Journal of Biological Science and Bioconservation *Volume 4, June 2012*

www.cenresinpub.org
ISSN 2277-0143

EFFECTS OF VARYING DOSAGE OF IMMOCOX BRAND OF COCCIDIAL VACCINE ON THE HEAMATOLOGICAL INDICES OF CHICKENS

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ABSTRACT
An experiment was conducted to assess the effect of Dosage administration of Immucox(R) Vaccine on the Heamatology of Chickens. Three dosage regimes including control representing 50% (GPA), 100% (GPB), 250% (GPC) and 0% (GPD) were investigated on 204 chicken. 50 chickens allotted to each group and 4 were slaughtered before the commencement of the experiment (pre vaccination) to ascertain the heamatological profile before the commencement of the experiment, with the view to ascertaining the feature and causes of reported field problems associated with field application of anti-coccidial vaccines. The results of the heamatological findings were rather inconsistence; the PCV suggested that the effect of tissue damage and fluid loss was mildest in group C; superior in A and B group. There were no differences in the HB values generally except at day 6 piv. Lymphocytes counts fluctuated in all the groups except during the period 4 to 9 days piv when the count in group A and B were relatively stable. The results here showed that the vaccine was protective to varying degrees against heamatological challenges and thereby underscores the values of coccidial vaccines. Moreover, a modified dosage regime as in group C provided supererior protection to the standard (proprietary) dosage without any adverse effects on the haematological indices.
Keyword: *Immocox Vaccine, Chicken and Heamatology*

INTRODUCTION
Coccidiosis is the term applied to the disease state or condition caused by infection with one or more of the species of Coccidia, a sub-division of the phylum Appicomplexa, class Sporozoasida. Subclass Coccidiasina, order Eucoccidiorida, family Eiimeriidae (Shirley, 1992). Coccidiasis refers to extremely light infections or infection with non-pathogenic species with absence of clinical or subclinical Coccidiosis (Reid, 2008). The protozoa paraasite of the genus **Eimeria** multiply in the intestinal tract and cause tissue damage with resulting interruption of feeding and leading to dehydration, blood loss and increased susceptibility to other disease agents (MC Dougald and Reid, 2007). The disease Coccidiosis is worldwide in-distribution and is responsible for extensive losses in industries producing poultry and also water fowl (Shane, 2005). Although Commercial Live and attenuated vaccines have been available in many developed and developing countries for about a decade, the first widely known Coccidial Vaccine in Nigeria's market is Immucox ® marketed by Animal care services consult (Nig) Ltd. (Adene ,1997). Mcllroy, (1995) stated that live Coccidiosis vaccines have been developed to deliver uniformly low doses of viable oocysts to the entire flock. Administration at a specific age stimulate a broad Immunity to Coccidial. Two non-attenuated Coccidiosis vaccines are available for use in broiler breeder. i.e Coccivac and Immucox. Both of these vaccines have controlled the disease in broiler breeders especially where management practices conform to accepted

standards. This study therefore Examines the effects of different dosage of Immucox brand of Coccidial Vaccine on the Immuno- physiology of vaccinated chickens in terms of haematological parameters.

MATERIAL AND METHODS

Experimental Site

The study was conducted at the college of Agriculture, teaching and research farm Jalingo; Taraba State Nigeria. Jalingo, the Taraba State Capital is located between Latitude 8^0.30" and Longitude $11^{0.}$ 50" in the guinea savannah zone of Northern Nigeria. The area has a mean average annual rainfall of about 1000 – 1500mm with a temperature range from 30 – 38 degrees depending on the season.

EXPERIMENTAL CHICKENS AND HOUSING

Two hundred and four (204) cockerel day – old chicks were acquired from a commercial hatchery, in Jalingo, Nigeria. The chicks were derived from a single flock and were uniform with respect to hatch and incubation. Four chicks were sacrificed for pre-vaccination sample collection. The chicks were randomly distributed into four experimental groups. Group A, Group B, Group C, and Group D each containing fifty (50) chicks. The house containing each group was thoroughly cleared by washing with plus detergent and disinfected by fumigation with formalin/potassium permanganate vapour 48 hours before chicks were housed. Fresh, white wood shavings were used for litter on concrete flooring. Heat was provided by locally constructed coal pots using charcoal.

