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Effects of fenbendazole and combined preparation of levamisole with triclabendazole on growth performance and haemato-biochemical parameters in sheep

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ABSTRACT

This study aimed to evaluate the efficacy of fenbendazole and a combined preparation of levamisole and triclabendazole against gastrointestinal nematodes in naturally infected sheep. Eighteen sheep of 18-23 month old irrespective of sex infested with gastrointestinal nematodes were selected from 30 sheep on the basis of egg count for this experiment and randomly divided into three equal groups (group A, B and C) where each group consisted of 6 sheep and sheep of group A were treated with fenbendazole orally at the dose rate of 7.5mg/kg body weight, sheep of group B were treated with a combined preparation of levamisole and triclabendazole orally at the dose rate of 10mg/kg body weight, and sheep of group C were used as control. The results of the comparative efficacies of different anthelmintic of fenbendazole were 96.15%, and combined preparation of levamisole and triclabendazole 92.72% on EPG count. McMaster fecal egg counting method discloses the *Haemonchus* spp., with *Trichostrongylus* spp, *Strongyloides* spp., and *Cooperia* spp. also present. The body weight of the treated animals were slightly increased which were significant ($p<0.05$) on day 28. After treatment with fenbendazole and a combined preparation of levamisole and triclabendazole, blood parameters like, total erythrocyte count (TEC), Hemoglobin (Hb) content, packed cell volume (PCV) and serum biochemical parameters like, total protein (TP) were increased significantly ($p>0.05$ and $p<0.01$) in sheep but blood parameters like, erythrocyte sedimentation rate (ESR), total leukocyte count (TLC) and serum biochemical parameters like, serum glutamate oxalate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT) were decreased significantly ($p>0.05$) in all treated sheep on day 28. The farm management practices along with results of the present study revealed the efficacy of multiple anthelmintic against gastrointestinal nematodes in sheep.

INTRODUCTION

Sheep rearing is very popular in rural area in Bangladesh and gives profitable returns to its owner. Agriculture is the economic backbone of Bangladesh and approximately 80% people depend on it directly or indirectly for their subsistence. The livestock is an important sub-sector which is considered to be the backbone of agriculture in Bangladesh. The total contribution of animal farming sector in Bangladesh to gross domestic products (GDP) is approximately 3.02% (Anon, 2000) and livestock sector is contributing about 1.54% GDP (Economic Review, 2018). The livestock population in Bangladesh is currently estimated to comprise 24.086 million cattle, 1.485 million buffaloes, 26.100 million goats and 3.468 million sheep (Hamid and Kamruzzaman, 2017; DLS, 2018) which plays an important role in the rural economy (Kamaruddin, 2003).

Ruminants constitute the major portion of livestock, which are used for draft purpose, meat, and milk and also important for good quality leather and a source of income for farmers. The agro-ecological and geo-climatic condition of Bangladesh is favourable to the ecological conditions suitable for the growth and development of parasites of which the helminth parasite predominates. As Bangladesh is a low laying country thus parasitism is most common in

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everywhere of this country. It depends directly or indirectly on several interacting factors, which include climate, weathers, management, and age, hereditary and physiological state of the health of the host. Despite the special importance on the raising ruminants, the improvement of this sector in Bangladesh is badly threatened. It is thought to be one of the major constraints that hinder the development of livestock population (Kakar and Kakarsulemankhel, 2008).

Parasitism has been considered as one of the major constraints of livestock production in rural areas of the country. Gastrointestinal nematodiasis showing a severe destruction on health and production (Perry et al. 2002; Sahlu et al. 2009) all over the world assignable to impacts on economy also (Silvestre et al. 2000) and market value of the living animals with a high rate of anthelmintic resistance prevalence (Howell et al. 2008; Kaplan et al. 2004). Haemonchosis caused by *Haemonchus contortus*, a nematode in sheep and goats, for example, is associated with causing hemorrhagic anemia, hypoproteinemia, and parasitic gastroenteritis which ultimately reduce the production potential of goats.

