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Effect of neem (*Azadirachta indica*) leaves powder against Coccodia in commercial broiler chickens

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Abstract
The experiment was conducted at the nearby poultry farm of the College of Veterinary Science and Animal Husbandry, NDUAT, Kumarganj, Faizabad, UP, India. A total of 200 unsexed Vencob commercial broiler chicks were distributed to four treatment groups each made of 50 chicks in a 4-brooder rooms. All the fifty chicks from each treatment were divided to form 5 replicates of 10 chicks each in a Completely Randomized Design (CRD). The four treatment groups were supplemented with neem leaf powder @ 0g, 1g, 2g and 3g / kg of broiler ration respectively. The litter of each treatment group was mixed weekly with dry neem leaves @ 0g, 2g, 4g and 6g / sqft area. The fecal sample from each group was analyzed for parasitic eggs at every two weeks interval. The results of group treated with 2g NLP/kg feed showed maximum reduction of 62.5% while the group treated with 1 g NLP/kg feed showed maximum reduction of 44.44% and the group treated with 3g NLP/kg feed was the least potent showing 37.5% reduction of oocysts count. All these values were not comparable with the control groups of birds where no treatment was provided. The effect of neem leaf feeding and the effect of neem leaf application in the litter might have synergized the reduction of OPG count in the treatment groups under study.

Keywords: Coccidiosis, Neem (*Azadirachta indica)* leaf powder**,** OPG, Commercial broiler

Introduction
Many anti- parasitic drugs have been developed and introduced in the poultry industry all over the world. Coccidiosis is one of the most detrimental and lethal management diseases of poultry. It causes high mortality in affected flocks. Since various anti-coccidial feed additives, predominantly polyether ionophorous anti-biotics, have been developed and used (Matsuda *et al*. 1989) [6]. While effective for avian coccidiosis, the continuous use and misuse of anticoccidial drugs have led to the emergence of drug-resistant strains (Ruff and Danforth 1996) [9]. To prevent the emergence of drug resistant strains, new drugs have been developed and administered on a rotational basis with existing drugs. However, this has resulted in the increased cost of poultry products. Furthermore, drug- or antibiotic-residue in the poultry product is potentially annoyance to consumer. Therefore, it is sought that the regulations for anticoccidial drugs should be strengthened gradually. Halofuginone was derived from an extract of the *Dichroa febrifuga*. The original extract, febrifugine, was known for antimalarial and anticoccidial activity, but was never marketed because of a very narrow safety margin at the dose of 3 ppm. Other extracts of herbs were known to be effective against parasites, such as malaria, amoeba, trichomonad, arthropods and helminths (Shuhua and Catto 1989, He and Zhang 1989, Qnan 1990, Dutta *et al* 1990, Matsuda *et al* 1991,) [11, 4, 8, 3, 5]. *Azadirachta indica* (Neem) has been used since centuries in the folk medicine to treat various parasitic infections of man and animals (Nadkarni 1976) [7]. Therefore, in order to evaluate the anticoccidial activity of *Azadirachta indica* (Neem), its leaf powder were administered in feed at graded doses to the chickens.

Materials & Method
A total of 200 unsexed Vencob commercial broiler chicks were distributed to four treatment groups each made of 50 chicks in a 4-brooder rooms. All the fifty chicks from each treatment were divided to form 5 replicates of 10 chicks each in a Completely Randomized Design (CRD). Water and broiler diet for the four respective treatments were offered ad libitum. The four treatment groups were supplemented with neem leaf powder @ 0g, 1g, 2g and 3g / kg of broiler ration respectively. The litter of each treatment group was mixed weekly with dry neem leaves @ 0g, 2g, 4g and 6g / sqft area.

Fresh leaves of the neem trees surrounding the college premises were harvested and sun-dried until they become crispy while retaining the greenish coloration. The leaves were turned regularly to prevent uneven drying and decay. The dried leaves then were pulverized with a blender. A 2mm mesh diameter sieve was used to obtain fine dust which will be stored in air tight container until they were used. The fecal sample from each group was analyzed for parasitic eggs at every two weeks interval.

