ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 9 (10): 931-934, 2010
ISSN 1682-8356

Effects of Components of *Melia azadirachta* on Coccidia Infections in Broilers in Calabar, Nigeria

Patrick U. Owai and Mgbere Gloria
Department of Animal Science, University of Calabar, Calabar, Nigeria

Abstract: This study was undertaken to assess the potentials of the extract from Neem plant leaves, *Melia azadirachta*, as a potential intervention against coccidiosis. The extract concentrations used were 15% for Treatment 1, 20% for Treatment 2, 5.0% for Treatment 3 and 0.5% which was used as control for Treatment 4. A total of 48 Anak broilers, raised from day old in deep litter were used for the study. The birds came down at three weeks of age with a mixed infection of coccidiosis. Thereafter, the birds were divided into four (4) groups of 12 birds each. One bird from each group was subjected to post-mortem inspection prior to and after the administration of the intervention while faecal samples of the birds were taken and analyzed prior to and after the administration of the intervention. Three different concentrations of the neem extract were prepared and standardized at 15, 10 and 5%. The various concentrations of the intervention were then administered to each group of birds for a continuous period of five days. Post-mortem examinations carried out revealed that the birds were moderately to heavily infected before and after the administration of the intervention. The study revealed that the initial level of coccidiosis infection of the birds were heavy infection (+++) for Treatments 1 and 2, moderate infection (++) for Treatment 3 and very low infection (+) for Treatment 4. The final levels of infection after the administration of the intervention were low (+) for Treatment 1, moderate for Treatments 2, 3 and 4 while the differences in the levels of the initial and final infections were (-2, -1, 0, +1) for Treatments 1, 2, 3 and 4 respectively. The first Treatment (T_1) with 1.5% concentration, the level of infection was considerably, treatment 2 (T_2) with 10.0% concentration reduced the level of infection was reduced a little; treatments 3 (T_3) with 5.0% concentration had no effect on the level of infection while in treatment 4 (T_4) the control with 0% concentration there was an increase in the level of infection, because there was no intervention here the parasitic organisms grew without hindrance hence the level of infection increased. By inference therefore, treatment 1 (T_1) with 15.0% concentration of the intervention was the most effective against coccidiosis in broiler birds.

Key words: Effects, components, *Melia azadirachta*, coccidia infections, broilers

INTRODUCTION

Coccidiosis is a disease of both turkey and chickens as well as many other animals and is caused by several different species of parasites affecting different animals though most commonly found in poultry. All the species though similar in appearance affect different parts of the intestine and take different times to develop and produce clinical signs in poultry (Ajivor and Hellins, 1987; Bains, 1979; Dafwang and Ogundipe, 1987). This disease is caused by various species of Cocidia which are generally host specific. Coccidiosis spreads from bird to bird through eating or drinking contaminated food or water, litter or other material containing coccidian (Salsbury, 1971; Soulsby, 1978). Infection with a single species of coccidium are rare in natural conditions, mixed infections being the rule; but nevertheless in many outbreaks, the clinical entity can be ascribed principally to one species or occasionally a combination of two or three (Kennedy, 2001; Mcmmullin, 2001).

Emeria tenella is the most pathogenic and important species followed by *Eimeria necatrix* though other less pathogenic but yet important species exist (Siegmund, 1979; Soulsby, 1978). Coccidiosis should be regarded as ubiquitous in poultry management since even under extreme conditions of experimental work it is difficult to avoid infection completely for any length of time, Bayer (1985); Gietema (1995). Disease may be acute or chronic; in acute cases, the faeces may contain blood while chronic cases are accompanied by loss of condition, dullness and untriftiness (Oluyemi and Roberts, 2000; Kennedy, 2001). Treatment in the past has been based on the administration of conventional coccidioccidal drugs either in water or feeds. Cost of drugs has increased tremendously in recent times and most of the coccidial organisms have developed some resistance to most of the currently available drugs thereby prompting the exploration of new areas for appropriate medicinal relief. Neem plant is a shrub

Corresponding Author: Patrick U. Owai, Department of Animal Science, University of Calabar, Calabar, Nigeria

which is indigenous to our environment and generally planted as an ornamental to line roads or pathways. It consists of several thousand of chemicals which are responsible for its amazing properties. One family in Neem that has constantly attracted attention of scientists are the tetra-triperpenoids or the liminoids similar to the steroids. One of the most active and well studied of the Neem chemicals is Azadirachitin (National Research Council, 1993). Azadirachitin in Neem leaves has been reported to produce anti-protozoan, anti-bacterial and antifungal effects, Schmutterer (1990). Nimbins and Sodium Nimbinate, another chemical in Neem have been proven to posses anti-malarial and analgesic and spermicidal effect. Neem has also been used to produce pesticides for home and farm uses (Emosaire, 1993) while Neem oil is rich in long chain fatty acids, (National Research Council, 1993). This study was therefore undertaken to assess the efficacy of Neem leaves in the treatment of coccidiosis in poultry so that it could possibly be recommended for subsequent use as an intervention against poultry coccidiosis.

