

COMPARATIVE EFFICACY OF THE SELECTED INDIGENOUS MEDICINAL PLANTS WITH A PATENT DRUG LEVAMISOLE AGAINST ASCARIASIS IN VILLAGE POULTRY

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ABSTRACT

The experiment was conducted at the Department of Pharmacology, Bangladesh Agricultural University, Mymensingh, during the period from July 2005 to November 2006 to study the comparative efficacy of indigenous medicinal plants Neem (*Azadirachta indica*) and Bothua (*Chenopodium album*) with a patent drug Levamisole (Poulnex[®]) against Ascariasis. Sixty ascarid infected chickens were randomly divided into 6 equal groups and treatment schedule were as follows: Group A = Controlled (Infected), Group B = Levamisole 30mg/kg b. wt; Group C = Neem 1gm/kg b. wt. (Alcoholic extract); Group D = Neem 1gm/kg b. wt. (crude extract); Group E = Bothua 1gm/kg body wt. (Alcoholic extract) Group F = Bothua 1gm/kg body wt. (Crude extract) orally once at a time and closely observed for 28 days. Fecal egg count (EPG) were 100% reduced in Levamisole and Neem (alcoholic and water extract) treated groups. On the other hand EPG were somewhat increased in other three groups. Body weight, TEC, Hb and PCV were increased significantly in above mentioned three groups (Levamisole and both groups of Neem) and decreased in rest three groups but TLC and ESR were decreased significantly. After post mortem examination no parasites were found in three groups of treated poultry (Levamisole and both groups of Neem). Parasites were remained available (17-24 numbers) in rest three groups. So it is concluded that Neem (*Azadirachta indica*) and levamisole is equally effective but Bothua (*Chenopodium album*) is completely ineffective against Ascariasis in village poultry.

Key words: Efficacy, medicinal plant, ascariasis, poultry

INTRODUCTION

Parasitism is an important limiting factor of poultry production in Bangladesh. Most of the poultry farmers cannot afford to buy modern drugs for the treatment of parasitic diseases. Moreover parasites are becoming resistant to some modern anthelmintics. Conversely, there are many herbs and plants locally available, which have medical value against parasitic infestation. Pharmacological actions along with therapeutic trial of these plants may be studied experimentally, which might prove worthy of medical value. More than 500 wild and cultivated medicinal plants of this country have so far been enumerated with information on their medicinal properties and uses (Yusuf et al.1994). Medicinal plants are being used traditionally in this country as folk medicine. World Health Organization (WHO, 1993) has recognized the necessity for investigation and mobilization of ancient medicinal practice to fulfill the primary health care of the animals and realizes that the traditional system of medicine may play an important role in the development of livestock of the third world countries.

Considering all these points, present research work was designed to study the comparative study of Neem (*Azadirachta indica*) and Bathua (*Chenopodium album*) extract with that of patent drug (Poulnex[®]) levamisole in village poultry.

MATERIALS AND METHODS

The experiment was conducted at the Department of Pharmacology, Bangladesh Agricultural University, Mymensingh, during the period from July 2005 to November 2006. To complete the research work following steps were followed.

Collection of village poultry

One hundred village poultry were purchased from the local market of Mymensingh out of which 60 Ascarid positive birds were selected to study the comparative efficacy of the selected indigenous plants Neem (*Azadirachta indica*) and Bathua (*Chenopodium album*) with a patent drug Poulnex[®] (Levamisole) against Ascariasis in village poultry. The chickens were allowed to take rest for 7 days for the adaptation. The experiment was carried out in poultry shed of the Department of Pharmacology, Bangladesh Agricultural University, Mymensingh. The age and body weight of all selected chicken ranged from 2 to 4 months and 345 to 405gm respectively. The chickens were supplied with normal diet and drinking water.

The test plants

Neem (*Azadiracta indica*) leaves were collected from the garden of medicinal plants of the Department of Pharmacology, BAU. Lamber`s quarter (*Chenopodium album*) plants were collected from the K.R Market of BAU.

The test drug

Oral preparation of Levamisole [Poulnex®, Novartis (Bangladesh) Limited] was selected and collected from the local market of Mymensingh.

Layout of the experiment

Group	Drugs	Time (days)				
		Pretreatment	Post treatment			
		Day 0	Day 7 th	Day 14 th	Day 21 st	Day 28 th
A	Controlled	++ ** OO	++ **	++ ** OO	++ **	++ ** OO
B	Levamisole 30mg/kg b.wt.	++ ** OO	++ **	++ ** OO	++ **	++ ** OO
C	Neem 1gm/kg b.wt. (Alcoholic extract)	++ ** OO	++ **	++ ** OO	++ **	++ ** OO
D	Neem 1gm/kg b.wt. (Crude extract)	++ ** OO	++ **	++ ** OO	++ **	++ ** OO
E	Chenopodium 1gm/kg b.wt. (Alcoholic extract)	++ ** OO	++ **	++ ** OO	++ **	++ ** OO
F	Chenopodium 1gm/kg b.wt. (Crude extract)	++ ** OO	++ **	++ ** OO	++ **	++ ** OO

++ Clinical parameter; ** Hematological parameter; Parasite count; OO Egg count.

