

Efficiency of aqueous and alcoholic extract of *Rosmarinus officinalis* and lemon *Eucalyptus* plants in controlling nymphs and adults of the *Macroisphum euphorbiae*(Hemiptera: Alyrodidae) on cut flowers.

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Abstract:

A laboratory experiment was carried out to determine the impact of lemon *Eucalyptus* and *Rosmarinus officinalis* aqueous and alcoholic extracts on a few elements of *Macroisphum euphorbiae*'s life performance. The results of the study showed that the alcoholic extract of *Rosmarinus officinalis* had a significant effect on the non-cumulative mortality of the different fungi of the insect, and at concentrations (0.25, 0.50, 0.75) mg / ml, the results were (66.7, 83.3, 93.3) for nymphs, respectively, and for adults it was (70.0 , 85.3, 88.0), respectively, where the concentration exceeded 0.75 mg / ml, where the highest killing rate was (93.3, 88.0) for nymphs and adults, respectively, after 72 hours. While the mortality rate in the aqueous extract of *Rosmarinus officinalis* plants at the same concentrations for nymphs was (50.0, 66.7, 83.3), respectively, and for adults (30.0, 53.3, 66.7), respectively, as the concentration exceeded 0.75 mg / ml, and the highest mortality rate was (83.3, 66.7). nymphs and adults, respectively, after 72 hours. Also, the alcoholic extract of lemon eucalyptus plant at concentrations (0.25, 0.50, 0.75) mg / ml had a significant effect on the non-cumulative destruction of the different roles of the insect, as the results were (56.7, 73.3, 86.3) for nymphs, respectively, while the adults were (59.7, 73.0, 78.0) respectively after 72 hours. While the percentage of mortality in the aqueous extract of lemon eucalyptus at the same concentrations was (40.0, 55.8, 73.3) for nymphs, respectively. and (36.7, 56.7, 70.0) for adults, respectively, where the concentration exceeded 0.75 mg / ml, where the mortality rate was (73.3, 70.0) for nymphs and adults, respectively, after 72 hours. The results indicated that there is a direct relationship between the concentration of the extract and the percentage of death rate.

Key Word : *Macroisphum euphorbiae*, *Rosmarinus officinalis*, lemon *Eucalyptus*.

introduction-:

Cut flowers are used for cosmetic purposes or given to express love, friendship, gratitude or appreciation(1). Caring for gardens and ornamental plants is considered an urban standard for nations. Wherever a civilization exists and flourishes in any era, its image is always represented in caring for ornamental plants(2). Aphids are r-strategist (3)insects with a fleeting link to the host plant and the ability to reproduce in large numbers very quickly (4).After an early phase of strong expansion, aphid colonies often begin to fall. Crowding, the presence of natural enemies, and the decline in plant quality all encourage

this last phase, which is largely responsible for the development of winged morphs(5,6). Human use of pesticides Frequent use of chemicals in pest control causes the emergence of new strains that are resistant to the action of those pesticides that are repeatedly used in their control, and this naturally requires the continuation of finding new effective pesticides that soon lose their effect with repeated use. Therefore, rosemary and lemon eucalyptus plants were chosen in an attempt to invest it as an alternative. Safe from chemical pesticides, as well as insecticides of botanical origin, including rosemary, which contains natural products Efficient against pests, and several researchers linked its

efficiency to the plant's high content of glycosides, phenolic compounds, and carotenoids(7). Due to the lack of studies on the use of rosemary and lemon eucalyptus plants in some aspects of the life performance of *M. euphorbiae* on cut flowers.

Materials and methods:

Rosmarinus officinalis and lemon Eucalyptus samples were collected in September from the Musayyib district of the Babylon Governorate in preparation for the year 2022. Prof. Dr. Huda Jassim Muhammad Al-Tamimi examined samples of rosemary plants at the University of Babylon/College of Science . Where they were washed separately for the purpose of removing impurities from them. Then it was dried at room temperature with continuous stirring to prevent rotting. Then, it was ground with an electric grinder for 15 minutes, and the vegetable powders were placed separately in glass containers, 27 cm high and 9 cm in diameter, and closed tightly, and kept in the refrigerator until use.

Preparation of an aqueous extract of the *Rosmarinus officinalis* and lemon eucalyptus plants: A boiling water extract of the *Rosmarinus officinalis* and lemon eucalyptus plants was prepared according to the method (8)based on Harborne(9). Add 200 ml of cold, distilled water and 10 g of mint plant powder to a 500 ml glass beaker. For a better extraction, combine the plant material with a magnetic mixer for 15 minutes before leaving the solution in a tight container for 24 hours.

