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## Larvicidal activity of medicinal plant *Eucalyptus* leaf extracts against *Anopheles* mosquitoes collected from district Kohat

**Shehzad Zareen, Shahid Niaz Khan, Muhammad Adnan, Hameed Ur Rehman, Muhammad Asim, Sana, MA Waheed, Javid Khan, Telawat Khan, Mujaddad-Ur Rehman**

**Abstract**

*Eucalyptus* is one of the most diverse genres among flowering trees with multiple stem. It mainly dominates Australia as it has more than 700 species found over there. Fresh leaves of *Eucalyptus* were collected from their natural habitat, that they were crushed and converted into powder form. To obtain plant extract, that powder was dissolved in different solvents, an artificial pond was designed at KDA region of district Kohat in bushy and semi green area where mosquitoes were considered to be in large number. Experiments were performed in 7 assays of Petri dishes in 4 steps; each Petri dish was filled with equal amount of water. About 20 healthy/active larvae were placed in every Petri dish at each step. A total of 140 larvae were used in each step (20 Larvae X 7 Petri dishes = 140 assays). *Eucalyptus* leaf extracts have a larvicidal activity against larvae of *Anopheles* mosquitoes. No larva was found dead till 7 hour of observation when distilled water was applied into Petri dishes. Larvicidal activity can be enhanced by applying maximum concentration of leaf extracts along with an extended time frame.

**Keywords:** *Eucalyptus*, *Anopheles*, larvicidal effect

**1. Introduction**

*Eucalyptus* is one of the most diverse genres among flowering trees with multiple stem<sup>[1]</sup>. It mainly dominates Australia as it has more than 700 species found over there<sup>[2]</sup>. *Eucalyptus* is considered to be ever-green tree, but some of the species shed their leaves<sup>[3]</sup>. This plant is used to treat so many diseases. Its phytochemicals have larvicidal activity against mosquito larvae<sup>[4]</sup>. Many species of *Anopheles* mosquitos have ability to transmit Malaria infection as they are carriers of *Plasmodium*<sup>[5]</sup> Larvae of *Anopheles* mosquitos are developed in marshy areas and ponds which are considered to be mosquito breeding sites<sup>[6]</sup>. Current study is designed to investigate the larvicidal activity of *Eucalyptus* leaf extract against larvae of *Anopheles* mosquitos

**2. Materials and Methods****2.1 Plant Sample Collection and preparation**

Fresh leaves of *Eucalyptus* were collected from their natural habitat at mountains of KDA district Kohat. Plant sample was identified by Department of Botany KUST Kohat, leaves were transported to the Graduate Research Laboratory, Department of Zoology KUST Kohat where they were washed and shade dried. After that they were crushed and converted into powder form. To obtain plant extract, that powder was dissolved in different solvents i.e. Methanol, Chloroform, Ethyl Acetate, Hexane and distilled water. After getting Plant extract, solutions of different molarities (5ml, 10ml, 15ml and 20ml) were prepared in test tubes.

**2.2 Collection of Mosquito Larvae**

An artificial pond was designed at KDA region of district Kohat in bushy and semi green area where mosquitos were considered to be in large number. Within a week an increasing growth of mosquito larva population was observed. Larvae were collected in a plastic jar and were transported in to Laboratory for identification and observing larvicidal activity of the plant extract.

