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T Sujatha
Scientist (Contractual),
Livestock Research Station,
Garividi, Andhra Pradesh, India

B Rajeev Kumar
Assistant Professor
(Contractual), Department of
Veterinary Physiology &
Biochemistry, College of
Veterinary Science, Garividi,
Andhra Pradesh, India

M Murali Krishna
Assistant Professor
(Contractual), Department of
Livestock Production
Management, College of
Veterinary Science, Garividi

Effect of feeding neem (*Azadirachta indica*) leaves on status of worm infection in neonatal lambs

T Sujatha, B Rajeev Kumar and M Murali Krishna

Abstract

The effects of feeding neem leaves against natural gastrointestinal nematodes in neonatal lambs was studied. 200 lambs which were born during lambing season (November to January) were randomly selected and divided into 4 different groups each consisting of 50 neonatal lambs. The status of worm burden was studied from 11th day to 3 months. In group – I, lambs were neither dewormed during course of study nor fed with neem leaves, in group – II they were fed with replaced diet containing only neem leaves and lambs were not dewormed. In the group – III they were Dewormed early and the lambs were not fed with neem leaves and in group –IV they were dewormed early and also fed with neem leaves as replaced diet. The overall positive rate in the group – I was notably at higher rate (88%) followed by group – II(44%). However, in group - III and IV the positive percentage is significantly low. In group –I, the lambs were very susceptible to gastro intestinal parasites like Amphistomes, Strongyles and coccidia. Even in this group mixed infections like Strongyles & coccidia were found to be at higher rate. The synergistic action of early deworming and Feeding with neem leaves aided in the achievement of less positive percentage in group - IV.

Keywords: *Azadirachta indica*, worm infection, neonatal lambs

Introduction

Among small ruminants, sheep rearing in north costal region of Andhra Pradesh had been significant in terms of meat production (Rao *et al.*, 2014) [7]. The productivity of sheep in these regions is influenced by many factors, one among them is Parasitism (Arsenopoulos *et al.*, 2021) [3]. The greater losses associated with gastro-intestinal parasites are subclinical (Amin *et al.*, 2010) [2]. Many studies revealed that grazing sheep on lush green pastures during monsoon seasons might be one of the probable cause in acquiring gastro intestinal parasitic infections and Ecto-parasitic infestation. So in order to manage profitable sheep flock there must be regular deworming starting from lamb stage (Singh-Knights *et al.*, 2014) [10].

Among Gastrointestinal parasitic infections, Strongyles, Amphistomes and Coccidiaseems to be more prevalent in small ruminants (Zinorova *et al.*, 2016) [11]. Usage of several anthelmintics, repeatedly in flock significantly led to the development of Resistance (Scheuerle *et al.*, 2009) [8]. Alternative deworming practices like management of parasitism with herbal substances gained importance in recent days (Githiori *et al.*, 2005) [5]. Among herbals, feeding of Neem leaves in lambs aided not only in prevention of gastro intestinal parasites but also helped to grow lambs at faster rate (Shinde *et al.*, 2016) [9]. Keeping in view of this, the present study was carried out to access the impact of neem leaves as an alternative and novel source for anthelmintics.

Materials and Methods

The Current study was conducted at Koduru and surrounding villages of Vizianagaram district during the period between 23rd of November 2021 to 13th May 2022 (Lambing season), on 200 lambs. Dung sample were screened for gastro intestinal parasites at Department of veterinary Laboratory Diagnosis, College of veterinary science, Garividi. Day old lambs were selected for this study and fed on milk for the first 10 days for the welfare of animal. These 200 lambs were divided into 4 groups containing 50 each. Each selected lamb was identified with painting a different colour over dorsal vertebrae, for different groups. In group1, lambs from 11th day to 3 months were fed with normal feed like milk, subabul leaves and guinea grass but those lambs were not fed with neem leaves and they were not dewormed against parasitism. In group-II, lambs were fed with only neem leaves as replaced feed and not been dewormed against gastrointestinal parasites. In group-III, lambs were fed with normal feed like milk, subabul leaves, Guinea grass but not neem leaves and they were early dewormed @ 10th day against various parasitic infections.