Parasitic infection, alone or concurrently occurring with other infectious diseases, causes significant economic loss due to significant mortality, stunted growth, underweight animals, poor skin quality, and decreased milk and meat production. Parasitic infection in sheep also has an adverse effect on blood enzyme levels, which in turn suppresses sheep production in different biological ways. The levels of Createnine, serum glutamate pyruvate transaminase (SGPT), and serum glutamate oxalate transaminase (SGOT) were reported to be increased significantly, whereas total serum protein (TSP) was reported to be significantly decreased in goats infected with parasites (Sharma et al. 2001).

The anthelmintic activities and therapy of levamisole, fenbendazole and triclabendazole have been studied (Dale and Haylett, 2004). Levamisol belongs to the nicotinic agonist group of anthelmintics that includes pyrantel and that selectively produces muscle cell depolarization and spastic paralysis in nematodes and fenbendazole act by inhibiting tubulin polymerization. Nearly all anthelmintics usage in Bangladesh is coming from abroad and there is a few data available about safety, toxicity, efficacy, and required dose in farm animal in Bangladesh (Kamruzzaman et al. 2017). Through prophylactic anthelmintics measurement, parasitic diseases can be controlled. This present study was aimed to evaluate the efficacy of two modern anthelmintic, fenbendazole and a combined preparation of levamisole and triclabendazole against gastrointestinal nematodiasis in sheep on the basis of their effects on egg per gram (EPG) count, hematological parameters like TEC, Hb, PCV, ESR, TLC, serum biochemical parameters like SGOT, SGPT, Creatinine etc. and body weight gain or loss were also included in this investigation.

MATERIALS AND METHODS

Experimental period, location and treatment

This study was conducted for a period of 28 days during the period of July to December, 2018. The experiment was conducted at the Narikalbaria sheep farm, under the Department of Veterinary and Animal Sciences, University of Rajshahi, Rajshahi. That farm was selected for this study to evaluate the effects of fenbendazole (Fenvet®) and combined drug of levamisole and triclabendazole (LT Vet®) against nematodiasis on EPG, hemato-biochemical parameters and body weight in sheep. Eighteen sheep of 18-23 months old sheep, weighing between 15 to 20 kg were selected randomly which were severely infected with gastrointestinal nematodiasis irrespective of the species of parasites involved.

Experimental design

Eighteen sheep were randomly divided into three groups each comprising of six sheep and marked as A, B, and C. Sheep of group B were treated with tablet Fenvet® (Fenbendazole 500, Globe Pharmaceuticals, Ltd, Bangladesh) orally at the dose rate of 7.5 mg/kg body weight, group C were treated with bolus LT Vet® (A combined preparation of levamisole and triclabendazole, Acme Laboratories, Ltd, Bangladesh) orally at the dose rate of 10 mg/kg body weight, and sheep of group A served as untreated control.

Measurement of Egg Per Gram (EPG) count

McMaster fecal egg count method was used. The faecal samples were collected from the treated and control groups of goat on 7th, 14th, 21st and 28th day of treatment to investigate the fecal egg count. Immediately after collection samples were sent to the laboratory for examination by Modified Stoll's Dilution Method.

Hematological examination and Measurement of Biochemical parameters

The hematological studies were performed within five hours after collection of blood. The estimation of hematological parameters were carried out by Automated Dymind DH-33 Hematology Analyzer and verified manually by the standard method.

Statistical analysis

All the data were statistically analyzed by the statistical package programmed MSTAT-C and following the standard methods by (Ram et al., 2007) to find out the level of significance at 1 and 5% level. Graphical representation of all performed by using New Microsoft Excel Worksheet 2010. The mean difference among the treatments was determined as per Dancan's Multiple Range Test. The eggs of parasites were identified on the basis of morphological characteristics and then counted.

