



Repellent effect of aqueous, alcoholic and oil extracts of cumin seeds *Cuminum cyminum* on the female mosquito *Culex pipiens molestus* (Diptera: culicidae)

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Abstract

The research tries to know the impact extruder for extracts of aqueous, alcohol and oily seeds cumin *Cuminum cyminum* concentration (2, 5, 10, 15 and 20) % and study of their impact extruder on adult mosquitoes, using pigeons as a food source, also tackle to know influence extruder to extract oil at the hands of donors compared with the extruder trade of insect repellent. The results showed more than extracted oil to alcohol and water in the expulsion of adult mosquitoes and for all concentrations was the percentage of expulsions (50.00, 81.50 and 93.33)%, respectively, it is clear from that the extracted oil has provided high protection to areas of treatment pigeons body for the duration of the experiment, and the results showed that treatment of the hands of donors by oil extract has provided protection for about an hour which is comparable to the period of protection provided by the commercial extruder.

Key words: *Cuminum cyminum*, extracts, Repellent effect, mosquito, *Culex pipiens molestus*.

Introduction

Studies and research in the field of mosquito control from more studies of the other arthropoda other important medical (Chalabi, 1998) but not human may type mosquitoes carrier of the disease, the cause of nuisance and disturb the comfort enough to be considered a problem has increased this problem with the discoveries that have been developed this insect at the site of lead bane that threaten human health, it is the number one enemy of man and animals, it bites and sucks blood and leaves a significant impact as a result of injecting saliva to prevent clotting of blood (Auda, 1987) and also a mosquito plays an important role in the transfer of a large number of pathogens to humans and animals (Abu-Alhab, 1982) Among these diseases, malaria and dengue fever, yellow fever and elephantiasis (Rozendall, 1994). I have been using many of the pesticide chemical to fight mosquitoes and despite by these pesticides from

the great successes in the eradication of pathogens carried by insects to humans and animals but it led to the contamination of environmental media (Aladel, 1979), prompting interest in the safety of the environment to the use of pesticides of plant origin that have proved effectiveness as material repellent or lethal or toxic to insects harmful (Ladd *et. al.*, 1978), so the study targeted the possibility of obtaining extracts aqueous, alcohol and oil from the seeds of cumin *Cuminum cyminum* because of its medical importance and study the impact extruder on adult mosquitoes *Culex pipiens molestus* also the aim of the research to know influence extruder to extract oil shale at the hands of donors.

Materials and Methods

Cumin seeds collected *Cuminum cyminum* of a trade markets in the city of Fallujah, and grind dried and preserved at a temperature of the laboratory, while use has been diagnosed in the

lush of the Iraqi National - General Authority for examination and certification of seeds - Ministry of Agriculture was to create a colony of the mosquito and diagnosed at the Museum of Natural History at the University of Baghdad, were cultured in disposable plastic capacity (500) cm³ and fed to feed rabbits (Rabbit chow) Metamorphic pupae trans per day to cages covered with soft cloth along side (50) cm, and the purpose of insurance for females the blood meals from birds has been developed from the pigeon all over the cage after removing the feathers on the chest area. For the purpose of preparation of aqueous extract was taken (40) g of seed powder and placed in the Erlenmeyer flask containing the (200) cm³ of distilled water with mixed using a mixer magnetic for a period of (30) minutes, and then placed in a centrifuge for a period of (15) minutes after the status solution stand in the electric furnace and a temperature of 35 °C and when to obtain dry extract was mixed (5) grams of powder with dried aqueous extract (20) g of Vaseline (Albanaa, 1988) and it came concentrations (2, 5, 10, 15 and 20)% The treatment of control was Vaseline. The extracted alcohol obtained from the mixed (50) g of seed powder by soxhelt and added it (350) ml of ethanol concentration (99.5%) and the process continued the process of extraction for a period of (12) hours and a temperature of 40 °C using a vacuum rotary evaporator at the temperature (35) °C (Harborne, 1973). Concentrations and attended the same way as the preparation of aqueous extract concentrations. The extracted oil obtained by adding (350) ml of petroleum ether (60-40)°C to a continuous extraction and followed the steps above in the preparation of alcoholic extract (Ba-Angood *et al.*, 1996). For the purpose of determining the biological quality of the extracts against adult mosquitoes were isolated adult emerging new age (24) hours in the cages of Education where he developed (10) females in each cage, and by (5) replicates, was installed a dove in each cage after the removal of feathers from the area pectoris and dorsal and survey the two bare different concentrations (2, 5, 10, 15 and 20)% either the control treatment was only Vaseline and continued feeding for 12 hours was calculated rate of expulsion, according to Schreck (1977).

Data were analyzed using the least significant difference LSD (Alrawi *et al.*, 1980) has been studying the impact extruder to extract oil shale of the latency at the hands of the donors and compared with the extruder trade of insect repellent where it was clear the hands of the nine donors from the palm to the wrist and by 3 replicates for each extract and the comparison that was Vaseline ointment and the treatment standard that was introduced as commercial repellent hands inside the cage for one hour (Gilbert *et al.*, 1955).

