COMPARATIVE EFFICACY OF CYPERMETHRIN, DELTAMETHRIN AND ZEROKEET AGAINST BROWN DOG TICKS

P. Kumar, Sucheta Sinha, S.R.P.Sinha, A.K. Gautam, Sudha Kumari and S.Kumar

Department of Parasitology

Bihar Veterinary College, Patna-14.

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Corresponding Author : drpankajvet96@gmail.com

ABSTRACT

Acaricidal efficacy of two promising pyrethroids, Cypremethrin and Deltamethrin and a herbal preparation Zerokeet in terms of tick mortality and re-infestation period were assessed by spraying against different stages of *Rhipicephalus sanguineus* on dogs. Cypermethrin was proven to be best followed by Zerokeet and Deltamethrin for tick mortality of all stages and re-infestation period at their recommended dose. Similarly 100 per cent mortality was achieved just within 24 hours on application of 25 per cent enhanced dose of the Cypermethrin and Zerokeet against larva, nymph and adult stages of tick whereas Deltamethrin was 98.6, 95.23 and 90 per cent effective for respective tick stages within 24 hrs and 100 per cent mortality was achieved within 48 hrs on post treatment of enhanced dose of Deltamethrin. Longest reinfestation period was also noted on treatment of Cypermethrin followed by Zerokeet and Deltamethrin . All the drugs were well tolerated without any visual side effect even on enhanced doses.

KEY WORDS : Acaricides, Pyrithroids, Zerokeet

INTRODUCTION

Tick infestation in dogs is a global problem and maximum tick control measures are solely depend upon the application of chemical acaricides. Due to negligible deleterious effects Cypermethrin and Deltamethrin are now- a- days most widely used pyrethroid group of acaricides by pet owners. Deltamethrin and Flumethrin used against *Ixodes ricinus* and *Rhipicephalus sanguineus* in hair of Cattle and Sheep, (Melhorn *et al*., 2011 and 2012). Zerokeet a herbal biofriendly product also found effective against tick infestation. The present scenario indicates that indiscriminate and improper application developed a certain degree of resistance in local tick population against these promising acaricides. Therefore, present study was carried out to evaluate the marginal degree of performance of these acaricides against different developmental stages of brown dog ticks on application of their recommended dose and 25 % higher atoxic dose than recommended dose in local dog population of Patna and its surroundings.

MATERIALS AND METHODS:

Two trials were conducted to evaluate the comparative efficacy of Cypermethrin, Deltamethrin and a herbal preparation Zerokeet (*Cedrus deodara ,Pongami glabra , Azadirachita indica , Eucalyptus globules, Acarus calamus*; Dabur Ayurvet Ltd. Ghaziabad), at their recommended dose @1 ml/lit, 2 ml/lit. and 100 ml/200 ml. respectively and 25% higher concentration of each acaricide i.e. 1.25 ml/lit. 2.5 ml/lit. and 125 ml/200 ml respectively. A total of 40 moderate to highly infected dogs with ticks were randomly selected and divided into two groups, consisting of 20 dogs for each trials. Each group was further divided into four sub- groups. Out of which three were selected for treatment with Cypermethrin, Deltamethrin and Zerokeet and rest one was served as untreated.

The number of ticks (larvae, nymph and adult) of all experimental dogs was counted and mean of the each group was noted before treatment. Freshly prepared solutions, as per experimental

Table no.- Comparative efficacy (%) of acaricides on its recommended and enhanced dose against Tick infested dog