RESULTS AND DISCUSSION

Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on egg count EPG (eggs per gram) in sheep

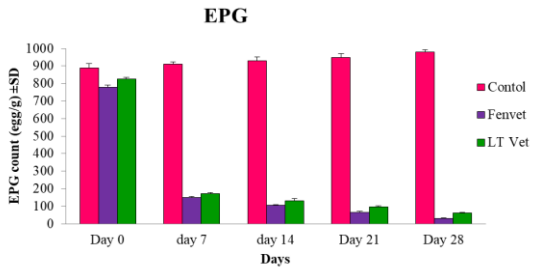

Figure 1: Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on egg count EPG (eggs per gram) in sheep.

The result of the effects of two commercial anthelmintics against gastrointestinal nematodiasis in sheep is presented in (Table 1, Figure 1 and Figure 2). Mean EPG (eggs per gram) count of untreated control group A (day 0) was 890.00±023.45 and on the EPG count values at 7th, 14th, 21st, and 28th day were 910.00±012.19, 930.00±020.51, 950.00±020.43, and 980.00±012.56 respectively and the rate of EPG count was increased. The study evaluated the effectiveness of the products by measuring the percentage of reduction in mean egg count, which was compared to the mean egg count per gram of feces. A significant ($p<0.01$) reduction of EPG count was found on 7th, 14th, 21st and 28th day of treated sheep of group A and B respectively.

Table 1: Effects of different anthelmintics on egg count (EPG) in sheep

Groups	Treatment	Pretreatment	Post-treatment				%Reduction at day "28"
		Day 0	Day 7	Day 14	Day 21	Day 28	
A	Control	890.00 ± 023.45	910.00 ± 012.19**	930.00 ± 020.51**	950.00 ± 020.43**	980.00 ± 012.56**	-
B	Fenvet®	780.00 ± 012.09	150.00 ± 004.25**	105.00 ± 002.51**	65.00 ± 05.61**	30.00 ± 03.15**	96.15
C	LT Vet®	825.00 ± 011.25	170.00 ± 007.15**	132.00 ± 012.31**	96.00 ± 05.21**	60.00 ± 03.65**	92.72

** = Significant at 1 percent level ($p<0.01$)
The above values represent the mean ± SD of 6 sheep in each group.

In the treatment group B, mean EPG count before treatment 780.00±012.09 and after treatment mean EPG on 7th, 14th, 21st, and 28th day were 150.00±004..25, 105.00±002.51, 65.00±05.61 and

30.00±03.15, respectively. The rates of reduction of mean EPG on 28th day after treatment were 96.15%. This result is more or less similar by earlier reported Atanásio et al. (2002), Mostofa et al. (2005), Amin et al. (2010), Macedo et al. (2010), Monirul et al. (2015), and Khanam et al. (2015).

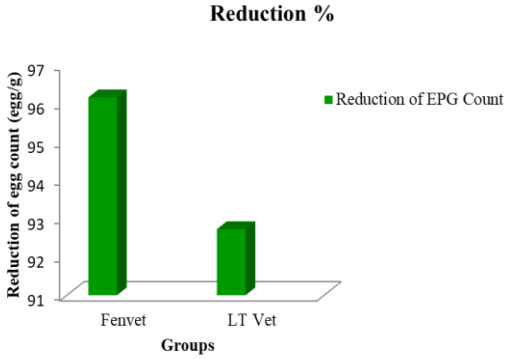

Figure 2: Comparison of the reduction of egg count EPG (%) in sheep after the treatment with Fenvet® (Fenbendazole) and LT Vet® (combined preparation of levamisole and triclabendazole).

In treatment group C, the pre-treatment mean EPG count was 825.00±011.25 and the post-treatment mean EPG count values at 7th, 14th, 21st and 28th day were 170.00±007.15, 132.00±012.31, 96.00±05.21, and 60.00±03.65, respectively. The rate of reductions were significantly increased to the extent of mean EPG on 7th , 14th , 21st and 28th day after treatment were 92.72%. The result is more or less similar by earlier reported Rashedunnabi et al. (2014), Sultana et al. (2015), Nwosu et al. (2007), Ram et al. (2007) and Soutello et al. (2007).

