Effect of alcoholic extract of Nerium Oleander plant in controlling beetle Castaneum (Herbst) Tribolium

Abbas Ghanem Hamza Najah Muhammad Bari Huda Abdel-Amir Muhammad Shnwer

Abstract: A laboratory study was conducted in order to evaluate the effect of the alcoholic extract of the Nerium oleander plant on some aspects of the life performance of the red rusty flour beetle T. castaneum. The non-cumulative concentration of the larvae and the adult insect, where the concentration of 75 mg / ml gave the highest percentage of the death rate in the larvae and adults (80.12% and 75.31%), respectively, compared with the control treatment, which amounted to 0.00, and at the lowest concentration of 25 mg / ml after 24 hours, the percentage of the death rate Larvae and adults in the alcoholic extract (23.33% and 13.00%), respectively, compared with the control treatment, which amounted to 0.00.

Introduction

The red rusty flour beetle, Castaneum (Harbst) Tribolium, is one of the most important insect pests, as the red rusty flour beetle attacks stored grains and other food products, including flour, cereals, pasta, beans and nuts, causing them to be lost and damaged. Flour beetle is the most common secondary pest of all stored plant commodities worldwide (1)Infestation of stored grains with insects is a serious problem due to the heavy losses it causes in stored foodstuffs, and the reports of the Food and Agriculture Organization (FAO) indicated that The annual losses due to infection reach 10% of the total amount of grain (2)(

The oleander plant was recently classified among the important medicinal plants, because it contains many active substances, and its leaves contain more than 30 glycosides. Tomeya are the glycosides oleandrin and neriine, which are present in all parts of the plant. The dry leaves are the part that is used medically, as they are used to extract the active ingredients (3)

The repeated use of manufactured chemical pesticides caused the emergence of insect strains that are genetically resistant to these pesticides and increased the cost of control as well as polluting the ecosystem, which necessitated the search for alternative biological methods of plant origin, which showed distinct results, including plant extracts and alcohol in controlling insect pests and limiting their infestation(4).

Materials and working methods :

ISSN 2072-3857

Table No. (1) plants used in the research

Collection area/Babylon	Used part	Plant family	The scientific name	The local name
Technical college Gardens Musayyib	Flowers	Apocynaceae	Nerium oleander	Oleander

Collecting and diagnosing oleander plant samples:

The flowers of the oleander plant were collected from the gardens of the College of Technology, Musayyib 3/3/2023, and samples (whole plant) were diagnosed in the Plant Production Laboratory / College of Technology, Musayyib. They were placed on pieces of cloth in a dark room so as not to expose them to sunlight and turn them over between periods. And another to dry completely and after drying it was ground using an electric mill for the purpose of using it in making extracts in subsequent experiments

Preparation of alcoholic extract of N. oleander flowers. oleander :-

I followed method(5) in preparing the alcoholic extract by taking the weight of 10 gm of the dry matter powder of N. oleander flowers and placed in the extraction apparatus (Soxolate appratory) and 200 ml of ethyl alcohol was added to it and the extraction was done for 24 hours at a temperature of 45 °C ˚ The extracted sample and the container were concentrated on the raw extracted materials of plants, and the process was repeated several times to obtain a sufficient quantity. The material was dried in the electric oven at a temperature of 40-45 °C, after which the dry residuals were taken and placed in airtight glass containers with weight information and kept in the refrigerator until use

Statistical analysis: The experiments were analyzed according to the factorial experiment model and with a completely randomized design (C.R.D) and using the Least significant difference (L.S.D) test under the probability level (0.05) to show the significance of the existing differences(6).

Results and discussion

The effect of overlapping the amount of alcoholic extract oleander N. oleander. Percentage of larval death of the red rusty flour beetle T. castaneum after (72, 48, 24) hours.

The results of Table (2) showed the effect of the amount of extract and the time period on the percentage of larvae death, as the highest percentage of death was at a concentration of 75%, the time period of 72 hours, reaching 86.67%, while the lowest percentage of death was at a concentration of 25%, reaching 23.33% for the alcoholic extract of the oleander plant, indicative The results of the statistical analysis indicate that there are significant differences between the results.

. The cause of the caterpillars' death is due to the caterpillar's ingestion of the alcoholic extract during its entry into the flour when it

ISSN 2072-3857

was treated with the alcoholic extract of the plants under study. It is also due to the quality of the chemicals and the degree of polarity of the solvents it extracts. For example, ethyl alcohol extracts tannins, alkaloids and phenols, and hexane extract extracts volatile oils and fatty compounds, and ethyl acetate extracts the compounds. Alkaloids and polyphenols, as these substances are considered very effective, with the highest percentage of mortality at the highest concentration of 75% (80.12, 72.10, 63.23), respectively. During a period of time (24,48,72) hours compared to the control treatment, which amounted to 0.00, while the death rate at the concentration was 50% (33.33, 43.51, 56.21), respectively, during a period of time (24,48,72) hours compared to the control treatment, which amounted to 0.00, and the lowest percentage of mortality at the concentration was 25% (23.33, 23.33, 30.00) respectively during a period of time (72, 48, 24) hours, compared to the control treatment, which amounted to 0.00.

