



## **Effects of Insecticide on Cockroaches of Quetta city, Baluchistan**

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### **ABSTRACT**

*Cockroaches are serious household and public health pest distributed worldwide. Control strategies are difficult to achieve. The average temperature of Quetta is found favorable for the growth and reproduction of cockroaches. In the present study, the effectiveness of locally available insecticides was evaluated against the three cockroach species i.e., *Periplaneta Americana*, *Blattella germanica* and *Blatta orientalis* which were collected from different localities of Quetta city during the entire year 2016. The trail was carried out on adult cockroaches according to method recommended by the WHO. Nine insecticides were selected for this study including Mortein power guard, Lambda-cyhalothrin, Baygon, Finis chalk, Tar o mar liquid, Typhon killer, DDT powder, DDVP liquid and Finis liquid respectively. The present study result revealed that Mortein power guard, Baygon, Tar o mar liquid and DDVP liquid were found to be most effective with 100 % efficacy, to cause mortality of the cockroaches with direct contact after 10 minutes. Finis liquid and Typhon Killer were placed at second position, whereas the Lambda cyhalothrin and Finis chalk to control cockroaches was found completely failed practice.*

**Key Words:** *Blattodea, insecticides, Commercial, Mortality, Cockroaches, effectiveness.*

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### **INTRODUCTION**

Cockroaches belong to the order Blattodea (1). Cockroaches have distributed all over the worldwide and approximately 5,000 species (2), among them only 50 species have been reported living in or around human living structures (3).

These insects are important pests because they spread filth and ruin food, fabrics and book-bindings. They disgorge portions of their partially digested food at intervals and drop feces. They also discharge a nauseous secretion both from their mouths and from glands openings on the body which gives a long lasting, offensive cockroach smell to areas or food visited by them. Cockroaches are not usually the most important cause of a disease, but they may play a supplementary role in some allergic diseases as well as spread of some diseases like: diarrheal diseases, amebic dysentery, cholera, leprosy, plague, typhoid fever and viral diseases such as poliomyelitis. Therefore, they might be important in transmission of nosocomial infections (4,5).

Cockroaches are serious household and public health pest worldwide (6). Cockroaches are harmful as well as they are also important as a tools for balancing environment. Cockroaches are responsible for breaking macrobiotic matter in to simplest form. They are

also of vital significances because they transfer the microbes of soil by loading the microbes on the different body parts.

Control of these species have been very difficult to achieve. In order to keep it under control, different organochlorine and organophosphate insecticides have been used, as well as carbamate and pyrethroid compounds. Still this species has been developing resistance to these compounds. At present, resistance has become a substantial problem that sometimes causes failure of control operations in many countries (6). Heavy infestations of cockroaches can be effectively managed by chemical control measures, followed by environmental management to deprive them of food and shelter. (7, 8, 9).

The present study was conducted to determine the susceptibility levels of these cockroach species to insecticides currently being used in its control program in Quetta City, Baluchistan.

## **MATERIAL AND METHOD**

### **Study area**

During this course of study cockroaches included; *Periplaneta americana*, *Blattella germanica* and *Blatta orientalis* were collected from different localities of Quetta city during the year 2016. The cockroaches samples were transferred to (CASVAB), university of Baluchistan for further experimental procedure.

### **Collection of cockroaches**

Total 270 adult samples of cockroaches were collected randomly by direct hand picking. Three species of cockroaches were collected from the Quetta city i.e. American cockroaches (*Periplaneta americana* n=90), German cockroaches (*Blattella germanica* n=90) and Oriental cockroaches (*Blatta orientalis* n=90).

### **Chemicals**

Commercially available chemicals included Mortein power gard (Ready to use), Taro mar o liquid, Typhon killer, Typhon powder, Finis chalk, Dichlorvos or 2,2-dichlorovinyl dimethyl phosphate (DDVP), Lambda- cyhalothrin, Finis insect killer liquid (Rich-d-trans Allethrin 0.1%, Cypermethrin 0.075%, Tetramethrin 0.1%, citronella perfume and solvents 99.725%) were used during experimental procedure insecticide.

### **Glass jars method**

Tests were conducted on adult cockroaches of American cockroaches, German cockroaches and Oriental cockroaches by WHO standard method [10]. The duration of trail was based on 1 h and thereafter cockroaches were transferred to the holding caps. During insecticide trials, in the glass jars thin layer of butter was applied in glass jar order to prevent cockroaches come outside the jars. Concentrations of commercially prepared doses were given to cockroaches within the jar Lambda cyhalothrin powder were diluted in 50 ml of tap water and 1ml solution was used. Those which need to be prepared were diluted in water according to requirements on magnetic stirrer.

After dilution of insecticides, with the help of pipette 1ml of insecticide distributed it evenly in the glass jar. After adding insecticide in the glass jar then rolled on flat surface for to uniform distribution of insecticide in glass jar to achieve better results. The resistance of insecticides was evaluated by adding 10 adult cockroaches were added in per glass jar. Nine insecticides test were performed during present studies, and readings of mortality were taken after 10 minutes interval for 60 minutes.

## **RESULTS**

Different cockroach species were collected from different localities of the Quetta city. A total 270 cockroaches were collected and among which n=90 were *Periplaneta americana*, n=90 were *Blattella germanica* and n=90 were *Blatta orientalis*. The species of cockroaches were identified by the help of identification keys. The 9 different locally formulated insecticides were applied on the cockroaches by using glass jar method that was described by WHO [10].