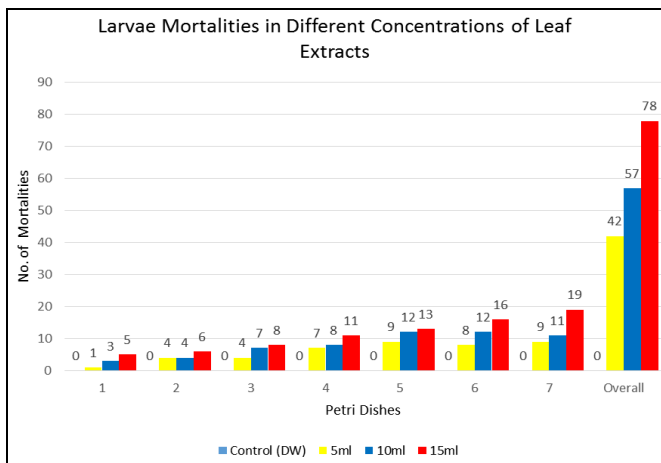
### 3 Results

Experiments were performed in 7 assays of Petri dishes in 4 steps; each Petri dish was filled with equal amount of water. About 20 healthy/active larvae were placed in every Petri dish at each step. A total of 140 larvae were used in each step (20 Larvae X 7 Petri dishes = 140 assays). In 1<sup>st</sup> step 15ml distilled water was added in all of the 7 Petri dishes containing mosquito larvae and were observed till 7 hours. No larva mortality was observed in any one of the Petri dish. In

2<sup>nd</sup> step about 5 ml leaf extract was added to each dish, larvicidal activity was observed after every hour. An overall 42/140 (30.00%) mortality was observed after 7<sup>th</sup> hour. In 3<sup>rd</sup> step about 10ml extract was added to each Petri dish. An overall 57/140 (40.71%) mortality rate was found. In last step about 15ml extract was added to each Petri dish, about 78/140 (55.71%) mortality rate was observed after 7<sup>th</sup> hour. Mortality record of each hour at each concentration is shown in Table-I

| Steps               | Conc.   | Mortalities n(n/20 X 100) in Hours |          |          |           |           |           |           | Total Mortalities |
|---------------------|---------|------------------------------------|----------|----------|-----------|-----------|-----------|-----------|-------------------|
|                     |         | 1                                  | 2        | 3        | 4         | 5         | 6         | 7         |                   |
| 1                   | Control | 0(0.00)                            | 0(0.00)  | 0(0.00)  | 0(0.00)   | 0(0.00)   | 0(0.00)   | 0(0.00)   | 0(0.00)           |
| 2                   | 5ml     | 1(5.00)                            | 4(20.00) | 4(20.00) | 7(35.00)  | 9(45.00)  | 8(40.00)  | 9(45.00)  | 42(30.00)         |
| 3                   | 10ml    | 3(15.00)                           | 4(20.00) | 7(35.00) | 8(40.00)  | 12(60.00) | 12(60.00) | 11(55.00) | 57(40.71)         |
| 4                   | 15ml    | 5(25.00)                           | 6(30.00) | 8(40.00) | 11(55.00) | 13(65.00) | 16(80.00) | 19(95.00) | 78(55.71)         |
| Overall Mortalities |         |                                    |          |          |           |           |           |           | 177(31.60)        |

Graph-I indicates an elevated larvicidal activity of *Eucalyptus* leaf extract at maximum inhibitory concentration i.e. 15ml. which killed about 177/560 (31.60%) of *Anopheles* larvae within 7 hours of activity.



### 4. Discussions

Current study is quite parallel to the study of (Brooker & Kleinig, 1990) who suggested the control of mosquito larvae with phytochemicals of *Eucalyptus* plants. Current study is also in agreement to the Study of Chippendale in 1973 who revealed that after planting *Eucalyptus* swampy and morbid areas can be converted into healthy ones as this plant has an ability to absorb water and also kill the larvae of mosquitos. Study of Rehman and Motoyama in 1998 [7] also suggested that oil extracts from *Eucalyptus* can kill mosquitos and other insects like flies and beetles as well. Earlier studies [8-11] also indicated the ability of *Eucalyptus* plant extracts against mosquitos.

### 5. Conclusion

*Eucalyptus* leaf extracts have a larvicidal activity against larvae of *Anopheles* mosquitos. No larva was found dead till 7 hour of observation when distilled water was applied into petri dishes. Distilled water was used a negative control. About 31.60% larvae were killed by 15ml concentration of *Eucalyptus* leaf extracts. Larvicidal activity can be enhanced by applying maximum concentration of leaf extracts along with an extended time frame.

### 6. Acknowledgment

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