

EFFECTS OF DIAZONIN AND DELTAMETHRIN AS ACARICIDES ON BLOOD GLUCOSE LEVEL OF CROSSBREED CALVES, INFESTED WITH TICKS

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ABSTRACT

A comparative study on the effects of two acaricides diazinon and Deltamethrin on blood glucose level of tick infested calves was made. It was observed that blood glucose level increased significantly ($p < 0.05$) with increase in the concentration of selected acaricides diazinon and deltamethrin.

KEYWORDS: Diazinon, Deltamethrin, Acaricides, Blood Glucose Level, Ticks And Crossbred Calves

Livestock plays a pivotal role in the growing agrarian scenario of Indian economy. It provides livelihood security through employment generation and sustainable household nutrition to poor rural masses of India. Loss of productivity from the livestock sector is of multifactorial in nature, ticks have been recognized as a major cause of production loss predominantly in tropical and subtropical countries of the world (De Castro, 1997). Global cost of Ticks affected ranked have been very high with the impact on poor farming communities in the developing countries including India. A recent estimate calculated on the cost of control of Ticks affecting Indian livestock was 498.7 million US \$ per annum (Minjauw and McLeod, 2003). The ticks surpass all arthropods in the variety of bacterial, viral and protozoan disease, they transmit to man and livestock to save the valuable livestock, a number of acaricides are being used widely in different concentrations without considering their toxic effects. Development of resistance to acaricides (Soloman, 1983) is one of the major bottleneck in tick control programs universally including India (Chaudhri and Nathani, 1964 & Sngwan et.al., 1993). The acaricidal toxicity may alter different biochemical bloodprofiles especially blood glucose in animals.

The main objective was this study is to investigate any alternation in blood glucose level of livestock due to

application of different acaricides (particularly diazinon and deltamethrin) in various concentration.

MATERIALS AND METHODS

The study was carried out in 47 tick infested cross breed cow calves of either sex aging between 8 to 10 months; which are procured from different private dairy farms and khatahs located in the urban areas of Varanasi. These Calves were found infested mainly *B. microplus*, *H. anatolicum* and *Hemaphysalis bispinosa*. The calves were divided into three groups. Group A to B consisted 21 calves each, while group C (Control group) consisted of 5 calves only. Diazinon (Neocidal) and deltamethrin (Butex) were each assigned to group A and B respectively. Group A and B both were again subdivided into sub groups such as A1, A2, A3, B1, B2 and B3 for the use of three different concentrations of respective acaricides. Each of these sub groups consisted 7th calves each. For the trial Diazinon and deltamethrin were used in 0.5%, 2.5%, and 5% concentration as spray.

Blood glucose was examined at different time intervals as per the analyzes using standard statistical procedure as given by Sanedcor and Cochran (1967).

Table 1: Analysis of variance of blood glucose level (mgdL⁻¹) under various acaricides at different concentration at different time intervals

Sources of variations	D.F.	0.5% concentration		2.5% concentration		5% concentration	
		M.S	F	M.S	F	M.S	F
Between time intervals	4	33.79	1.51	188.67	7.42	5255.30	342.59
Between Drugs	2	113.61	5.06	761.81	2.96	2506.36	163.39
Drugs × time intervals	8	8.70	0.3	68.60	2.69	1371.46	8.40
Error	60	22.43		25.43		15.34	

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RESULTS AND DISCUSSION

Ticks are responsible for the transmission of large variety of diseases that affect livestock economy (Soulsby, 1982). A number of tick control strategies have so far been suggested by researchers, practitioners and adopted by the livestock farmers. Presently chemical treatment remains the cornerstone for tick control in developing countries. However, due to continuous investigation of acaricidal Diazinon and Deltamethrin treatment for increased the glucose level. In vivo therapeutic efficacy of identified fractions against experimentally challenged infestation was also evaluated to develop a suitable acaricide formulation.

