

Efficiency Of Water and Ethanol Alcohol Extract Of *Eucalyptus camaldulensis* Leaves On Mortality Mosquito Larvae of *Aedes caspius pallas* in AL-Kut city/ Iraq

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كفاءة المستخلص المائي والكحولي لاوراق نبات اليوكالبتوس *Eucalyptus camaldulensis* على هلاك يرقات بعوض *Aedes caspius pallas* في مدينة الكوت / العراق

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الخلاصة :

شملت الدراسة تقييم فاعلية المستخلص المائي والكحولي لاوراق نبات اليوكالبتوس *Eucalyptus camaldulensis* Dehnhardt في قتل يرقات الطور الثالث و الرابع لبعوض *Aedes caspius pallas* التي جمعت من مزارع القمح والشعير في مدينة الكوت - واسط / العراق للفترة من تشرين الثاني 2013 ولغاية شهر ايار 2014 .

اظهرت نتائج التحليل الاحصائي وجود فروق معنوية بين المستخلصين المائي والكحولي لاوراق نبات اليوكالبتوس وتركيزها المستخدمة بمستوى معنوية (0.05) وسجلت اعلى نسبة قتل عند التركيز 10000 ppm للمستخلص الكحولي 100% وبنسبة قتل 90% للمستخلص المائي. وتم حساب التراكيز القاتلة LC50 و LC90 لليرقات المعاملة وللنوع نفسه وهي للمستخلص الكحولي (8, 2700 ppm) على التوالي ، وللمستخلص المائي (2500, 9900 ppm) على التوالي.

Abstract

The study evaluated the effectiveness of the water and alcohol extracts of *Eucalyptus camaldulensis* Dehnhardt leaves in killing of the 3rd-4th instar larvae of *Aedes caspius pallas* collected from Wheat and Barley fields in AL- Kut city, Wasit province / Iraq. During the period of five months (November 2013- May 2014).

The results from statistical analysis showed significant difference between alcoholic extract and the water extract and the concentrations of *Eucalyptus camaldulensis* leaves (0.05) recorded high mortality rate in concentration 10000ppm with 100 % to alcoholic extract and mortality rate to water extract with 90 %. As well as the alcoholic LC50 and LC90 that were given to same species, were calculated and the results were (8, 2700 ppm) respectively. Whilst the water extract at the same lethal concentrations findings were (2500, 9900 ppm) respectively.

Key words: *Aedes caspius* , *Eucalyptus camaldulensis* ,plant extract.

1-Introduction

The human problem with mosquitoes has been and continues to exist since ancient times has been exacerbated this problem with the discoveries that put this insect in a place that leads the pests that threaten human health, it is the number one enemy of humans and animals [1,2]. Malaria, which is transmitted by female mosquitoes, is one of the most serious human diseases. Studies have shown that malaria kills one child every 40 seconds [3]. *Culex* mosquitoes transmit viruses that cause meningitis in humans and animals, and transmit viruses that cause chickenpox and dengue fever viruses [4].

A. caspius mosquitoes are the carriers of many viral pathogens, including the Tahyna (TAH) virus in the Middle East, the head of Rift Valley Fever (RVF), and bacterial pathogens, such as *Francisella tularensis*, a disease of humans, rodents and some animals The House. In Southeast Asia, type *A. albopictus* (Skuse) was recorded as a secondary vector of dengue fever and *A. aegypti* (Linn.) As a baseline vector of dengue virus [5, 6].

The types of mosquitoes differ in terms of the quality of the water

in which the eggs are placed. Some of them prefer pure fresh water, slow flow, others prefer sedentary water, covered with aquatic plants, leaves, algae and shaded trees [1]. This is the availability of wheat and barley farms from suitable environments for mosquito growth and development. In developing countries is usually appropriate for the development of mosquito-borne disease problems through the creation of an ideal breeding ground for mosquitoes [7].