MATERIALS AND METHODS

The population for the study was made up of 48 Anak 2000 broilers raised from day old on deep litter in a unit within the University of Calabar Research Farm, Calabar, Cross River State, Nigeria. The birds were raised from day old in deep litter while the litter was regularly wetted so that it could be damp enough to cause oocyst sporulation and subsequent infection of the birds. At three weeks of age, the birds started passing out bloody faeces and at this time they were separated into four (4) groups of 12 broilers each. Faecal samples of the infected birds were collected and analyzed prior to and after the administration of the intervention at the Veterinary Diagnostic Laboratory, Barracks Road, Calabar to determine the level of infection with the coccidial agent as well as the specie of coccidial organisms present prior to and after the administration of the Neem extract intervention.

Neem leaves were harvested from Neem plants lining the main entrance of the University of Calabar Main Campus before sunrise at the time photosynthesis was lowest. The leaves were washed with clean water and air dried for 2 h. Small quantity of the leaves, 50 g of the leaves was weighed out using analytical weighing balance into a mechanical grinder and crushed into a fine paste. The paste was them soaked in 1000mls of saline for 24 h. The mixture was then poured into a clean poplin cloth to filter out the extract. The extract obtained was 5% concentration. The same procedures were repeated using the same quantity of saline throughout but with 100 g, 150 g of leaves to obtain 10% and 15% concentrations of Neem leaves extracts respectively. Saline was used rather than distilled water to enhance the preservation of the various chemicals constituents of the Neem leaves over a long period of time to prevent activities of microbes in the solutions for the duration of the study. Three different concentrations of the crude extracts of the Neem leaves were prepared and made into 5%, 10% and 15% while the control group had no intervention in it. The three different extract concentrations as well as the control were then administered separately to the four groups of birds. The rate of administration was 5 cl of the Neem extract and 25 cl of water which was given via drinking water in each of the four groups for a period of five days. No other medicated water was given within this period and conventional feeds were fed the birds while the birds were also inoculated against Newcastle and Gumboro diseases.

On the sixth day, faecal samples of all the groups were taken to the diagnostic laboratory for final faecal analysis for coccidial oocysts while four birds (one from each group) selected randomly were taken to the Animal Science laboratory, University of Calabar, for post-mortem to confirm the lesions both macroscopically and microscopically. Data collection was done using changes in respect of the level of infection of coccidiosis in the experimental birds in response to the Neem intervention. The level of infection was determined through laboratory analysis of the faecal samples as well as post-mortem conducted on the experimental birds prior to and after the administration of the interventions. The results are all presented using descriptive statistics such as tables, percentages and means.

RESULTS AND DISCUSSION

The results of the initial level of coccidial infection prior to the administration of the intervention in the various concentrations is presented in Table 1. The final level of infection after the administration of different concentrations of the intervention is presented in Table 2. Observed differences between the initial levels and final levels of coccidial infections after the administration of the various interventions are presented in Table 3.

The predominant coccidial organisms present prior to the administration of the interventions were *Eimeria acervulina*, *Eimeria mitis*, *Eimeria tenella*, *Eimeria maxima*, *Eimeria necatux*, *Eimeria mivati*, *Eimeria praecox*, virtually most of the intestinal coccidial organisms as well as caecal organisms were present. In the final results or observation obtained after the administration of the interventions, few of the organisms were found but defaced or denatured except those in the 4th treatment that acted as a control in which no intervention was administered. Analysis of the data shows that the initial levels of infection in the various groups of birds in treatments 1, 2, 3 and 4 were heavy infection, moderate, moderate and low infection rates respectively. Neem leave extracts of different

Table 1: Initial level of infection prior to the administration of the intervention

	Treatments			
	1 (15%)	2 (10%)	3 (5%)	4 (0%)
Replicate 1	++	+++	+	+
Replicate 2	+++	+++	++	+
Replicate 3	+++	+++	++	++
Replicate 4	++	+++	+++	++

Source: Detected levels of coccidial infection from the study

Table 2: Final level of infection after the administration of the intervention

	Treatments			
	1 (15%)	2 (10%)	3 (5%)	4 (0%)
Replicate 1	-	++	+	+
Replicate 2	+	++	++	+
Replicate 3	+	++	++	+++
Replicate 4	-	++	+++	+++

Source: Detected levels of coccidial infection from the study

Table 3: Mean difference in the levels of the initial and after infections

	Treatments			
	1 (15%)	2 (10%)	3 (5%)	4 (0%)
Mean initial level	+++	+++	++	+
Mean final level 2	+	++	++	++
Differences	-2	-1	0	+1

Source: Detected levels of coccidial infection from the study

Key:

(+) = Denotes low/mild infection or infectivity
(++) = Denotes moderate infection or infectivity
(+++) = Denotes heavy infection or infectivity
(-) = Denotes absence of infection or infectivity

concentration were used as an intervention against the coccidial organisms. Treatment 1 had 15%, Treatment 2 had 10%, treatment 3 had 5% and treatment 4 had 0% concentration or no intervention since it served as a control. The final results after one week of administration of the intervention from an analysis of the faecal samples were low infection, low infection, moderate infection and moderate infection for treatments, 1, 2, 3 and 4 respectively.