The overall mean value of acaricides Diazinon treated cross breed calves infested with tick, blood glucose level in different concentration with different time interval (like 0.5, 2.5 and 5.0 % concentration and 0, 6, 24, 48 and 72 hours) was recorded as $\pm 49.52 \pm 56.36$ and ± 65.80 hours respectively whereas the increasing the glucose level ($P < 0.05$) was significantly (Table 1). Similarly, acaricides Deltamethrin were ± 50.36 , ± 51.92 and ± 60.08 hours, respectively, while the same for control treatment was ± 46.30 , ± 46.32 and ± 46.20 hours. The increased the blood glucose level of cross breed calves respectively, had significant ($P < 0.05$) difference from the average blood glucose level (± 5.6 hours) laid by cross breed calves infested with tick. (Table 2).

Table 2: Blood glucose level (mgdL⁻¹) under various acaricides in different concentrations and time interval in cross breed calves

Name of acaricides	0.5% concentration mean \pm S.E	Overall mean (in hr)	2.5% concentration mean \pm S.E	Overall mean (in hr)	5% concentration mean \pm S.E	Overall mean (in hr)
	Time intervals (in hr)		Time intervals (in hr)		Time intervals (in hr)	
	0, 6, 24, 48, 72		0, 6, 24, 48, 72		0, 6, 24, 48, 72	
Diazinon	46.2, 50.2, 50.8, 50.8, 49.60 $\pm 2.27, \pm 2.20, \pm 3.8, \pm 3.44, \pm 3.15$	49.52	46.2, 61.6, 64.2, 60.6, 54.20 $\pm 2.15, \pm 2.77, \pm 3.17, \pm 3.31, \pm 4.19$	56.36	46.4, 35.6, 48.8, 102.2, 96.0 $\pm 2.77, \pm 1.80, \pm 2.60, \pm 1.65, \pm 2.34$	65.80
Deltamethrin	45.8, 51.8, 51.6, 51.2, 51.40 $\pm 0.86, \pm 1.16, \pm 1.03, \pm 1.28, \pm 1.08$	50.36	46.0, 52.0, 54.4, 55.0, 52.20 $\pm 1.30, \pm 1.30, \pm 1.60, \pm 1.79, \pm 1.59$	51.92	46.0, 34.8, 44.8, 90.6, 84.2 $\pm 1.00, \pm 1.36, \pm 1.84, \pm 1.03, \pm 0.97$	60.08
Control	46.2, 46.6, 46.4, 46.2, 46.2 $\pm 1.59, \pm 1.63, \pm 1.86, \pm 1.5, \pm 1.59$	46.30	46.2, 46.6, 46.4, 46.2, 46.2 $\pm 1.59, \pm 1.63, \pm 1.86, \pm 1.59, \pm 1.59$	46.32	46.2, 46.6, 46.4, 46.2, 46.2 $\pm 1.59, \pm 1.63, \pm 1.86, \pm 1.5, \pm 1.59$	46.20
Overall mean (in hr)	46.07, 49.53, 49.60, 59.40, 49.70		46.13, 53.40, 55.00, 53.94, 50.87		46.20, 39.00, 46.67, 79.67, 75.47	

Haematological study revealed slightly lower values in the calves of all the groups before starting of the in vivo study. However, there was no clinical illness in any of the calves. There was a significantly ($P < 0.05$) increased haemoglobin level in calves of all the two acaricides Diazinon and Deltamethrin treatment with different time interval. 0, 6, 24, 48 and 72 hour calves of these two groups showed improvement and increased haemoglobin level.

Their study on tick infestation showed that cross breed calves resulted in increased glucose level. The effect is more prominent in cross breed calves of improved body

condition. They also reported that increased significantly ($p < 0.05$) with increase in the concentration of selected acaricides diazinon and deltamethrin with increase in time interval. Hb is an inevitable consequence of heavy infestation of any blood-feeding parasite, and cross breed calves deaths attribute to increased blood glucose level as a result of infestation (Jonsson, 2006). O'Kelly et al. (1971) studied the interaction of tick effects (specific and anorectic) and changes in blood composition of herford cattle infested, reported that decrease in Hb %, haematocrit values, neutrophil count and increase in lymphocyte count are due to specific effects of ticks. This study demonstrate that acaricides have limited efficacy in reducing tick

infestations and is often accompanied with serious drawbacks by the development of acaricide resistant ticks (Graf et al., 2004). Investigation of acaricidal Diazinon and Deltamethrin treatment for increased the glucose level of cross breed calves. Furthermore, the development of new acaricides is an improved along with nontoxic as well as easily available in the local market (Graf et al., 2004).

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