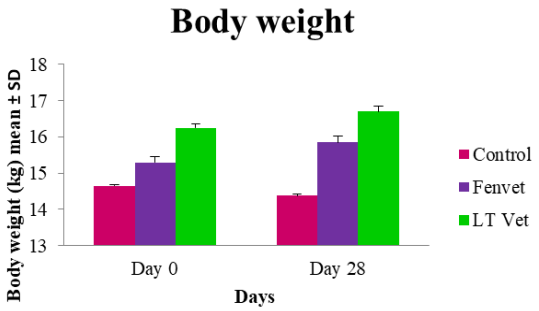

Figure 3: Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on body weight gain/loss in kg in sheep.

Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on body weight

The result of the effects of two commercial anthelmintics on body weight in sheep is presented in (Table 2, Figure 3). In the control group (group A) body weight was reduced to the extent of 1.84% after 28th day (Table 2) supported by Rashedunnabi et al. (2014), Hasan et al. (2015), Sultana et al. (2015), Amin et al. (2010). Some earlier workers found improvement in body weight after treatment Pandit et al. (2009). The mean initial body weight on day 0 of sheep in group B and C were 15.30±0.11 and 16.25±0.10 kg respectively. On the 28th day of the post-treatment, the mean values of body weight were increased up to 15.65±0.18 and 16.70±0.15 in the sheep of group A and B, respectively.

Table 2: Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on body weight gain/loss in kg in various treatment days in sheep

Groups	Treatment	Pretreatment	Post-treatment		Body weight gain/loss of individual sheep (kg)
		Day 0	Day 28		
		Body weight (kg)	Body weight (kg)	% Change	
A	Control	14.65 0.03	14.38 0.05*	1.84	-1.60
B	Fenvet®	15.30 0.15	15.85 0.18*	3.59	+3.20
C	LT Vet®	16.25 0.10	16.70 0.15*	2.76	+2.80

Table 3: Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on hematological parameters in control and study groups of sheep at day 28 post-treatment

Group	Treatment	Pre-treatment at Day '0'					Post-treatment at Day '28'				
		TEC 106 /µl)	Hb (g %)	PCV (%)	ESR (mm in 1st hour)	TLC 103 /µl)	TEC 106 /µl)	Hb (g %)	PCV (%)	ESR (mm in 1st hour)	TLC (103 /µl)
A	Control	7.65 ± 0.07	6.95 ± 0.13	26.60 ± 0.25	0.25 ± 0.04	11.40 ± 0.08	7.18 ± 0.12**	7.20 ± 0.25**	27.40 ± 0.04*	0.65 ± 0.03	12.06 ± 0.10**
B	Fenvet®	7.88 ± 0.07	7.48 ± 0.25	29.23 ± 0.15	0.40 ± 0.07	10.90 ± 0.04	8.45 ± 0.08**	9.50 ± 0.29**	32.00 ± 0.18*	0.35 ± 0.01	9.05 ± 0.05**
C	LT Vet®	7.24 ± 0.09	7.72 ± 0.15	28.52 ± 0.69	0.30 ± 0.04	11.42 ± 0.25	7.85 ± 0.02**	8.72 ± 0.05**	31.24 ± 0.20*	0.24 ± 0.05	10.90 ± 0.06**

** = Significant at 1 percent level ($p<0.01$); * = Significant at 5 percent level ($p<0.05$)
The above values represent the mean ±SD of 6 sheep in each group
N.B: TEC = Total erythrocytes count; Hb = Hemoglobin; PCV = Packed cell volume; ESR = Erythrocyte Sedimentation Rate; TLC = Total leukocyte count; SD = Standard Deviation

Table 4: Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on Biochemical parameters in control and study groups of sheep at day 28 post-treatment

