

## Study of the effect of aqueous & alcoholic ginger extract on land snails *Zingiber officinale* compared to the molluscicide

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### Abstract

The study aimed to find out the effect of raw hot aqueous and alcoholic extract *Zingiber officinale* with three different concentrations (20, 25 ,30 ) mg/kg on the destruction of land snails *Monacha obstructa* compared with the effectiveness of using molluscicide Metaldehyde (6%) in three concentrations (15, 20, 25 ) mg/kg. It was found that the third concentration, which is (30) of the alcoholic ginger extract, is the closest to the action of the pesticide, especially in the third week.

### Introduction

In view of the technical developments taking place in the world on the one hand, and the toxic effect left by pesticides on the environment on the other hand, it has become necessary to resort to other alternative strategies that contribute to controlling snails effectively and safely. Hence, pesticides of plant origin or what is known as plant extracts were used (1) Where plant extracts are of great importance in pest control, humans used them in control as they are safe and effective alternatives compared to chemical pesticides that have a negative impact on the environment and human health as they cause environmental problems, high toxicity and environmental imbalance (2). The plant pesticides can be extracted from all parts of the plant or from specific parts of the plant, and this depends on the effectiveness of the chemicals (3). Many plant extracts have been studied on the rate of destruction of some types of snails, which are considered dangerous agricultural pests. (4). Where the essential oils of some plants such as mustard and cumin were extracted in the fight against insects and some types of land snails, a

toxic effect was observed on these snails in different proportions (5) and some of them were used as poisonous baits and their effectiveness was proven by eliminating 90% of the snails On the other hand, contact is considered safe on field plants (6) to know the effect of the ethanolic extract. Each of the leaves of Ashar and grapes of the wolfberry and the aerial parts of the bulbal on the pupal stage of the housefly, where these extracts led to the failure of a large number of treated pupae from transformation into the stage of the full insect.

### Material and method:

*M. obstructa* adults were collected from the farms of the Kamaliya region in the holy city of Karbala manually during the month of November 2022 (7). All ginger (rhizomes) were collected from local markets, dried in well-ventilated places, away from sunlight, and ground with a mill. Grinder The hot and alcoholic and aqueous extract of ginger plants was prepared according to the method of (8) and modified from (9) with making several modifications to it by increasing the extraction period to (24) hours.

## Results and Discussion:

Table No. (1) the concentrations of hot aqueous ginger extract compared to the concentrations of molluscicide during the duration of the experiment, It can be seen that the concentration (30) mg/kg of the hot aqueous ginger extract is the closest effective

concentration of the pesticide in the third week of the experiment, It was found from the table (1) that the best concentration of the hot aqueous ginger extract was the concentration (30)mg/kg, where the average of the averages was (33.33 ),There were significant differences (0.05 ) between the concentrations used Figure (1).

**Table (1) the concentrations of hot aqueous ginger extract compared to the concentrations of molluscicide during the duration of the experiment**

Concentration	Time			Concentration rate
	Week 1	Week 2	Week 3	
0	0.00	0.00	0.00	0.00
20	0.00	20.00	40.00	20.00
25	10.00	20.00	40.00	23.33
30	20.00	30.00	50.00	33.33
Time rate	7.50	17.50	32.50	
LSD	Concentration	Time	Interaction	
	3.7472	3.2451	6.4903	
Moral level	0.05	0.05	0.05	

**Figure ( 1) the effectiveness of hot aqueous ginger extract compared to the pesticide during the duration of the experiment**

