

*Article*

**Studies of the comparative efficacy of alcoholic extracts of Bironja, Turmeric, and Veranda leaves with that of patent drug Nilzan against Nematodiasis in sheep**

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Received: 27 February 2017/Accepted: 23 March 2017/ Published: 30 April 2017

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**Abstract:** The objectives of this study was to determine the comparative efficacy of some indigenous plants (Bironja, Turmeric and Veranda leaves) with that of patent drug Nilzan against Nematodiasis in sheep. Out of 85 sheep of indigenous breed 75 sheep which were suspected to be suffering from nematode, aged 2- 3 years and weighing about 10-12 kg were used for this study. The sheep were divided into 15 equal groups (Group A, B, C, D, E, F, G, H, I, J, K, L, M, N and O). The collected Bironja, Turmeric and Veranda leaves were cut into small pieces and sun dried for 7 days followed by drying separately in a hot air woven at 45°C for 6 hours. Then alcoholic extracts of selected medicinal plants were prepared by mixing 100 gm of each grinded powdered sample with 250 ml of alcohol and kept in separate air tight bottle and labeled for further study. Administration of three different doses of powdered Bironja (3, 6 & 9 ml /kg body wt), Turmeric (2, 4 & 6 ml /kg body wt) and Veranda leaves (2, 4 & 6 ml /kg body wt) showed 13-40% , 11-15% and 4-7% efficacy respectively against nematodes in sheep. Administration of Nilzan (30 mg/kg body wt) orally was highly effective (73-89%) against all the species of nematodes in sheep. Among medicinal plants Bironja was found to be most effective followed by turmeric. Veranda leaves were found to be totally ineffective against nematodes in sheep. No significant change was observed following treatment with Bironja seeds, Turmeric, Veranda leaves and Nilzan on serum glucose and SGPT in sheep. Haematological parameters were not significantly altered following any of the doses of three medicinal plants and Nilzan in sheep.

**Keywords:** indigenous plants; nematodiasis; sheep

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## **1. Introduction**

There are 195.28 million of livestock in Bangladesh of which sheep 1.09 million (Amin, 1994). In Bangladesh sheep are raised for meat production, though they are basically dual purpose animal producing both meat and wool. Field veterinarians often speak of parasitic disease as being one of the important hindrances to sheep productivity in the country but very few published reports could be traced in respect of their clinical details. Due to various problems, the health, production and performance of livestock in Bangladesh are at the lowest ebb compared with those of other countries. Parasitism is also an important limiting factor of livestock production in most of the tropical and sub-tropical countries. It is established that infestations due to nematode undermine the health and productivity of animals. Asian Development Bank (ADB) report clearly mentioned the loss of productivity of animals in terms of mortality, loss of milk, meat, generation loss and loss of reproductive rate due to animal parasites to the extent of 50 % in Bangladesh (ADB, 1984). Besides the use of various modern patent drugs for the treatment of various diseases people throughout the world have been using the traditional

indigenous medicinal plants and herbs as remedial agents for prevention, mitigation and cure of disease conditions since long. A variety of medicinal preparations from indigenous herbs and plants are now-a-days manufactured by same pharmaceutical industries in India, Indonesia and Thailand. In Bangladesh, the Hakims, Ayurveds and Kabiraj's are using indigenous plants for the treatment of human being. In village condition animal diseases are treated by Kabirajs and Quacks who use various indigenous plants. Research in India towards the direction of application of indigenous plants and their products to veterinary practice have lead to the development of certain industries of which Indian Herbs Research Company of Shaharanpur in Uttar Pradesh needs worth mentioning. In Bangladesh work on this aspect is very limited. So keeping all this view in mind, the present study has been undertaken.