Groups	Treatment	Pre-treatment at Day '0'				Post- treatment at Day '28'			
		Total protein (g/dl)	SGOT (IU/L)	SGPT (IU/L)	Creatinine (mg/dl)	Total protein (g/dl)	SGOT (IU/L)	SGPT (IU/L)	Creatinine (mg/dl)
A	Control	8.25 ± 0.12	113.03 ± 0.15	15.97 ± 0.02	0.87 ± 0.02	7.45 ± 0.25	114.08 ± 0.02**	16.23 ± 0.13**	0.88 ± 0.02**
B	Fenvet®	8.32 ± 0.03	115.05 ± 0.21	16.65 ± 0.04	0.92 ± 0.01	8.79 ± 0.03**	113.59 ± 0.06**	16.35 ± 0.04**	0.93 ± 0.03**
C	LT Vet®	7.95 ± 0.05	114.03 ± 0.23	16.47 ± 0.03	0.88 ± 0.01	8.15 ± 0.07**	113.53 ± 0.03**	16.19 ± 0.15**	0.89 ± 0.01**

** = Significant at 5 percent level ($p<0.05$)
The above values represent the mean ±SD of 6 sheep in each group.

The body weight increased significantly ($P<0.05$) after treatments in group B and C. The body weight was increased and this may be due to removal of parasitic load, proper absorption and metabolism of nutrient in the parasite free gastrointestinal tract. The body weight gains in the Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) treated sheep are supported by Sultana et al. (2015), Akraruzzaman et al. (2015b), Rashedunnabi et al. (2014), Gupta et al. (2017), Monirul et al. (2015) in sheep, cattle, calves and goats. On the other hand, the body weight significantly decreased in untreated control group due to overload of parasites within the body of goat. The improvement percentage in goats of group B and C after 28th day was 3.59% and 2.76% respectively. The body weight of sheep almost similar to their pre-treatment values.

Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and

triclabendazole (LT Vet®) on hematological parameters in control and study groups of sheep at day 28 post-treatment

Total Erythrocyte Count, TEC in (x10^6 /µl)

The effects of anthelmintic Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on TEC of sheep for 28 days at 7 days interval was shown in Table 3 and represented in the Figure 4. The mean value of TEC in control group (group A) was 7.65±0.07 but the mean values of TEC started to decrease on 28th day and recorded as 7.18±0.12. The pre-treatment values of TEC (million/ mm^3 of blood) were 7.88±0.07 and 7.24±0.09 in the sheep of group B and C, respectively. On 28th day of the post-treatment, the mean values of TEC were increased up to 8.45±0.08 and 7.85±0.02 in the sheep of group B and C, respectively. The mean value of TEC was significantly increased ($p<0.01$) on 28th day of the treatment of three anthelmintics. These results are more or less similar with the earlier researchers of Soutello et al. (2007), Demeler et al. (2009), Rashedunnabi et al. (2014), Sultana et al. (2015), and Amin et al. (2010) in sheep.

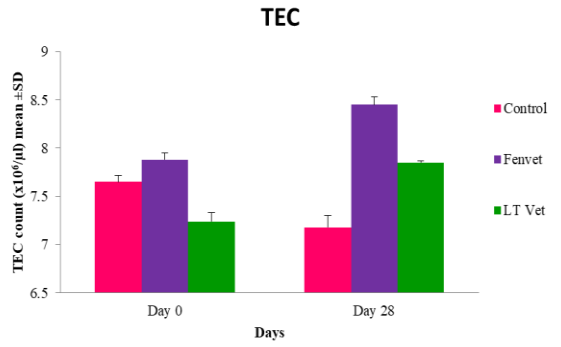

Figure 4: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on TEC (million/cu. mm.) in sheep.

