STUDIES ON PREVALENCE OF ASCARIASIS IN INDIGENOUS CHICKENS IN GAIBANDHA DISTRICT AND TREATMENT BY PINEAPPLE LEAVES EXTRACT

Mst. Kamrunnaher Akter¹, ABM Jalal Uddin¹*, Maksudur Rashid¹, Fahima Binte Aziz², Md. Bazlar Rashid² and Mahmudul Hasan²

¹Department of Livestock Services (DLS), Bangladesh; ²Department of Physiology and Pharmacology, Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200, Bangladesh

*Corresponding author: ABM Jalal Uddin; E-mail: abulbasar47@gmail.com

ARTICLE INFO

ABSTRACT

Ascariasis is very common in indigenous chicken causing retarded growth, low productivity and mortality. Considering the problem of Ascaridia galli in chickens, anthelmintic resistance, high cost and human health hazard of chemical anthelmintic the use of medicinal plant is an alternative choice. The study was conducted to determine the incidence of ascariasis in Polashbari upazilla of Gobindaganj district during July to November 2012 and subsequently evaluated the efficacy of pineapple (Ananus comosus) leaves extract against ascariasis infected chickens. Out of 500 chickens examined for presence of A. galli infestation by faecal sample examination, 365 hens and 135 cocks. The 292 female (80%) and 119 male (88.15%) were found infected with A. galli. The highest infection rate 95.26% was found in 60 to 90 days of age group. Infected chickens were treated with pineapple leaves extract @ 1ml/kg body weight per OS for 7 consecutive days. The efficacy of anthelmintic treatment was evaluated by counting fecal egg per gram (EPG) compared with pretreatment values. Body weight and hematological changes of each chicken was recorded in pre and post treatment. In the untreated control chickens the average EPG increased from 300 ± 11.07 to 340 ± 13.96. The average EPG reduced from 300 ± 11.07 to 60 ± 7.40 within 28 days of pineapple treatment. The mean body weight gain in treated chicken was significantly (p<0.01) higher than the control. Pineapple leaves extract increased the TEC, Hb and PCV and decreased TLC and ESR values of chickens. But in control group TEC, Hb and PCV decreased and TLC and ESR values increased. It may be concluded that pineapple leaves extract treatment effectively reduced the ascariasis load in chicken and improved body weight.

To cite this article: Akter MK, ABM Jalal Uddin, M Rashid, FB Aziz, MB Rashid and M Hasan, 2016. Studies on prevalence of ascariasis in indigenous chickens in Gaibandha district and treatment by Pineapple leaves extract. Res. Agric. Livest. Fish. 3 (1): 157-163.
INTRODUCTION

Poultry is a promising sector in Bangladesh which is increasing day by day. Poultry production is hindered by many problems among which various diseases namely bacterial, viral and parasitic infections are the most important (Ojok, 1993). In fact poultry of Bangladesh are infested with various parasites (Sarkar, 1976). Management system plays an important role in the occurrence of parasitic disease. The parasitic load leads to lower productivity, retarded growth rate and death of birds (Barger, 1982; Sykes, 1994). Ascariasis caused by *Ascaridia galli* is a common parasitic problem of chicken both in rural and farm conditions in Bangladesh (Islam and Shaikh, 1967; Haq, 1986). *A. galli* causes extensive economic losses in different ways such as loss of weight gain, meat production, egg production and death of birds (Kamal, 1989). Piperazine citrate is widely used for the treatment of ascariasis in chickens. The use of anthelmintics by farmers for poultry parasite is not usual and strategic. Frequent and improper use of anthelmintics increases the resistant population of nematodes (Waller et al., 1987). Furthermore the withdrawal period of anthelmintic is not maitained for consumption of poultry in Bangladesh which can cause significant health threat. Therefore, the use of safe and cost effective alternative approach for treatment of poultry parasite is necessary. There are several indigenous medicinal plants have anthelmintics action and used against both ecto and endoparasites in Bangladesh (Mostofa, 1983; Mannan et al., 1997). Pharmacological actions along with therapeutic trial of these plants may be studied experimentally, which might prove worthy of medical value. Pineapple leave extract is used as anti-inflammatory, anti bacterial and anthelmintic agent (Mostofa, 1983 and Amin et al., 2009). Considering the diversified pharmacological function of pineapple the present study was designed to evaluate the efficacy of pineapple leave extract on ascariasis in indigenous chicken.

