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Comparative efficacy of a herbal anthelmintic and piperazine citrate against natural infection of *Toxocara vitulorum* (Goeze 1982) in cow and buffalo calves*

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From ancient times, herbal anthelmintics enjoy good reputation and their efficacies are well documented. Out of the commonly available herbal plants, *Butea frondosa* and *Embelia ribes,* have been reported for promising anthelmintic efficacy against poultry ascariasis and other intestinal worms of animals including those of human beings (Sharma and Sisodia 1976, Satyanarayanana Rao and Krishnaiah 1982, Kirtikar and Basu 1975). Recent trend in veterinary medicine is the intensive search for and use of herbal products, as the modern anthelmintics are much costlier.

The present study was, therefore, undertaken to evaluate and compare the efficacy of a proprietary herbal anthelmintic with piperazine citrate against economically important *Toxocara vitulorum* in cow and buffalo calves.

Locally available 30 calves (18 buffalo and 12 cow) below 2 months of age and naturally infected with *Toxocara vitulorum*, were randomly divided into 3 groups, each comprising 10 calves (6 buffalo and 4 cow). Faecal egg counts (EPG) were done by Stoll's dilution technique on day 0, 7 and 21 post-infection (PI). Each calf of group 1 was treated orally with 2 doses of 50 ml proprietary herbal anthelmintic on day 0 and 15. Each calf of group 2 was treated twice with 200 mg kg^{-1} body weight piperazine citrate. The calves of group 3 served as infected-untreated control. Parasite free calves (6 buffalo and 4 cow calves) served as healthy control. Blood and serum samples were collected from all the calves on day 0, 7 and 21 PT for evaluation of haematological and biochemical parameters. Percentage efficacy of the drug was calculated as follows:

$$\text{Per cent efficacy} = \frac{\text{Pretreatment mean EPG} - \text{Posttreatment mean EPG}}{\text{Pretreatment mean EPG}} \times 100$$

Data on efficacies of the drugs were analyzed by paired 't' test between days of treatment and Fisher 't' test between the drugs (Snedecor and Cochran 1968).

Each 10 ml of the herbal anthelmintic contains: *Embelia ribes* 0.5; *Punica granatum* 0.55; *Caesalpinia crista* 0.5; *Artemisia maritima* 0.45 ; *Carum copticum* 0.5; *Gardenia gummifera* 0.4; *Centratherum anthelminticum* 0.4; *Butea monosperma* 0.8, *Cassia angustifolia* 0.5 and *Acorus calamus* 0.4 (all in g).

The herbal anthelmintic (Table 1) showed on an average 52.88% efficacy on day 7 and 77.60% on day 21 PT. The worms started to be expelled out in faeces after 48 hr of treatment and continued for 4-6 days. Piperazine citrate was 79.84% effective on day 7 and 94.50% on day 21 PT. The worms started passing out within 24 hr and continued for 3-4 days. Both the drugs were well tolerated and no clinical signs of side effects were seen. Statistical analysis showed that efficacy of each drug between days 7 and 21 of treatment was significant ('t' values = 6.09*–9.89** and 15.49**–17.30** respectively), but when the efficacies of these drugs were compared with each other the differences were found nonsignificant ('t' values = 0.130^{NS} and 0.027^{NS} respectively). An explanation for statistical failure to prove significance between 77.60% and 94.50% efficacies might possibly be because of rather large variations in EPG counts. In addition to significant decrease in PT EPG counts, moderate to marked increase in Hb, PCV, TEC, TSP and A/G ratio were recorded in calves treated with these drugs which were significantly decreased prior to treatment. The increase was more marked in calves treated with piperazine citrate, the values reaching almost to normal level, as compared to the herbal anthelmintic treated calves.

Butea frondosa and *Embelia ribes* of the herbal present anthelmintic were found quite effective anthelmintics against *Ascaridia galli* of poultry (Sharma and Sisodia 1976,

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Table 1. Anthelmintic efficacy of kriminth and piperazine citrate against *T. vitulorum* infection in treated and untreated cows and buffalo calves

Groups	Species	No. of	Drug	Dose	Av.pretreatment	Average eggs per gram of faeces			
calves	used				EPG 0 days	7 days	Efficacy(%)	21 days	Efficay (%)
1	Cow	4	Kriminth	50ml/calf	20250±1205.82	9725±1704.16	51.97	4600±194.93	77.28
	Buffalo	6	Kriminth	50ml/calf	19225±59.17	8883.3±121.09	53.79	4241.6±53.22	77.93
2	Cow	4	Piperazine citrate	200mg kg^{-1} b.w.	24800±1784.7	5200±948.68	79.03	1312.5±723.09	94.70
	Buffalo	6	Piperazine citrate	200mg kg^{-1} b.w.	23708.3±89.26	4708.3±54.54	80.14	1350±116.66	94.30
3	Cow	4	-	Infected untreated	11375±214.58	16250±107.37	-	11700±400.17	-
	Buffalo	6	-	Infected untreated	14325±45.99	40766±301.39	-	40766±301.39	

Gr. 1, Infected treated with harbal anthlmintic; Gr. 2, infected treated with piperazine citrate, Gr. 3, infected untreated.

Satyanarayanana Rao and Krishnaiah 1982) and Oxyurids of mice (Mehta and Parasar 1966). Misra (1977) reported that Wopel was 96.13% effective against monieziasis in calves. In this study the herbal drug was moderately effective in two doses, but presumably, its efficacy could be increased with repeated doses at weekly intervals, as the drug contains most effective ingredients stated above, besides being apparently safe and comparatively cheaper. However, further study is needed to confirm the present finding and before the drug may be fully patronized for animal health package. The reference drug, piperazine citrate has a high, though not cent per cent efficacy. Our finding are in close agreement with the reports of Baruah *et al.* (1980) and Joshi *et al.* (1997).

Based on the findings of the present study it is concluded that efficacy of piperazine citrate is superior to the herbal anthelmintic.It is recommended that the herbal drug may be used as an alternative next to piperazine citrate.

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