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EFFECT OF TETRACYLCINE INCLUSION IN STARTER DIET ON HAEMATOLOGICAL AND SERUM BIOCHEMICAL PROFILE OF BROILER CHICKS

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ABSTRACT

A total of sixty day-old Anak, 2000 broiler birds were used in this experiment, which lasted for 56 days, to determine the effects of subtherapuetic administration of tetracycline on haematology and serum biochemistry of broiler birds. The birds were randomly assigned to three treatment diets in a completely randomized designed and each treatment group was further sub-divided into four replicates. Three basal diets were used in the experiment. Treatment 1 was un-supplemented diet while treatments 2 and 3 were supplemented with 5g of tetracycline /25kg of starter diet and 2.5g of tetracycline/25kg of starter diet respectively. Feed and water were provided *ad-libitum*.The haematological study showed that treatment of birds with tetracycline has no significant effects on most blood profiles. But there were cases of better growth performance of the experimental animals over the control.

Keywords: Tetracycline, haematology, serum biochemistry, broiler starter birds

INTRODUCTION

The haematology and serum chemistry of animals have much physiologic implications. The changes in haematological constituents are important indicators of the physiological or pathological state of the animal (Ijaz *et al.*, 2003). They also reflect the responsiveness of an animal to its internal and external environment (Esonu *et al.*, 2001).Blood examination is also performed for screening procedure to assess general health (Gutienez *et al*., 1971, Pienado *et al*., 1999). Also physiological equilibrium is maintained mainly by the blood in the body but many physiological conditions may alter this equilibrium (Greneser, 1986). When thorough history and physical examination fail to yield a diagnosis in difficult cases, many practitioners turn to blood samples for a complete blood count and chemistry panel, hoping these tests will identify the problems. Tetracycline belongs to a class of drugs called antimicrobials. Other drugs in this category are antiprotozoal, antiviral, antifungal and antiparastic drugs. These are chemicals produced by microorganism and are mostly active on replicating bacteria except viruses (Yuri, 2001). Tetracycline is mostly administered at low doses (subtherapuetic levels) in animal feed especially in dirty environments. These additives are absorbed minimally from the gut and do not have a systemic action (Rosen, 1995, Esonu, 2006). Therefore, there is no risk of residue deposite in meat (Darwang *et al*, 1987). Supplementing animal feed with antimicrobial agents to enhance growth has been a common practice for more than 30 years and it is estimated to constitute more than half of the total antimicrobial drugs used worldwide. There is a dearth of information on the haematology and serum chemistry of growth promoters (tetracycline) inclusion in broilers diets. The aim of the present study is to explore the dynamic changes in the blood profile of chicks fed with diets containing subtherapuetic levels of tetracycline so as to

provide scientific basis for understanding some pharmaco-dynamic effects of the drug in animals.

MATERIALS AND METHODS:

This experiment was carried out at the Poultry Research Unit of The Department of Animal Science, Ebonyi State University, Abakaliki. Sixty day old Anak 2000 boiler chicks were used for a period of fifty-six days. The birds were housed in open sided poultry house whose sides and demarcations between pens were covered with wire gauze. The birds were raised on a concrete floor covered with rice husk as litter materials (deep litter system). The feed stuffs and ingredients used were purchased from safari livestock farm at Abakaliki in Ebonyi state. The feeds were formulated by mixing the feed ingredients according to their percentage contribution and partitioned into three components 50kg, 25kg and 25kg for the control, treatment two and treatment three respectively. The tetracycline used was purchased from a nearby chemist store. The capsules were opened and contents weighed using a sensitive weighing scale in the Food Science and Technology Laboratory of Ebonyi State University.Two quantities were measured out; 5mg and 2.5mg. The 5mg was thoroughly mixed with one of the 25kg of the starter diet (This was fed to the birds in treatment two). The 2.5mg was mixed with the other 25kg starter broiler diet and fed to the birds in treatment three. The 50kg starter diet was left un-supplemented, which was fed to the control animals.

Table 1: Composition (%) of Experimental Starter Diet

Ingredients	**Percentage contribution**
Yellow maize	45.00
Wheat offal	11.00
Fishmeal	4.50
Groundout cake	30.0
Palm kernel cake	4.0
Bone meal	3.0
Oyster shell	1.60
Vitamin-mineral premix	0.25
Methonine	0.15
Lysine	0.25
Salt	0.25
Total	100

Effect of tetracylcine inclusion in starter diet

FEEDING AND MANAGEMENT

In the experiment, the chicks were fed with commercial broiler starter diet from day one to tenth day (1-10days) i.e. brooding stage. Thereafter, the three experimental diets were assigned to the birds. The chicks were properly vaccinated against Newcastle disease and infectious bursal disease (Gumboro).

