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Efficacy of Neem (*Azadirachta indica*) and Pineapple (*Ananas comosus*) Leaf Powder on *Ascaridia galli* Infection in Chicken

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Abstract

A study was conducted to assess the efficacy of herbs *Azadirachta indica* (Neem) and *Ananas comosus* (Pineapple) for the control of ascaridiosis in chicken. Neem leaf powder (@100 mg /kg feed /day), Pineapple leaf powder (1gm /kg feed /day) and combined preparation (100 mg +1gm /kg feed/day) were found effective against *Ascaridiagalli*. The percent efficacy by declining rate of EPG and worm count revealed that combined preparation of Neem and Pineapple leaf powder was most effective, followed by Pineapple leaf powder and Neem leaf powder at 28 day post treatment. The present study revealed that Neem and Pineapple could be safe and effective dewormer and may provide an alternative of chemical anthelmintics.

Key Words: Neem, Pineapple, anthelmintics, chickens, *Ascaridiagalli*

Introduction

The control of Ascaridiosis through indiscriminate use of chemical anthelmintics lead to drug resistance, harmful residual presence in meat and egg for human health and promote environmental hazards (Hossain *et al.* 2015). Neem (*Azadirachta indica*), a tropical evergreen native plant of India contain specific therapeutic compound with high antiseptic, antiviral, antipyretic, anti inflammatory, antiulcer, anti fungal, anthelmintic properties, (Amin *et al.*, 2009). Pineapple (*Ananas comosus*) is another tropical plant widely cultivated and possessing anthelmintic activity (Hossain *et al.*, 2015). *A. Comosus* leaves contain proteolytic enzyme, cysteinases and proteinases that were shown to have anthelmintic activity *in-vitro* and *in-vivo* (Steppek, *et al.* 2004; Behnke *et al.*, 2008).

Hence the present study was designed to evaluate the anthelmintic properties of Neem and Pineapple for the control of ascaridiosis in chicken.

Materials and Methods

Present investigation included the collection of intestinal loops from 500 chickens of different slaughter points at local markets situated in Patna. The mature parasites were collected by opening the individual intestine in normal saline solution. For the culture of eggs selected mature female worms were macerated and processed for embryonation at 28-30°C in a B.O.D. incubator as per the method described by Ali *et al.* (2011). At 21 days of post embryonation, eggs matured to infective stage, were collected by repeated (three times) centrifugation at 1000 rpm followed by washing the pellet in normal saline. The pellet then suspended in double distilled water to count the number

of eggs as per the procedure of Ali *et al.* (2011). The study of efficacy of Neem (*Azadirachta indica*) and Pineapple (*Ananas comosus*) for the control of *A. galli* infection in chicken was determined by procuring one hundred broiler chicks and randomly dividing into 5 Groups (T1, T2, T3, T4 & T5) consisting of 20 birds in each group. Each bird of all the four groups (T1, T2, T3 & T4) were fed with infective egg suspension containing 400 eggs/ml and T5 was kept as healthy control. Establishment of infection of *A. galli* was monitored in droppings of infected birds.

Ascertainment of infection by faecal dropping examination (approx. between 55-62 days post infection) was done and Powder of Neem and Pineapple leaf was supplemented to Group T1 and T2 after mixing it with saturated sucrose solution at the rate of 100 mg/kg and 1 gm/kg of feed respectively throughout the experimental period and T3 group was fed with combination of both Neem and Pineapple leaf powder whereas chicks of T4 group was left as untreated infected control and T5 group was kept as untreated non-infected control. The worm counts in two birds of the group and EPG were carried out on 0 day, 7th, 14th, 21st, and 28th day of post-treatment. Efficacies of these preparations were recorded by the declining trends of the worm count or EPG as per routine method and comparative study was done by standard statistical techniques (Snedecor and Cochran, 1994).

$$\text{Efficacy \%} = \frac{\text{EPG Pre-treatment} - \text{EPG post-treatment}}{\text{EPG Pre-treatment}} \times 100$$

$$\text{Efficacy (\%)} = \frac{\text{no. of parasite in control bird} - \text{no. of parasite in treated birds}}{\text{no. of parasite in control bird}} \times 100$$

Results and Discussion

The efficacies of Neem and Pineapple leaf powder and their combination on *Ascaridia galli* infection in chicken were evaluated on the basis of eggs per gram (EPG) count at different time interval and have been presented in table-1.