Fecal oocyst count

Fecal samples were stored in a refrigerator until processed. The FOC was determined by modified Mac Master Technique. First of all two gram of feces were taken in 30 ml of a saturated salt solution the sample solution was thoroughly mix. Immediately after mixing a sample of the solution was extracted using a pipette and placed into one half of a Mac Master slide. This was repeated to fill the other half of the slide. The number of eggs counted in both sides of the chamber was multiplied by 50 to estimate the total number of eggs in the sample. Results were reported as oocyst per gram (OPG).

Results and Discussion

Effect of neem leaves against coccidia

This work was done to appraise the anthelmintic properties of neem on commercial broilers. One of the major gastro intestinal parasites in poultry is coccidia. The anticoccidial screening of neem leaf powder was carried out in broiler chickens. The mean oocysts (coccidia) count per gram of feaces (OPG) and their percentage reduction in chickens at fort night intervals under different treatments are presented in Table 1 & Table 2. The treatments differed significantly ($p<0.05$) in reducing OPG at day 14, 28 and 42. The significant ($p<0.05$) variation during experimental days was also observed in reducing the OPG in case of three treatments. In chicks of T_1 group, OPG count prior to treatment was reduced from 450 to 250, showing a reduction of 44.44 % on the last day. This was significantly different on days 14, 28 and 42 from the pre treatment OPG value. On the next higher dose of NLP (i.e.,2g/kg feed) of T_2 group, pretreatment OPG count was reduced from 400 to 350, 250 and 150 on days 14, 28 and 42 respectively. This OPG counts were significantly lower than that of pre treatment values. These values showed 62.5% reduction in oocysts count at the end of experiment. In the group treated with 3g NLP/kg feed (i.e.,T_3 group), the pre treatment count was reduced from 400 to 350, 300 and 250 on days 14, 28 and 42 respectively, showing a reduction of 37.5% on 42nd day.

The results of group treated with 2g NLP/kg feed showed maximum reduction of 62.5% while the group treated with 1 g NLP/kg feed showed maximum reduction of 44.44% and the group treated with 3g NLP/kg feed was the least potent showing 37.5% reduction of oocysts count. All these values were not comparable with the control groups of birds where no treatment was provided.

Table 1: OPG count of the fecal sample of broiler chickens fed diet supplemented with neem leaf powder (NLP)

Days	Control T_0	NLP T_1	NLP T_2	NLP T_3	SEM	P value
Pre treatment	400	450	400	400	5.619	0.391
14th day	500^a	400^b	350^c	350^c	18.35	<0.001
28th day	550^a	300^b	250^c	300^b	35.927	<0.001
42nd day	600^a	250^b	150^c	250^b	51.799	<0.001

Values with different small letter subscripts in a row differ between groups significantly ($p<0.05$).

Table 2: Percentage reduction in OPG count of the fecal sample of broiler chickens fed diet supplemented with neem leaf powder (NLP)

Group	Pretreated (OPG)	Post treated 14 day (%)	Post treated 28 day (%)	Post treated 42 day (%)
Control T_0	400	-	-	-
NLP T_1	450	11.11	33.33	44.44
NLP T_2	400	12.50	37.5	62.5
NLP T_3	400	12.50	25.00	37.5

The effects of dried neem leaf powder feeding and the effect of dried neem leaf application in the litter might have synergized the reduction of OPG count in the treatment groups under study. The anticoccidial efficiency of neem in the current study is supported by the other studies which used neem as dried leaves (Tipun *et al*., 2006) [13]. The anticoccidial effect of neem may be ascribed to some bioactive chemicals such as azadirachtin which has a significant efficacy on viruses, fungal pathogens and protozoan parasites such as coccidian species (Biu *et al*., 2006) [2]. The results of the present study agreed with the findings of Sarker *et al*., (2016) [10] where they reported that neem leaf had significant ($p<0.01$) effect in reducing EPG and the commercial albendazole which ended 100% reduction in the fecal egg count, was only 6% more than that of neem leaf in zebu cow. Amin *et al*. (2010) [1] reported significant ($p<0.05$) effect of neem leaf in EPG at day 7, 14, 21 and 28, respectively. Sujan *et al*. (2008) [13] stated that the efficacy of neem leaf to be 81 % at day 21 in goats.

Conclusion

On the basis of above results, the present study might be concluded that birds of T_2 group showed significantly ($p<0.05$) decreased OPG value (62.5%) followed by T_1 (44.44%) and T_3 (37.50%).

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