PARAMETERS MEASURED

1ml of blood samples were collected into properly labelled sterilised bottles containing Ethylene diamine tetra-acetic acid (EDTA) for haematological and serum chemical analysis. The packed cell volume (PCV) was determined using micro haematocrit centrifuge with the haemoglobin as described by Lamb (8). White Blood Cell (WBC) count was estimated using haemocytometer.

DATA ANALYSIS

Data collected was subjected to analysis of variance according to the procedure outlined by Snedecor and Cochran (1980). The difference between the treatment means were separated using the least significant difference (LSD) as outlined by Obi (1990).

RESULT

The proximate composition of the experimental diet is shown in table 2. Table 3 shows the average values of the performance parameters of broiler starter birds fed with diets containing various levels of tetracycline, while table 4 shows the blood profile of the birds at ninth week.

Table 2: proximate composition of the experimental diet

Crude protein(%	23.470
Metabolizable energy (kcal/kg)	2758.700
Crude fibre (%)	3.815
Ash (%)	4.518
Crude fat (%)	4.360
Day matter (%)	89.580

Table 3: Effect of tetracycline on growth performance of the broiler chicks at ninth week

PARAMETERS	**EXPERIMENTAL DIETS**			
	T^1	T^2	T^3	SEM
AVERAGE INITIAL BODY WEIGH (G)	140^a	150^a	137.5^a	6.97
AVERAGE FINAL BODY WEIGHT (G)	912.50^a	1143.75^b	950.00^a	48.50
AVERAGE BODY WEIGHT GAIN (G)	602.5_a	6566.25^b	588.75^a	18.65
AVERAGE DAILY WEIGHT GAIN	21.51^{ab}	23.43^b	21.02^a	0.66
AVERAGE TOTAL FEED INTAKE (G)	1821.00^a	1991.00^a	1966.75^a	80.86
AVERAGE DAILY FED INTAKE (G)	65.03^a	71.41^a	68.45^a	2.81
AVERAGE FEED CONVERSION RATIO	2.95^a	3.02^a	3.37^a	0.19
AVERAGE FEED EFFICIENCY	0.23^a	0.33^b	0.29^a	0.01

Means within rows with unidentical superscripts differ significantly ($P<0.05$)

Effect of tetracylcine inclusion in starter diet

Table 4: Effect of tetracycline on the haematology and serum chemistry of the broiler birds at ninth week

HAEMATOLOGICAL PARAMETERS							**LIVER FUNCTION TEST**				
	Pcv	Hb	WBC	N	L	E	TB	DB	ALP	GOT	GPT
UNITS	%	$X10^9L$	$X10^9L$	$X10^9L$	$X10^9L$	$X10^9L$	UM	Umol/L	I.U/L	I.U/L	I. U/L
T1	30.00	11.50	6.70	36	62	02	14.40	2.20	319.00	69.00	7.00
T2	30.00	11.10	7.10	30.00	66.00	4.00	12.80	1.20	354.00	71.00	4.00
T3	25.00	9.90	5.50	22.00	78.00	-	15.00	0.74	282.00	59.00	1.00

PCV =Packed Cell Volume, HB = Haemoglobin, WBC = White blood cell count, N =Neutrophils ,L = Lymphocytes , E = Eosinophils, Tb = Total bilirubin DB =Direct bilirubin , Alp= Alkaline phosphate, GOP = Glutamate OxaloauteTransminase**,** GPT = Glutamate pyruvate Transminase

DISCUSSION AND CONCLUSION:

From the table 3, treatment 2 had the highest weight gain. In table 4, treatment two had the highest White Blood Cell and Lymphocytes than the other treatments. Treatment three had the highest lymphocytes value which differs with the other treatments. The increased level of lymphocyte in treatment 3 and subsequent decrease in the other tested parameters might be due to stress as suggested by Breazile *et al.* (1980). Reduction in WBC may lead to a disease condition like anorexia, dyspnoea, emaciation and loss of weight. There are no much differences in PCV count among treatments absence of blood pathogens or parasitic infections among the treatments which are capable of altering the PCV count value. The results of the serum chemistry were similar except in ALP and GOT whose values were above normal as document by Stewart (1990). The haematological study revealed that treatment of birds with tetracycline has no significant changes on the blood profile, this might be an indication that there were no destruction of matured RBC and no changes in rate of erythropoiesis, hence, its inability to stimulate hemostasis. The observation in T2 can also be attributed to the level of tetracycline in the diet which might have destroyed pathogenic organism in the alimentary tract thereby reducing morbidity and mortality due to reduced sub clinical diseases which is in line with the findings of Rosen (1995) and a reason for the observed higher weight gain. Thus, it can be concluded that administration of tetracycline up to 5g/25kg of starter diet, has no effect on the haematology and serum chemistry of broiler birds but can result to improve growth rate in broilers. More research should be conducted on histopathology and gut microbial study of including 5g/25kg of tetracycline in broiler starter diets.

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