Experimental design

All the 60 *Ascaris* infected chickens were randomly divided into 6 groups (A, B, C, D, E & F), each group consisting of 10 village poultry. Group A = Controlled (Infected); Group B = Treated with Levamisole 30mg/kg body wt., Group C = Treated with Neem (Alcoholic extract) 1gm/kg body wt; Group D = Treated with Neem (crude extract) 1gm/kg body wt.; Group E = Treated with Lamber`s quarter (Alcoholic extract) 1gm/kg body wt.; Group F = Treated with Lamber`s quarter (Crude extract) 1gm/kg body wt.

Study of parameters

These birds were closely observed for 28 days (Experimental period) and following parameters were recorded:

Clinical examination

The effect of the anthelmintic Levamisole, Neem and Lamber`s quarter leaves extract on body weight, feed consumption and water consumption of the experimental birds were recorded before and during administration of drugs. Birds under trial were weighed with Electric digital weighing machine. The weight of each bird was taken before feeding in the morning, in noon and afternoon. The average of these three weights was calculated and recorded. Mean live weight (gained/lost) of each group of birds on 7th, 14th, 21st and 28th days were recorded with the procedures described above.

Fecal egg count

Eggs were counted by improved McMaster method under the compound microscope in the Parasitology laboratory of BAU.

Parasite count during postmortem examination

On the 14th day of treatment five chickens from each group were slaughtered for post mortem examination to count number of parasites (*Ascaridia galli*) and to see if there were any pathological changes present. That was also done on the 28th day of treatment.

Statistical analysis

The data were analyzed statistically between control and treated groups of fowls by the well known *student's test* ('t' test).

RESULTS AND DISCUSSION

Effect on body weight

The effect of drug namely Poulnex®, extract of Neem leaves and Chenopodium medicinal plant on the body weight of poultry was observed for 28 days at 7 days interval. Mean body weight of each group of chickens prior to treatment was taken and means live weight gain of each group of poultry on 7th, 14th, 21st and 28th was calculated in gram Table 1.

The administration of Poulnex® in group B, Neem (alcoholic extract) in group C and Neem (crude extract) in group D increased the body weight of poultry gradually. But body weight of the poultry of controlled (infected) group A, group E (treated with Chenopodium 1gm/kg b.wt.) and group F (treated with Chenopodium 1.25gm/kg b.wt.) were not increased, rather decreased gradually. The progress of body weight in poultry group B, C and D might be due to proper absorption and metabolism of feed nutrients. Because at that time the poultry of group B, C and D were free from parasites. But the body weight of poultry groups A, E and F was not increased as they were suffering from parasitic infestation. Parasites interfere with absorption of feed nutrients. As a result, the body weight of the groups of poultry was decreased gradually. This result supports the observation of previous researchers (Githiori *et al.*, 2004 ; Martin *et al.*, 2005; Wrigley *et al.*, 2006; Ralston *et al.*, 2001; Rayes *et al.*, 2004).

Fecal egg count

The results of the efficacy of Neem, Poulnex® (Levamisole) and Chenopodium against ascariasis in village poultry are shown in the Table 2 .Reduction of EPG count was found on 14th and 28th day in the group of chickens of B, C and D and on the other hand EPG count was found increased or same in the groups of A, E and F.

Postmortem examination

Before treatment one chicken from each group was slaughtered and examined properly to count the number of parasites (*Ascaridia galli*) (Table - 3) and to observe if there were any pathological changes present. On the 7th, 14th, 21st and 28th day of experiment the same thing was recorded accordingly. There was no gross pathological change found in the relevant internal organs of the poultry groups B, C and D. On the other hand the controlled group (A) and treated (E and F) groups had shown different numbers of parasites (*Ascaridia galli*) on 7th, 14th, 21st and 28th day.