Due to the human suffering of these pests, the use of chemical pesticides and poisons to eliminate these pests in a deliberate and random, and the result of the accumulation and accumulation in the tissues of organisms such as humans, animals and plants, which led to the emergence of serious diseases such as cancer and the occurrence of these accumulations and sediments in Elements of the environment [8]. The resistance of mosquito larvae to many insecticides has also been observed in many countries of the world [9]. Therefore it is necessary to search for environmentally safe materials and specialized insecticides for the purpose where they are applied

around the world to find new modes of action of natural products [10] it is known that many of the secondary metabolites of the plant have insecticide properties, and the plants have a history of using them in home remedies to kill or expel insects. [11] Environmentalists are therefore calling for a return to the use of plant-based pesticides to resist pests rather than chemical pesticides for having desirable specifications that are not available in most chemical pesticides, including rapid degradation to non-toxic substances [12,13]. Also, it did not appear that the resistance in insects treated with these substances appeared as it does with the use of manufactured pesticides [14].

Eucalyptus is one of the most cultivated species in the world and boasts more than 700 species belonging to the Myrtaceae family. It has many different biological properties, such as Culicids [15]. *Eucalyptus camaldulensis* is important in the treatment of respiratory infections, which is a large and perennial tree that may reach several meters high and is grown in the water to be reclaimed. Its long roots, which are thirsty for water, can dry the earth. Spindle-shaped tip of the tip 10-15 cm long [16] .

The leaves of eucalyptus plant and its flowers are used in the medical field. Aromatic substances are extracted from it, and its leaves contain between 1.5-3.5% volatile oils. The basic compound in the leaves is the substance of the sineol (54-95%). Securities [17].

Since the Iraqi environment is rich in wild or cultivated plant species, which can be exploited to extract compounds that act as insecticides and spread mosquitoes in Iraq, this study was conducted to find alternatives to pesticides.

2-Materials and methods of work

2-1 Collection and diagnosis of plant samples

A sample of the eucalyptus plant was collected from a house garden in Al-Kut city for the period from November 2013 to January 2014. It was cleaned from the soil and washed well with water. It was then spreaded on a plastic burner at laboratory temperature (25 ± 2) for the purpose of drying and taking into account the continuous stirring, and after fully dried it was grinded by a conventional electric mill and put in nylon bags and kept at laboratory temperature until use.



Figure 1: *Eucalyptus camaldulensis* plant

2.2 Collection of mosquito larvae

The third and fourth larvae of *Aedes caspius pallas* were collected from the streams from the wheat and barley farms in Kut during the agricultural season 2013-2014 and from November 2013 to May 2014. The samples were identified by the Museum of Natural History / Baghdad University.

2.3 Preparation slides

Special slides of mosquito larvae were prepared using method [18].

2.4 Preparation of water extract

Prepare the water extract of *Eucalyptus camaldulensis* Dehnhardt leaves. Take 20 g dry powder of plant leaves and put in a glass flask of 500 cm containing 200 cm distilled water. Mix the plant material by using the mixer for half an hour at laboratory temperature. The solution was then sprayed with a tulle cloth or gauze to remove the plant waste. The centrifuge was then used at 3000 cycles / minute to obtain a clear vegetable extract. Place the solution in the oven at 35 ° C until dry [19 , 20].

5.2 Preparation of alcohol extract

The extract of *Eucalyptus camaldulensis* Dehnhardt was obtained by taking 100 g of dry powder of plant leaves and placed in Thumb tube in the Soxhlet extractor. 500 ml of ethanol alcohol (80% polar solvent) was added for 8 hours at 60 ° C, after which the leachate was dried in the oven at 40 ° C and the weight of the extract was 9,55 g / 100 g *Eucalyptus camaldulensis* Dehnhardt . Place the extract in a sterile glass container in the refrigerator until use [21] .