## 2. Materials and methods

By microscopic examination of the faeces of eighty five sheep of indigenous breed seventy five sheep aged 2 to 3 years old and weighing 10 to 12 kg were selected for this study which were carried out for nematode egg count. These sheep were randomly divided into 15 equal groups (Group: A, B, C, D, E, F, G, H, I, J, K, L, M, N, and O). Bironja, Turmeric and Nilzan were purchased from local market and Verenda leaves were collected from Bangladesh Agricultural University Campus. The collected samples except Nilzan were washed, cut and then sun dried for 7 days. Then these samples were dried separately in a hot air oven at 45°C for 6 hours and grinded separately. Alcoholic extracts of selected medicinal plants were prepared by soxhlet method (250 ml of alcohol was used for 100 gm powdered sample) and kept in a separate air tight bottle and labeled for further study. The comparative efficacy of Bironja, Turmeric and Verenda leaves with that of the patent drug Nilzan against nematodiasis in sheep were performed in three phases. In 1<sup>st</sup> phase five groups (Group A, B, C, D and E) were used of which, Group A were kept control without giving any treatment. Group B, C and D sheep were treated orally with alcoholic extracts of Bironja seeds at the dose rate of 3, 6 & 9 ml /kg body wt respectively. Group E were treated with Nilzan at the dose rate of 30 mg/ kg body wt. In 2<sup>nd</sup> phase five groups (Group F, G, H, I and J) were used of which, Group F were kept control without giving any treatment. Group G, H and I sheep were treated orally with alcoholic extracts of Turmeric at the dose rate of 2, 4 & 6 ml /kg body wt respectively. Group J were treated with Nilzan at the dose rate of 30 mg/ kg body wt. In 3<sup>rd</sup> phase five groups (Group K, L, M, N and O) were used of which, Group K were kept control without giving any treatment. Group L, M and N sheep were treated orally with alcoholic extracts of Verenda leaves at the dose rate of 2, 4 & 6 ml /kg body wt respectively. Group O were treated with Nilzan at the dose rate of 30 mg/ kg body wt. After treatment with different doses of Bironja, Turmeric and Verenda leaves, all the treated and controlled sheep were closely observed for 24 days.

### 2.1. Determination of biochemical and haematological parameters

Biochemical parameters like serum glucose and SGPT (serum glutamic pyruvic transaminase) were also determined by using autoanalyser (Model No. Reflotron M-06).

### 2.2. Drugs and chemical used

Nilzan (Tetramizol hydrochloride and oxcyclozanide) was purchased from local market. Diagnostic kit (Glucose, SGPT) test combination used in this study were purchased from Fisons Bangladesh Ltd. Anticoagulant Haymes solution, 0.14 hydrochloric acid solution, Wrights stain, 90% alcohol, 10% formalin, normal saline (0.09) saturated salt solution, were prepared in the laboratory.

### 2.3. Statistical methods

The data was analysed statistically between normal and treated values by the well-known student's t test (t<sup>2</sup> test).

## 3. Results and Discussion

### 3.1. Bironja

The oral administration of alcoholic extracts of Bironja in doses of 3, 6 and 9 ml/kg body wt. was found to almost ineffective against *Trichostrongylus* spp but the effect of Nilzan was satisfactory (Table 1). In group B (3 ml/kg) the mean EPG (Egg per gram) values were 620 and 530 respectively at pre-treatment period and on 24<sup>th</sup> day after medication. Similarly, in group C the mean EPG values were 630 and 480 respectively at pre-treatment period and on day 24 after treatment with 6 ml/kg body wt. of Bironja in sheep. In group D (9 ml/kg) the mean EPG values were 670 and 440 respectively before treatment and on 24<sup>th</sup> day after treatment. Following Nilzan (30 mg /kg body wt) administration the mean EPG was 680 before treatment and 120 on 24<sup>th</sup> day of treatment.

The reduction of mean EPG were 12, 23 and 34% due to administration of 3, 6 and 9 ml/kg of bironja extracts respectively. Whereas, the reduction was upto 83% after Nilzan administration.