MATERIALS AND METHODS

The experiment was conducted at the Department of Physiology and Pharmacology, Hajee Mohammed Danesh Science and Technology University, Dinajpur and Upazila Livestock Office, Palashbari, Gaibandha, during the period from July to November, 2012

Study area and sampling

A total of 500 native chickens (*Gallus gallus domesticus*) of 2 to 7 months age from different villages of Palashbari Upazila of Gaibandha District were examined to study the prevalence according to sex, age and location. Fecal samples were collected from the cloaca during early in the morning. The sample were packed within polythene bags and sent as soon as possible to the laboratory for examination. Direct smear method and Stoll's ova counting technique were used for fecal sample examination following the procedure described by Urquhart (2003) and Soulsby (1982).

Experimental bird

Fourty five indigenous chickens having infection with *Ascaridia galli* were selected for this experiment. The chickens were allowed to take rest for 7 days for adaptation. The experiment was carried out in upazila livestock office, Palashbari, Gaibandha. The age and body weight of chickens ranged from 2 to 7 months and 300 to 500 gm, respectively. The chickens were supplied with normal diet and water.

Fecal eggs count

For determination of infectivity, fecal samples were collected and eggs were counted by Stoll's ova counting technique and direct smear method through microscopy following the procedure described by Rahman et al. (1996) and Soulsby (1982). At least three slides from each faecal sample were examined.
Drug and plant

Pineapple leaves (*Ananus comosus*) were collected from the horticulture garden of the University. Ten percent (10%) water extract of pineapple leaves was prepared freshly, 20 gm pineapple leaves was grinded in mortar and pastle, the extract was made in 20ml water. The extract was then administered 1ml/kg orally by dropper.

Experimental design

All the 30 chickens randomly divided into 2 groups (control and treatment). Control group was without treatment and treatment group was treated with pineapple leaves extract. Pineapple leaves extract was administered orally @ 1 ml/kg bwt by dropper by 7 consecutive days. All the chickens of treated and control groups were closely observed for 28 days after treatment and on body weight, feeding efficiency, feather coat.

Hematological examination

Blood samples were collected from the wing vein of chicken of both control and treated groups at pre-feeding and during feeding (28 days) period at 7 days interval. Total erythrocytes count (TEC), Erythrocytes sedimentation rate (ESR), Packed cell volume (PCV) and Total leukocyte count (TLC) were performed as per methods described by Schalm et al. (1975). Hemoglobin estimation was performed as per method described by Coffin (1955).

Postmortem examination

Before treatment three chickens from each group were also slaughtered to count the number of parasites (Ascarids) and to see if there were any pathological changes present. After treatment three chickens from each group were slaughtered to count number of parasites (*A. galli*) and to see if there were any pathological changes present on 14th and 26th day of treatment.

Statistical analysis

Comparison of the mean values of the treatment against those of the control was performed by Student’s t-test and the level of probability considered significant when p<0.05.

RESULTS AND DISCUSSION

Out of 500 chickens 365 were hens and 135 were cocks. Among the female 292 (80%) and male 119 (88.15%) birds were found infected with *A. galli*.

Prevalence of ascariasis

The prevalence of ascariasis in chickens in different villages of Palashbari upazila of Gaibandha district is presented in table 1. The highest (93%) and lowest (74.74%) prevalence of ascariasis were recorded in village Andua and Nuniagari, respectively.

Table 1. Incidence of ascariasis in chickens of different age groups of Palashbari upazila of Gaibandha District

| Category                        | Category-1 (2-3 months) | Category-2 (above 3-5 months) | Category-3 (above 5-7 months) | Total |
|---------------------------------|-------------------------|-------------------------------|-------------------------------|-------|
| Number of chicken examined      | 190                     | 180                           | 130                           | 500   |
| Number of infected chicken      | 181                     | 167                           | 72                            | 420   |
| Rate of infection (%)           | 95.26                   | 92.78                         | 55.38                         | 84    |
A significant higher incidence (95.26%) of the infection was recorded in chickens between 2-3 months of age, followed by 92.78% and 55.38% between age group of 3-5 months and 5-7 months respectively. Similar findings have reported by Sarker et al. (2009), Gauly et al. (2005), Romanenko et al. (1985). The results indicate that the rearing or management system in different village and age factors played an important role in ascariasis in chicken.