MANAGEMENT AND FEEDING

The birds were attended in accordance with standard practices, incorporating safeguards to minimize cross-contamination of pens of different treatment e.g changes of foot wear and use of foot baths with disinfectants at the entrances to each pen and rodent control using rodenticides. Each group was routinely vaccinated against infections bursal disease (1^{st} and 3^{rd} week), Newcastle disease (NDX i/0, NDV Lasota, NDV komarov), at day old, 3 week and 6 weeks respectively, fowl pox disease (FPV) at 8 weeks of age. Antibiotic/multivitamin (terramycin chick formula) was administered in drinking water the first three days of life. Commercially prepared basal rations without anticoccidias and growth promoting drugs were used. Feed input was ad-libitum.

IMMUCOX® VACCINATION PROTOCOL

The birds were starved of water for 2 hours and no water from any source was available to them during vaccination. A 4 liter Jug of water was half filled and one with water and one pounch of immucox ® diluents (part 1 of 2. 100g). a proprietary but unspecified product by Vetech Laboratory Ontario. Canadex and marketed by Animal care services consult (Nig) Ltd. Comes in a powdered prepack of 100gm to be reconstituted in water. Thus a 400 dose vial of Immucox® vaccine (part 2 of 2) was poured into a Jug and the jug was filled with tap water to the 4 liter line. The mixture was vigorously shaken. A dose of 10ml' per bird was therefore the proprietary dose of a 400 dose vial in 4 liter of water. The vaccine was administered at 5 days of age vial drinking water at different dose regimes as follows: group A: 50% dose vaccinated (i.e half the recommended proprietary dose of 10ml/birds). The fifty birds therefore received a total of 250ml (i.e 5ml.bird) of reconstituted vaccine. Group B: 100% dose vaccinated (i.e the recommended proprietary

dose of 10ml/birds) the fifty birds therefore received a total of 500ml (i.e 10ml/bird) of reconstituted vaccine. Group C: 250% dose vaccinated (2.5 x the recommended proprietary dose i.e 25ml/birds). The fifty birds therefore received a total of 1250ml of reconstituted vaccine.
Group D: Unvaccinated control group 1.250ml of cold tap water was administered to this group.

BLOOD SAMPLING AND PARAMETER DETERMINED

Blood samples were collected from the heart, Jugular Vein on day 4 pre-vaccination and also an day 2, 4, 6, 9, 23, and 51 post-vaccination with Immucox ® from three chicken per group into a sample bottle containing (EDTA) ethylene diamine tetraacetic acid anticoagulant. Sterilized microhaematocrit tubes were used, blood was drawn by capillary action, the botton sealed by flaming and centrifuged at 5,000RPM.

DATA ANALYSIS

All Data obtained were interpreted using standard procedures as described by viscos (1975). The haemoglobin level was measured using standard procedures as described by (Lucas and Jamroz: 1961).

RESULTS

The Heamatological values obtain for deferent dosage of immucox brand of coccidial vaccine on chicken are presented in Table 1: there was an initial rise to 28% and 28.7% in groups C and D respectively at day 2 PIV, which was followed by decline to 23.7% and 25.3% respectively in both groups at day 4 PIV, the PCV values in these two groups continued to follow a similar pattern characterized by a gradual rise to 26.3% in group C and 27.3% in group D at day 9 PIV. The average PCV values declined for the second time to 25.3% in group C but 24.3% in group D at day 23 PIV. This trend was followed in the two groups at the termination of experiment at day 51 PIV. The average PCV values in group A and B shared a similar pattern which in contrast to the pattern's in C and D lacked the peak at 2days PIV. Thus, from the pre-vaccination values of 21.2% in each of the two groups (A and B), the PIV gradually rose during the post – vaccination stages to initial peaks of 25% in group A and 25.7% in group B at 9days PIV the values in group A and B remained lower than those in C and D until day 23 PIV.

