

## An Alternate Approach to Control Coccidiosis in Commercial Broiler Chickens Through PhytoGenics

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### ABSTRACT

Coccidiosis is a major parasitic disease of poultry and many anti parasitic drugs have been developed in the past, still it causes high mortality in affected flocks. Many herbs have anti parasitic properties which needs to be studied widely. In view of this present study was undertaken. A total 200 day old VENCOB day old chicks were divided into four equal groups ( $T_0$ - $T_4$ ) and each group was subdivided into 5 replicates of 10 chicks each in CRD model. The three treatment groups were supplemented with 0.2% Neem leaf powder, 0.2% Amla fruit powder and 0.5% Black cumin powder respectively. The  $T_0$  was control group with only basal diet. The fecal egg count (FEC) was conducted day 1, day 21 and day 42. The results of treatment groups  $T_1$  showed significantly

higher reduction (88.88%) in oocyst per gram (OPG) count followed by  $T_3$  (62.50%) and  $T_2$  (50.00%). The present trial might be concluded that neem leaf powder, black cumin powder and amla fruit powder were significantly effective in controlling the coccidia oocyst in commercial broilers. However, neem leaf powder was found more effective than other two.

**Keywords** Coccidiosis, Neem (*Azadirachta indica*) leaf powder, Amla fruit powder, Black cumin powder, Commercial broiler.

### INTRODUCTION

Animals and plants are dependent on each other since beginning of their existence and this is evident in the ability of animal in the wild to self medicate when sick. This association depends on the phytochemicals in plants which are of health benefit. Generally scavenging animals and backyard poultry birds self-medicate by ingesting plants that contain medicinal properties. The avian coccidiosis causes high mortality and morbidity along with poor FCR and weight gain. So many anti helmenthic drugs are in use however the emergence of drug resistance coccidia strains have complicated a situation (Nogueira *et al.* 2009). Moreover, drug residues in poultry products are harmful to

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consumers. Another approach to control coccidiosis is vaccination of birds, but in case of improper and poor management, these vaccines can trigger severe reactions which may badly affect the performance of broiler birds (Champman 2009). Due to this drawback of live vaccines, attenuated vaccines were tried, but these are expensive to produce. Therefore, cost effective alternative approaches to control avian coccidiosis have been explored with phytochemicals coming from different types of phytochemical elements (Abbas *et al.* 2011). Bonsu *et al.* (2012) studied on medicinal response of broiler chickens to diets contain neem leaf meal. Black cumin has many bio active ingredients of which thymoquinone present upto (30- 48%) is the most abundant amongst others such as flavonoids, anthocyanins and alkaloids (Ahmad *et al.* 2013, Desai *et al.* 2015). This could have positive impact on animal health (Paarakh 2010, Javed *et al.* 2012). The objectives of the present investigation are to investigate the probable efficacy of supplementation with dried neem (*Azadirachta indica*) leaf powder, Amla (*Emblica officinalis*) fruit powder and black cumin (*Nigella sativa* L.) powder in broiler diets as anticoccidial agent in commercial broiler chickens.

## MATERIALS AND METHODS

### Experimental birds and feeding of herbs

A total of 200 unsexed VENC OB commercial broiler chicks were used in this experiment the chicks were kept in the deep litter pens under standard clean and hygienic conditions. The approximate chemical composition (%) of poultry feed provided to the birds for CP, CF, EE, NFE was 18.75, 4.07, 5.27, 65.51 respectively. Three experimental diets were prepared through which neem, amla, black cumin were mixed at levels of 0.2% and 0.5% respectively. Free axisto feed and water for all birds were ensured.

### Preparation of herbal products

#### *Processing of neem leaves powder*

Fresh neem leaves from mature plants around the college premises in the polythene bags and brought to the laboratory for processing. The neemleaves were

dried under for 7 days and they were grounded into powder using mixer grinder.

#### *Processing of amla fruit powder*

Fresh mature amla fruits were collected from amla trees from Pratapgarhamla farms and processed it in laboratory to make these amla fruits in fine particles and dry it in sun light and hot air oven to remove moisture for avoid decay and growth of mould and it will reduce its nutritional value.

#### *Processing of black cumin powder*

Black cumin seeds were collected from market, cleaned it properly and then slightly grinded it in the grinder and it was ready for use.

### Fecal samples

Fresh fecal samples were collected at day 1, day 21 and day 42. Fecal egg counts were determined by modified Mac-Master Technique using saturated sodium chloride solution as the floating media.