6.1 Study of the effect of water and alcohol extract of *Eucalyptus camaldulensis* Dehnhardt plant in the destruction of larvae of the third and fourth stages of mosquitoes (*Aedes caspius pallas*)

The previously used method was used by [22] to test the response of larval larvae to mosquitoes by preparing five concentrations (1,10,100,1000,10000 ppm) for *Eucalyptus camaldulensis* Dehnhardt and three replicates for each concentration in 125 mL bicarat. 10 larvae of the third and fourth stages of the *Aedes caspius* mosquitoes were used for each repeater using 100 mL chlorinated faucet water. The larvae were supplied with a 1 ml diet solution after being prepared in vitro. Leave the larvae

for 2 hours before adding the extract. Mortality was calculated after 24 hours per concentration compared with control.

2.7 Statistical analysis of results

In the implementation of the experiments, the ANOVA method was used to analyze the results, using a test with a significant difference of 0.05 (L.S.D.) to determine the significance of the differences between the different transaction rates [23]. As for the LC50 and LC90 concentrations, SPSS was used by probit analysis [24].

3. Results and discussion

The results showed that the water tables emerging from the wheat and barley farms were suitable for the growth and development of the various insect species, including mosquitoes. Most of the species identified in these genus are *Aedes*, which were observed during February, which is consistent with the observed [25].

The results showed that the amount of plant extract used in the study was higher than the water extract of the same plant, which was 9,55 g / 100 g compared to 8.23 g / 100 g dry powder of water extract.

3.1 Effect of water and alcohol extract of *Eucalyptus camaldulensis* Dehnhardt leaves on the larvae of

the third and fourth stages of mosquitoes *Aedes caspius pallas*

The results of Table (1) and Figure (2) showed no significant differences between the water and alcohol extracts of *Eucalyptus* leaves and significant differences between the concentrations used. The results showed that the extract was higher than the 10000 and 1000 ppm (100% and 83%) respectively.

The results showed that the concentration of 10000ppm for the water extract recorded the highest kill rate of 90%. It was observed that the killing rates decrease with low concentration. The results of the present study can be compared only in terms of effect, different plant type, and the nature of the active substance and its concentration in the results of previous studies. The study found that the alcoholic extracts of *Trichodesma africanum* and *rupicola cleome* caused a 100% kill rate of *A. caspius* mosquitoes at the highest concentration of 10µg / ml except for the *ochradenus baccatus* oleander extract, causing a 90% killing rate at the same concentration.

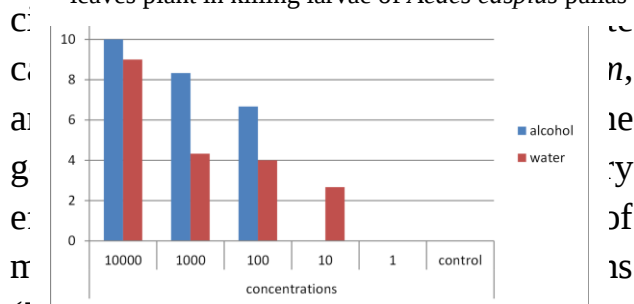
A study found that the ethanol extract of *Melia azedarach* had the highest percentage of *A. Aegypti* larvae at the

extract	Concentrations (ppm)						mean
	10000	1000	100	10	1	control	
alcohol	100	83.3	66.7	0	0	0	41.66667
water	90	43.3	42.0	26.7	0	0	33.33333
mean	95	63.3	53.35	13.35	0	0	
L.S.D0.05	Ex.		con.		Ex *		
	9.59		16.62		23.5		

highest concentration (ppm 50).