Effect on body weight

The effect of pineapple leaves on body weight was observed for 28 days at 7 days interval. Mean body weight of each group of chickens at pretreatment and post treatment period is presented in Table 2.

| Group of chicken | 0 day | 7th day | 14th day | 21st day | 28th day | Mean weight gain (%) |
|------------------|-------|---------|----------|----------|----------|----------------------|
| Control          | 402.466±3.65 | 398.241±3.88 | 405.53±3.58 | 403.413±3.54 | 406.06±3.46 | 0.89                |
| Pineapple leaves extract @ 1gm/kg bwt orally | 430.03±5.29 | 431.99±5.92 | 437.79±5.19 | 439.07±5.56* | 446.09±5.26* | 3.74               |

Values given above the represent the mean ± SE of 5 chickens

Effect on parasite

Pineapple leaves extract against ascariasis showed reduction of EPG count on 14th and 28th day in the treated group of chickens whereas EPG count was increased in control group (Table 3). The data showed that pineapple leaves extract was found to be about 53% effective within 14 days of treatment and 80% effective within 28 days of treatment. These results are in agreement with earlier reports of Patra et al. (2010), Amin et al. (2009), Sujon et al. (2008), Islam et al. (2005), Khalid et al. (2005) and Khatun et al. (1995).

| Group of chicken | Pre-treatment (No.) | After drug administration (post-treatment) (No.) |
|------------------|---------------------|-----------------------------------------------|
|                   | 0 day               | 14th day | 28th day |
| Pineapple leaves extract @ 1gm/kg bwt orally | 8±1.63   | 3±1.32 | 1±1.31 |
| Control           | 10±1.41             | 14±1.41 | 15±1.90 |

Values given above the represent the mean ± SE of 3 chickens
Effect on hematological parameters

On day ‘0’ the mean value of initial body weight of treated group was 430.03±5.29 gm and on the 28th day of post treatment, the mean value of body weight was 446.09±5.26 gm. The body weight was significantly (p<0.05) increased (3.74% on 28th) at post treatment period compared to pretreatment. But percentage of body weight gain of the control group was very negligible as 0.89% on 28th day. The present findings support the earlier observation of Hoque et al. (2006), Khalid et al. (2005), Islam et al. (2004, 2005), Khatun et al. (1995).

Table 5. Effects of pineapple leaf extract on TEC (million/cu mm) in indigenous chickens in different treatment period

| Blood Parameters | Group          | 0 day       | 7th day      | 14th day     | 21st day     | 28th day     |
|------------------|----------------|-------------|--------------|--------------|--------------|--------------|
| TEC (million/cu mm) | Pineapple Treated | 3.53±0.26  | 3.53±0.26  | 3.56±0.265  | 3.61±0.29  | 3.7±0.13     |
|                  | Control         | 3.20±0.32  | 3.17±0.46  | 3.056±0.34  | 3.12±0.30  | 2.96±0.19    |
| Hemoglobin (gm%) | Pineapple Treated | 9.48±0.54  | 9.52±0.47  | 9.6±0.38    | 9.6±0.35   | 9.8±0.53     |
|                  | Control         | 9.14±0.68  | 8.96±0.57  | 8.9±0.50    | 8.88±0.51  | 8.82±0.50    |
| PCV (% 30 minutes) | Pineapple Treated | 19.36±0.88 | 20.86±0.84 | 20.92±0.78  | 21.64±0.78 | 22.38±0.65   |
|                  | Control         | 20.46±0.88 | 20.02±0.78 | 19.8±0.78   | 19.12±0.93 | 18.22±0.69   |
| ESR (mm/1st hour) | Pineapple Treated | 0.5±0.27   | 0.44±0.34  | 0.48±0.29   | 0.42±0.36  | 0.4±0.32     |
|                  | Control         | 0.62±0.39  | 0.56±0.4   | 0.6±0.32    | 0.58±0.29  | 0.48±0.29    |
| TLC (10³/mm³)    | Pineapple Treated | 7.66±0.64  | 7.60±0.45  | 7.56±0.30   | 7.53±0.28  | 7.43±0.39    |
|                  | Control         | 10.23±0.69 | 10.32±0.75 | 10.37±0.71  | 10.41±0.64 | 10.49±0.81   |

