Academicia Globe:
Inderscience Research

ISSN: 2776-1010 Volume 4, Issue 2, Feb., 2023

STUDY OF EFFECT SOME VEGETABLE OILS AND TWO TYPE OF FUNGI AGAINST THE VARROA

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Abstract
This study included evaluating the effectiveness of some vegetable oils (Pimpinella anisum oil , Nigella sativa , Syzygium aromaticum) and Verticillium lacinii, Metarhizum anisopliae fungi in control on varroa after 24 and 48 hours of use , by placing oil-saturated paper at the bottom of the cells to find out which type of extracts are most effective in control, The study indicator that Metarhizum anisopliae is the most effective, reaching (85.98%), followed by Verticillium lacinii by (80.16)%, followed by Pimpinella anisum (78.3%), Syzygium aromaticum (% (73.1) and Nigella sativa (60.16%.

Keywords: vegetable oils, fungi , varroa

Introduction

Honey bees, like other living organisms, are exposed to a number of pathogens that affect on their lives and at least their behavior and production, and these factors are environmental factors, the use of pesticides, or climate changes and pathogens such as Varrao ,,The damage caused by Varrao and the pesticides that are used to control it are among the most dangerous factors for honey bees, Oldroyd, 2007.

The Varroa parasite is present with bees almost permanently, causing it with different degrees of infection that lead to deformities in the body and lack of production, and in increasing the infection leads to the death of bees completely, as well as is the main carrier of viruses during feeding, which causes harm to bees in the future (Degrandi etal, 2012).

The parasite feeds by sucking blood fluid in incomplete stages (larvae and pupae) and adult stage of honey bee individuals. The first to discover it was the scientist Woodman in 1904 on Indian bees and in 1960 the parasite moved to western bees. In 2000 it was renamed by al .scientists),2009 etAnderson and Truman to Varroa destructor (Thapa

Many methods have been used to eliminate the Varrao so that it has a low toxicity on honey bees, including pesticides, but due to the effect of the residues of these pesticides on honey bee products as well as the emergence of generations of Varrao resistant to pesticides, it has become necessary to find alternative ways in order to eliminate this parasite (Brasesco etal.,2017).

Including the use of plant and biological extracts as alternative means to chemical pesticides due to the lack of expected dangers from them and their safety on human health and the environment (2014; Singh chandler etal, 2001) for these reasons, the control using natural materials began to develop, especially fungi that are pathogenic to insects, as it was found that these fungi have the ability to control on Varroa(Davidson etal.2003).

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Inderscience Research

ISSN: 2776-1010 Volume 4, Issue 2, Feb., 2023

Previous studies have shown that some parasites have efficacy against Varroa mites, including(Shaw etal, 2002, Kanga etal 2003). Essential oils were also used as alternative means for chemical pesticides. Essential oils were used against Varroa, such as Rosmarinus officinalis, Eucalyptus sp , Thymus oil (Zakaria and Allam, 2007) as a result of the effectiveness of fungi and essential oils against Varro . So the aim of the study was to compare the control effects using two types of fungus Verticillium lacinii , Metarhizum anisopliae Three types of essential oils (Pimpinella anisum oil , Nigella sativa , Syzygium aromaticum)

Materials and Methods

The experiments were conducted in apiaries located in the Sanyia district in March 2021, beehives were used, which were close in terms of number and contained on bees, and the cells that showed infection with varao were selected for the experiment at a rate of one varroa per 100 of the workers (Abed, 1992).The focus is on the workers of honey bees that incubate inside the cells, which are preferred by varroa after 24 and 48 hours after the experiment.

A4 paper coated with petroleum jelly was placed on the base of the cells in order to determine the number of dead varawa after treatment (Al-Jadani, 2018). Obtained from specialized places to extract natural oils, As for fungal isolates, lecanii Verticillium was isolated from the whitefly, while the Metarhizum anisopliae was isolated from house flies and the fungi were diagnosed according to the classification key Raw filtrates of the fungus were prepared by configuring four glass flasks

2-1 Preparation of raw fungal filtrates

Each contains 300 Potato Dextrose Broth ml, after which each flask is inoculated with two discs with a diameter of 1 cm from the edge of the colony of fungi growing at the age of 5 m in the nutrient medium PDA and by four flasks for each fungi then incubated the flask at temperature of o 2 ± 25 m to 14 days, then shaking the bottles daily, and after the end of the incubation period, separating the mycelium using Whatman No 1 filter After that, the filtrates were passed through the Millipore filter 0.45 µm The filtrates were put in sterile flasks and in a sterile location then filtrates put in the refrigerator until use, and (others, Melo 2011: Samson, 1981).