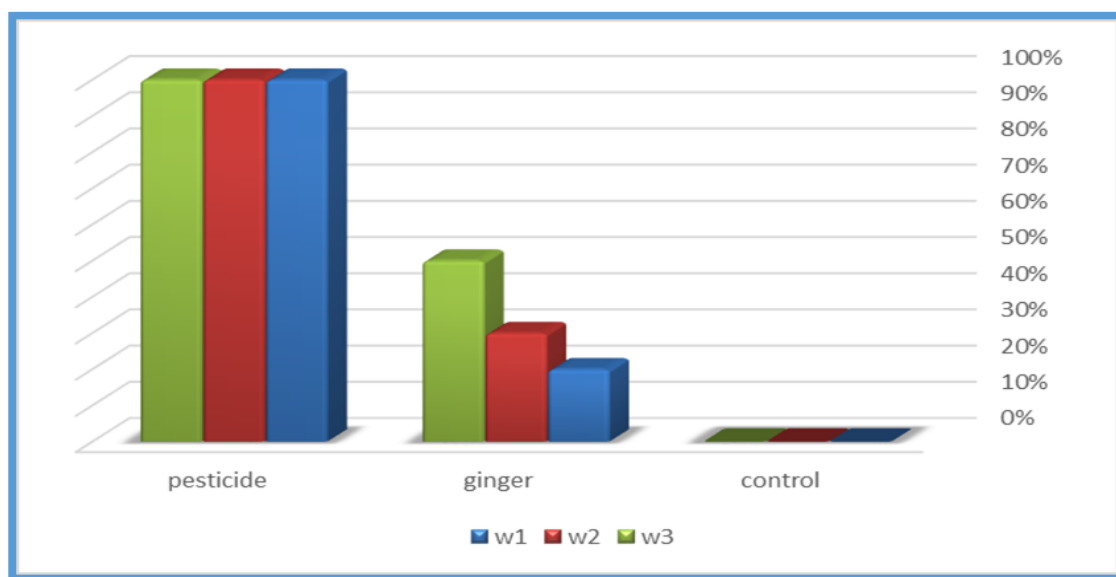


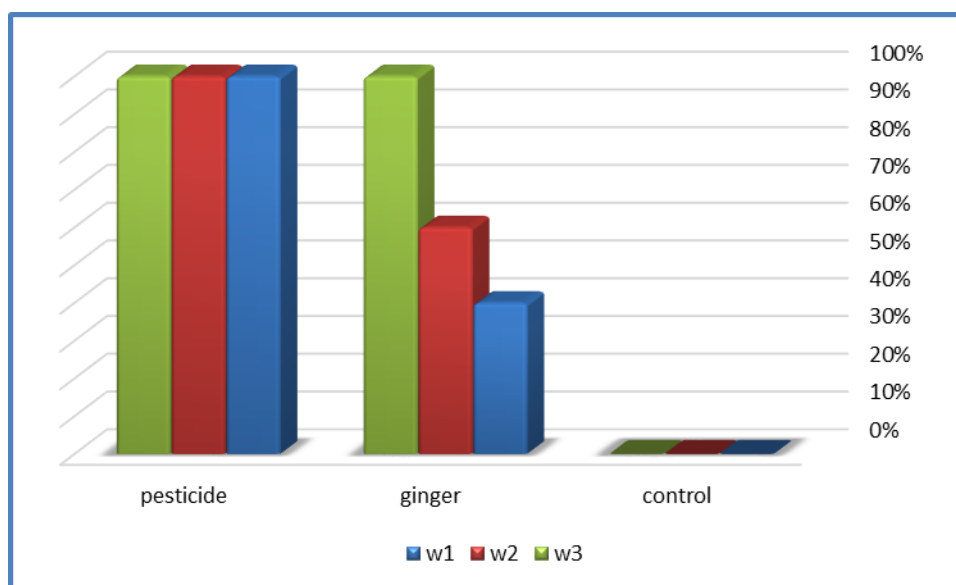
Table No. (2) the concentrations of alcoholic ginger extract compared to the concentrations of molluscicide ( during the duration of the experiment, It can be seen that the concentration (30) mg/kg of the alcoholic ginger extract is the closest effective concentration of the pesticide in the third week

of the experiment, It was found from the table (2 ) that the best concentration of the alcoholic ginger extract was the concentration (30), where the average of the treatment was ( 66.66) There were significant differences (0.05) between the concentrations used Figure (2).