Table 1. Effects of Poulnex®, Neem and Chenopodium on body weight (gm) in village poultry

Group of poultry	Drug and dose	Pre-treatment	Post-treatment			
		0-day	7 th day	14 th day	21 st day	28 th day
A	Control	385.20 ±0.83	357.80 ±1.20	362.20 ±0.27	341.80 ±0.08	330.00 ±0.35
B	Levamisole 30mg/kg.b.wt.	375.40 ±0.2	382.60 ±0.09	391.00 ±0.16	421.20 ±1.32	439.60 ±0.19
C	Neem (Alcoholic extract) 1gm/kg.b.wt.	378.80 ±0.34	389.60 ±0.09	400.20 ±0.06	399.00 ±2.30	426.80 ±0.57
D	Neem (Crude extract) 1gm/kg.b.wt.	374.40 ±0.30	379.20 ±0.66	397.40 ±0.18	427.60 ±0.41	435.80 ±0.34
E	Chenopodium (Alcoholic extract) 1gm/kg.b.wt.	380.00 ±0.30	358.20 ±0.28	353.20 ±0.60	326.40 ±0.28	307.40 ±0.05
F	Chenopodium (Crude extract) 1gm/kg.b.wt.	380.60 ±0.24	359.00 ±0.47	354.80 ±0.36	322.40 ±0.06	287.40 ±1.17

Values given above represent the mean of 5 poultry.

Table 2. Effects of Poulnex® (Levamisole), Neem and Chenopodium on fecal egg count in village poultry

Group of poultry	Drug and dose	Pre-treatment	Post-treatment	
		0-day	14 th day	28 th day
A	Control	133.33 ±18.26	166.66 ±17.21	166.66 ±17.21
B	Levamisole 30mg/kg.b.wt.	166.66 ±18.26	0.00	0.00
C	Neem (Alcoholic extract) 1gm/kg.b.wt.	166.66 ±18.26	0.00	0.00
D	Neem (Crude extract) 1gm/kg.b.wt.	133.33 ±18.26	0.00	0.00
E	Chenopodium (Alcoholic extract) 1gm/kg.b.wt.	166.66 ±18.26	166.66 ±25.09	200.00 ±25.09
F	Chenopodium (Crude extract) 1gm/kg.b.wt.	133.33 ±18.26	166.66 ±17.21	166.66 ±17.21

Values given above represent the mean of 5 poultry.

Comparative efficacy of medicinal plants & levamisole against ascariasis in poultry

Table 3. Effects of Poulnex[®], Neem and Chenopodium on number of parasites in village poultry

Group of poultry	Drug and dose	Pre-treatment	Post-treatment			
		0-day	7 th day	14 th day	21 st day	28 th day
A	Control	30	40	60	50	50
B	Levamisole 30mg/kg.b.wt.	40	0	0	0	0
C	Neem (Alcoholic extract) 1gm/kg.b.wt.	30	0	0	0	0
D	Neem (Crude extract) 1gm/kg.b.wt.	20	0	0	0	0
E	Chenopodium (Crude extract) 1gm/kg.b.wt.	20	30	30	40	50
F	Chenopodium (Crude extract) 1.25gm/kg.b.wt.	20	20	30	30	50

Values given above represent of 5 poultry.

From this trial, it is concluded that among Poulnex[®], Neem and Chinopodium, Poulnex and neem are more effective against Ascariasis in village poultry. But Poulnex is not cost-effective and not easily available for rural people; From this sense Neem is considering more suitable one. Indeed this study is preliminary one considering small population and however, further research works should be carried out to explore the possible therapeutic issue of Neem against Ascariasis in village poultry.

REFERENCES

- Githiori JB, Høglund J, Waller PJ and Baker RL (2004). Evaluation of anthelmintic properties of some plants used as livestock dewormers against *Haemonchus contortus* infections in sheep. *Parasitology* 129 (2): 245-53.
- Martin RJ, Verma S, Levandoski M, Clark CL, Qian H, Stewart M and Robertson AP (2005). Drug Resistance and neurotransmitter receptors of nematodes: Recent studies on the mode of action of levamisole. *Parasitology* 131(Suppl): S71-84.
- Ralston MJ, Stankiewicz M and Heath DD (2001). Anthelmintics for the control of nematode infections in the brush tail possum (*Trichosurus vulpecula*). *Newzealand Veterinary Journal* 49 (2): 73-77.
- Rayas D, De Rosa MJ, Bartos M, Bouzat C (2004). Molecular basis of the differential sensitivity of nematode and mammalian muscle to the anthelmintic agent levamisole. *Journal of Biological Chemistry* 279 (35): 36372-81.
- WHO (1993). *Summary of WHO guidelines for assessment of herbal Medicines*. *Herbal Gram* 28: 13-14.
- Wrigley J, McArthur M, McKenna PB and Mariadass B (2006). Resistance to a triple combination of broad-spectrum anthelmintics in naturally acquired *Ostertagia circumcincta* infections in sheep. *Newzealand Veterinary Journal* 54 (1): 47-49.
- Yusuf M, Chowdhury JU, Wahab MA and Begum J (1994). *Medicinal Plants of Bangladesh*. Bangladesh Council of Scientific and Industrial Research, Dhaka, Bangladesh.