Results and Discussion

Table (1) and Figure (1) Explained the obtained results, the influence of aqueous, alcohol and oil extracts of the cumin to adult mosquitoes appeared that the oil oil extracted gave the highest effectiveness in the expulsion of adult alcohol and then extracted, followed by water, where the number of adult feeders (9.0, 8.6, 7.3, 6.3 and 4.0) by concentrations of aqueous extract (2, 5,10,15,20)% respectively, and expulsion rates (13.66, 27.52, 35.20, 40.33 and 50.00)% respectively, while the number of adult feeders using alcoholic extract (8.3, 6.6, 4.3, 3.3, 1.3) for the same concentrations above the rates the repellent of (16.20, 33.33, 45.67, 69.50 and 81.50) % while the number of adult feeders using extracted oil (7.3, 6.5, 3.3, 2.3 and 1.0) and by concentrations above the rates the expulsion of (30.67, 41.50, 55.66 , 85.67 and 93.33%) and found that the rate of expulsion is directly proportional with the increase in concentration used. It may be the reason for failure of mosquito to suck blood from the areas of treatment of these extracts that these extracts form a layer impeding the arrival of odors emitted from the skin of the host to the olfactory centers in the antennae, which depend on the insect, mainly in the inferred hostess and sucking the blood of which (Schmdit, 2005) In the notional normal when mosquitoes feeding purports to land on more than one place in the body of a family before he decided to absorb the blood depending on the sense of smell and that this process is a qualitative characteristic Species-specific (Duke, 1983). The results of this study agree with the findings of the study (Abdul Amir,1981) that the rate of expulsion of female mosquitoes. *Culex pipiens* L was (88.64) and (36.07 %) when using plant extracts *Peganum harmala*,

Table (1): The effect of aqueous, alcoholic and oil extracts of cumin seeds *Cuminum cyminum* on the rates of the preparation of adult mosquitoes *Culex pipiens molestus* feeders on the pigeon.

Concentrations%	<i>Cuminum cyminum</i> extracts		
	aqueous	alcoholic	oily
control	9.6	9.6	9.6
2	9.0	8.3	7.3
5	8.6	6.6	5.6
10	7.3	4.3	3.3
15	6.3	3.3	2.3
20	4.0	1.3	1.0

LSD concentrations of extract = 3

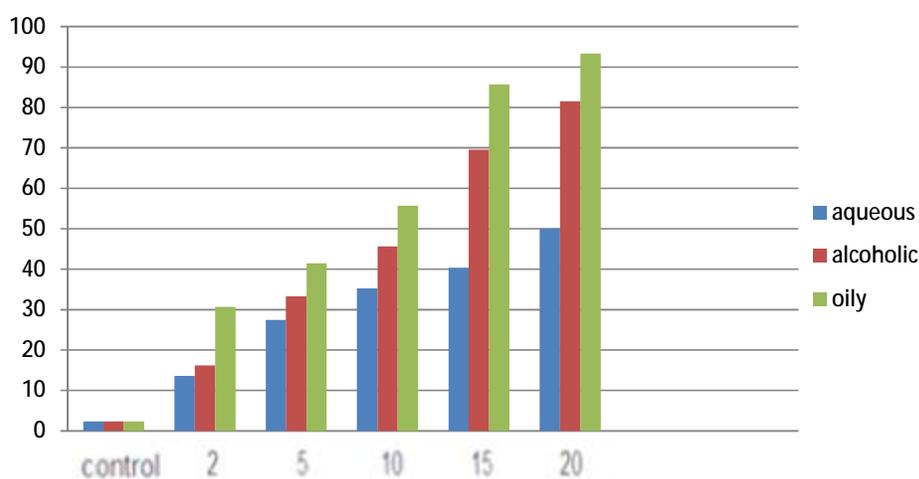


Figure (1): the impact of aqueous, alcoholic and oil extracts of cumin seeds in the rate of expulsion of adult mosquitoes, *Culex pipiens molestus*.

Table (2) evaluation effect of the extract oil repellent against adult mosquitoes, *Culex pipiens molestus* at the hands of donors and the concentration of 20% and within 60 minutes.

treatment	time	First refined	second refined	third refined	Rate
		the number of mosquitoes			
Control	4	16	6	18	5
Abstract oil	50	3	55	3	53.33
Of insect repellent	60	0	60	0	60

LSD for the rate of prevention = 4.89, The average number of mosquitoes = 2.44

Achillea santolina, respectively *harmala*, *Achillea santolina*, respectively, using a concentration of 1%, (Kim *et al.*, 2004). Fennel oil extracted from the fruits of *Foeniculum vulgare* good repellent to female mosquitoes *Aedes aegypti* (Dua *et al.*, 1995) The addition of neem oil in greasy lotion on the exposed parts of the body gave protection against several species of mosquitoes, especially *Anopheles*, *Culex*, and *Aedes* percentages (94, 89 and 78)% respectively.