From the final analysis, the observations and deductions were that in Treatment 1 with 15% concentration of the extract, there was a reduction in the level of infection leaving a low infection rate. Treatment 2 with 10% concentration of the extract had a slight reduction in the level of infection after 5 days administration of the intervention. Treatment 3 which initially had a moderate level of infection still ended with that level of infection indicating that the organisms remained static for the period of the administration of the intervention. By implication, it means that the intervention maintained the coccidial organisms in a dormant state, unable to multiply, unable to die and unable to replicate. Treatment 4, which served as a control in which no intervention was added had a marginal increase in the infection rate arising from the ability of the coccidial organisms to reproduce continuously since there was no hindrance for them. A common feature seen in all the groups in which the various interventions were administered was that the coccidial organisms left after one week's administration of the intervention were defaced under the microscope hence the interventions had a detrimental effect on cell structure and may result in deformation if allowed to reproduce. Treatment 1 with 15% concentration of the intervention was the most effective concentration for the intervention because Sprent (1986) stated that for an intervention to be proven effective, it must be able to destroy about 80% of the causative organisms of the disease for which it was administered.

Conclusion: The potentials for increasing poultry population and its product such as meat, eggs can only be met and fully realized if birds are adequately protected against harmful effects of periodic diseases such as coccidiosis. In spite of the fact that this disease appears common in the field and occurs with so much frequency, its far reaching effects are either underrated or even ignored. Profitable poultry production demands efficient management as well as effective disease control measures since disease remains and will continue to remain a major profit limiting factor in the poultry industry.

REFERENCES

Ajivor, V.F.K. and E.K. Hellins, 1987. Poultry Keeping in the tropics (3rd Edn.) University Press Limited Ibadan in association with Oxford University Press.

Bains, B.S., 1979. A Manual of Poultry Diseases, Hoffman-La Roche and Co. Ltd., Base, Switxerland, pp: 133-165.

Bayer, Leverkuseen/Germany, 1985. Book for Farmers Stock Diseases, Harmony Projects Ltd. 98 Badagry Expressway. Lagos, pp: 93-96.

Dafwang, I.I. and S.O. Ogundipe, 1987. Poultry Farmers Handbook of Disease Prevention, extension Bulletin No. 28 Poultry Series No. 3 Agric Ext and Resarch Liaison Services, ARU-Xaria.

Emosaire, S.O., 1993. The Use of Neem in controlling cowpea pests. Nig. J. Emtomilogy, Vol. 7.

Gietema, B., 1995. Chicken Farming, Printing Division of Gbemi Sadipo Press Ltd. Abeokuta, Nigeria, pp: 72-84.

Kennedy, M.J., 2001. Reviewed Paper presentation at the European Coccidiosis discussion group organised by the Central Veterinary Laboratory, Weybride, United Kingdom.

Mcmmullin, J., 2001. Paper presented at the European Coccidiosis discussion group organised by the Central Veterinary Laboratory, Weybride, United Kingdom.

National Research Council (NRC), 1993. Neam: A Tree for solving global problems. National Academy Press Washington, United States of America.

Oluyemi, J.A. and F.A. Roberts, 2000. Poultry production in warm Wet Climates. Spectrum Books Limited. Ibadan.

Salsbury, Manual of Poultry Diseases, 1971. Salbury Laboratories, Charles Cityr, Iowa State. United States of America, pp: 10-15.

Schmutterer, H., 1990. Properties and potentials of natural pesticides from the neem tree. Annu. Rev. Entomol., 35: 271-298.

Siegmund Otto, H., 1979. The Merck Veterinary Manual, A Handbook of Diagram and Therapy for the Veterinarians Merde and Co. Inc. Rachway, New Jersey. United States of America.

Soulsby, E.J.L., 1978. Helminths, Arthropods and Protozoa of Domestic Animals. 6th Edn., Low Priced edition-Baillierie Tindall, London, pp: 9-12.

Sprent, J.F.A., 1986. Some observations on the Economics of *Bunnostomum phlebosdomum*. A Handbook of Cattle Parasitol., 37: 202-210.