The solution was repeatedly filtered with filter paper, and the filtrate was collected. After that, the foreign substances were added and centrifuged for ten minutes at a speed of 3000 revolutions per minute to obtain dry residuals. These residuals were then stored in little glass bottles that were carefully closed and maintained in the refrigerator until usage.

With three replications for each concentration used in the treatment, 10 adults and nymphs were taken separately and placed in plastic

petri dishes (1.6 x 9) cm, taking into account the small amount of food medium inside the dishes. Each dish was then sprayed separately with 3 ml of these extracts and allowed to dry for 2 minutes. Three duplicates of the control treatment, which consisted solely of distilled water, were then put into an incubator set at a temperature of 25 C. After 1, 2, or 3 days, the number of dead larvae was counted. transaction.

Effect of plant extracts on the insect: Recently, interest has increased in the use of chemicals of plant origin and plant extracts in attempts to develop alternatives of biological origin to deal with pests so that they are easy to use, quick to decompose, and have little impact on the environment and health to replace synthetic pesticides (10). Plant materials that possess insecticidal properties have been used traditionally in all parts of the world without leading to the emergence of resistant species, and plant insecticides, when compared to industrial pesticides, are safer for the environment and generally less expensive and easy to manufacture and use (11.)

Preparation of the alcoholic extract of the *Rosmarinus officinalis* and lemon eucalyptus plants: By placing 10 gm of the dry matter powder of the *Rosmarinus officinalis* and lemon eucalyptus plants in a Soxhlet apparatus and adding 200 ml of ethyl alcohol to it, it prepared the alcoholic extracts according to the (12) .method. At a temperature of 45 degrees Celsius, the extraction procedure took place for an entire day. The extracted sample was then concentrated in a rotary evaporator before the container containing the unprocessed plant parts was put on top of it. Dry residuals from the material were collected and put in sealed glass containers with a known weight before being stored in the refrigerator until usage. The material was dried in an electric oven at a temperature of 40 to 45 °C. To get the appropriate quantity, it went through the process multiple times. In order to determine the biological activity of the crude alcoholic

extracts of the *Rosmarinus officinalis* and lemon eucalyptus plants, 6 g of dry residual was taken for each extract separately, and it was dissolved in 3 ml of ethyl alcohol and 3 ml of the dispersant material. The volume was then completed to 100 ml with distilled water, and the concentration of the basic solution became 6%, or the equivalent of 60 mg / ml. The diffuser was combined with 3 ml of ethyl alcohol and 3 ml of distilled water for the control treatment.

Analytical statistics The studies were examined using a completely randomised design (C.R.D.) and the factorial experiment model, and the significance of the observed differences was demonstrated using the Least Significant Difference (L.S.D.) test at the probability level (0.05). The mortality rate was adjusted in accordance with equation (13.)

Corrected loss percentage (loss in treatment % - loss in the comparative treatment % \div (loss in comparison % - 100) \times 100

Results and discussion:

Table 1 shows that the *Rosmarinus officinalis* plant's alcoholic extract, which had the highest mortality rate of 93.3% and the lowest mortality rate of 56.7% at a concentration of 0.25 mg/ml, outperformed the aqueous extract, which had the highest mortality rate of 83.3% and the lowest mortality rate of 33.3% at a concentration of 0.75 mg/ml. It is also noted that there is a direct proportion between the time period and the concentrations, that is, as the time period increases, the percentage of mortality rate increases, reaching 61.1 %, 71.1%, and 90.0 % in concentrations 0.25, 0.50, and 0.75 mg/ml after (24, 48, and 72) hours in the alcoholic extract. As for the aqueous extract, the percentage of mortality rate was 41.3 %, 63.3 %, and 78.9% in concentrations 0.25, 0.50, and 0.75 mg/ml after (24, 48, and 72) hours, respectively. As for the effect of the extract type factor, the alcoholic extract was superior in comparison to the aqueous extract by increasing the percentage

of mortality, reaching 55.5 % with the alcoholic extract and 45.8 % with the aqueous extract. As for the interference, the highest percentage of the mortality rate was 93.3% in the concentration of 0.75 mg / ml after 72 hours and for both types compared with the control treatment, and the findings of the statistical analysis showed that the outcomes obtained differed significantly from one another.

Table (2) shows the alcoholic extract of *Rosmarinus officinalis* at a concentration of 0.75 mg / ml, as the highest mortality rate was 88.0% and the lowest was 63.3% at a concentration of 0.25 mg / ml, while the aqueous extract had the highest mortality rate at a concentration of 0.75 mg / ml, which amounted to 66.7% and the lowest is 20.0% at a concentration of 0.25 mg / ml. It is also noted that there is a direct proportion between the time period and the concentrations, that is, the longer the time period, the greater the percentage of the death rate, as it reached 66.6 %, 78.4 %, and 84.0% in concentrations 0.25 and 0.75 mg/ml after (24, 48 and 72) hours. As for the aqueous extract, the percentage of mortality was 24.4 %, 50.0 % and 61.1 % at concentrations 0.25, 0.50 and 0.75 mg/ml after (24, 48 and 72) hour compared with the control treatment.