Table-1: Post treatment changes in Mean ± S.E. of Eggs per Gram (EPG) and percent efficacy of herbal preparations in *A. galli* infected chicken.

Group	Eggs per Gram (EPG)						Percent Efficacy	
	0 day	7 th	14 th	21 st	28 th	Mean	S.E.	
T1	2815.8 ^{Ea}	2101.8 ^{Dc}	1626.8 ^{Cc}	1336.4 ^{Bb}	1037.4 ^{Ac}	1626.8	25.36	
T2	2901.8 ^{Ea}	1891.2 ^{Db}	1516.8 ^{Cb}	1280.2 ^{Bb}	781.6 ^{Ab}	1516.8	34.82	
T3	2859.6 ^{Ea}	1665.2 ^{Da}	1250.6 ^{Ca}	713.2 ^{Ba}	396.0 ^{Aa}	1250.6	41.76	
T4	2840.4 ^{Aa}	2903 ^{Ad}	2883.6 ^{Ad}	2929.6 ^{Ac}	3032.4 ^{Bd}	2883.6	56.26	
T5	66.80	103.26	79.35	101.78	82.34	66.80	3.98	

Table-2: Post treatment changes in Worm count and percent efficacy of herbal preparations in *A. galli* infected chickens.

Groups	Anthelmintic used	Number of parasites												
		0 day	7 th day	Efficacy	Chi-square X ²	14 th day	Efficacy	Chi-square X ²	21 st day	Efficacy	Chi-square X ²	28 th day	Efficacy	Chi-square X ²
T1	Neem	23	19	29.62	2.46	16	42.85	24.85**	14	44.00	66.82**	12	60.00	144.34**
T2	Pineapple	25	17	37.03		15	46.42		11	56.00		8	73.33	
T3	Neem + Pineapple	25	16	40.74		12	57.14		7	72.00		5	83.33	
T4	Infected untreated (control)	24	27	-		28	-		30	-		30	-	
T5	Non-infected, untreated (control)	-	-	-	-	-	-	-	-	-	-	-	-	-

** Significant ($P > 0.05$)

Average EPG ranged from 2815 to 2901.8 eggs per gram faeces before treatment in the four treatment groups. The EPG declined sharply and significantly in all the treatment groups after administration of Neem and Pineapple leaf powder and their combination from first week (Table-1), while considerable increase in EPG was seen on the 7th day observation in control group. However among treatment groups, combined treatment group (T3) was found to be most efficacious, followed by pineapple treated group (T2) and lowest was observed in Neem treated group (T1) at 7th, 14th, 21st and 28th day observation in terms of percent reduction in egg count, statistically also the difference in count of mean egg per gram of faeces between treatment groups as well as days of observation was found to be highly significant.

However, the reduction of worm counting (Table-2) was not significant till observation of first week but significant differences were noted 15th day onwards in terms of worm count and percent efficacy. Similar pattern of reaction of Neem, pineapple and combination treatment in terms of efficacy was as observed in egg count trial. Patra *et al.* (2010) also reported that Neem and Pineapple leaf powder caused cent percent evacuation of ascarid worms on 28th and 56th day post treatment respectively, in chicks. These results also corroborate with findings of Akter *et al.* (2015) who reported superior performance of Pineapple leaves extract in all treatment groups against ascariidiosis. Observations are also in close agreement with earlier reports of Amin *et al.* (2009) and Sujon *et al.* (2008). It may be suggested that mechanism of action of Azadirachtin (and other compound of neem) and cysteine proteinase (pineapple) may have potential of destroying or eliminating properties (Shazia and Goyal, 2012) towards ascarid worms as progressive decrease in worm count or reduction in EPG was evident at post-treatment days. Gupta (2008), Patra *et al.* (2010) and Oparaocha *et al.* (2008) also observed and reported anthelmintic activity of *Azadirachita indica* and *Carica papaya* in broiler chicken infected with *A. galli*.

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Conflict of Interest: All authors declare no conflict of interest.

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