**Table 1. The comparative efficacy of Bironja with that of patent drug Nilzan against *Trichostrongylus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
A	Control	670±17.75	680±11.09	690±9.86	700±15.03	710±15.79	730±18.83	740±23.31	
B	Bironja (3ml/kg)	620±22.65	610±29.31	600±13.31	580±9.07	570±15.51	550±11.57	530±13.36	11.66%
C	Bironja (6ml/kg)	630±27.23	610±22.43	590±11.36	550*±9.56	500**±5.78	490**±12.67	480**±11.88	23.08%
D	Bironja (9ml/kg)	670±23.32	630±20.08	610±9.18	550**±13.36	520**±12.38	450**±9.42	440**±11.56	34.32%
E	Nilzan (30mg/kg)	680±21.81	590**±29.30	390**±13.93	310**±17.86	190**±10.05	140**±5.59	120**±15.11	82.60%

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

In case of *Haemonchus* spp. In group B (3 ml/kg) the mean EPG count was 530 before treatment and on 24<sup>th</sup> day of treatment value was 430. In group C (6ml/kg) the mean EPG count was 820 before treatment and on 24<sup>th</sup> day of treatment the value was 580. Similarly, in group D, the mean EPG values were 670 and 400 before treatment and on day 24 respectively of treatment with 9 ml alcoholic extract of Bironja per kg body weight. Following Nilzan administration the mean EPG was 790 before treatment on 24<sup>th</sup> day after treatment it was 200 in group E. The reduction of mean EPG was 19, 29 and 40% respectively following 3, 6 & 9 ml Bironja / kg body wt and the reduction was upto 75% following administration of 30 mg Nilzan / kg body wt. in sheep (Table 2).

**Table 2. The comparative efficacy of Bironja with that of patent drug Nilzan against *Haemonchus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
A	Control	810±25.08	920±11.29	830±21.35	840±13.49	850±19.34	890±15.62	900±20.90	
B	Bironja (3ml/kg)	530±11.35	520±21.52	500±20.09	490±19.91	470**±11.70	450**±6.83	430**±7.94	18.86%
C	Bironja (6ml/kg)	820±12.08	790±11.92	750**±7.05	700**±0.07	670**±13.85	590**±10.83	580**±9.78	29.26%
D	Bironja (9ml/kg)	670±16.57	620±13.92	540±11.51	490**±9.85	430**±13.34	400**±10.04	400**±5.98	40.29%
E	Nilzan(30mg/kg)	790±8.88	670**±22.73	460**±7.73	360**±12.58	260**±6.56	220**±6.96	200**±21.43	74.68%

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

In case of *Oesophagostomum* spp., in group B (3 ml/kg) the mean EPG count was 600 before treatment and on 24<sup>th</sup> day of treatment value was 490. In group C (6ml/kg) the mean EPG count was 590 before treatment and on 24<sup>th</sup> day of treatment the value was 440. Similarly, in group D, the mean EPG values were 570 and 370 before treatment and on day 24 respectively of treatment with 9 ml alcoholic extract of Bironja per kg body weight. Following Nilzan administration the mean EPG was 640 before treatment on 24<sup>th</sup> day after treatment it was 170 in group E (Table 3).

**Table 3. The comparative efficacy of Bironja with that of patent drug Nilzan against *Oesophagostomum* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period EPG	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
A	Control	560± 15.65	570± 12.71	570± 11.79	580± 13.85	590± 11.90	590± 20.99	600± 19.87	
B	Bironja(3ml /kg)	600± 13.01	580± 17.85	550± 21.56	530± 22.53	510**± 13.15	500**± 9.59	490**± 10.93	18.33%
C	Bironja(6ml /kg)	590± 15.95	550± 13.31	520**± 11.15	500**± 13.67	490**± 19.41	460**± 10.62	440**± 6.83	25.42%
D	Bironja(9ml /kg)	570± 17.57	500± 13.51	480**± 13.81	430**± 9.81	400**± 10.04	380**± 11.81	370**± 9.56	35.08%
E	Nilzan(30mg/kg)	640± 9.38	510**± 26.62	380**± 13.49	280**± 8.56	210**± 5.68	190**± 8.73	170**± 19.57	73.43%

