SHORT COMMUNICATION

In vitro Efficacy of Deltamethrin against Hyalomma anatolicum anatolicum

Pratibha Thakur¹*, RK Bagherwal², AK Jayraw³, AK Soni⁴

Ind J of Vet Sci and Biotech (2019): 10.21887/ijvsbt.15.1.12

Tick and tick-borne diseases such as theileriosis, babesiosis, and Anaplasmosis pose a constant threat to cattle health. *Rhipicephalus (Boophilus) microplus* and *Hyalomma anatolicum* are the most commonly found cattle tick species and cause significant economic losses to dairy and leather industries by adversely affecting the milk production and quality of hides. Tick control strategy involves mainly the use of synthetic acaricides which results in the development of acaricide resistance. Deltamethrin acts on the parasites by contact and has strong lipophilic action thus penetrates the cuticle and bind the peripheral nerve ganglion and block the motor activity. The present study was aimed at the determination of *in vitro* efficacy of Deltamethrin against *H. anatolicum* ticks collected from healthy cattle of college farm and nearby dairy farms.

MATERIALS AND METHODS

Live adult female engorged *Hyalomma anatolicum* ticks were collected from healthy cattle of college farm as well as nearby private dairy farms and villages. The commercially available preparation of deltamethrin (Butox 1.25% EC, Intervet) was used at the concentration of 25, 50, 75 and 100 ppm in distilled water. After identification ticks were placed in a test tube and were closed with a piece of cloth and rubber band. These tubes were transferred in a desiccator having saturated potassium hydroxide solution at the base to maintain 85% relative humidity. The desiccator was closed airtight with its lid by applying vaseline on the contact surface of lid and desiccator. Then, the tubes were placed in an incubator at 29°C and 85% relative humidity (RH). Tubes were examined periodically to check the laying of eggs and subsequent hatching.

Larval Packet Test

The larval packet test (LPT) was conducted as per FAO (2004) with minor modifications. The Whatman filter paper number 1 was cut in parallelogram shape (5.5 cm \times 5 cm) and were impregnated with 0.5–0.6 mL of different concentrations of deltamethrin, with the help of pipette and dried for 30 min in an incubator at 37°C. Treated and dried parallelograms of paper were folded in half forming equilateral triangular packets and sealed on the sides with adhesive tapes forming

¹⁻⁴Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Mhow, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India

Corresponding Author: Pratibha Thakur, Department of Veterinary Medicine, College of Veterinary Science and Animal Husbandry, Mhow, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, India, e-mail: pratibhathakur652@gmail.com

How to cite this article: Thakur, P., Bagherwal, R.K., Jayraw, A.K., & Soni, A.K. (2019). *In vitro* Efficacy of Deltamethrin against *Hyalomma anatolicum anatolicum*. Ind J Vet Sci and Biotech, 15(1):55-56.

Source of support: Nil **Conflict of interest:** None

Submitted: 10/7/2019 Accepted: 19/7/2019 Published: 27/7/2019

an open-ended packet. After insertion of approximately 150 larvae, the open side of each packet was sealed with adhesive tape, and the packets were placed in a desiccator kept in BOD incubator maintained at $28 \pm 1^{\circ}$ C and $85 \pm 5\%$ RH. The packets were removed after 24 h, and larval mortality was calculated.

 $\begin{array}{ll} \text{Corrected} &= \underline{\text{Test mortality (\%)-Control mortality (\%)}} \times 100 \\ \text{mortality (\%)} & 100-\text{Control mortality (\%)} \end{array}$

RESULTS AND DISCUSSION

The results of the present study revealed that deltamethrin caused 63.05 % and 94.45 % mortality at 25 and 50 ppm. Beyond 50 ppm, the mortality reached 100%. Previously Bagherwal *et al.* (1994) and Kishore *et al.* (2017) also reported 100% efficacy with 75 and 100 ppm, respectively. This is because of continuous and indiscriminate use with improper concentrations of deltamethrin Shyma *et al.* (2015) reported resistance against deltamethr in In R. (B.) microplus. Gaur *et al.*, (2016) and Katuri *et al.*, (2017) reported resistance against deltamethrin, cypermethrin, and diazinon. It is concluded from present work that deltamethrin at 75 and 100 ppm can be recommended for tick control/irradication programme.

ACKNOWLEDGMENT

Authors are thankful to Vice Chancellor, NDVSU, Jabalpur and Dean, College of Veterinary Science and AH, Mhow for providing facilities to undertake this study.

[©] The Author(s). 2019 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons. org/licenses/by/4.0/), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

REFERENCES

- Bagherwal, R.K., Sharma, A. and Dhanotiya, R.S. (1994). Studies on the efficacy of deltamethrin against different stages of Hyalomma anatolicum. Indian Vet. J.,71: 1073-1076.
- FAO (2004). Resistance Management and Integrated Parasite Control in Ruminants: Guidelines. Animal Production and Health Division, Food and Agriculture Organization of the United Nations. Rome, pp. 25–77.
- Gaur, R.S., Sangwan, A.K., Sangwan, N. and Kumar, S. (2016). Acaricide resistance in Rhipicephalus (Boophilus) microplus and Hyalomma anatolicum collected from Haryana and Rajasthan states of India. Exp Appl Acarol, 69(4): 487-500.
- Katuri, R.N., Das, G., Singh, A.K., Chalhotra, S.K. and Nath, S., (2017). Comparative efficacy of deltamethrin and chlorpyriphos in bovine ticks in and around Jabalpur. J Parasit Dis., 41(3): 713–715.
- Kishore, V., Loach, N., Kumar, A. and Mohan, L. (2017). Toxicity evaluation of cypermethrin, deltamethrin and diazinon with reference to Hyalomma anatolicum (Acari: Ixodidae). Journal of Entomological Research, 41(3):251
- Shyma, K.P., Gupta, J.P., Singh, V. and Patel, K.K. (2015). In Vitro Detection of Acaricidal Resistance Status of Rhipicephalus (Boophilus) microplus against Commercial Preparation of Deltamethrin, Flumethrin, and Fipronil from North Gujarat, India. Journal of Parasitology Research.

Announcement: SVSBT-2019

VII Annual Convention and National Seminar of SVSBT

The VII Annual Convention of the Society for Veterinary Science & Biotechnology (SVSBT) and *National Seminar on "Biotechnological Advances for Improving Animal Health and Productivity"* will be **organized at Navsari during 5-6 December, 2019** by the College of Veterinary Science & Animal Husbandry, Navsari Agricultural University, Navsari, Gujarat. The organizing committee of *SVSBT-2019 invites abstracts* of original and quality research work limited to 250 words by e-mail to svsbt2019@gmail.com latest *by 15th November, 2019*. Details of Seminar will be available on website nau.in. *For Further details, please contact:*

Dr. B. P. Brahmkshtri

Organizing Secretary cum Professor & Head Department of Animal Biotechnology

College of Veterinary Science & Animal Husbandry

Navsari Agricultural University, Navsari – 396450 (Gujarat)

E-mail: svsbt2019@gmail.com; mobile +91 94273 86685

