it is also because of the mechanical damage issued by exposing the insect in the nymph instar to wet by oil and from an isolated layer between the insect and air , these results of our study are consistent with that of (Najem, 2011 ~ Muter &

Table 5: Effect of the various concentrations of *R. officinalis* oil and the first period of *B. tabaci* after 24, 48 hours of treatment.

Concentration	Percentage of adults mortality		Average
	After 24 hours of treatment	After 48 hours of treatment	
25%	15Aa	45Ba	30aC
50%	36Ab	55Cb	45.5bB
75%	72Ac	77cD	74.5cB
100%	95Ad	100Bd	97.5Cd
Average	54.5Aa	54.25Bb	0.0

*The similar small letters in on column mean that no significant differences between them.

Mohammed, 2017).

Najem and muter proved that the increasing in the concentration accompanied an increasing in the ratio of killing , and the longer the time of the continuous exposing to the concentration toxical material by the insect or its in star led to accumulate the toxicity in it digestive system damaging its enzymes especially these are responsible for clearing the toxicity. So our study results are consistent with that of (Al-faraji, 2008). In increasing the concentration Al- Farajy concluded that the ethanol extract of Colocynth fruit had an efficiency of the killing the *C. maculatus* . The higher ratio of killing against this was 91.66% in the concentration (1000) parts in million total, and the lowest ratio of killing against the same insect 16.66% in the concentration 1000.

Parts in million /total lowest ratio of killings against the same insect 16.66% in the concentration 1000 parts in million/total. The decreasing of the enzyme activity in clearing the toxicity is due to this studied toxicity and its metabolism. This is compliant with (Holing,1979) ,who affirmed that the increasing the concentration led to increase the ratio of killing and this state is due to lessen then activity of the enzymes responsible for clearing the toxicity and their metabolism to these pesticides. This permeated the molecules of these pesticides to access to their targets (position of the effect) directly without exposing to reactions of clearing the toxicity or there is a chance to change to Activation although the main function of these pesticides came from weak of sensitivity the enzymes of clearing the toxicity to these pesticides that had more than thousand a well–Known Kind so far (Anzenbacher, anzenbacherova, 2001). It is observed the studied oil concentrations had an effect on the strength of body wall and then analyzed it and led to die the insect in the nymph and adult instars, but the effect is stronger in the body wall of the first period nymph than in the adult because the nymph body wall. Is softer than in adults containing the waxen layer this is improved our study.

Conclusions

It is observed that the impact of the various concentrations of the *R. officinalis* oil was contrast. The concentration (100%) gave the higher ratio of killing *B. tabaci* first the period adults and nymphs. There is a direct relation between the factor of exposure to the oil concentration and the ratio of killing. The *R. officinalis* plant method is one of the ideal and alternative methods for the biological control.

Recommendations

Isolate the active Compounds from the seed leaves and oil this studied plant; and select and identify them thanks to the toxically impact of this plant on killing the nymph and adult instars. Perform similar studies related to the same plant family to find a plant more effect on control and killing this insect and its instars.

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