

EFFECT of EFFICACY of COMMUNIS MYRTUS on TRIBOLIUM CASTANEUM

Thabet Mudheher Khalaf^{#1}, Husham Naji Hameed², Sohaib SERRI SHAKIR^{3,4} & Mohammed Ahmed Mustafa⁴

^{#1}Department of Biology, College of Education for women, University of Tikrit

²Department of biology, College of Education, University of Samarra

³Ministry of Education Saladin

⁴Department of pathological Analysis, College of Applied Sciences University of Samarra

⁴Department of Medical Laboratory Techniques, College of Technology, University of Imam Ja far Al-Sadiq _ Dujail

²Hisham.n370@uosamarra.edu.iq

⁴Mohammed.alsad3@gmail.com

Abstract:

The results of the study showed that there is a positive effect of the plant extract in achieving killing rates, as the alcoholic extract of communis myrtus was significantly superior to the aqueous extract.

With a concentration of 3% after 72 hours of treatment on the remaining concentrations in the rate of killing of camels, which reached 88%, while the highest rate of killing of camels in concentration was 3% after 72 hours of treatment with the aqueous extract, reaching 63%.

Keywords: *Tribolium castaneum*, *communis myrtus*, anti-larvae and whole.

INTRODUCTION

The stored grains are of great importance in the lives of many peoples in different countries of the world. The stored grains and other foodstuffs are exposed to damage as a result of being infected with pests or being exposed to inappropriate environmental conditions, the most important of which is the heat and humidity inside the grain. As well as the relative humidity inside the stores, thus these conditions lead to the loss of the economic and nutritional value of these materials. *Tribolium castaneum* (Herbst) is considered a dangerous pest on ground grain products such as flour, bran, millet, etc., The use of pesticides leads to contamination of these materials, in addition to their repeated use, leading to the emergence of resistant cases in the red rust beetle due to pesticides (Abdullahi et al. 2019).

MATERIALS & METHODS

Breeding of the rusty flour beetle *Tribolium castaneum* Herbs

The insect was obtained from infected flour from one of the mills in the city of Samarra, and the red flour beetle was raised on Whole wheat flour because it contains vitamin B1 and protein in a high proportion compared to white flour (& Mukerji Sinha, 1953),

Whereas, the nutritional value of brown flour is much higher than white flour because it contains a high percentage of bran and germ, while white flour (Namira Zero) almost contains the endosperm tissue, starch and gluten only (Yunus et al., 1987).

According to the method of the researcher (Onon, 1982)

After the emergence of the adults, they were diagnosed in the Natural History Museum / Department of Insects and Invertebrates for testing

Isolate the flour beetle are full of red Alsdiah

The virgins were isolated from the breeding environment and placed with the same amount of breeding medium, then they were preserved in the nursery and inspected daily to follow their development and the emergence of adults (Abbas, 1998).

Collection and classification of plants

Myrtle plants were collected from the gardens of the University of Samarra, the used plant parts (leaves) were cleaned, all foreign impurities attached to them were removed, and they were placed in an electric oven at a temperature of (25) C for the purpose of drying with constant stirring to prevent rotting for a period of three days, then put each dried plant inside a paper bag And it was kept in conditions free of moisture until it was extracted and used in the experiment (Supavarn et al. 1974).

Preparation of the plant extract Ethanol extranet

The plant extract was prepared according to the method (Riose et al. 1987).

Preparation of the aqueous extracts of the study plants

The extract was based on the Harborne (1984) method

Toxicity test of plant extracts against full roles and larvae (3rd age)

To study the lethal effect of the plant extract on the rusty flour beetle, three different concentrations of the myrtle plant were prepared (0.75, 1.5, and 3).

$$\frac{\text{Death Percentage in the Test} - \text{Percentage of death in the comparison}}{100 - \text{percentage death in comparison}} \times 100$$

The value of LC 50 (lethal concentration of half of individuals) was calculated using the special papers for this (Log probit paper) (Abdullah,et al,2015).

Statistical analysis

The following statistical tests were conducted to analyze the results obtained using the SPSS system

RESULTS & DISCUSSION

The effectiveness of *M. communis* extract aqueous and alcoholic

The results of the current study showed different effects of the mycelium plant extract in the killing rate of red rusty flour beetle integuments depending on the user, where the highest rate of killing of camelids was in the concentration of 3% of the aqueous extract as it reached 63.3% as in Table (1), while the highest percentage of killing of camelids was in Concentration 3% for the alcoholic extract, reaching 87.3%, as shown in Table (1).