### 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).

### Statistical analysis

The data generated were analyzed through statistical program SPSS 20.0 by one way analysis of variance.

## RESULTS AND DISCUSSION

Table 1 represents the data of all experimental birds

**Table 1.** OPG count of the fecal sample of broiler chickens fed diet supplemented with neem leaves powder (NLP), amla fruit powder (AFP) and black cumin powder (BCP). Values with different small letter subscripts in a row differ between groups significantly ( $p < 0.05$ ).

Days	Control T <sub>0</sub>	NLP (0.2%) T <sub>1</sub>	AFP (0.2%) T <sub>2</sub>	BCP (0.5%) T <sub>3</sub>	SEM	p value
1 day	400	450	400	400	6.059	0.446
21 <sup>th</sup> day	550 <sup>a</sup>	250 <sup>c</sup>	300 <sup>b</sup>	300 <sup>b</sup>	33.267	<0.001
42 <sup>nd</sup> day	750 <sup>a</sup>	50 <sup>d</sup>	200 <sup>b</sup>	150 <sup>c</sup>	69.134	<0.001

shedding the coccidia oocysts from day one to 42 recorded on three week basis. The control groups showed 400, 550 and 750 oocyst per gram at 1<sup>st</sup>, 21<sup>st</sup> and 42<sup>nd</sup> day respectively the birds of group T<sub>1</sub> (neem leaf powder treated) recorded 450, 250 and 50 OPG at respective intervals whereas the broiler birds of group T<sub>2</sub> (amla fruit powder treated) counted 400, 300 and 200 OPG at day 1, 21 and 42 respectively. The broiler birds of T<sub>3</sub> (black cumin powder treated) exhibited 400, 300 and 150 OPG at day 1, 21 and 42 experimental period respectively. At day 42, the OPG count of fecal samples of broiler chickens were statistically significant among different groups. The lowest OPG was recorded in T<sub>1</sub> followed by T<sub>2</sub>, T<sub>3</sub> and T<sub>0</sub>. The % reduction in OPG count of fecal sample of broiler chickens fed diet supplemented with neem leaf powder, amla fruit powder, black cumin powder have been shown in Table 2. From perusal of this table it is evident that there was significant reduction in OPG count in treated groups of birds as compared to control group. The birds of group T<sub>1</sub> exhibited the highest reduction (88.88%) in OPG count of fecal sample followed by birds of T<sub>3</sub> (62.50%) and T<sub>2</sub> (50.00%) at the end of the experiment.

The coccidiocidal effect of neem in the present study was supported by other studies which used neem either as dried leaves (Tipun *et al.* 2006). The

**Table 2.** Percentage reduction in OPG count of the fecal sample of broiler chickens fed diet supplemented with neem leaves powder (NLP), amla fruit powder (AFP) and black cumin powder (BCP).

Group	Day 1 (OPG)	21 day (Reduction %)	42 day (Reduction %)
Control T <sub>0</sub>	400	-	-
NLP T <sub>1</sub>	450	44.44 <sup>a</sup>	88.88 <sup>a</sup>
AFP T <sub>2</sub>	400	25.00 <sup>b</sup>	50.00 <sup>b</sup>
BCP T <sub>3</sub>	400	25.00 <sup>b</sup>	62.50 <sup>b</sup>

efficacy of neem against coccidia might be attributed to azadirachtin: The bio active chemicals of neem which has a prominent effect on viruses, funguses and protozoa like coccidia species (Biu *et al.* 2006). The results of the present study agreed with the findings of (Sarker *et al.* 2016) 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 reported significant ( $p < 0.05$ ) effect of neem leaf in EPG at day 7, 14, 21 and 28, respectively. Forouzanfar *et al.* 2014 reported that black cumin seed was affective against cestode worm in children and there was significant reduction in the fecal eggs per gram counts. There was lack of literature available so far regarding the efficacy of amla fruit powder against protozoan of chickens.

## CONCLUSION

On the basis of above results, the present study might be concluded that birds of T<sub>1</sub> group showed significantly ( $p < 0.05$ ) decreased OPG value (88.88%) followed by T<sub>3</sub> (62.50%) and T<sub>2</sub> (50.00%). The present result exhibited the promising effects of photogenics against coccidian in commercial broilers. However, further extensive research work need to be done to explore the possible therapeutic use of these phyto-genics against problem is like coccidia in chickens.

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