**Table (2) the concentrations of alcoholic ginger extract compared to the concentrations of the pesticide during the duration of the experiment**

Concentration	Time			Concentration rate
	Week 1	Week 2	Week 3	
0	0.00	0.00	0.00	0.00
20	10.00	40.00	30.00	26.66
25	30.00	60.00	10.00	33.33
30	40.00	60.00	100.00	66.66
Time rate	20.00	40.00	35.00	
LSD	Concentration	Time	Interaction	
	1.6377	1.4183	2.8366	
Moral level	0.05	0.05	0.05	

**Figure (2 ) the effectiveness of alcoholic ginger extract compared to the pesticide during the duration of the experiment**



**Table (3) Comparison of the highest concentration of the two extracts of hot aqueous ginger and alcoholic ginger compared to the highest concentration of the pesticide**

Treatment	Time			Treatment rate
	Week 1	Week 2	Week 3	
Control	0.00	0.00	0.00	0.00
Ginger boiled 30	20.00	30.00	50.00	33.33
Ginger alcoholic 30	40.00	60.00	100.00	66.66
pesticide 25	100.00	100.00	100.00	100.00
Time rate	40.00	47.50	62.50	
LSD	Treatment	Time	Interaction	
	3.19	2.7626	5.5252	
Moral level	0.05	0.05	0.05	

When comparing the concentration of 30 of the hot aqueous ginger extract and the alcoholic ginger with 25 of the pesticide (metaldehyde), we note that the effectiveness of the alcoholic ginger extract is the closest to the effectiveness of the pesticide in killing snails, as the treatment rate was (66.66) and the best time factor was the third week, which gave a death rate of 100% . This study came as an approach to a study (10) The study showed that ginger extract has high toxicity scores against the clover snail *M. obstructa* It resulted from the occurrence of a biochemical and histological defect in the organs of the snail body, which led to the death of the snail at different rates.

#### References:

- Nerio, L.S., Olivero – Verbel, J. and Stashenko, E. (2010). Repellent activity of essential oils : A review. *Bioresource Technology*, 101, 372- 378.
- Pavela ,R. (2014) Acute , Synergistic and Antagonistic Effects of some Aromatic Compounds on the *Spodoptera littoralis* Bois.(Lep.,Noctuidae) Larvae. *Industrial Crops and products*, 60,247-258.
- Afifi, Fathy Abdel Aziz. (2000). *Foundation of Toxicology*, Dar Al- Fajr for publishing and Distribution, Cairo, Egypt.
- Moser, F.; Dondi, F.(2015). Environmental protection between chemical practice and applied ethics : A critical review . *Toxicol Environ. Chem.*;6: 100-110
- Abdel- Haleem, A. A. (2014). Cytotoxicity of Egyptian plant extract *Origanum syriacum* on gametogenesis of two Egyptian terrestrial slugs, using TEM. *Int. J. Acad. Sci.Res.*, 2 (1):01-08.
- Mahmoud, H.; Amara T. AL-S. and AL-Janqa, A. A. (2015). Effect of botanical extracts of Ashar, Wolfberry and Bulbul on the pupal stage of the two- winged housefly. *Sebha University Journal of Research and Applied Sciences*.14(1).

- Ghulam, I.N. (2015). Ecological, Biological and Histological study of the freshwater snails infected with digenean larvae. PHD thesis. Karbala university: 88-94.
- Mansour, Nasir Abd Ali.(1995). The effect of extracts *Ibicella lutea* is different from the deer plant On the life performance of the white fly (Martyniaceae) PhD thesis. Bemisia tabacci (Genn) Philosophy of the Mechanism of Science, University of Basra, 126 pages.
- Harborne, J.B. (1973) . Phytochemical Methods. Chapman and Hall Ltd.,London , 49-188.
- El-Atti, M.A. ;Elsheakh , A.A. ; Khalil , A.M. and Elgohary , W.S. (2019). Control of the glassy clover snails *Monacha cartusiana* using *Zingiber officinale* extract as an ecofriendly molluscicide.African J.Biol. Sci. , 15(1):101-115.