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

### 3.2. Turmeric

The oral administration of alcoholic extracts of Turmeric in doses of 2, 4 and 6 ml/kg body wt. was found to almost ineffective against *Trichostrongylus* spp. but the effect of Nilzan was satisfactory (Table 4). In group G (2 ml/kg) the mean EPG (Egg per gram) values were 710 and 630 respectively at pre-treatment period and on 24<sup>th</sup> day after medication. Similarly, in group H the mean EPG values was 790 and 680 respectively at pre-treatment period and on day 24 after treatment with 4 ml/kg body wt. of Turmeric in sheep. In group I (6 ml/kg) the mean EPG values were 680 and 580 respectively before treatment and on 24<sup>th</sup> day after treatment. Following Nilzan (30 mg /kg body wt) administration the mean EPG was 760 before treatment and 100 on 24<sup>th</sup> day of treatment. The reduction of mean EPG were 12, 14 and 15% due to administration of 2, 4 and 6 ml/kg of Turmeric extracts respectively. Whereas, the reduction was upto 87% after Nilzan administration in case of *Haemonchus* spp. in group G (2 ml/kg), the mean EPG was 550 and 490 respectively at pre-treatment and 24<sup>th</sup> day of treatment. In group H, the mean EPG 500 and 430 respectively at pre-treatment and 24<sup>th</sup> day of treatment following administration of alcoholic extracts of Turmeric at the dose rate of 4ml/kg body wt/ sheep. In group I (6 ml/kg) the mean EPG values were 490 and 430 respectively at pre-treatment and 24<sup>th</sup> day after treatment. Following Nilzan administration (30 mg /kg body wt.) the mean EPG was 540 and 60 respectively at pre-treatment and 24<sup>th</sup> day of medication. All the three doses of turmeric i.e 2,4 and 6 ml/kg body wt could reduce the mean EPG were 11, 12 and 12% respectively and reduction was 89% following Nilzan administration in sheep (Tables 4 and 5).

**Table 4. The comparative efficacy of Turmeric with that of patent drug Nilzan against *Trichostrongylus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period EPG	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
F	Control	770± 22.36	780± 29.32	790± 7.68	800± 4.83	810± 11.11	830± 19.32	840± 19.83	
G	Turmeric(2 ml/kg)	710± 20.32	700± 9.86	690± 4.95	670± 7.08	650± 21.01	640± 20.93	630**± 9.86	11.56%
H	Turmeric (4 ml/kg)	790± 12.32	750± 19.93	720*± 17.71	770**± 7.10	690**± 4.67	680**± 12.81	680**± 11.79	13.92%
I	Turmeric (6ml/kg)	680± 29.09	670± 22.07	660± 23.31	640± 7.95	620± 19.03	600*± 11.05	580**± 9.03	14.70%
J	Nilzan(30 mg/kg)	760± 10.82	420**± 12.36	390**± 9.86	290**± 10.92	200**± 10.43	140**± 22.02	100**± 8.83	86.84%

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

**Table 5. The comparative efficacy of Turmeric with that of patent drug Nilzan against *Haemonchus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
F	Control	520±	530±	540±	550±	570±	580±	590±	
		21.25	23.36	19.09	9.86	5.97	11.06	12.36	
G	Turmeric(2ml/kg)	550±	540±	530±	510±	500*±	490*±	490*±	10.90%
		11.15	12.32	19.32	14.76	8.96	9.12	10.09	
H	Turmeric(4 ml/kg)	500±	480±	470±	460*±	450*±	440*±	430*±	12.00%
		15.65	13.08	9.96	2.97	12.03	12.30	10.96	
I	Turmeric(6ml/kg)	490±	480±	470±	460±	450±	440±	430±	12.24%
		12.32	29.03	27.63	11.93	13.05	8.86	12.36	
J	Nilzan(30 mg/kg)	540±	400**±	290**±	170**±	100**±	80**±	60**±	88.88%
		29.32	29.92	23.03	12.32	29.32	21.23	7.80	

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

In case of *Oesophagostomum* spp, in group G (2 ml/kg), the mean EPG was 570 and 460 respectively at pre-treatment and 24<sup>th</sup> day of medication. Similarly in group H, the mean EPG was 520 and 440 respectively at pre-treatment and 24<sup>th</sup> day of medication. Following administration of alcoholic extracts of turmeric at their dose rate of 4 ml/kg body wt. In group I (6ml/kg) the mean EPG values were 550 and 470 respectively before treatment and 24<sup>th</sup> day of treatment. Following Nilzan administration the mean EPG was 550 and 70 respectively before and 24<sup>th</sup> day of medication (Table 6).