Table (1): The effect of the different concentrations of the aqueous and alcoholic extract of the myrtle plant on the rates of killing the red rust flour beetles after (24, 48 and 72) hours of treatment

Plant type	Type of plant extract	Extract concentration	Time / hour			Average concentration	Average plant extract
			24	48	72		
	Water	0.75	10	15	10	11.7 b	37.6b
		1.5	36.7	53.3	56.7	48.9 a	
		3	36.7	56.7	63.3	52.2 a	

Average murder Palmstkhals alcohol					27.8b	41.7a	43.3a		
Alcoholic	0.75				13.3	27.3	36.7	25.8 c	48.8 a
	1.5	33.3		43.3	70.0	48.9 b			
	3	55.0	73.3	87.3	71.9 a				
Average murder Palmstkhals alcohol		33.9c	48 b	64.4a					
Average general killing		30.8c	44.8b	54a					

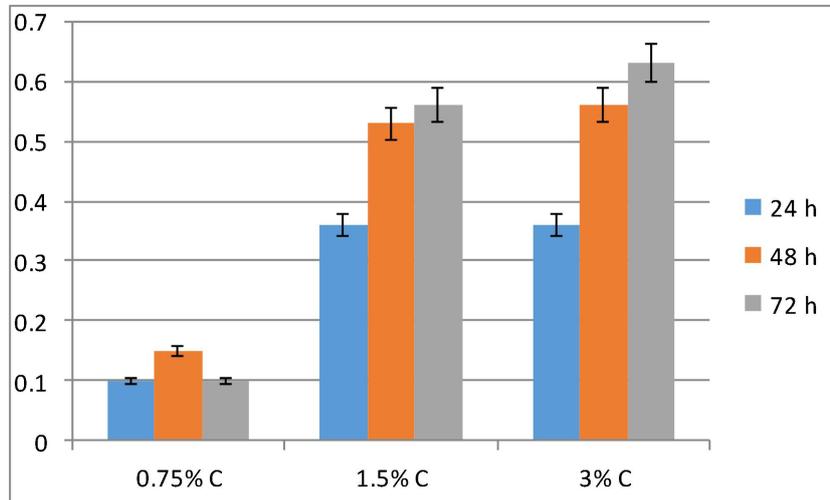


Figure (1): The effect of aqueous extract of the myrtle plant on the percentage of killing the rusty flour beetle particles.

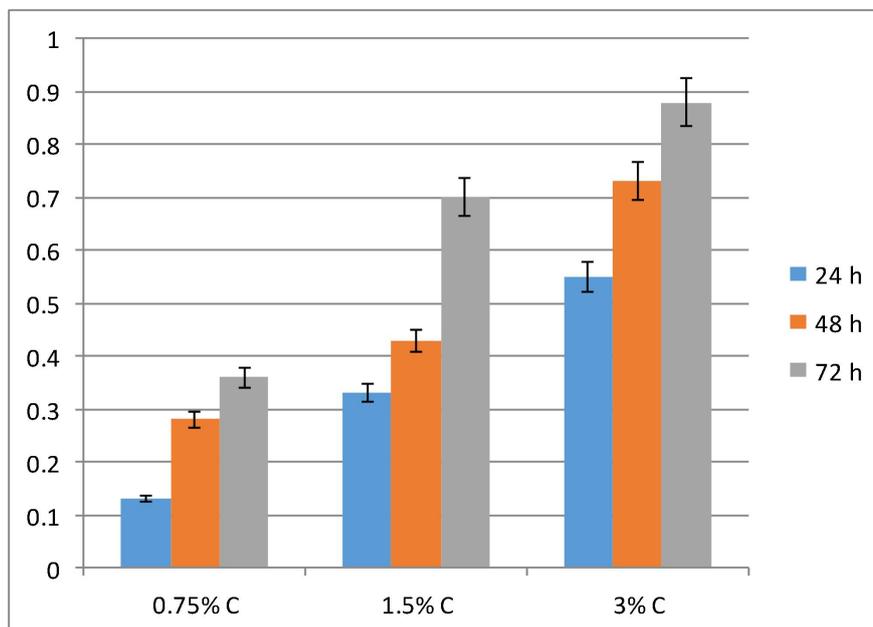


Figure (2): The effect of the alcoholic extract of the myrtle plant on the percentage of killing the rusty flour beetle.