Table (2) showed the length of protection from mosquitoes and the number of mosquitoes attracted on hands treatment extract appeared that all the extracts have the status of protection from mosquitoes for a period of little or relatively long and show that the extract of cumin oil has high efficiency in the expulsion of mosquitoes, where the abundance of protection for (53.33) minutes which is comparable to the period of protection provided by the extruder trade may be due to the oil, cumin acts as a repellent to insects when used by donors. This finding corresponds with (Barnard, 2006) as the use of essential oils extracted from plant (Thyme, Clove) has provided protection from the bites of mosquitoes for a period of 1.5 to 3.5 and when the concentration is 50% . Also Girgenti and Suess (2002) reached that the natural plant oils (Eucalyptus and Clover) has provided protection for about an hour against *Aedes aegypti*, while providing chemical compound 10KBR3023% full protection for the volunteers. Osmani *et al.* (1974) found that some of the volatile oils such as lemon grass oil, ginger oil is a repellent materials for adults house flies, mosquitoes, and Lemon grass oil is the oil causes the shock to those of insects.

References

- Abdul Amir, K., 1981. Investigation of some Iraqi plants containing toxic substances and the attractive or repellent to insects. Master Thesis, Faculty of Agriculture, University of Baghdad.
- Abu Alhab, J.K., 1982. Insect vectors of disease, a series of world knowledge.
- Aladel, Kh.A., 1979. Born full in chemical pesticides and plant protection. Library for printing and publishing, University of Mosul.
- Albanaa, Y.M., 1988. Effect of caffeine and some plant extracts on some fungi and pathogenic bacteria and detail Alanoai of macrophages. Master Thesis, Faculty of Science, University of Mustansiriyah.
- Auda, N.A., 1987. Predators of mosquitoes and control life. Council of Scientific Research, Life Science Research Center. Summary of a lecture at training courses on modern methods of pest control medical.
- Alrawi, M.Kh. and Muhammad A.A., 1980. Design and analysis of agricultural experiments, reprint University of Mosul.
- Ba-Angood, S.A., Ermel, K. and Schmutterer, H., 1996. Azadirachtin onten of Yemeni neem seed kernels (Azadirachta) india A. (Juss) and its effect on the development of the mexican bean beetle *Epilachna varivestis* muls. Univ. of Aden. J. Natural Appl. Sci., 1: 13 - 25.
- Barnard, D.R., 2006. Repellency of essential oils extracted from plants in Thail and against four mosquito vectors (Diptera: culicidae) and oviposition deterrent effect against *Aedes aegypti* (Diptera: culicidae). South east Asian J. Trop Med. Public health. (Abstract).
- Chalabi, M., 1998. Effect of plant extracts cancer lial *Euphorbia granulata* in the performance life of the mosquito, *culex pipiens* (Diptera: culicidae) Ph.D. thesis College of Science, Baghdad University.
- Dua, V.K., Naypal, N. and Sharma, V.P., 1995. Repellent action of neem cream against mosquito. Indian. J. Malaeio L., 32:47-53.
- Duke, J.A., 1983. Hand book of energy corps.
- Gilbert, I.H., Gouck, H.K. and Smith, C.N., 1955. New mosquito repellents. J. Econ. Entomolo. 48: 441-443.
- Girgenti, P. and Suess, L., 2002. Repellent activity against *Aedes aegypti* (L.) of formulas based on natural vegetable extracts or synthetic active agents. Ann. Lg.14(3) :205-10. (Abstract).
- Harborne, T.B., 1973. Phytochemical methods. Halasted press. Johnwiely and Sons, NewYork.
- Kim, S.I., Chang, K.S., Yang, Y.C., Kim, B.S. and Ahn, Y.J., 2004. Repellency of aerosol and cream products containing fennel oil to mosquitoes under laboratory and field conditions. Pest. Manag. Sci., 60(11): 1125-30.
- Ladd, T.L., Jacobson, M. and Buriff, C.R., 1978. Japanese beetles: Extracts from neem tree seeds as feeding deterrents. J. Econ. Entomo.L. 71: 810-813.

- Osmani, Z., Naidu, M.B. and Anees, I., 1974. Effect of different temperature on the repellency of certain essential oil against house. Flies and mosquitoes. *Pesticides*, 8:45-47.
- Rozendall, J.A., 1997. Vector control, Methods for use by individuals and communities World Health Organization, Geneva.
- Schmdit, W.C., 2005. Outsmarting olfaction, The Next Generation of Mosquito Repellents. *Environ. News*. 113(7): 468-471. Schmdit, W.C., 2005. Outsmarting olfaction, The Next Generation of Mosquito Repellents. *Environ. News*. 113(7): 468-471.
- Schreck, C.E., 1977. Techniques for the evaluation of insect repellents. Article review. *Ann. Rev. Entomol.*, 22: 101 - 119.