**Table 6. The comparative efficacy of Turmeric with that of patent drug Nilzan against *Oesophagostomum* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
F	Control	510±	520±	530±	540±	540±	550±	560±	
		29.36	33.03	12.29	15.53	11.48	12.82	11.03	
G	Turmeric(2ml/kg)	570±	560±	550±	540±	530±	520±	460**±	12.28%
		13.25	19.51	29.32	22.03	12.96	31.03	9.86	
H	Turmeric(4 ml/kg)	520±	510±	490±	470±	460*±	450*±	440*±	13.46%
		9.41	9.05	10.11	4.75	12.61	19.51	19.42	
I	Turmeric(6ml/kg)	550±	530±	510±	500±	490±	480*±	470**±	14.56%
		21.41	29.51	30.32	5.45	15.13	11.03	12.82	
J	Nilzan(30 mg/kg)	550±	490±	350**±	270**±	190**±	100**±	70**±	87.27%
		31.03	22.03	5.05	5.95	11.95	9.05	11.03	

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

### 3.3. Veranda

The alcoholic extracts of Veranda leaves in doses of 2, 4, 6 ml/kg body weight orally was almost ineffective against *Trichostrongylus* spp. in sheep. In group L(2 ml/kg) the mean EPG values were 790 and 760 respectively, in group M, the mean EPG values were 790 and 740 respectively(4ml/kg), in group N receiving highest dose (6 ml/kg) the mean EPG values were 760 and 710 respectively at pretreatment and 24<sup>th</sup> day of treatment. In group O, following administration of Nilzan (30 mg/kg body wt.) the mean EPG values were 790 and 210 respectively at pre-treatment and 24<sup>th</sup> day after medication. The three different doses of alcoholic extracts of veranda leaves i.e 2, 4 and 6 ml/ kg body wt (the mean EPG reduction upto 4-7% against *Trichostrongylus* spp. In case of *Haemonchus*, in group L, with 2 ml/kg the mean EPG values were 690 and 680 respectively, in group M(4 ml/ kg, the mean Epg values were 630 and 590, in group N (6 ml/ kg) the mean EPG values were 590 and 550 respectively at pre-treatment and 24<sup>th</sup> day of treatment. Following administration of

Nilzan (30 mg/kg) the mean EPG values were 610 and 140 respectively at pre-treatment and 24<sup>th</sup> day of medication. The three different doses of alcoholic extracts of veranda leaves i.e 2, 4 and 6 ml/ kg body wt c(the mean EPG reduction upto 4-7%) against *Haemonchus* spp. In case of *Oesophagostomum* spp. In group L (2 ml/kg) the mean EPG count was 420 before treatment and on 24<sup>th</sup> day of treatment value was 400. In group M (4ml/kg) the mean EPG count was 390 before treatment and on 24<sup>th</sup> day of treatment the value was 370. Similarly, in group N, the mean EPG values were 560 and 520 before treatment and on day 24 respectively of treatment with 6 ml alcoholic extract of Verenda per kg body weight. Following Nilzan administration the mean EPG was 470 before treatment on 24<sup>th</sup> day after treatment it was 110 in group O (Tables 7, 8 and 9).

**Table 7. The comparative efficacy of Verenda with that of patent drug Nilzan against *Trichostrongylus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period EPG	Post-treatment period						Percentage of EPG Reduction
			4th day EPG	8th day EPG	12th day EPG	16th day EPG	20th day EPG	24th day EPG	
K	Control	780±	780±	790±	810±	820±	830±	840±	
		17.85	16.53	14.76	21.38	16.86	18.98	11.56	
L	Verenda(2 ml/kg)	790±	790±	780±	770±	770±	760±	760±	3.79%
		11.09	12.36	12.54	9.03	11.31	12.02	12.96	
M	Verenda c (4ml/kg)	790±	780±	770*±	760±	750±	750±	740±	6.32%
		21.03	22.31	13.96	11.06	19.86	17.31	18.96	
N	Verenda (6ml/kg)	760±	750±	740±	730±	720±	720±	710±	6.51%
		11.56	10.96	19.85	21.38	19.36	17.83	19.56	
O	Nilzan(30m g/kg)	790±	630**±	420**±	310**±	250**±	230**±	210**±	72.15%
		6.54	17.58	9.85	7.53	12.56	21.38	6.93	