Table 1: Group Average PCV and HB Values at different Period of experiments

	Days of Post Immuscox®													
Period	Prevaccination		2		4		6		9		23		51	
Parameter	PCV	HB	PCV	Hb	PCV	Hb	PCV	Hb	PCV	Hb	PCV	Hb	PCV	HB
Group A	21.2	6.3	21.7	5.6	23	6.2	23.3	5.1	25	5.6	25.3	6.5	28.7	10.7
Group B	21.2	6.3	22	5.5	22	5.4	23.7	5.1	25.7	6.4	26	6.1	27	9.7
Group C	21.2	6.3	28	5.5	23.7	5.7	25.3	8.1	26.3	4.7	25.3	6.3	25.6	9.2
Group D	21.2	6.3	28.7	6.0	23.3	6.3	26.6	5.0	27.3	4.9	24.3	7.7	28	6.9

PCV = Packed Cell Volume.
HB = Haemoglobin
PIV = Post Immucox ® Vaccine is presented in Tab I.

The haemoglobin values in the three vaccinated groups A, B, and C, slightly declined from the pre-vaccination value of 6.3g/100ml to 5.6g /100ml, 5.5g/100ml and 5.5g/ml respectively at day 2 PIV. The values in the three groups subsequently showed similarly moderate fluctuations from day 4 PIV to day 23 PIV except in group C where the HB values rose to 8.1 at day 6 PIV. The HB Values rose in the three groups from day 23 PIV to terminal values of 10.7, 9.7 and 9.2 respectively at day 51 PIV. In the unvaccinated control group D. the Hb values was slightly higher than in the three test groups from day 2 to day 6 PIV when it declined to 4.9 at day 9 PIV the group D. HB value subsequently rose to 7.2 at day 23 PIV and terminated at 6.9 at day 51 PIV.

Table 2: Days of Post Immucox® Vaccine

Period	Prevaccine		2days		4days		6days		9 days		23days		51days	
Parameter	Lymp	HET	Lymp	HET	Lymp	HET	Lymp	HET	Lymp	HET	Lymp	HET	Lymp	HET
Group A	65.2	32.2	46.3	51.0	55.3	41.0	55.0	44.0	55.3	43.3	35.3	58.7	46.3	53.3
Group B	65.2	32.2	36.3	43.7	58.3	40.3	48.7	51.3	50.3	49.0	61.3	32.7	47.0	51.0
Group C	65.2	32.2	59.7	36.3	62.7	44.7	39.3	57.0	58.3	38.3	47.7	33.3	39.6	59.7
Group D	65.2	32.2	37.0	61.0	72.7	33.0	59.0	41.3	58.3	42.7	52.0	44.7	66.0	39.7

LYMP = Lymphocytes.
HET = Heterophils

The result of lymphocytes counts in the three vaccinated groups is presented in table 2: groups A, B, C, and control group D fluctuated throughout the period of observation. The fluctuation was initially greatest in group A in which the lymphocyte count declined to 46.3% at day 2 PIV. The values in the three test groups remained highest in group C up to day 4 PIV after which it declined to the lowest level of 39.3% amongst the groups at day 6 PIV although the trends remained generally similar until day 23 PIV when the widest divergence occurred with a rise in group B but a decline in the other 3 groups. lymphocytes counts in the control group D showed the widest fluctuation amongst the four groups with counts of 37% and 72.7% at day 4 PIV. The counts in group D subsequently remained relatively stable as in groups A and B until day 23 PIV when the lymphocyte values rose subsequently to 66% at day 51 PIV. The average heterophil count in each of the three test groups is presented in table 2. The heterophil counts of the three test groups also fluctuated during the PIV period of observation. The minimal and peak values for group A were 42.0% and 58.7% at days 4 and 23 PIV respectively. The corresponding value for group B were 32.7% and 51.3% at days 23 and 6 PIV respectively. For group C the corresponding values were 38.3% and 57.0% at days 9 and 6 PIV respectively. The heterophil value in the control group D showed higher fluctuation initially with a value of 61.8% at day 2 PIV and the minimal value of 33.0% at day 4 PIV, the value in group D were relatively more stable during 6 to 51 day PIV.