Corresponding Author
T Sujatha
Scientist (Contractual),
Livestock Research Station,
Garividi, Andhra Pradesh, India

In group-IV, lambs were fed with only neem leaves and milk and were early dewormed@10th day against different infectious endoparasites. Deworming was done to Group –III and IV with Azolanide-DS (Albendazole 3% w/v+ Rafoxanide 3% w/v) @ 0.25 ml per kg body weight. Albendazole was given @ 25 mg per kg body weight. Rafoxanide was given @ 10mg per kg body weight. Neem leaves were fed adlibitum to group-II and group – IV and the normal feed in group II and IV has been replaced by Neem leave diet without any special recommendations. In order to evaluate the Parasitism in the 4 groups they were screened by the faecal sample examination. Samples were collected from all the lambs in each group for every 10 days interval. Each sample was thoroughly examined at least 25 fields per sample and all the results were tabulated to exemplify incidence at varying factors.

Results

In the present study, it was revealed that, there were no parasitic eggs in the lamb dung samples up to 10th day. So it is conclusive that there was no parasitic infection in neonatal lambs from day 1-10. It can be further adjudged by stating lambs acquire immunity from the ewes through the colostrum. The results of the effect of neither neem leaves feeding nor dewormed against Parasitism in neonatal lambs were shown in Table – 1. It was found that in this group, there is progressive increase in worm infection during the course of three months and the lambs were infected with Amphistomes, Strongyles, and Coccidia (Fig 1, 2 and 3 respectively) at higher rate. It was also found that even there were multiple parasitic ova (Strongyles and Coccidia) in a single dung sample. Moreover, it was clearly noted that the at the end of 90 days, 88% of the lambs were infected with the parasites. The overall positive rate in this group of lambs was represented as high as 88% and as low as 22%. When compared to rest of the three groups in this group the morbidity, rate of infection, rate of spread were seems to be high.

The results of the effect of neem leaves feeding on worm burden status of neonatal lambs were presented in Table – 2. In group II, there is moderate rate of infection when compared to overall parasitism in all the remaining groups. The overall positive rate in this group was found to be as high as 44% and as low as 20% during the course of study. The lambs in this

group had less rate of infection when compared to the group – I and high rate of infection than the Group - III and IV. In this, the lambs were infected with Amphistomes, Coccidia and Strongyles moderate rate and multiple parasitic ova were also found in the dung sample. It was clearly evident that with the feeding of neem leaves had a considerable effect over control on parasitism but the control is not up to the level of anthelmintics. The efficacy of anthelmintics is great over the neem leaves. The neem leaves has clear effect on Amphistomes but the strongyles seems to be resistant for that which need to be further documented.

The results of the effect of early Deworming on worm burden status of neonatal lambs were shown in the Table – 3. In group III, there is very less rate of infection when compared to overall parasitism in all remaining groups and has considerably high rate of infection than Group – IV and significantly less rate of infection than Group –I and II. In this group of lambs although they were dewormed against parasites, gastrointestinal protozoal infections like coccidia seems to be high but the rate of infection is very less when compared to group-I and II. The overall positive rate in this group of lambs was found to be as high as 12% and as low as 4%. On faecal sample examination it revealed that the infection is very mild which has only 2-3 parasitic ova per 20 -25 fields of examination with respective protozoa. It was clearly evident that early deworming has no significant effect over Protozoal infection up to certain level of efficacy.

The results of the Effect of feeding neem leaves and early deworming on worm burden status of neonatal lambs were tabulated in the Table –4. In group IV, there was very less rate of infection when compared to overall parasitism in general and has very less rate of infection than group –I, II and III. The overall Positive rate in this group of lambs was found to be as high as 6% and as low as 2%. The very low rate of infection and the morbidity seems to be the combined effect of neem leaves and early deworming. It was clearly evident that when animals fed with neem leaves and early dewormed then the rate of infection in flock is very low which is almost 0%. In this group of lambs the synergistic action of neem leaves and deworming the lambs doesn't show any parasitic infection against Amphistomes, Coccidia, Strongyles and Mixed infection. Even this synergistic action is more pronounced against protozoal infections like coccidia and gastrointestinal nematodes like strongyles.