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

**Table 8. The comparative efficacy of Verenda with that of patent drug Nilzan against *Haemonchus* spp. in sheep.**

Group of animals	Drug and dose/kg body wt	Pre-treatment period EPG	Post-treatment period						Percentage of EPG Reduction
			4th day EPG	8th day EPG	12th day EPG	16th day EPG	20th day EPG	24th day EPG	
K	Control	640±	660±	6700±	680±	690±	700±	710±	
		29.36	32.46	12.60	13.56	3.89	7.79	21.38	
L	Verenda(2 ml/kg)	690±	680±	680±	670±	670±	660±	660±	4.34%
		22.02	12.36	31.03	21.63	8.85	9.99	9.09	
M	Verenda(4 ml/kg)	630±	630±	620±	610±	600±	590±	590±	6.34%
		12.38	10.05	11.45	13.67	15.56	8.85	10.36	
N	Verenda (6ml/kg)	590±	590±	580±	570±	560±	550±	550±	6.77%
		19.11	10.05	21.36	2.93	7.83	10.36	12.83	
O	Nilzan(30m g/kg)	610±	530**±	430**±	320**±	240**±	190**±	140**±	77.04%
		3.26	23.65	8.86	12.76	9.87	14.46	8.57	

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease (p<0.01).

**Table 9.**The comparative efficacy of Verenda with that of patent drug Nilzan against *Oesophagostomum* spp. in sheep.

Group of animals	Drug and dose/kg body wt	Pre-treatment period	Post-treatment period						Percentage of EPG Reduction
			4th day	8th day	12th day	16th day	20th day	24th day	
			EPG	EPG	EPG	EPG	EPG	EPG	
K	Control	470± 12.54	480± 7.79	480± 3.03	490± 5.64	500± 13.05	500± 11.79	510±12.06	
L	Verenda(2 ml/kg)	420± 12.38	420± 11.11	410± 10.93	410± 13.36	410± 15.69	400± 21.38	400±15.95	4.76%
M	Verenda(4 ml/kg)	390± 29.38	390± 25.52	380± 11.98	380± 10.32	370± 9.09	370± 12.03	370±11.11	5.12%
N	Verenda (6ml/kg)	560± 21.32	560± 2.67	540± 29.32	540± 12.38	530± 31.03	530± 12.21	520±22.32	7.14%
O	Nilzan(30 mg/kg)	470± 10.38	360**± 7.78	300**± 12.32	230**± 18.54	170**± 8.76	130**± 24.23	110**±6.64	77.04%

Values given above represent the mean ± SE of 5 sheep.

\*\*Significant decrease ( $p < 0.01$ ).

#### 4. Conclusions

Parasitism is one of the most damaging diseases in sheep. It is established that infestations due to nematode undermine the health and productivity of animals such as loss of milk, meat, generation loss and loss of reproductive rate due to animal parasites to the extent of 50 % in Bangladesh. From this point of view a research was conducted to study the comparative efficacy of Bironja, Turmeric and Verenda leaves with patent drug Nilzan against nematodiasis in sheep. Fifteen groups of sheep (each consisting of 5 sheep) naturally infected with various nematodes to study the anthelmintic efficacy of Bironja, Turmeric and Verenda leaves and patent drug Nilzan. Administration of three different doses of Bironja (3, 6 & 9ml/kg body wt), Turmeric (2, 4 & 6 ml/kg body wt) and Verenda leaves (2, 4 & 6 ml/kg body wt) showed 12-15%, 11-15% and 4-8% efficacy against trematodes in sheep. Administration of Nilzan (30mg/kg body wt) orally was highly effective (73-89%) against nematodes used in this study. Among the medicinal plants, Bironja seeds were found to be most effective followed by Turmeric. Verenda leaves were found to be totally ineffective against nematodiasis in sheep. Therefore it can be concluded that the patent drug Nilzan is highly effective against nematodes in sheep. However, among the medicinal plants, Bironja seeds and turmeric may be used against nematodes when patent drugs are not available or become out of reach for the poor farmers of Bangladesh.

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