Values given above the represent the mean ± SE of 5 chickens

The administration of pineapple leaves extract increased the TEC, Hb and PCV and reduced TLC and ESR values of chicken. But in non treated control group, TEC, Hb and PCV were decreased and TLC and ESR values were increased. The maximum reduction or increased values were observed at 28th day of post treatment. Changes in hematological parameters were similarly reported by other researchers (Hoque et al., 2006; Islam et al., 2005; Khatun et al., 1995).

Postmortem examination

There was no significant pathological change in any internal organs of the chicken of the treated groups. Reduction of parasite count was found on 14th and 28th day in the group of chicken treated with pineapple extract. The highest reduction of number of parasites was recorded on 28th day of treatment. On the other hand, number of parasites was increased day by day in control group A. This findings support the earlier observation made by Gauly et al. (2005) and Malakhov (1988).

Effect on feeding efficiency

Treatment of chicken with pineapple leaves extract significantly increased feeding efficiency of the chickens. But feeding efficiency decreased gradually in chickens of control group.

Effect on feather coat

The feather coats of all treated chicken were observed smooth and shiny at 28th day of post treatment period. Rough and discoloured feather coats obverted in non treated control were due to severe parasitic infestation. A. galli is prevalent in indigenous chicken in different villages of Gaibandha district which suggest treating the infested chicken with effective anthelmintics and implementing regular deworming program of chicken in the study areas. Pineapple leaves showed highly encouraging efficacy as an
Anthelmintics. Considering the availability and low cost pineapple leaves can be used to treat chicken ascariasis. Since this study is a preliminary work in a small population of chicken further studies must be carried out to evaluate the adverse effects, bio-chemical analysis of pineapple leaves against ascariasis in chickens.