Table No. (2) Effect on the percentage of destruction of larvae of the red rusty flour beetle T. castaneum using N. oleander extract. oleander. laboratory alcoholic:

Average	72	48	24	Concentration
0.00	0.00	0.00	0.00	Comparison
25.00	30.00	23.33	23.33	25%
44.35	56.21	43.51	33.33	50%
71.81	80.12	.72.10	63.23	75%
	41.58	34.23	29.97	Average
	Overlap	period	Concentration	L.S.D .50
	8.31	5.12	9.59	

The effect of overlapping the amount of alcoholic extract oleander N. oleander. Percentage of death of adults of the red rusty flour beetle T. castaneum after (72, 48, 24) hours.

Table (3) shows that the superiority of the alcoholic extract of the oleander plant in killing adults of the red rusty flour beetle indicates that it contains effective compounds similar to those found in chemical pesticides, and these are toxic, repellent, or inhibit feeding, which affect the absorption of food from the gastrointestinal tract leading to its death (7)(

It is also due to the degree of polarity of the solvents and the type of chemicals it extracts. For example, ethyl alcohol extracts tannins, phenols and semi-alkaloids, and the hexane extract extracts fatty compounds, volatile oils and ethyl acetate extracts alkaloids and polyphenols. These materials are considered very effective, with the highest percentage of mortality at the highest concentration of 75%. (59.23, 68.10, 75.31), respectively, during a period of time (24, 48, 72) hours compared to the control treatment, which amounted to 0.00, while the percentage of mortality at the concentration was 50% (35.33, 40.00, 49.33), respectively, during a period of time (24,48 , 72) hours compared to the control treatment, which amounted to 0.00, and the lowest percentage of death at the concentration was 25% (13.00, 26.67, 33.33) during a period of time (72, 48, 24) hours, compared to the control treatment, which amounted to 0.00. The results of the statistical analysis indicated that there are differences significant among the results.

ISSN 2072-3857

Table No. (3) Effect on the percentage of death of adults of the red rusty flour beetle T. castaneum using N. oleander extract. oleander. laboratory alcoholic

Average	72	48	24	Concentration
0.00	0.00	0.00	0.00	Comparison
24.33	33.33	26.67	13.00	25%
41.55	49.33	40.00	35.33	50%
67.54	75.31	68.10	59.23	75%
	39.49	33.69	26.89	Average
	6.21	7.81	10.27	L.S.D .50

Conclusions and recommendations

conclusions

1-The alcoholic extract of oleander proved to be highly effective in killing adults of the red rusty flour beetle. The treatment increased with increasing concentrations and time periods under study.

2-The effect of the alcoholic extract of the oleander plant on the larvae of the red rusty flour beetle, and the mortality rate increased with increasing concentration.

3-The larval stage was more affected by the alcoholic extract than the adults by

Recommendations:

Testing the effectiveness of the extracts against insects belonging to different insect order

Searching for different local plants to know their repellent effect to protect stored flour against insect infestation of stored materials:increasing the concentration

References

1- badawi , eali abrahim waldirihim , yusif bin nasir (1991) , (afat alhubub walmuadialmakhzunah waturuq mukafahataha) almamlakih alearabiah alsaeudih , jamieuh almalik saeud.

-2 zaydan , hindiun zidan ; jamaeuh , aihmad eali ; eafifi , fathi eabd aleaziz ; fam , eizat zaki wasayid aihmad , salwaa mustafaa (1993). alnashat alhayawii albaqi libaed almustakhlasat alnabatiat ealaa baed hasharat alhubub almakhzunat waealiqat dhalik bihayawiat albudhur almueamilah , majalat aitihad aljamieat alearabiah lildirasat walbuhuth alziraeiatih , jamieat eayn shams alqahirh: m 1 , e 1 , 113-123 safhah

3-Zibbu, G. & A. Batra (2010) . A Review on Chemistry andPharmacological activity of Nerium oleander L. J. Chem. Pharm.Res., 2(6):351- 358.

4-López-Valcárcel, M. E., Del Arco, A., & Parra, G. (2023). Sublethal exposure to agrochemicals impairs zooplankton ability to face future global change challenges. *Science of The Total Environment*, *873*, 162020.

5-Harborne, J.B. (1984). Phytochemical Methods, A guide to modern techniques of plant analysis . 2nd ed., London , New York. Chapman and Hall.pp.. 288.

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

7-Uroko, R. I., Aguwamba, C., Aaron, C. F., Nweje-Anyalowu, P., & Uche, M. E. (2022). Evaluation of phytochemicals, antioxidant contents and in vitro antioxidant activities of a combined ethanol extract of Spermacoce radiata and Hypselodelphys poggeana leaves. Journal of Medicinal Herbs,, 13(3), 57-65.

ISSN 2072-3857