



DETECTION OF ANTHELMINTIC RESISTANCE IN SMALL SCALE GOAT REARING UNITS IN THRISSUR

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Abstract

Fecal Egg Count Reduction Test (FECRT) was employed for the in vivo detection of anthelmintic resistance to albendazole and ivermectin in small scale goat rearing units in Vallachira Panchayath of Thrissur District, Kerala. Resistance was detected against albendazole with per cent egg count reduction of 71 per cent and lower 95 per cent confidence interval less than 90. Ivermectin was found effective with per cent egg count reduction of 97 per cent. Resistance to albendazole can be attributed to the prolonged and intensive use of the drug. The use of ivermectin orally for deworming has been introduced recently and the drug is still efficacious. Detection of resistance in small holder farmers' flocks warrants judicious use of these drugs to prevent further selection for resistance. Haemonchus contortus was the predominant species among gastrointestinal nematodes identified by coproculture and this factor also contributed to the rapid selection for resistance.

Key words:- Anthelmintic resistance, FECRT, goats, *Haemonchus contortus*

Anthelmintic resistance has emerged as a major problem hampering the successful control of gastrointestinal nematodes in small ruminants. There have been several reports of anthelmintic resistance from different states in India (Dhanalakshmi *et al.* 2003; Jeyathilakan *et al.* 2003; Deepa and Devada, 2007; Easwaran *et al.* 2009 and Buttar *et al.* 2012), mainly from organized sheep or goat farms. Reports of anthelmintic resistance from

small holder farmers' flocks are rare. Effective monitoring of resistance is vital in order to maintain the efficacy of the currently available anthelmintics and to prevent further selection for resistance. The present study reports *in vivo* detection of anthelmintic resistance in small goat rearing units in Vallachira Panchayath of Thrissur District in Kerala.

Materials and Methods

The study was conducted in adjacent, small holder farmers' flocks with flock size of 15 to 30 animals, maintained under identical managemental and feeding practices in Vallachira Panchayath. The farmers administered anthelmintics without proper veterinary advice and did not follow any regular deworming schedule.

Fecal egg count reduction test (FECRT) was performed for detection of resistance to the two commonly used anthelmintics, albendazole and ivermectin as per the guidelines of WAAVP (Coles *et al.* 2006). Thirty kids, aged three to six months which have not been dewormed eight weeks prior to the study, were randomly allocated into three groups of ten animals each. Rectal samples were collected from all the animals and they were given recommended dose of anthelmintics. Group I was given albendazole (Valbazen, Pfizer) @ 5 mg/kg orally; group II – ivermectin (Neomec, Intas) @ 0.2 mg/kg orally and group III was left untreated as the control group.

Rectal samples were again collected on day 14 post treatment. Egg counts were made on the pretreatment and post treatment

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samples by Modified Mc master technique. The data were analysed statistically for finding out the per cent reduction in egg counts using a programme, RESO. Reduction in egg counts of less than 95 per cent with lower 95 per cent confidence limit less than 90 was considered as indicative of resistance against the drug (Coles *et al.* 1992).

Copro culture was done on pooled pre treatment samples and post treatment samples for identifying the species of infecting nematodes. Mature third stage larvae were identified based on morphological characters (Van Wyk *et al.* 2004).

Results and Discussion

Results of FECRT are presented in the table. Resistance was detected against albendazole while ivermectin was found effective.

The results indicate the development of resistance against albendazole in small holder farmers' flocks in Kerala. Resistance to albendazole could be attributed to the prolonged and intensive use of the drug over the years. The drug is being widely used by the farmers for deworming their livestock even without proper veterinary advice, often leading to underdosing.

In this study, ivermectin was found effective with a per cent egg count reduction of 97 per cent. This can be attributed to the fact that the use of oral ivermectin for deworming has been introduced only recently and its use is not widespread. However there are increasing reports of development of resistance to the drug in farms in the recent years (Deepa and Devada, 2007; Buttar *et al.* 2012). This warrants the judicious use of the drug to maintain its efficacy.

Previous reports of anthelmintic resistance are mainly from organized farms

with intensive anthelmintic treatment schedules. Existence of drug resistant GI nematodes in breeding animals in farms increases the risk of dissemination of resistant strains to small holder farmers' flocks as farm bred animals are distributed to farmers (Easwaran *et al.* 2009). Reports of anthelmintic resistance from small holder farmers' flocks are rare or uncommon, but if the present use of anthelmintics is continued, the situation can become unmanageable (Harikrishnan, 2012). Thus the detection of anthelmintic resistance in small holder farmers' flocks is significant and warrants implementation of proper anthelmintic treatment strategies to check further development of resistance.

GINematode species identified by coproculture was predominantly *Haemonchus contortus* (85%), followed by *Trichostrongylus* sp. (8%) and *Strongyloides* sp. (7%). High biotic potential of GI nematodes especially *H. contortus* contributes to rapid selection for resistance as large number of generations of worms are produced within a short time (Deepa and Devada, 2007). Since *H. contortus* was the predominant GI nematode species observed in this study, this factor also might have contributed to the selection for resistance.

In conclusion, the detection of anthelmintic resistance in GI nematodes of goats necessitates implementation of urgent measures to slow down the development of resistance. Farmer perception regarding the judicious use of anthelmintics should be increased through extension activities. Periodical screening of flocks for resistance by FECRT is also recommended.

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Table: Results of FECRT

| Anthelminic | Mean post treatment EPG | % reduction | Lower 95% confidence limit | Upper 95% Confidence limit | Result |
|-------------|-------------------------|-------------|----------------------------|----------------------------|-------------|
| Albendazole | 88 | 71 | 35 | 87 | Resistant |
| Ivermectin | 9 | 97 | 91 | 99 | Susceptible |
| Control | 303 | - | - | - | - |

study through the project on 'Detection of anthelmintic resistance in GI nematodes of goats'.

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