Hemoglobin content (gm %)

The effect of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on Hb of sheep for 28 days was shown in Table 3 and Figure 5. The mean pre-treatment value of Hb (gm. %) in control group (group A) was 6.95±0.13 but the mean values of Hb (gm. %) started to increase on 28th day and recorded as 7.20±0.25. The pre-treatment values of Hb (gm. %) were 7.48±0.25, and 7.72±0.09 in the sheep of group B and C, respectively. On 28th day of the post-treatment, the mean values of Hb (g %) were increased up to 9.50±0.29, and 8.72±0.05 in the sheep of group B, and C, respectively. The mean value of Hb (gm. %) was significantly increased ($p<0.01$) on 28th day of two anthelmintics treatment of sheep. Similar results have also been stated with the earlier researchers of Soutello et al. (2007), Rashedunnabi et al. (2014), Sultana et al. (2015), Amin et al. (2010), and Nwosu et al. (2007) in sheep and goat.

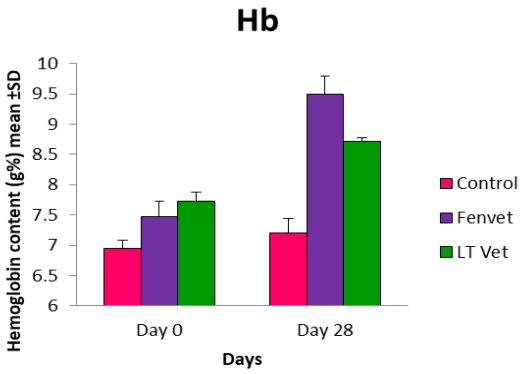

Figure 5: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on Hb Estimation (gm. %) in sheep.

Packed cell volume (PCV %)

The effect of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on PCV of sheep for 28 days was shown in Table 3 and Figure 6. The mean value of PCV in control group (group A) was 26.60±0.25 but the mean values of PCV started to increase on 28th day and recorded as 27.40±0.04. The pre-treatment values of PCV were 29.23±0.150 and 28.52±0.69 in the sheep of group B and C respectively. On 28th day of the post-treatment, the mean values of PCV were increased up to 32.00±0.18 and 31.24±0.20 in the sheep of group B and C respectively. The mean value of PCV was significantly increased ($p<0.01$)

on 28th day of two anthelmintics treatment. Similar results have also been stated by the earlier workers of Amin et al. (2010), Akraruzzaman et al. (2015a), Rashedunnabi et al. (2014), Monirul et al. (2015), Shrimali etal. (2016), Singh et al. (2015), and Soutello et al. (2007) in sheep and goat.

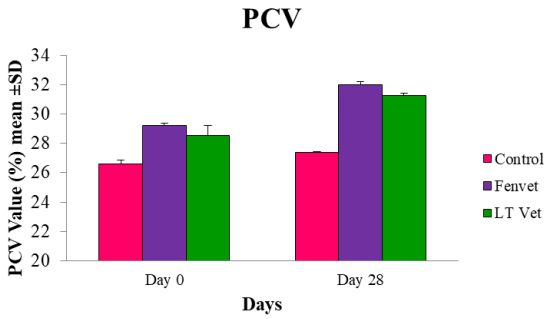

Figure 6: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on PCV (%) in sheep.

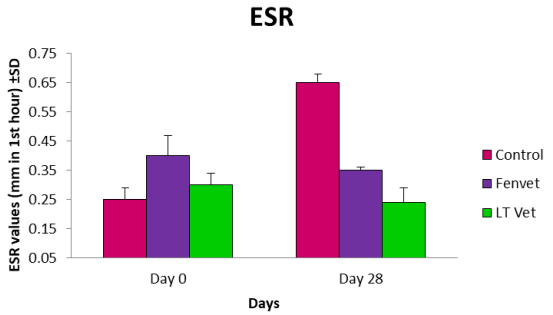

Figure 7: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on ESR (mm/h) in sheep.

