



## STUDY OF PROTEINS IN THE LARVAE OF *Aedes aegypti* AND *Anopheles stephensi* AFTER EXPOSURE TO THE PHYTOTOXIN *Lasiosiphon eriocephalus*

R.G. Patil

Emeritus Fellow, P.G. Department of Zoology,  
L.B.S.College of Arts, Science and Commerce, Satara  
Email [ramraopatil21@yahoo.com](mailto:ramraopatil21@yahoo.com)

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**ABSTRACT:** Protein is an important and essential organic constituent which plays important role in the cellular metabolism. Mosquito *Aedes aegypti* and *Anopheles stephensi* is a vector for transmission of diseases like malaria, dengue and yellow fever. Mosquitoes are controlled by synthetic chemicals but scientists are in the search of effective alternative. In this study phytotoxin *Lasiosiphon eriocephalus* is studied for their effects on the proteins in the larvae of mosquitoes *A. aegypti* and *A. stephensi*. These larvae of mosquitoes are exposed to the phytotoxin *Lasiosiphon eriocephalus* for 2, 4, 8, 12, 24 and 48 hrs. It is observed that proteins are decreased in the exposed larvae of *A. aegypti* and *A. stephensi*. The proteins are found to be decreased with increase in time.

**Key words :-** *A. aegypti*, *A. stephensi*, phytotoxin and *Lasiosiphon eriocephalus*

### INTRODUCTION:

Mosquitoes spread all over the world except Antarctica. Mosquito species are more active in warm and humid tropical regions. Mosquitoes had created health problem all over the world. There are different diseases caused by biting of mosquitoes. Actually mosquitoes act as a vector for transmitting diseases causing viruses and parasites. Among the mosquitoes like *A. aegypti* and *A. stephensi* act as a vector for transmitting several diseases like dengue, malaria, chicken guinea and yellow fever.

Use of synthetic chemicals had resulted in the production of resistant mosquitoes which are spread all over the world (Chevillon *et al.*, 1999). Because of high cost of chemicals, concern to the environment, effect on non target population and resistance in mosquito the use of synthetic chemicals had been minimized (Brown, 1986, Russell *et al.*, 2009). Use of phytotoxins in the control of mosquitoes is used as new alternative for the synthetic chemicals. The efforts have been made in this work to study the effects on phytotoxin *L. eriocephalus* on the proteins of larvae of mosquito *A. aegypti* and *A. stephensi*.

### MATERIAL AND METHODS :-

Larvae of *Aedes aegypti* and *Anopheles stephensi* with development of 5 days and phytotoxin *Lasiosiphon eriocephalus* were selected for this study. These larvae of *A. aegypti* and *A. stephensi* were exposed for 2, 4, 8, 12, 24 and 48 hrs. respectively to conc. 213.07 and 210.14 ppm

of phytotoxin *L. eriocephalus*. These concentrations 213.07 and 210.14 ppm are the LC<sub>50</sub> values of phytotoxin *L. eriocephalus* respectively for the *A. aegypti* and *A. stephensi*.

The alcoholic extracts of powder of leaves of *L. eriocephalus* had been prepared with the help of Soxhlet's apparatus and Lowry's method (1951) was used to study the proteins in the larvae.

### OBSERVATION:

**Table No.1.** Effects on proteins of mosquito larvae *A. aegypti* after exposure to the phytotoxin *L. eriocephalus*

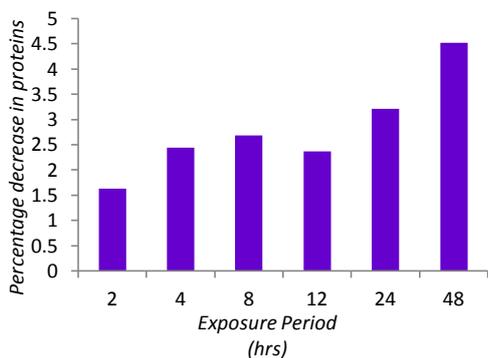
Exposure Period (hrs)	Proteins (mg/gm of body wt.)		Percentage decrease in proteins (%)
	Normal	Exposed	
2	27.50	27.05	1.63
4	24.50	23.90	2.44
8	26.00	25.30	2.69
12	29.50	28.60	2.37
24	28.00	27.10	3.21

48	26.50	25.30	4.52
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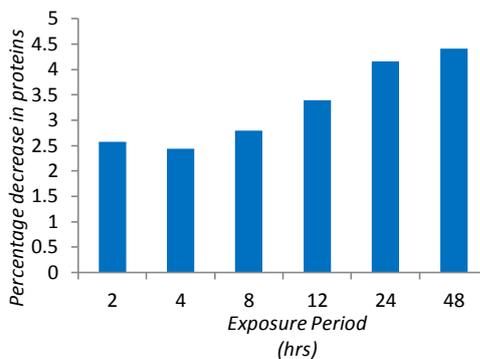
**Table No.2.** Effects on proteins of mosquito larvae *A. stephensi* after exposure to the phytotoxin *L. eriocephalus*