2-2 Effect of fungal filtrates and vegetable oils

The three oils (Pimpinella anisum oil , Nigella sativa , Syzygium aromaticum) and fungal filtrates prepared by using saturated white paper and completely covered with oils and fungal filtrates. That used by 10 ml and placed at the base of the cells, while the control group used paper coated with petroleum jelly only. The numbered papers were replacing with the beginning of the use of each treatment for a period of two days, The numbers of dead Varrao were then collected on all papers and through these numbers the effectiveness wase estimated (Al-Jadani, 2018). after which the numbers of dead Varrao were collected on all papers and through these numbers the effectiveness of each of treatments estimated (Al-Jadani, 2018).

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Statistical Analysis

The results were analyzed statistically using equations according to(Daher etal., 2009).

-1The relative effectiveness of the substance % = the number of dead varrao after 24 hours of treatment _ average natural failing before treatment / the number of falling varrao after 24 hours of treatment × 100

-2The ratio between falling varrao after and before treatment is as follows

-The ratio between natural falling after and before treatment = the number of falling varrao after 24 hours of treatment / average natural falling before treatment.

-Percentage of falling varrao after an hour compared to total falling after 24 hours % = number of failing varrao after one hour of treatment / number of total dead varrao after 24 hours of treatment × 100.

Results and Discussion

Through the results of the research , it was found number of dead varrao naturally from the cells before starting the experiment was within 2-8 and after 24 hours it was 7-10 and reached after 48 hours 8-13 where the use of petroleum jelly paper under the base of the cells without treatment with any kind of materials used in the control was the average of the dead varrao 26.42% and after 48 hours in the untreated cells the number of dead varrao reached 8-13. This study proven the effect of lecanii Verticillium , Metarhizum anisopliae and extracts of the three oils on the death rate of the Varroa and according to the following:

Effect of Pimpinella anisum oil

Table 2 shows the effect of Pimpinella anisum oil on the Varrao

The average precipitation of dead varrao was 78.3% and the arithmetic mean after 24 hours was 49.99% compared to the control group of 26.42%, as well as the number of dead varrao was 19-23 after 48 hours of treatment

Table 3 shows the effect of Nigella sativa oil on the Varrao.The average precipitation of dead varrao was 60.6%% and arithmetic mean after 24 hours was 57.5% compared to the control group of 26.42%, as well as the number of dead varrao was 13-20 after 48 hours of treatment.

Table 4 Explains the effect of Syzygium aromaticum oil on Varrao.The average precipitation of dead varrao was 73.1%% and the arithmetic mean after 24 hours was 44.67% compared to the control group of 26.42%, as well as the number of dead varrao was 14-19 after 48 hours of treatment.

Table 5 shows the effect fungal filtrate of Metarhizum anisopliae on the Varrao.The average precipitation of dead varrao was 85.98%% and the arithmetic mean after 24 hours was 70.30 % compared to the control group of 26.42%, as well as the number of dead varrao was 19-24 after 48 hours of treatment.

Table 6 shows the effect fungal filtrate of Verticillium lecanii on the Varrao.The average precipitation of dead varrao was 80.16%% and arithmetic mean after 24 hours was 64.17% compared to the control group of 26.42%, as well as the number of dead varrao was 15-22 after 48 hours of treatment.

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ISSN: 2776-1010 Volume 4, Issue 2, Feb., 2023

study above show the activity of both essential oils and fungal filtrates in the control of varawa, as it indicates that the highest average was when using the fungal filtrate of Metarhizum anisopliae, where it reached 85.98%. The lowest arithmetic mean was when using Nigella sativa oil with an average of 57.67%.

Fungi have by-products that have the ability to interfere with the host's immune system, which leads to a lack of activity and movement and thus the death of the host, and fungi have little effects on bees compared to the pesticides Charnely AK (2013). Vegetable oils also have a toxic effectiveness in control on Varroa parasite and have a safe effect on bees in addition to the lack of resistance by Varrao and ease of application and the lack of additional effort by beekeepers to apply them, and can be used throughout the year (Al-Buraki and Hajij, 2015).

