

COMPARATIVE EFFICACY OF DIFFERENT ANTHELMINTICS AGAINST GASTROINTESTINAL NEMATODES IN MALABARI GOATS

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ABSTRACT

The comparative efficacy of combination of ricobendazole with ivermectin, fenbendazole with ivermectin, ivermectin and fenbendazole alone was examined against gastrointestinal nematodes at the University Goat Farm, College of Veterinary and Animal Sciences Pookode, Wayanad, Kerala. Faecal sample examination of 60 animals revealed the presence of eggs/ova of *Trichuris*, *Strongyles* and *Strongyloides* species. Out of these, 28 animals infected with gastrointestinal nematodes were selected for the study. They were treated with combination of ricobendazole with ivermectin (group A), fenbendazole with ivermectin (group B), ivermectin alone (group C) and fenbendazole alone (group D). Faecal eggs per gram (EPG) of the selected animals were evaluated at day 0, 7 and 14. The group A showed better effect

on the *Strongyle* and *Strongyloides* species, whereas group B showed comparatively good results on *Trichuris* species in Malabari goats. The study concluded that combination of anthelmintic drugs could be used effectively for the treatment of gastrointestinal nematodes of goats.

Keywords: Anthelmintic efficacy, Gastrointestinal nematodes, Goats, Benzimidazoles, Ivermectin

INTRODUCTION

Malabari goats are reared mainly in northern districts of Kerala and are often called Tellicherry goats. Helminthic infections have become a major and persistent constraint on the growth and development of these goats. These infections are rarely fatal, but chronic infection often causes debilitating effects leading to huge economic loss. Although farmers rely on anthelmintics for the control

of these helminthic infections (Godara *et al.*, 2011), their effectiveness is limited by the emergence of anthelmintic resistance. Therefore, the present study was carried out to evaluate the comparative efficacy of combination of ricobendazole with ivermectin, fenbendazole with ivermectin, ivermectin alone and fenbendazole alone against gastrointestinal nematodes in Malabari goats at University Goat Farm, College of Veterinary and Animal Sciences, Pookode.

MATERIALS AND METHODS

The goats selected for the study were maintained in separate pens having concrete floors and were allowed to browse in open land around the college premises in addition to being fed with standard concentrate, groundnut and greens as per their age and body weight. Water was provided ad libitum. Twenty-eight Malabari goats were assigned to four groups of seven animals each, irrespective of sex and body weight. They were treated with a combination of ricobendazole with ivermectin (group A), combination of fenbendazole with ivermectin (group B), ivermectin alone (group C) and fenbendazole alone (group D). Faecal samples collected on 0th, 7th and 14th day of treatment were examined for gastrointestinal (GI) nematodes using concentration techniques (Taylor *et al.*, 2007). The EPG was carried out for each

animal using modified McMaster egg counting technique (Geurden *et al.*, 2022)

On day 0, group A was treated with a combination of ricobendazole with ivermectin (RICOSRI- IM[®] 3g bolus) at 10mg/kg body weight orally and group B with a combination of fenbendazole with ivermectin (PRE-TEK I[®]3g bolus) at 7.5 mg/kg body weight orally. Animals in Group C were treated with ivermectin alone (MECTIN[®]10mg tablet) at 0.2 mg/kg body weight and group D with fenbendazole alone (FENTAS[®]1.5g bolus) at 7.5 mg/kg body weight. The percentage efficacy of anthelmintics was calculated on the basis of reduction in mean egg per gram (EPG) using the standard formula (Wirtherle *et al.*, 2004).

$$\text{FECR}\% = \frac{(\text{FEC}_{\text{bt}} - \text{FEC}_{\text{at}})}{\text{FEC}_{\text{bt}}} \times 100$$

[FECR (%) is the percentage faecal egg count reduction, FEC_{bt} and FEC_{at} are the mean egg counts before and after treatment, respectively]. All the data obtained in the study were statistically analysed, between group comparison within each day was done by using Kruskal Wallis ANOVA. Whereas, between days comparison within each group was done by using Friedman's test followed by Wilcoxon signed rank test for pair wise comparison.

RESULTS AND DISCUSSION

The results of the study are summarized in Table 1. The study showed statistically significant ($P < 0.001$) reduction in the numbers of both *Strongyle* and *Strongyloides* eggs in group A with 100 per cent FECR. This drug combination was also effective for *Trichuris* species. Though a statistically significant ($P < 0.001$) reduction in *Strongyle*, *Strongyloides* and *Trichuris* egg counts were evident in group B, the faecal reduction of *Strongyle* egg counts in this group was less compared to group A. In group C, which was treated with ivermectin alone, a statistically significant reduction in the count of *Strongyloides* ova ($P < 0.01$) was observed. However, only a small reduction of the same was observed for *Strongyle* (57 per cent) and *Trichuris* (75 per cent). The group D revealed

statistically significant reduction ($P < 0.005$) of counts but reduction in *Strongyle* and *Strongyloides* egg numbers were non-significant. The moving average of faecal egg counts of different helminths in Groups A, B, C and D on day 0 (before treatment), 7 and 14 (after treatment) were represented graphically. Benzimidazole (BZD) and pro-BZD drugs are used widely to treat gastrointestinal helminthiasis including migrating larvae, liver flukes and lungworm infections in animals. These drugs have reported to have a broad spectrum of activity and low mammalian toxicity (Mckeller and Scott, 1990). Since, the parent molecules of BZD anthelmintics are short-lived and are extensively metabolised in all animal species, the metabolic products predominate in systemic circulation. Moreover, the primary metabolites, usually produced by oxidation and hydrolysis,