Erythrocyte sedimentation rate (ESR, mm/hr)

The effect of Fenvet® and LT Vet® on ESR of sheep for 28 days was shown in Table 3 and Figure 7. The mean value of ESR (mm/h) in control group (group A) was 0.25±0.04 but the mean values of ESR (mm/h) started to increase on 28th day and recorded as 0.65±0.03. The mean value of ESR (mm h^{-1}) was significantly decreased ($p<0.05$) on 28th days of treatment. The initial values of ESR (mm h^{-1}) were 0.40±0.07 and 0.30±0.04 in the sheep of group A and B, respectively. On 28th day of the post-treatment, the mean values of ESR (mm h^{-1}) were increased up to 0.35±0.01and 0.24±0.05 in the sheep of group B and C, respectively. This result is similar to the reports of Mortensen et al. (2003), Rashedunnabi et al. (2014), Sultana et al. (2015), Amin et al. (2010), Khalil et al. (2004) and Demeler et al. (2009) in sheep and goat.

Total leukocyte counts (TLC, thousand/cu.mm of blood)

The effect of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on ESR of sheep for 28 days was shown in Table 3 and Figure 8. The mean value of TLC in control group (group A) was 11.40±0.08 but the mean values of TLC started to increase on 28th day and recorded as 12.06±0.10. The mean value of TLC was significantly decreased ($p<0.05$) on 28th days of treatment. The pre-treatment values of TLC were 10.90±0.04 and 11.42±0.25 in the sheep of group B and C, respectively. On 28th day of the post-treatment, the mean values of TLC were increased up to 9.05±0.05 and 10.90±0.06 in the sheep of group B and C, respectively. These present findings in agreement of the works with Amin et al. (2010), Soutello et al. (2007), Khalil et al. (2004) and Demeler et al. (2009) in sheep and goat.

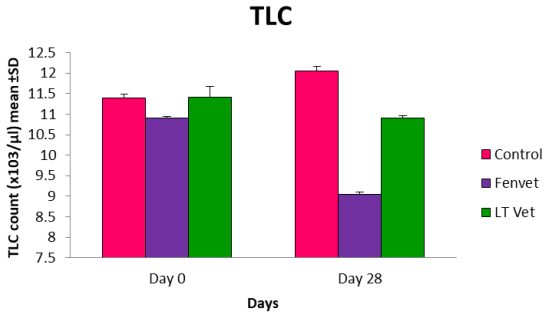

Figure 8: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on TLC (x10^3/µl) in sheep.

Effects of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on Biochemical parameters in control and study groups of sheep at day 28 post-treatment

Total Protein (g/dl)

The effect of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on total Protein (g/dl) of sheep for 28 days was shown in Table 4 and Figure 9. The mean value of TP in control group (group A) was 8.25±0.12 but the mean values of TP started to decrease on 28th day and recorded as 7.45±0.25. The mean value of TP was significantly decreased ($p<0.05$) on 28th days of treatment. The pre-treatment values of TP were 8.32±0.03 and 7.95±0.05 in the sheep of group B and C, respectively. On 28th day of the post-treatment, the mean values of TP were increased up to 8.79±0.03 and 8.15±0.07 in the sheep of group B and C, respectively. The amount of TP was increased in the treated groups and the results are in agreement with earlier observations Sharma et al., (2014), and Rashid et al., (2015). Significant decrease ($p<0.05$) in the value of total plasma protein was observed in parasitized sheep in the untreated control group. Similar decrease in total plasma proteins have been observed by Bordoloi et al. (2012).

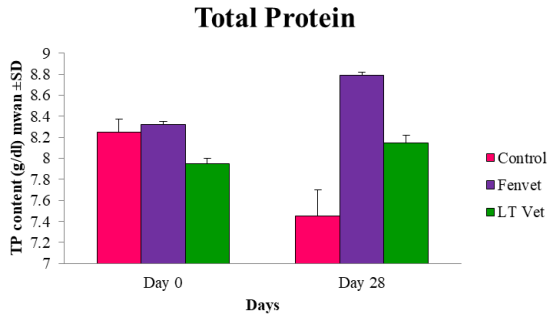

Figure 9: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on TP (g/dl) in sheep.

