SHORT COMMUNICATION

In vitro Efficacy of Deltamethrin against *Hyalomma anatolicum anatolicum*

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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 × 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 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 ± 1°C and 85 ± 5% RH. The packets were removed after 24 h, and larval mortality was calculated.

$$\text{Corrected mortality (\%)} = \frac{\text{Test mortality (\%)} - \text{Control mortality (\%)}}{100 - \text{Control mortality (\%)}} \times 100$$

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.

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