As for the effect of the extract type factor, the alcoholic extract was superior in comparison with the aqueous extract through an increase in the percentage of death, reaching 57.2 % in the alcoholic extract and 33.8% in the aqueous extract. As for the interaction, the highest percentage of the death rate was 88.0% in the concentration 0.75 mg. / ml after 72 hours and for both types compared with the control treatment and the results of the statistical analysis indicated that there were significant differences in the obtained results.

And this study agrees with Redoan (14) that nymphs are more sensitive than adults because

they are in the stage of development, which facilitates the penetration of the pesticide or extract into the insect's epidermis.

Table (1): Different of concentrations of aqueous and alcoholic extracts of *Rosmarinus officinalis* on the percentage of the nymphal period of the *Macroisphum euphorbiae*.

Extract type	The time period is in hours concentration mg/ml	24	48	72	concentration rate	average Extract type
aqueous extract	Control	0.0	0.0	0.0	0.0	45.8
	0.25	33.3	40.6	50.0	41.3	
	0.50	60.0	63.3	66.7	63.3	
	0.75	76.7	76.7	83.3	78.9	
alcoholic extract	Control	0.0	0.0	0.0	0.0	55.5
	0.25	56.7	60.0	66.7	61.1	
	0.50	63.3	66.7	83.3	71.1	
	0.75	86.7	90.0	93.3	90.0	
average time periods		47.0	49.6	55.4		
LSD(0.05) value for Extract type		5.12				
LSD value (0.05) for the concentrations		8.83				
LSD value(0.05) for the time periods		4.65				
LSD(0.05) value for interaction		7.15				

Table (2): Different of concentrations of the aqueous and alcoholic extract of the *Rosmarinus officinalis* plant in the percentage of the adult period mortality of the *Macroisphum euphorbiae*.

Extract type	The time period is in hours concentration mg/ml	24	48	72	concentration rate	average Extract type
aqueous extract	Control	0.0	0.0	0.0	0.0	33.8
	0.25	20.0	23.3	30.0	24.4	
	0.50	46.7	50.0	53.3	50.0	
	0.75	56.7	60.0	66.7	61.1	
alcoholic extract	Control	0.0	0.0	0.0	0.0	57.2
	0.25	63.3	66.7	70.0	66.6	
	0.50	73.3	76.7	85.3	78.4	
	0.75	77.4	86.7	88.0	84.0	
average time periods		42.1	45.4	49.1		
LSD(0.05) value for Extract type		4.55				
LSD value (0.05) for the concentrations		6.12				
LSD value(0.05) for the time periods		4.55				
LSD(0.05) value for interaction		10.60				

Table (3) shows the 0.75 mg/ml concentration of the lemon eucalyptus plant's alcoholic extract, with the highest mortality rate being 86.3% and the lowest being 63.3%. 7% and 20.0% at 0.25 mg/ml of concentration, respectively. It is also noted that there is a direct proportion between the time period and the concentrations, that is, the longer the time period increases, the percentage of death rate increases, as it reached 53.3%, 65.5%, and 81.0% in concentrations 0.25 and 0.50. And

0.75 mg/ml after (24, 48, and 72) hours. As for the aqueous extract, the percentage of

mortality was 36.5%, 48.7%, and 67.2% in concentrations 0.25, 0.50, and 0.75 mg/ml after (24, 48, and 72). hour compared with the control treatment. As for the effect of the extract type factor, the alcoholic extract was superior in comparison with the aqueous extract through an increase in the percentage of death, reaching 49.2% in the alcoholic extract and 38.1% in the aqueous extract. As

for the interaction, the highest percentage of the death rate was 88.0% in the concentration 0.75 mg. / ml after 72 hours and for both types compared with the control treatment and The statistical analysis's findings showed that the outcomes were significantly different from one another.

The laboratory study conducted by Al-Hattab (15) also showed that the use of ethyl alcohol

Table (3): Different of concentrations of the aqueous and alcoholic extract of the lemon eucalyptus plant in the percentage of the nymphal period of the *Macroisphum euphorbiae*.

