

---

***In vitro* efficacy of cypermethrin against *Hyalomma anatolicum anatolicum***

L. Prasad, R.K. Bagherwal, A.K. Jayraw\*<sup>1</sup>, N. Rajput<sup>2</sup>, N. Yadav, M.Shakya<sup>1</sup> and P.Thakur

<sup>1</sup>Department of Veterinary Parasitology <sup>2</sup>Department of Veterinary Pharmacology & Toxicology,

Department of Veterinary Medicine

College of Veterinary Science and Animal Husbandry

Nanaji Deshmukh Veterinary Science University, Jabalpur

Mhow – 453 446 (M.P.) India

---

**Publication Info**

**Article history:**

Received : 11-07-2018

Accepted : 18-08-2018

Published : 17-10-2018

**Key Words:**

*Hyalomma anatolicum anatolicum*, cypermethrin, *in vitro* efficacy

**\*Corresponding author:**

jayrawanant@yahoo.co.in

This work is licensed under the Creative Commons Attribution International License (<http://creativecommons.org/licenses/by/4.0/P>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Copyright ©: 2018 by authors and SVSBT.

**Abstract**

The present investigation was undertaken to evaluate *in vitro* efficacy of cypermethrin against *H. a.anatolicum*. The engorged *H. a.anatolicum* females dropped on ground were collected from dairy farms of nearby villages of Mhow and were maintained in the laboratory till hatching of the eggs and larvae were used for further study. Larvae were placed in filter paper packets impregnated with 100, 200, 400, and 800 ppm concentrations of cypermethrin for 24 hours which revealed the per cent mortality 89.84, 93.70, 100 and 100%, while the corrected per cent mortality and efficacy was found 89.30, 93.36, 100 and 100% .

**Introduction**

*Hyalomma anatolicum anatolicum* has gained noticeable importance because of its role as the major vector of *Theileria annulata* in cattle. Use of acaricides is the most common method of tick control adopted by the cattle owners in India and these acaricides are applied on infested animals at frequent intervals. Indiscriminate use with incorrect concentrations of acaricides might be

the cause of development of resistance against acaricides. Commonly used Cypermethrin (synthetic pyrethroid) is commercially available acaricide for tick control in India. Apart from its application against agriculturally important pests, it is also extensively used for the control of mosquitoes. The indiscriminate use of acaricides with incorrect concentrations of acaricides results in development of resistance against the acaricides. Therefore the present study was

conducted to assess the *in vitro* efficacy of cypermethrin against *H. a. anatolicum*.

### Materials and Methods

The engorged *H. a. anatolicum* females dropped on ground were collected from dairy farms of nearby villages of Mhow. Each fully engorged female tick was placed in a test tube and these test tubes were transferred in a desiccator having 10% potassium hydroxide solution at the base and the desiccators were placed in incubator at  $28 \pm 1^\circ\text{C}$  and  $85 \pm 5\%$  relative humidity and maintained till hatching of the eggs and released larvae were used to assess the efficacy of cypermethrin as per the method described by Shyma *et al.* (2012) with minor modifications. Pieces of Whatman filter paper No. 11 (5 x 10 cm in diameter) were used. The filter papers were impregnated with 100, 200, 400 and 800 ppm concentrations of analytical grade cypermethrin (Sigma-Aldrich). Seven-day-old hungry larvae were placed in open-ended packets which were transferred in desiccators. After 24 hours incubation in BOD incubator, live and dead larvae were counted and Corrected mortality (%) was calculated by using Abbott's formula.

### Results and Discussion

In the present study, the per cent mortality was observed as 89.84, 93.70, 100 and 100% while the corrected per cent mortality and efficacy was recorded as 89.30, 93.36, 100 and 100% at 100, 200, 400, and 800 ppm concentration of cypermethrin, respectively (Table 1). The data revealed that per cent mortality increased with increasing the concentration of cypermethrin and 100% mortality was observed at 400 ppm.

The efficacy of 89.30% recorded at the recommended concentration is in line with the findings of Arunachalam *et al.* (2007) and Sajid *et al.* (2009). At the same time Sangwan *et al.*

(1993) and Singh *et al.* (2015) reported resistance against cypermethrin. Continuous and indiscriminate use with incorrect concentrations of acaricides results in development of resistance against these compounds, which is attributable to the reduced efficacy of cypermethrin in the present investigation.

### Acknowledgement

Authors are thankful to the Honorable Vice Chancellor, NDVSU, Jabalpur and Dean, College of Veterinary Science and Animal Husbandry, Mhow for providing the necessary facilities to carry out the research work.

### Conflict of Interest

All authors hereby declare that there is no conflict of interest.

### References:

- Arunachalam, K., Raman, M., Narendrababu, R. and Karunanidhi, K. (2007). Comparative evaluation of acaricides in natural tick infestation of mecheri sheep in an organized farm. *Indian J. Small Ruminants*, **13**: 216-221.
- Sajid, M.S., Iqbal, Z., Khan, M.N., and Muhammad, G. (2009). In vitro and in vivo efficacies of ivermectin and cypermethrin against the cattle tick *Hyalomma anatolicum anatolicum* (Acari: Ixodidae). *Parasitology Research*, **105**: 1133-1138.
- Sangwan, A.K., Chhabra, M.B. and Singh, S. (1993). Acaricide resistance status of common livestock ticks in Haryana. *Indian Vet. J.*, **70**: 20-24.
- Shyma, K.P., Kumar, S., Sharma, K.A., Ray, D.D., and Ghosh, S. (2012). Acaricide resistance status in Indian isolates of *Hyalomma anatolicum*. *Experimental and Applied Acarology*, **58**: 471-481.
- Singh N.K., Jyoti, Haque, M., Singh, S.S., Rath, and Ghosh, S. (2014) A comparative study on cypermethrin resistance in *Rhipicephalus (Boophilus) microplus* and *Hyalomma anatolicum* from Punjab (India). *Ticks and Tick Borne Diseases*, **5**: 90-94.
- Singh, N.K., Gehlot, I.S., Jyoti, Bhat, S.A., Singh, H., and Singh, V. (2015). Detection of acaricidal resistance in *Hyalomma anatolicum anatolicum* from Banaskantha district, Gujarat. *J. Parasit. Dis.* **39**: 563-566.

**Table 1: Efficacy of cypermethrin against *H. a. anatolicum***

Cypermethrin (ppm)	Average no. of larvae		Mortality (%)	Corrected mortality (%)
	Treated	Dead		
Control	135	07	05.18	-
100	128	115	89.84	89.30
200	143	134	93.70	93.36
400	137	137	100	100
800	126	126	100	100