ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

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International Journal of Poultry Science 1 (4): 91-93, 2002

Comparative Efficacy of Salinomycin Sodium and Neem Fruit (*Azadirachta Indica*) as Feed Additive Anticoccidials in Broilers

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Abstract: The anticoccidial efficacy of a herb, neem fruit (*Azadirachta indica*) is compared with an ionophorus anticoccidial Kokcisan (salinomycin sodium) against coccidiosis in broilers. Two hundred and forty one-day-old broiler chicks were reared for 42 days. These birds were divided into 6 groups i.e. A,B,C,D,E and F comprising of 40 birds each. There were six treatments, 25 gm salinomycin sodium/50 kg feed (A), 50 gm ground neem fruit/50 kg feed (B), 100 gm ground neem fruit /50 kg feed (C), 150 gm ground neem fruit/50 kg feed (D), infected non-medicated (E), non-infected non-medicated (F). Groups A,B,C,D and E were given a challenge dose of coccidial oocyst at the age of 22 days. Weight gain, feed consumption, oocysts in the faeces, clinical findings and mortality were recorded. The result revealed that the birds of non-infected non-medicated group had better ($P<0.05$) weight gain as compared to medicated groups. The birds of Salinomycin sodium group have better weight gain and feed efficiency as compared to other treated groups but the difference was non significant ($P>0.05$). Moreover, neem fruit 150 gm/50 kg feed had excellent performance in terms of oocyst count and lower mortality as compared to other treated groups.

Key Words: Broilers, anticoccidial (neem), anticoccidial (Kokcisan)

Introduction

Coccidiosis is one of the most detrimental and lethal managemental disease of poultry. Coccidiosis is rapidly developing intestinal disease presenting with bloody diarrhoea and listlessness. It causes heavy mortality in affected flock. The losses due to coccidian outbreak are primarily by impaired feed conversion, depressed growth, lost pigmentation and downgrading at processing and mortality (McDougald and Roberts, 1988). Field experience indicates that a severe E. tennela infection, due to bad litter, is in many cases followed by intestinal *E. coli* infection (Stroom and Sluis, 1999).

The feed manufacturers are using synthetic feed additive anticoccidial in the feed to combat the coccidiosis. The prolong use of synthetic antroccidials often develop resistant in birds to these drugs. On the other hand, commercial coccidiostats lead to increase cost of poultry rations (Hayat *et al.*, 1996). Under these circumstances, it seems imperative that alternate economical ways and means be explored to avoid the use of expensive coccidiostats. The present study was, therefore planned to investigate the prophylactic effect of herb (Neem fruit) in comparison with salinomycin sodium against coccidiosis in broilers.

Materials and Methods

Two hundred and forty one-day-old broiler chicks were purchased from a local hatchery. The chicks were reared in a well-cleaned shed under standard hygienic conditions. The birds were randomly divided into equal 6 groups. One pen was allotted to each replicate. The chicks were placed on 5-10 cm bedding of new rice husk. Each pen was equipped with a feeder and waterer. Electric bulbs and ventilation fans were used to control recommended temperature and 24 hours of light. The birds were vaccinated against Newcastle disease and Infectious Bursal Disease. The birds were having free access to feed and water. The chemical composition/calculated nutrient profile of the basal diet is presented in the Table 1. The chicks received a starter ration from 0-4 weeks and finisher ration from 5-6 weeks.

The experiment had six dietary treatments i.e. 25 gm salinomycin sodium/50kg feed (A), 50gm ground neem fruit /50kg feed (B), 100 gm ground neem fruit /50kg feed (C), 150 gm ground neem fruit /50kg feed (D), infected non-medicated (E), non-infected non-medicated (F) The birds of groups A,B,C,D and E were inoculated with 30,000 sporulated oocysts of mixed Eimeria species on 22nd day. The experiment was carried out for 42 days. Feed intake and body weight of birds were recorded weekly on replicate basis. Clinical symptoms were observed after inoculation of infection. Fecal sample of the birds were collected on 5th, 6th and 7th days after infection to find oocyst per gram of faeces. Mortality was recorded and post mortem were carried out at the time of death of birds. The data collected was subjected to statistical analysis by one-way analysis of variance (ANOVA) and least significant difference LSD (Steel and Torrie, 1982).