SGOT (IU/L), SGPT (IU/L) and Creatinine (mg/dl)

The effect of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) on SGOT (IU/L), SGPT (IU/L) and Creatinine (mg/dl) of sheep for 28 days was shown in Table 4 and Figure 10. The mean value of SGOT in control group (group A) was 113.03±0.15but the mean values of SGOT started to decrease on 28th day and recorded as 114.08±0.02. The mean value of SGOT was significantly increased ($p<0.05$) on 28th days of treatment. The pre-treatment values of SGOT were 115.05±0.21 and 114.03±0.23in the sheep of group B and C, respectively. On 28th day of the post-treatment, the mean values of SGOT were decreased up to 113.53±0.03 and 113.59±0.06 in the sheep of group B and C, respectively.

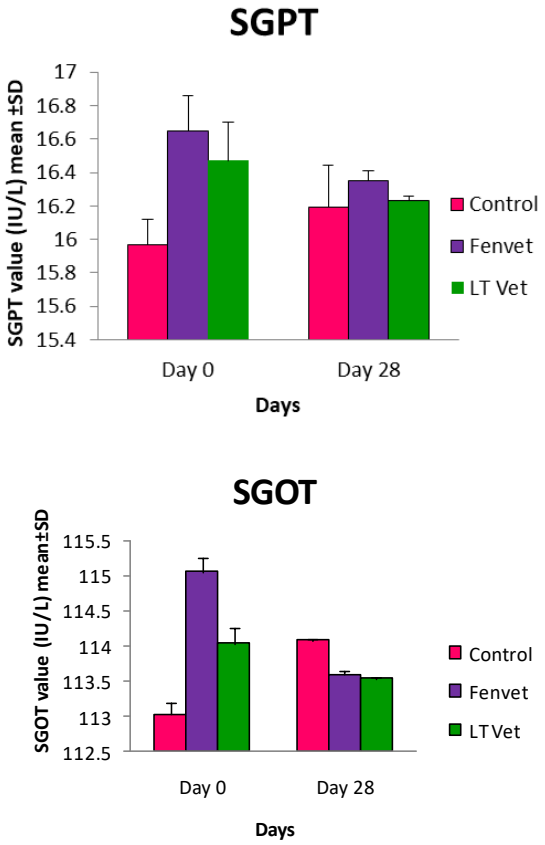

Figure 10: Comparative efficacy of Fenbendazole (Fenvet®) and combined preparation of levamisole and triclabendazole (LT Vet®) at recommended doses on SGOT (IU/L), and SGPT (IU/L) in sheep.

The mean value of SGPT in control group (group A) was 15.97±0.02 but the mean values of SGPT started to increase on 28th day and recorded as 16.19±0.15. The mean value of SGPT was significantly increased ($p<0.05$) on 28th days of treatment. The pre-treatment values of SGPT were 16.65±0.04 and 16.47±0.03 in the sheep of group B and C, respectively. On 28th day of the post-

treatment, the mean values of SGPT were decreased up to 16.35±0.04 and 16.23±0.13 in the sheep of group B and C, respectively. The anthelmintic treated groups showed a decrease in the levels of SGPT and SGOT. This suggests that the endoparasites affecting the sheep were successfully removed. These results are more or less similar with earlier reporters Sharma et al. (2014), and Rashid et al. (2015). However, no significant variations were recorded in and creatinine values.

CONCLUSION

This study indicated that Fenbendazole (Fenvet®)) is highly effective on egg count (EPG), hematological parameters (TEC, Hb, PCV, ESR and TLC) and biochemical parameters (total protein, SGOT, SGPT and creatinine) in gastrointestinal nematodiasis in sheep than that of combined preparation of levamisole and triclabendazole (LT Vet®) during the experiment. The findings of the present study may help the future researchers to explore the details pharmacokinetic and toxic effects, for wide therapeutic uses in Bangladesh for the treatment and control of parasitic infection in sheep. From these research findings, the veterinarian can choose the specific anthelmintics for gastrointestinal nematodiasis in sheep. Further studies on anthelmintics pharmacokinetic and toxicity would be helpful for scientists, veterinary practitioners and researchers.

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