In this regard, Abd El-Wahab et al. (2012) indicated the effectiveness of Pimpinella anisum oil in control on the Varroa reached to 99.1%. Another study by 1990, Kraus examined the effectiveness of Pimpinella anisum oil in activity against Varroa. as well Al-Baraki and Hajij, 2015 show that the evaporation of 1 ml / cell of Pimpinella anisum oil has an effectiveness 6.50 -8.81% and arithmetic mean 2.65%. the effectiveness of Pimpinella anisum oil may be due to the repellent effect, this is confirmed by Kraus (1990) in his tests to evaluate the effect of essential oils of many plants. Al-Jadani also explained the effectiveness of some essential oils such as sinapis oil, Olea europaea oil and Trigonella foenum seed oil in control in varroa . Deosi and Chhuneja, 2014 tested a sets of essential oils and proved effective against Varroa. Lecanicillium is effective against varrao with 100% mortality (Shaw et al. 2002). Lecanicillium has effective against varrao with 100% mortality (Shaw et al. 2002). . As explained by etal,2009. Rodríguez Allergy Varrawa against Metarhizum . Kanga etal.,2003 noted the efficiency of the Metarhizum in controlling the Varrao in field experiment . Jennifer etal.,2021 found that new strains of Metarhizum have the potential to control against varrao as an alternative to the use of chemical pesticides. Gerritsen and Cornelissen, 2006 found that Lecanicillium was effective against Varroa after 11 days of treatment.

Table 1 shows the preparation of the dead varroa in the control group

*h= hours

Beehive number	\ Numbers of natural falling varrao before the start of the experiment varrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	\ Relative effectiveness %	Average Effectiveness %	Ratio between varrao fall after and before treatment	Average percentage (double)	Failing after 48 hours varrao
After 1 h			total after 24 h							
1	6	-	8	-	-	25	26.42	2.5	2.4	11
2	5	-	7	-	-	38.57		1.3		13
3	9	-	12	-	-	25.71		3.5		8

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Table 2 shows the effect of Pimpinella anisum oil in the control against Varroa

Beehive number	Numbers of natural deciduous farrao before the start of the experiment farrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	Relative effectiveness %	Average Effectiveness %	Ratio between varrao fall after and before treatment	Average percentage (double)	Failing after 48 hours varrao
After 1 h			total after 24 h							
1	5	16	17	88.8	78.3	88.23	49.99	1.8	1.95	19
2	10	19	22	86.36		63.63		2.8		25
3	7	12	20	63.15		85		1.25		23

Table 3 shows the effect of Nigella sativa oil in the control against Varroa

Beehive number	Numbers of natural deciduous farrao before the start of the experiment farrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	Relative effectiveness %	Average Effectiveness %	Ratio between varrao fall after and before treatment	Average percentage (double)	Failing after 48 hours varrao
بعد ساعه			total after 24 h							
1	6	11	18	61.2	60.6	66.6	57.88	3	2.46	20
2	9	12	17	70.6		47.05		1.88		19
3	4	5	10	50		60		2.5		13

Table 4 shows the effect of Syzygium aromaticum oil in the control against Varroa

Beehive number	Numbers of natural deciduous farrao before the start of the experiment farrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	Relative effectiveness%	Average Effectiveness %	Ratio between varrao fall after and before treatment (	Average percentage (double)	Failing after 48 hours varrao
After 1 h			total after 24 h							
1	5	7	11	63.6	73.1	54.6	44.67	2.2	1.85	19
2	7	9	13	69.2		46.1		1.86		14
3	10	13	15	86.6		33.3		1.5		17

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Table 5 shows the effect of fungal filtrate of Metarhizum anisopliae in the control against Varroa

Beehive number	Numbers of natural deciduous farrao before the start of the experiment farrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	Relative effectiveness	Average Effectiveness %	Ratio between varrao fall after and before treatment	Average percentage (double)	Failing after 48 hours varrao
After 1 h			total after 24 h							
1	5	17	18	94.4	85.98	72.22	70.03	1.6	1.9	19
2	7	15	19	78.94		57.89		2.7		24
3	4	11	20	84.61		80		1.4		21

Table 6 shows the effect of fungal filtrate of lecanii Verticillium in the control against Varroa

Beehive number	Numbers of natural deciduous farrao before the start of the experiment farrao / day	Numbers of natural falling varrao after treatment \ varrao		The percentage of Varawa falling after an hour compared to the total fall after 24 hours %	Average %	Relative effectiveness %	Average Effectiveness %	Ratio between varrao fall after and before treatment	Average percentage (double)	Failing after 48 hours varrao
After 1 h			total after 24 h							
1	2	11	14	78.57	80.16	85.71	64.17	4.5	2.42	15
2	6	15	17	88.23		64.7		1.5		20
3	11	14	19	73.68		42.10		1.27		22

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