Table 1: Percentage efficacy of different anthelmintic groups

Groups	Treatment	Eggs identified	EPG		P value	FECR (%)
			Day 0	Day 14		
A	Ricobendazole and ivermectin combination	Strongyle	11000	0	21.00**(<0.001)	100
		Strongyloides	8000	0	15.00** (0.002)	100
		Trichuris	5000	1000	9.0* (<0.005)	80
B	Fenbendazole and ivermectin combination	Strongyle	6000	1000	8.00* (<0.005)	83.33
		Strongyloides	2000	0	11.00**(<0.001)	100
		Trichuris	4280	0	21.00**(<0.001)	100
C	Ivermectin alone	Strongyle	7000	3000	3.000 ^{ns} (0.392)	57.1
		Strongyloides	1000	0	15.36** (0.002)	100
		Trichuris	2000	500	8.00*(0.005)	75
D	Fenbendazole alone	Strongyle	6000	2000	7.208 ^{ns} (0.066)	66.6
		Strongyloides	1000	700	3.000 ^{ns} (0.392)	30
		Trichuris	1000	150	8.00*(0.005)	85

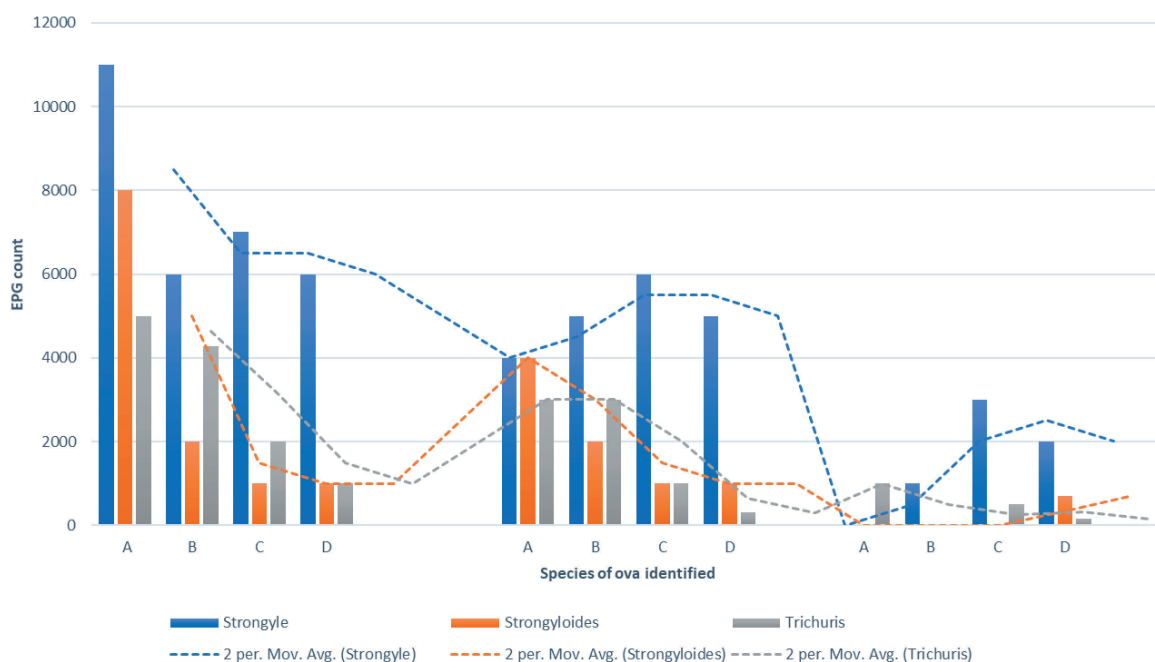


Fig. 2. Faecal egg count of different helminths in Groups A, B, C and D on day 0 (before treatment) and day 14 (after treatment)

are more polar and water soluble than the parent drug. After absorption from the intestine in ruminants, albendazole is rapidly metabolized into its active albendazole sulfoxide (ricobendazole) and inactive albendazole sulfone metabolites by liver enzymes (Delatour et al., 1986).

Anthelmintic resistance of gastrointestinal nematodes is serious threat to the health of goats nowadays, and it causes great economic loss to the farmers. Due to this booming issue, anthelmintic combinations would enable effective control of nematodes, in particular by delaying the emergence of resistance. The present study also indicated the better efficacy of combination of benzimidazole

and ivermectin against the gastrointestinal nematodes in goats compared to benzimidazole or ivermectin alone.

CONCLUSION

The study concluded that ricobendazole and ivermectin combination at 10 mg/kg orally can be effectively used for the Strongyle and Strongyloides infection in goats. Trichuris infection in goats can be treated with fenbendazole and ivermectin combination at 7.5 mg/kg orally with excellent outcome.

ACKNOWLEDGEMENT

The authors express their deep sense of gratitude to the Dean, College of

Veterinary and Animal Sciences, Pookode for providing facilities for this study. The authors are also thankful to the Professor in charge and staffs of university goat farm, CVAS Pookode.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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