DISCUSSION

The haemotological criteria presented rather complex and perhaps inconsistent results in these experiments. This was not totally unexpected; especially as avian haematological values are characterized by very wide ranges of normal values, as described by free man (1991).

In this study, the trends in PIV of group C and D were considerably similar suggesting a superiority of the two groups, by this criterion. The initial rise and higher values from day 2 to shortly after day 9 could be ascribed to normal trends associated with increasing age as explained by free man (1991). There were no major differences in the HB values generally except at day 6 PIV when the values in group C rose sharply and again at day 51 PIV when HB in group D declined in contrast to the values in the 3 vaccinated groups.
It is likely that the HB values at day 51 PIV was a reflection of increasing age, recovery from parasitic effect or tolerance at a stage when group D had succumbed to infection, with attendant tissue damage and fluid loss as explained by Rose, et al: (2005).
The continuous fluctuation in blood lymphocytes counts occurred in all groups, except during the period 4 to 9 day PIV when the counts in group A and B were relatively stable.
The periods of widest fluctuation roughly correlated with the phases of marked tissue reaction described by Sirios (1995). It is however possible that the invasive stages of **Elmeria** caused the immobilization of mononuclear cells and macrophages from blood to reactive sites in tissues and thus a transient depletion (relative lymphocytopenia) of circulating cells. This might explain the decline in the values from groups B and at the later stages.

CONCLUSION

The findings of the study have provided useful data and explanation on the haematological basis of the field problems associated with the application of such Coccidial vaccines. The results here showed that the vaccine was protective to varying degrees against heamatological challenge and thereby underscores the values of Coccidial vaccines. Moreover, a modified dosage regime as in group C proved superior to the standard (proprietary) dosage in terms of the crises examined. It is concluded therefore that solution to post – vaccination side effects so far associated with most Coccidial Vaccine.

REFERENCES

ADENE D.F. (1997): *Immucox ®: A new ton Forcocidiosis Control in Nigeria. NUMA Congress. (Sogbo) pp2*

FREEMAN B.M (1991) *the corpuscle and the physical characteristics of Blood in: Physiology and Biochemistry of the Domestic foul.vol. 2 (Ed Bell, D.J and freeman. B.M) pp841-850 Academic Press. London. New York.*

MC DUUGAID, L.R AND REID W.M. (2007): *Coccidiosis in: Desease of Poultry 10th Edition (Ed. Calneck B W. haimboldt, C.F. Reid W.M: Yodu Jr, H.W) pp865 – 883 lowa state university,Ames. USA.*

MCLLROY G. (1995): *Coccidiosis Control Programmes in broiler breeders ZooTechnica International 18:40-48.*

REID W.M (2008) *Coccidiosis in: Diseases of poultry 9th Edition (Eds Hofsfad MS: Calnek, BW: Helmboidt, C.T: Rid WM: Yoder J; H.W) pp 784 -815 Lowa State University Press Anes, Lowa, USA.*

ROSE, M.E: SMITH, A.L. and Waklind (1991) *Gamma Interferon Mediated Inhibition of Elmeria vermifermis growth in cultured fibroblasts and epithelia cell. Infec. Immun 59:586.*

SHIRIEY M.W (1992) *Research on Avian Coccidia Anundate: B. vet. J. 148 -479 – 497.*

SIRIOS. M. (1995) *Mosby's Fundamentals of veterinary techniques. Veterinary Clinical Laboratory Procedures, Mosby's Year Book.*