Acaricides	Recommended (R) & Enhanced(E)	No. of Dogs	Concentration	No. of ticks (Mean ±S.E)						No. of ticks (Mean ±S.E)			Residual effect (in days)
				Larva			Nymph			Adult			
				Pre-treatment	24 hrs Post-treatment	48 hrs. Post-treatment	Pre-treatment	24 hrs Post-treatment	48 hrs. Post-treatment	Pre-treatment	24 hrs Post-treatment	48 hrs. Post-treatment	
Cypermetrin	R	5	1ml/lit.	42.0±4.32	0.0 (100)	0.0 (100)	23.6±2.24	0.4 ±0.4 (98.3)	0.0 (100)	12.0±2.96	0.6±0.4 (95.0)	0.0 (100)	25-30
	E	5	1.25ml/lit.	38.0±5.41	0.0 (100)	0.0 (100)	23.6±2.22	0.0 (100)	0.0 (100)	14.2 ±2.87	0.0 (100)	0.0 (100)	28-32
Deltamethrin	R	5	2ml/lit.	41.0±4.63	03.6 ±0.6 (91.21)	0.2±0.2 (99.5)	21.6±0.92	2.4 ±1.85 (89.0)	0.2±0.2 (99.0)	10.4 ±1.74	1.4 ±0.4 (87.0)	0.2±0.2 (98.0)	15-20
	E	5	2.5ml/lit.	43.0±4.80	0.6 ±0.4 (98.6)	0.0 (100)	21.4±1.63	1.0 ±0.31 (95.23)	0.0 (100)	10.0 ±0.94	1.0 ±0.44 (90.0)	0.0 (100)	22-30
Zerokeet	R	5	100ml/200ml	41.2±5.89	0.8 ±0.37 (98.0)	0.0 (100)	20.4±3.72	0.4 ±0.4 (96.0)	0.0 (100)	11.2 ±1.15	0.8 ±0.37 (93.0)	0.0 (100)	20-30
	E	5	125ml/200ml	41.8±5.34	0.0 (100)	0.0 (100)	20.2±2.23	0.0 (100)	0.0 (100)	11.8 ±.37	0.2 ±0.2 (99.0)	0.0 (100)	25-30
Control	R	5	-	38.6±4.29	38.6 ±4.29	38.3±4.39	18.6±1.16	18.6 ±1.16	18.9±1.18	10.2 ±1.52	10.2 ±1.52	10.2±4.39	
	E	5	-	40.4±1.80	40.4 ±1.70	40.4 ±1.44	21.7±1.91	21.7±1.91	21.7±1.00	10.2 ±1.00	10.2 ±1.06	10.2 ±1.05	

plan of each acaricide were applied on the whole body of the dogs. The mean no. of ticks (all stages) of each group was counted for 24 and 48 hrs of post treatment observations. To determine the residual effect, the treated animals were observed till they become re-infested with any stage of ticks. The per cent efficacies were determined at the rate of dropping off larvae, nymph and adult from the host on post- treatment.

RESULTS AND DISCUSSION

The result of the present study summarised in the table reveals that Cypermethrin at recommended dose was found 100, 98.3 and 95% effective against larval, nymphal and adult stages of ticks, respectively at 24 hrs. post –treatment, whereas at 48 hrs. observations, it was shown that cent-per cent ticks were dropped off from the infected animals . On enhancement of concentration (25%) of same pyrethroid, cent per cent mortality was observed just within 24 hrs post treatment. Similarly, Deltamethrin was found 91.21, 89 and 87% effective against larval, nymphal and adult stages of ticks respectively, within 24 hrs and within 48 hrs efficacy reached 99.5, 99 and 98% against respective stages whereas same was found 98.6, 95.23 and 90% effective on treatment with enhance dose at 24 hrs and complete mortality was achieved against all stages within 48 hrs of post treatment.

The herbal product, Zerokeet was found 98, 96 and 93% effective against respective tick stages at 24 hrs and 100% eradication noted against all stages within 48 hrs at recommended dose, whereas at 25 % higher concentration, its efficacy was proven to be cent-per cent against larval, and nymphal stages and 99% against adult stage of ticks at 24 hrs and dogs were observed to be completely free from ticks within 48 hrs. on post treatment of 25 % higher dose of Zerokeet.

The comparative per cent efficacy among three drugs, revealed the superior performance of Cypermethrin followed by Zerokeet and then Deltamethrin. As per the observed mean residual protection period was also found highest in Cypermethrin treated group of animals followed by Zerokeet and Deltamethrin within both treated concentration. Present observation also corroborated with the report of Singh (2000) and Srivastava et al. (2001). Result of the present investigation showed that Zerokeet was found better for knocking off the dog ticks without any side effect but its higher price and quantity requirement may be the limiting factor regarding its usage than other two acaricides.

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