The reason may be due to the fact that the plant extract of the myrtle plant, its insecticidal activities, have been proven by the results of the current study, and this is in line with the results of the researcher Traboulsi and his group (2002) if the researcher found that the extracts of the myrtle plant and its oils have efficacy as an anti-insect against *Culex mosquito* larvae. *pipiens molestus* Forskal, where extracts of the Wallace plant were described as having an effective toxicity against mosquito larvae. On the other hand, and with a study conducted by Ayvaz and his group (2008) against three types of warehouse insects, namely

Ephestia kuehniella, *Plodia interpunctella* and *Acanthoscelides obtectus*, the researcher indicated that the extract of the mycelium plant has a susceptibility as an insecticide, and this corresponds to the results of the current study. Wallace oils showed the ability to kill both malaria and *pediculus humanis capitis*, and the reason was attributed to the mycelium oils having an anti-insect property (Milhau et al. 1997; Gautheir and others 1988). On the other hand, in a study conducted by Ghania and his group (2014) in Algeria, the researcher found that the alcoholic extract of mycelium leaves has the ability as an insecticide against both *S.oryzae* and *T. confusum*. This may explain the role of myrtle plant extracts against the red rusty flour beetle insect in the current study.

CONCLUSIONS

- 1- There is a direct relationship between the period of exposure to aqueous or alcoholic plant extract and the death rates of the red rust beetle.
- 2- A clear effect of the mycelium extract on the life of the red rusty flour beetle, as it was characterized by high efficiency to eliminate the full role of the beetle

RECOMMENDATIONS

- 1- Isolation, purification and diagnosis of active substances in the myrtle plant, which showed a high toxic effect, due to its adoption in the eradication of the rusty flour beetle and its use as alternative means for chemical pesticides.
- 2- Reducing the doses of pesticides used in the control by mixing them with non-toxic plant compounds to reduce environmental pollution.

REFERENCES

- [1] **Abdullah, S. K., Al-Samarraie, M. Q., & Al-Assie, A. H. (2015).** *Fungi associated with grapevine (Vitis vinifera L) decline in middle of Iraq. Egyptian Academic Journal of Biological Sciences, G. Microbiology, 7(1), 53-59.*
- [2] **Yunus, Abd al-Hamid Ahmad and Mahfouz Abd al-Qadir Muhammad and Zaki Abd al-Yas, (1987),** *The nutritional value of wheat grains, Ministry of Higher Education, University of Mosul, Dar al-Kutub Press for Printing and Publishing, University of Mosul, Iraq - Mosul, p. 77.*
- [3] **Anoun, Muhammad Ridha, (1982),** *The effect of competition between elusive flour beetles and rusty Tribolium confusum (Duval) & Tribolium castaneum (Herbst) on their population growth under different natural environmental conditions (Viriya), Master Thesis, College of Science, University of Baghdad, Ministry of Education Higher and Scientific Research, Republic of Iraq.*
- [4] **Abbas, Sahla Khorshid (1998).** *Study of the effect of four herbaceous plants on the rusty red flour beetle Tribolium castaneum (Herbst.) (Coleoptera: Tenebrionidae), Master Thesis, Girls' College of Education, Tikrit University, p.73.*
- [5] **Supavarn, P., Knapp, F. W., & Sigafus, R. (1974).** *Biologically active plant extracts for control of mosquito larvae. Mosquito news, 34(4), 398-402.*
- [6] **Riose ,J.L.,Recio,M.C.and Villar , A.(1987) .***Antimicrobial activity of selected Plants employed in the Spanish mediterranean area. J.Ethanopharmacol. , vol.21,pp: 139-152.*
- [7] **Harborne, J. B. (1984).** *Methods of plant analysis. In Phytochemical methods (pp. 1-36). Springer, Dordrecht.*
- [8] **Traboulsi A F, Taoubi K, El-Haj S, Bessiere J M and Rammal S 2002.** *Insecticidal properties of essential plant oils against the mosquito Culex pipiens molestus (Diptera: Culicidae), Pest Manag Sci, 58(5), 491-495.*

- [9] **Ayvaz A, Sagdic O, Karaborklu S and Ozturk I(2008).** *Insecticidal activity of the essential oils from different plants against three stored-product insects, J Insect Sci, 10(21), 1-13.*
- [10] **Milhau G, Valentin A, Benoit F, Mallie M, Bastide J M, Pellisier Y and Bessiere J M 1997.** *In vitro antimalarial activity of 8 essential oils, J Essent Oil Res, 9(3), 329-333.*
- [11] **Gauthier R, Agoumi A and Gourai M 1988.** *Activity of the extracts of Myrtus communis against Pediculus humanis capitis, Plant Med Phytother, 23(2), 25-108.*
- [12] **Ghania L.; Fazia M and Mohamed H. (2014).** *Antioxidant and insecticidal activity of algerian myrtus communis l. Extracts. IJASR. 4(6): 193-202.*