Extract type	The time period is in hours concentration mg/ml	24	48	72	concentration rate	average Extract type
aqueous extract	Control	0.0	0.0	0.0	0.0	38.1
	0.25	32.7	36.9	40.0	36.5	
	0.50	44.9	45.5	55.8	48.7	
	0.75	59.5	68.8	73.3	67.2	
alcoholic extract	Control	0.0	0.0	0.0	0.0	49.9
	0.25	50.0	53.3	56.7	53.3	
	0.50	60.0	63.3	73.3	65.5	
	0.75	76.7	80.0	86.3	81.0	
average time periods		38.8	42.9	46.7		
LSD(0.05) value for Extract type		5.47				
LSD value (0.05) for the concentrations		7.74				
LSD value(0.05) for the time periods		6.70				
LSD(0.05) value for interaction		10.94				

Table (4) shows the alcoholic extract of lemon eucalyptus was superior at a concentration of 0.75 mg / ml, as the highest mortality rate was 78.0% and the lowest was 40.0% at a concentration of 0.25 mg / ml. As for the

extract of the leaves of the night alum plant, *Irabilis jalapa*, on an insect of corn, *Rhopalosiphum maidis*, showed the effectiveness of the extract on nymphs and adults, where the mortality rate was 54.8% and 46.9% at a concentration of 20 mg / ml, compared with 6.1 and 12.3% in the control treatment after 48 hours, respectively, of treatment.

aqueous extract, the highest mortality rate was at a concentration of 0.75 mg / ml. 70.0% and

the lowest is 26.7% at a concentration of 0.25 mg / ml. It is also noted that there is a direct

proportion between the time period and the concentrations, that is, the longer the time period, the greater the percentage of the death rate, reaching 54.2% ,65.4%, and 75.7% at concentrations 0.25, 0.50, and 0.75 mg/ml after (24, 48, and 72) hours, while the aqueous extract had a percentage of death rate of 32.2%, 48.9%, and 62.9% at concentrations 0.25, 0.50, and 0.75 mg/ml after (24, 48, and 72) hours, compared with the control treatment.

As for the effect of the extract type factor, the alcoholic extract was superior in comparison

Table (4): Different of concentrations of the aqueous and alcoholic extract of the lemon eucalyptus plant in the percentage of the of the adult period mortality *Macroisphum euphorbiae*.

Extract type	The time period is in hours concentration mg/ml	24	48	72	concentration rate	average Extract type
aqueous extract	Control	0.0	0.0	0.0	0.0	36.0
	0.25	26.7	33.3	36.7	32.2	
	0.50	40.0	50.0	56.7	48.9	
	0.75	56.7	62.0	70.0	62.9	
alcoholic extract	Control	0.0	0.0	0.0	0.0	48.8
	0.25	47.4	55.5	59.7	54.2	
	0.50	60.0	63.3	73.0	65.4	
	0.75	73.3	76.0	78.0	75.7	
average time periods		38.0	42.5	46.7		
LSD(0.05) value for Extract type		5.44				
LSD value (0.05) for the concentrations		7.70				
LSD value(0.05) for the time periods		6.67				
LSD(0.05) value for interaction		10.89				

with the aqueous extract by increasing the percentage of death as it reached 48.8% in the alcoholic extract and 36.0% in the aqueous extract. As for the overlap, the highest percentage of the death rate was 78.0% in the concentration 0.75 mg / ml. After 72 hours, both types were compared with the control treatment, and The statistical analysis's findings showed that the outcomes were significantly different from one another.

The researcher Klock and others (16). showed that some compounds that are extracted from some plants, including medicinal plants, affect the enzyme Protase in the middle alimentary canal, in addition to the level of sugar and protein in the blood of insects. In addition, the researcher Chan and Klock explained that some substances The active chemicals found in the plant extracts may combine with some fatty compounds, proteins and digestive enzymes, and thus form indigestible chemical complexes, which leads to an effect on the metabolism of the insect's body. The results of the study conducted by the researcher Hamza in (17).showed the superiority of the ethyl alcohol extract of the dendritic enamel plant *Lantana camera* over the extract of the cinnamon plant *Cinnamomnm zeylanicum* with a concentration of 1.5% on bean *Aphis fabaes*, as it gave a mortality rate of 40.0% after 24 hours, while the comparison treatment was which amounted to 3.3% for the same period.

Additionally, the findings of this study by El-Hattab(18).agree that the effect of organic solvent extracts of the jasmine plant *C.nerme* on the vital performance of a green peach insect, and the superiority of the hexane extract in the effect compared to the extract of ethyl acetate, which came in the second degree, preceded by ethyl alcohol, and that the effect of the interaction between The concentration of the extract, the type Many investigations have demonstrated that the biological efficiency of rosemary is caused by the biological traits of the plant and its chemical make-up. which inhibit microorganisms, including fungus, and have the effects of carnosol and carnosic acid, such as diterpenoids rich in phenolic compounds, particularly compound(19,20).This conclusion is consistent with other studies' findings that *Trichophyton dermatophytes* and *Microsporium* are among the fungi that rosemary's active chemicals are effective against(21,22,23,24(

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