### **Effects of insecticide on *Periplaneta americana***

In the present study it was observed that Mortein power guard, Baygon, Tar o mar liquid and DDVP liquid was found to be the most effective insecticides among *Periplaneta americana* species. All insecticides showed 100 % mortality rate at direct contact. Typhon killer and Finis insect killer liquid showed 80 % mortality rate. The least effective chemical results were observed Lambda cyhalothrin with 20% mortality rate. Finis chalk and DDT

powder were failed against completely resistance towards *Periplaneta americana* as shown in Table 1.

#### Effects of insecticide on *Blattella germanica*

On the other hand, it was observed high level of mortality were seen with in the use insecticide such as Mortein power guard, Baygon, Tar o mar liquid, DDVP liquid, Typhon killer and Finis insect killer liquid were the most effective insecticides for *Blattella germanica*. All 9 insecticides which were used have 100 % mortality rate at direct contact. The Lambda cyhalothrin showed least effectiveness 60% mortality rate while the least effective insecticides finis chalk and DDT powder that showed highly resistance towards German cockroaches as shown in Table 2.

#### Effects of insecticide on *Blatta orientalis*

In case of *Blatta orientalis*, it was observed that Mortein power guard, Baygon, Tar o mar liquid, DDVP liquid, Typhon killer and Finis insect killer liquid were the most effective insecticide for *Blatta orientalis*. All 9 insecticides which showed 100 % mortality rate. Typhon killer showed 80% mortality towards oriental cockroaches. The Finis chalk, Lambda- cyhalothrin and DDT powder showed highly resistance towards oriental cockroaches as shown in Table 3.

**Table 1: Results for evaluation of insecticide on *P. americana***

S. NO	Insecticide name	Time Interval after					
		10 min	20 min	30 min	40 min	50 min	60min
1	<b>Mortein power guard</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead
2	<b>A lambda-cyhalothrin</b>	20% dead	40% dead	60% dead	80% dead	100% dead	100% dead
3	<b>Baygon</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead
4	<b>Finis chalk</b>	100% alive	100% alive	100% alive	100% alive	80% alive	100% alive
5	<b>Tar o mar liquid</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead
6	<b>Typhon killer</b>	80% dead	100% dead	100% dead	100% dead	100% dead	100% dead
7	<b>DDT Powder</b>	100% alive	100% alive	100% alive	100% alive	100% alive	100% alive
8	<b>DDVP Liquid</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead
9	<b>Finis liquid</b>	80% dead	100% dead	100% dead	100% dead	100% dead	100% dead

**Table 2: Results for evaluation of insecticide on *B. germanica***

S. NO	Insecticide name	Time Intervals after					
		10 min	20 min	30 min	40min	50min	60min
1	<b>Mortein power guard</b>	100% Dead	100% Dead	100% dead	100% Dead	100% dead	100% dead
2	<b>A lambda-cyhalothrin</b>	60% Dead	80% Dead	100% dead	100% Dead	100% dead	100% dead
3	<b>Baygon</b>	100% Dead	100% Dead	100% dead	100% Dead	100% dead	100% dead
4	<b>Finis chalk</b>	100% Alive	100% alive	100% dead	100% Alive	100% alive	80% alive
5	<b>Tar o mar liquid</b>	100% Dead	100% dead	100% dead	100% Dead	100% dead	100% dead
6	<b>Typhon killer</b>	100% Dead	100% dead	100% dead	100% Dead	100% dead	100% dead
7	<b>DDT Powder</b>	100% alive	100% alive	100% alive	100% Alive	100% alive	20% alive
8	<b>DDVP Liquid</b>	100% Dead	100% dead	100% dead	100% Dead	100% dead	100% dead
9	<b>Finis liquid</b>	100% Dead	100% dead	100% dead	100% Dead	100% dead	100% dead

**Table 3: Results for evaluation of insecticide on *B. orientalis***

S. NO	Insecticide name	Time Intervals after					
		10 min	20 min	30 min	40min	50min	60min
1	<b>Mortein power guard</b>	100% dead	100% dead	100% Dead	100% Dead	100% dead	100% dead
2	<b>Lambda-cyhalothrin</b>	100% alive	100% alive	20% Alive	100% dead	100% dead	100% dead
3	<b>Baygon</b>	100% dead	100% dead	100% Dead	100% dead	100% dead	100% dead
4	<b>Finis chalk</b>	100% alive	100% alive	100% Alive	100% alive	80% alive	60% alive
5	<b>Tar o mar liquid</b>	100% dead	100% dead	100% Dead	100% dead	100% dead	100% dead
6	<b>Typhon killer</b>	80% dead	100% dead	100% Dead	100% dead	100% dead	100% dead
7	<b>DDT powder</b>	100% alive	100% alive	100% Alive	100% alive	100% alive	60% alive
8	<b>DDVP liquid</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead
9	<b>Finis liquid</b>	100% dead	100% dead	100% dead	100% dead	100% dead	100% dead

## DISCUSSION

Cockroaches are difficult to control with insecticides for several reasons, e.g. they may become resistant to commonly used compounds. Chemical control methods provide temporary relief for short time period. Sanitation and proper management of sewerage pipe line systems in the houses can further be accompanied. In this study, our result revealed that Morein power guard, Baygon, Tar o mar liquid, DDVP liquid were found to be most effective insecticide while on the other hand Typhon killer and Finis insect killer liquid were the second most effective insecticide for the control the population of cockroaches. Lambda-cyhalothrin was the least effective insecticide for control measure. The Finis chalk, and DDT powder were subjected a failed chemical against all 3 different types of cockroaches.

## CONCLUSION

On the basis of observations made during this research rendered that performing the experimental work on the effectiveness of commercially formulated insecticides. It was noted although insecticide control provides temporary relief and subsequently cause allergic reaction to skin and eyes reactions. However, sanitation management of waste and sewerage pipe line must be packed.

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