Table 1: Chemical composition of experimental rations

Nutrients	Broiler Starter	Broiler Finisher
CP, %	20.00	19.00
M.E., Kcal/kg	2850	2950
Crude Fibre, %	3.71	3.42
Ether Extract, %	3.58	3.63
Ca, %	1.00	0.90
Available Phosphorus, %	0.42	0.42
Lysine, %	1.10	1.00
Methionine, %	0.48	0.48
Linoleic acid, %	1.50	1.50

Results

Mean values for feed consumption, weight gain, FCR, mortality percentage at 42 days of age and the total oocyst count of 5th, 6th and 7th day after inoculation have been presented in Table 2. Results revealed that the birds that were non-infected and non-medicated diet consumed higher feed ($P<0.05$) than all other medicated groups. The coccidial infection as well as addition of salinomycin sodium and all dosage levels of neem fruit caused suppression in feed intake ($P<0.05$). Data revealed that salinomycin sodium 60 ppm was better in terms of weight gain and feed efficiency than other medicated groups but this difference was statistically non significant ($P>0.05$). On other hand neem fruit 150 gm/50 kg feed had excellent activity in terms of

Table 2: Broiler Production performance (0-6 weeks)

Groups	Treatments	Avg feed intake/bird (gms)	Avg wt gained/bird (gms)	FCR	Mortality %	Total oocyst count
A	Infected+Kokcisan (salinomycin sodium)	4185[a]	2087[a]	2.00[a]	2.63	4350
B	Infected+neem 50 gm/50Kg feed.	4085[a]	1955[a]	2.09[a]	2.63	2900
C	Infected+neem100 gm/50Kg feed	4135[a]	1988[a]	2.07[a]	2.70	1500
D	Infected+neem150 gm/50Kg feed	4185[a]	2023[a]	2.06[a]	0	1250
E	Infected+non-medicated control	4556[b]	2001[a]	2.28[b]	12.82	20050
F	Non-infected+non-medicated control	4582[b]	2293[b]	1.99[a]	0	0

*Means in each row lacking a common superscript differ significantly (P<0.05)

oocyst count and reduction in mortality as compared to other infected groups and especially group fed on salinomycin sodium medicated feed.

Discussion

Feed consumption, weight gain, feed conversion: The results of present study indicated that group F consumed more feed as compared to other groups. The results of present study are supported by Hashmi *et al*. (1994); Hayat *et al*. (1991); Mohsin (1999) who reported that coccidiosis infection results in decrease feed intake.

Elwinger *et al*. (1998) reported that ionophorus anticoccidials monensin and narasin induced growth promoting effects similar to the tested growth promoters like avilamycin and avoparcin which might be attributes to their antibacterial effects. The same could not be established in our experiment because addition of salinomycin sodium caused suppression in weight gain and feed consumption as compared to unmedicated control. Appetite was a major factor causing decreased performance. The factors controlling feed consumption are complex and remain poorly understood (Hogg, 1992), however one reason could be the formation of ionophorus complexes in the birds. The findings of present study are supported by Chapman *et al*. (1993) and Farzana and Anjum (1999).

All infected groups showed a depression in weight gain and impaired feed conversion as compared to uninfected control. The difference was more pronounced in group B (neem 50 gm/50kg feed) whereas the birds of salinomycin sodium has shown better weight gain as compare to herbal anticoccidial.

All isolates of Eimeria cause significant weight suppression and impaired FCR (Logan *et al*., 1993). The reason for this impairment is that the organism destroys the absorptive mucosal surface, competes for micro nutrients resulting into metabolic imbalances and hence adversely effects nutrient utilization.

Mortality: Mortality occurred in all the infected groups except group D. The highest mortality was observed in infected unmedicated control 12.82% followed by group c (neem fruit 100 gm/50kg feed), group B (neem fruit 50gm/50kg feed) and group A salinomycin sodium (Table 2) Postmortem lesions confirmed it to be caused by Eimeria tenella infection.

The results are in agreement with Guha *et al*. (1991), who reported that herbal anticoccidial show less mortality (3%) and (2%) which is evident from our results that group B and C show mortality between 2-3%. The results of group D (0%) correlates with Mandal *et al*. (1992) who studied that efficacy of herbal anticoccidials is higher dose levels. So the group D has 0 % mortality.

Kokcisan (salinomycin sodium) did not prove so effective, as ionophore medications are often effective with mild coccidiosis, but ineffective at moderate or severe exposures (Sluis, 1998).

Oocyst count: Oocyst counts were carried out on 5th, 6th and 7th day after the introduction of infection. The counts were zero in uninfected groups. Large number of oocysts was produced in all the infected group however the count of birds given neem fruit 150gm/50 kg feed significantly lower than the other groups. The parasite was not completely suppressed by any of the treatments. Flocks given anticoccidial drug in diet remain susceptible to infection and clinical disease can readily occur at any time (Chapman, 1993). The ionophorus anticoccidial did not work in our case. The reason for this observation is the resistance that is caused by ionophorus anticoccidials (Butaye *et al.,* 2000). This is also supported by Sluis (1998) who reported that severity of test exposure is important as resistant to ionophore are often effective with mild coccidiosis but ineffective at moderate or severe exposure.

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