Exposure Period (hrs)	Proteins (mg/gm of body wt.)		Percentage decrease in proteins (%)
	Normal	Exposed	
2	23.20	22.60	2.58
4	24.50	23.90	2.44
8	28.50	27.70	2.80
12	26.50	25.60	3.39
24	24.00	23.00	4.16
48	24.90	23.80	4.41

**Fig. No. 1.** Effects on proteins of mosquito larvae *A. aegypti* after exposure to the phytotoxin *L. eriocephalus*



**Fig. No. 2.** Effects on proteins of mosquito larvae *A. stephensi* after exposure to the phytotoxin *L. eriocephalus*



When larvae of *A. stephensi* exposed for 2, 4, 8, 12, 24 and 48 hrs. of phytotoxin *L. eriocephalus* the proteins were found decreased with increase in exposure period. The percentage decrease in proteins is observed as 2.58%, 2.44%, 2.80%, 3.39%, 4.16% and 4.41% respectively to the exposure period 2, 4, 8, 12, 24 and 48 hrs.

**DISCUSSION :**

Protein is a energy source used during stress condition of animals. When larvae of *A. aegypti* and *A. stephensi* exposed to the phytotoxin from *L. eriocephalus* the protein contents in the both larvae get depleted. The proteins in the larvae of *A. aegypti* get decreased by 1.63%, 2.44%, 2.69%, 2.37%, 3.21% and 4.52% respectively for exposure periods 2, 4, 8, 12, 24 and 48 hrs. whereas proteins in the larvae *A. stephensi* get decreased by 2.58%, 2.44%, 2.80%, 3.39%, 4.16% and 4.41% respectively for exposure period 2, 4, 8, 12, 24 and 48 hrs.

Similar types of results were obtained by Sharma *et al.* (2006) in *Culex quinquefasciatus* and *Anopheles* due to the effect of *A. annua*. Annadurai and Rembold (1993) and Li XD *et al.* (1995) had observed decreased protein level in *Spodoptera litura* and *Schistocera gregaria*.

According to Sharma *et al.* (2006) decrease in proteins is due to the interference of phytotoxin in the protein synthesis and also due to the degeneration and rupturing of larval tissue. Umminger (1970) was of the opinion that protein is a energy source to spare during stress condition.

In our study larvae of *A. aegypti* and *A. stephensi* when exposed to the phytotoxin *L. eriocephalus*, may interferes protein synthesis in the larvae which causes depletion in the protein amount. Furthermore due to the stress condition larvae used the protein source for energy which may also results in the depletion in proteins.

Therefore from above discussion it is concluded that when larvae exposed to the phytotoxin *L. eriocephalus* it interferes protein synthesis and also stress condition is produced which further results in the depletion of proteins. It is also concluded that decrease in proteins is correlated with increase in exposure period.

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#### **REFERENCES:-**

**Annadurai RS, Rembold H.( 1993) :** *Azadirachtin* A modulates the tissue specific 2D polypeptides patterns of the dessert locust, *Schistocercia gregaria*. *Naturwissenschaften*; 80: 127-130.

**Brown A.W. (1986) :** Insecticide resistance in mosquitoes :a a pragmatic review *J. Am Mosquito Control Association*, 2, 123-140.

**Chevillon, Christine, Raymond, Michell, Guillemaud Thomas, Pasteur and Nichol (1999) :** Population genetics of insecticide resistance in the mosquito *Culex pipiens*. *Biol.J.Linn.Soc.*, (1-2), 147-157.

**Li XD, Chen WK, Hu MY. (1995):** Studies on the effects and mechanism of *azadirachtin* and rhodojaponin on *Spodoptera litura* (F.). *J South China Agricultural University*; 16: 80-85.

**Lowry, O.H., Rosebrough, N.J., A.L. and Randall R.J. (1951):** Protein measurement with folin phenol reagent., *J.Biol.Chem.*, 193; 265-275.

**Russell TL, Kay BH, Skilleter GA (2009) :** Environmental effects of mosquito insecticides on saltmarsh invertebrate fauna. *Aquat. Biol.*, 6, 77-90.

**Sharma P, Mohan L, Srivastava CN. (2006) :** Growth inhibitory nature of *Artemisia annua* extract against *Culex quinquefasciatus* Say. *J Asia Pacific Entomol*; 9: 389-395.

**Sharma P, Mohan L, Srivastava CN. (2006) :** Phytoextract-induced developmental deformities in malaria vector. *Bioresour Technol* b; 97: 1599-1604.

**Sharma P, Mohan L, Srivastava CN. (2006) :** Phytoextract-induced developmental deformities in malaria vector. *Bioresour Technol* 97: 1599-1604.

**Sharma P, Mohan L, Srivastava CN. (2006) :** Growth inhibitory nature of *Artemisia annua* extract against *Culex quinquefasciatus* Say. *J Asia Pacific Entomol* 9: 389-395.

**Umminger, B.L. (1970) :** Physiological studies in super cooled hill fish *Fundulus heteroclitus*, III Carbohydrate metabolism and survival at sub zero temperature, *J.Exp.Zool.*, 173, 159-174.