REFERENCES

1. Amin M R, Mostofa M, Hoque ME and Sayed MA, 2009. In vitro anthelmintic efficacy of some indigenous medicinal plants against gastrointestinal nematodes of cattle. Journal of Bangladesh Agriculture University, 7: 57–61.
2. Barger IA, 1982. Helminth parasites and animal production. In: Symons, L.E.A., A.D. Donald and J.K. Dineen (Eds), Biology and control of endoparasites. Academic press, Sydney. pp.: 133-155.
3. Coffin DL (1955). Manual of Veterinary Clinical Pathology (3rd edn). Comstock Publishing Association, Inc. New York, USA.
4. Gauly M, Homannb T and G Erhardt, 2005. Age-related differences of Ascaridia galli egg output and worm burden in chickens following a single dose infection. Veterinary Parasitology, 128(1-2): 141-148.
5. Haq MS, 1986. Studies on helminthes infections of chicken under rural condition of Bangladesh. Bangladesh Veterinary Journal, 20: 55-60.
6. Hoque M E, Mostofa M, Awal MA, Choudhury ME, Hossain MA and Alam MA, 2006. Comparative efficacy of piperazine citrate, levamisole and pineapple leaves extract against naturally infected ascariasis in indigeneous chickens. Bangladesh Journal of Veterinary Medicine, 4: 27-29.
7. Islam SA, Rahman MM, Hossain MA, Chowdhury MGA and Mostafa M, 2005. Comparative efficacy of some modern anthelmintics and pineapple leaves with their effects on certain blood parameters and body weight gain in calves infected with ascarid parasites. Bangladesh Journal of Veterinary Medicine, 3: 33-37.
8. Islam AWMS and Shailk H, 1967. Efficacy of ivermectin (pour on formulation) against gastrointestinal nematodiasis and ectoparasites in cattle of Bangladesh. Indian Journal of Pharmacology. 31: 234-238.
9. Islam SA, Mostofa M, Awal MA and Khan KA, 2004. Efficacy of pineapple leaves extract compared with modern anthelmintics against ascariasis in calves. The Bangladesh Veterinarian, 21: 9-13.
10. Kamal AHM, 1989. Pathological investigation on the mortality of chickens in Bangladesh Agricultural University Poultry Farm. M.Sc. (Vet. Science) Thesis, Department of Pathology, Bangladesh Agricultural University, Mymensingh.
11. Khalid S MA, Amin MR, Mostofa M, Choudhury ME and Uddin B, 2005. Effects of indigenous medicinal plants (neem and pineapple) against gastrointestinal nematodiasis in sheep. International Journal of Pharmacology, 1: 185-189.
12. Khatun M, Awal MA, Mostofa M and Rashid MSH, 1995.Comparative efficacy of pineapple leaves with Fenbendazole against gastro-intestinal nematodes in goats. Bangladesh Veterinary Journal, 29: 75-78.
13. Malakhov Av, Korchagin Al, Pevneva VD and Nadykto MV, 1988. Tolerance of Ascaridia galli to piperazine. Veterinariya, Moscow, No. 7, 38-39.
14. Mannan MA, Rafiq K, Mostofa M and Hason Q, 1997. Comparative efficacy of Ivomec pour on, Neguvon Ointment and Neem-tobacco herbal preparation against naturally occurring hampsore Lesion in cattle. Bangladesh Veterinary Journal, 31: 119-122.
15. Mian R, 2009. Comparative efficacy of the selected indigenous medicinal plants with a patent drug levamisole against ascariasis in village poultry. Bangladesh Journal of Veterinary Medicine, 7: 320-324.
16. Mostofa M, 1983. Efficacy of some indigenous medicinal plants against gastrointestinal nematodiasis in cattle and their comparative activity with that of Nemafax. M.Sc (Vet. Science) Thesis, Department of Pharmacology, BAU.
17. Ojok L, 1993. Diseases as important factor affecting increased poultry production in Uganda. Der Tropenland Wirt Zeitschrift fur die landwirtschaft in din Tropen und Subtropen. 94: 37-44.
18. Patra G, Lyngdoh WM, Ali MA, Prava M and Chanu KV, 2010. Comparative Anthelmintic Efficacy of Pineapple and Neem Leaves in Broiler Chickens Experimentally Infected with Ascaridia galli. International Journal of Poultry Science. 9: 1120-1124.
19. Rahman MH, Ahmed S and Mondol MMH, 1996. Introduction to Helminth Parasites of Animals and Birds in Bangladesh. RS. Tahsina Mostofa (1st edn.). 16(18): 105-106.
20. Romanenko PT, Troenko TA, Zaremba IA and Kuzyakin AV, 1985. Age variation in helminth infection on chicken’s farm and factory faems in the Roostov region. Poultry Abstract. 11: 249-250.
21. Sarkar AJ, 1976. The prevalence of avian diseases in Bangladesh Agricultural University Farm. Bangladesh Veterinary Journal, 10: 61-66.
22. Sarker RR, Mostofa M, Awal MA, Islam MS and Mammon SA, 2009. Prevalence of ascariasis in village poultry at five upazilas under feni District. Bangladesh Journal of Veterinary Medicine, 7: 293-295.
23. Schalm DW, Jain NC and Carrol EJ, 1975. Veterinary Haematology. 3rd edn. Lea and Febiger Philadelphia. USA. p.622.
24. Soulsby EJL, 1982. Helminth Arthropods and Protozoa of Domesticated Animals. 7th edn, Balliere Tindal and Cassell Ltd. London.
25. Steel JW and Symons LEA, 1982. Nitrogen metabolism in nematodies of sheep in relation to productivity. In: Symons, LEA, AD Donald and JK Dineen (Eds), Biology and control of endoparasites. Academic press, Sydney. pp: 235-256.
26. Sujon MA, Mostofa M, Jahan MS, Das AR and Rob S, 2008. Studies on medicinal plants against gastrointestinal nematodes of goats. Bangladesh Journal of Veterinary Medicine, 6: 179-183.
27. Sykes AR, 1994. Parasitism and Production in farm ruminanta. Animal Production, 59: 155-172.
28. Urquhart GM, Aremour J, Dunchan JL, Dunn AM and Jeninis FW, 2003. Veterinary Parasitological 2th edition, Blackwell sciences ltd.
29. Waller PJ, Asbakk K, Hrabok JT, Oksanen A and Nieminen M, 1987. Prolonged persistence of fecally excreted ivermectin from reindeer in a sub-arctic environment. Journal of Agriculture Food Chemistry, 54: 9112-9118.