Table (1): Effect of alcohol and water extracts of leaves plant in killing larvae of *Aedes caspius pallas*

Figure (2): Effect of alcohol and water extract of leaves plant in killing larvae of *Aedes caspius pallas*



treated larvae were (0, 1000 ppm) and (2700, 9900) ppm for the aquatic extract, and these results do not agree with its findings[28] The lethal concentrations of LC50 and LC90 for the treated larvae of the plant extracts were *cinnamomum cassia*, *white camphor*, *Cinnamomum glanduliferum*, (58.41, 82.36, 42.98, 55.35, 81.32 and 107.689 mg / ml) may be due to differences in the types of plants used, the nature of their active ingredients and the concentrations used.

A study [29] showed that the water extracts of *Ricinus communis* leaves, *Tetrachinhs articulate* wood and all concentrations of high toxicity against *A. caspius* mosquitoes.

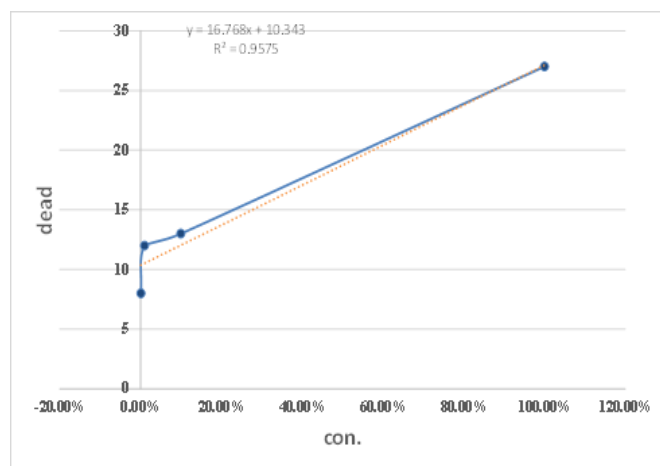
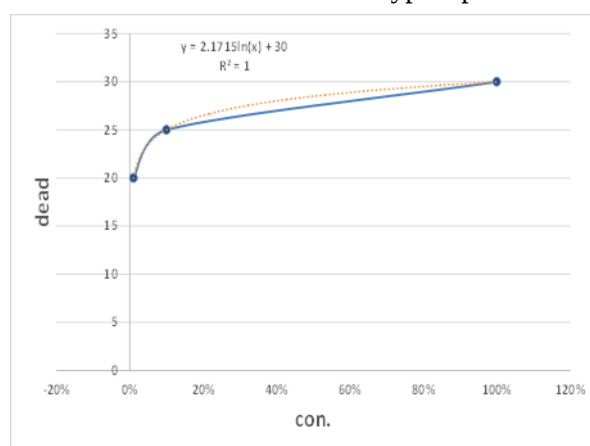


Figure (3): LC50 and LC90 lethal concentrations of *A. caspius* larvae treated for water extract of leaves

Figure (4): LC50 and LC90 lethal concentrations of *A. caspius* larvae treated with elcohol extract of leaves of eucalyptus plant



The effect of the extract of alcohol in general on the water extract of leaves of eucalyptus plant in the killing of mosquito larvae, because the ethanol solvent was more effective in dissolving the effective compounds of water, it is clear that the amount of alcohol extract is higher than the amount of water extract may be due to differences in the degree of polarity of solvents used The polarity index of water 9 and ethanol 5.2 [30]. indicates that reducing the polarity of the solvent by choosing another solvent may

increase its effectiveness in dissolving the active compounds.

The efficacy shown by the extract of the eucalyptus plant is attributable to the fact that it contains phenols and flavonoids in particular, and has been shown to be effective in the killing of *Taragama siva* [31]. These are the phenolic compounds found in the plant (ellagic acid, gallic acid and Rizk acid) It has been observed that it has the ability to form complexes with magnesium and calcium and thus inhibit larval growth [33]. The eucalyptus extracts showed an inhibitory effect of *Phthorimeae operculella* with a concentration of 10% at 15,20.25 m. At the same time, it was a good repellent for moth larvae. The expulsion rate was 90% after 12 hours and 100% after 24 hours[34] .

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