Table 1: Effect of neither neem leaves feeding nor Dewormed against Parasitism in neonatal lambs

Group-I						
Day	Amphistome	Strongyle	Coccidia	Mixed infection	Total positives	Total negatives
Day 11	0	0	0	0	0	50
Day 21	3	4	3	1	11	39
Day 31	3	6	7	7	23	25
Day 41	3	10	8	6	27	28
Day 51	4	14	2	7	27	23
Day 61	6	12	6	8	32	18
Day 71	7	10	10	9	36	20
Day 81	9	12	13	2	36	16
Day 90	3	17	12	12	44	6

Table 2: Effect of neem leaves feeding on worm burden status of neonatal lambs

Group-II						
Day	Amphistome	Strongyle	Coccidia	Mixed infections	Total positive	Total negatives
Day 11	0	0	0	0	0	0
Day 21	2	8	3	1	14	36
Day 31	5	3	7	2	17	33
Day 41	1	6	2	1	10	40
Day 51	3	7	2	3	15	35
Day 61	2	3	2	5	12	38
Day 71	0	5	2	5	12	38
Day 81	1	2	12	7	22	28
Day 90	1	2	14	2	19	31

Table 3: Effect of early Deworming on worm burden status of neonatal lambs

Group -III						
Day	Amphistome	Strongyle	Coccidia	Mixed infection	Total positives	Total negatives
Day 11	0	0	0	0	0	50
Day 21	0	1	2	0	3	47
Day 31	0	2	3	1	6	44
Day 41	0	1	1	1	3	47
Day 51	0	1	2	2	5	45
Day 61	0	1	5	0	6	44
Day 71	1	0	3	0	4	46
Day 81	0	0	2	0	2	48
Day 90	1	1	3	1	6	44

Table 4: Effect of feeding neem leaves and early deworming on worm burden status of neonatal lambs

Group -IV						
Day	Amphistomes	Strongyles	Coccidia	Mixed infection	Total positives	Total Negatives
Day 11	0	0	0	0	0	50
Day 21	0	0	0	0	0	50
Day 31	0	0	1	0	1	49
Day 41	0	1	0	0	1	49
Day 51	0	0	1	0	1	49
Day 61	0	1	0	0	0	50
Day 71	0	0	2	0	2	48
Day 81	1	0	1	0	2	48
Day 90	2	0	1	0	3	47



Fig 1: Amphistome egg

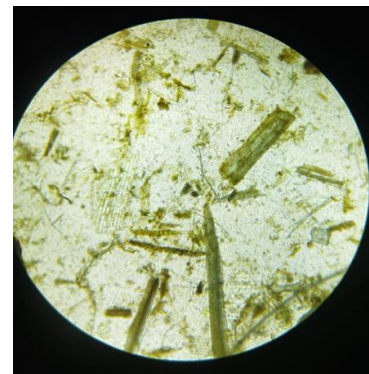


Fig 3: Coccidia egg

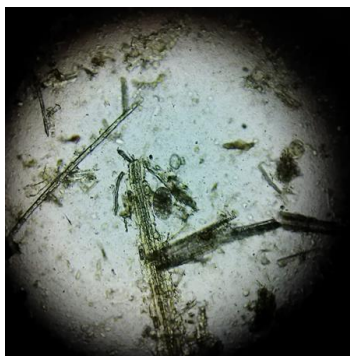


Fig 2: Strongyle egg

Discussion

In the current study, it was found that there was a drastic reduction of parasitism after feeding of neem leaves. These findings were in accordance with Amin *et al.*, (2010) [2]. It was further exemplified that the synergistic effect of neem leaves and deworming could be helpful in the control of gastro intestinal protozoans (Coccidia) and it was found to be in relation with Amin *et al.*, (2010) [2].

Amin *et al.*, (2008) [1] found that in cattle post treatment with neem leaves resulted in marked decline of worm burden. When it implies to the current study there is a progressive

development of resistance to the parasitic infection in the lamb stage. The results were not associated in terms of quantitative assessment it might be due to the age group and also seasonal and species difference.

Some of the lambs in group I & II exhibited Self cure phenomenon, against strongyle infection even without treatment against respective parasite. So on the basis this finding, it could be adjudged as that the strongyle infection might be due to the Hemonchus which represents self-cure phenomenon in the respective flock.

Further, it was found that, the results from the current study were in contrary to the findings of Jamra *et al.*, (2015)^[6] as they obtained 100% negative results in bovine species after neem treatment. However, in current study the positive rate found to be as high as 44% which could be deciphered as dosage of the Neem leaf feeding and level of intake.

In Current study, the efficacy of neem leaves was found to be high but not upto the level of anthelmintics i.e., Albendazole and rafoxanide. It was found in correlation with Arunachal *et al.*, (2002)^[4] in which they tested the anthelmintic efficacy of different neem products and found that neem leaves has better efficacy than the seeds and bark and had less efficacy than the praziplus.

Conclusion

It may be concluded that neem leaves has moderate efficacy as anthelmintic against various gastrointestinal parasites in sheep and may be used as an alternative natural herbal drug in field conditions rather than usage of resistant anthelmintics

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