PERFORMANCE AND VISCERAL ORGAN WEIGHTS OF GUINEA FOWL (*Numida meleagris*) GIVEN DIFFERENT ANTIBIOTICS AS GROWTH PROMOTANTS

TUNDE OGUNTONA*

Department of Animal Science

Faculty of Agriculture

University of Maiduguri, Maiduguri

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ABSTRACT

The effect of feeding recommended levels of three antibiotics on the visceral organs of growing guinea fowls has been examined. Day old broiler type guinea fowls were given Oxytetracycline, Roxarsone, and zinc bacitracin supplemented diet till 12 weeks of age. Dressed weight of medicated guineas were significantly higher than controls. No treatment effects were observed on the lungs, gizzards and reproductive organs. Fat pads were significantly (P.05) heavier in treated birds as compared with controls. Heart and liver weights were also significantly higher (P.05) in treated guinea fowls.

Key words:- Guinea fowls, Growth promotants, Organ weights

INTRODUCTION

Intensive livestock production as it is practiced in modern day agriculture would be less profitable without additive. These additives include drugs and growth promotants or enhancers. Among these growth enhancers, antibiotics (or antimicrobials) though used in small quantities (F.A.C., 1985), account for a large proportion. It has been estimated for example (DSA, 1984) that the total economic contribution resulting from the use of livestock growth promoters in the European communities during 1982 represented over 1.2 billion ECU'S. Studies on the response of guinea fowls to antibiotics are few (Vo et al., 1985; Oguntona and Zubair, 1988) and little is known about the comparative efficiencies of these materials in promoting guineafowl's growth. The guineafowl is native to the savanna (guinea) zone of Africa and constitute a very important source of animal protein for many people in this part of Africa. In France guineafowl is a gourmet item (Blum et al., 1957; World Poultry, 1986) and it is rapidly becoming important in the United States as well (Hughers and Jones, 1980). More information is therefore needed on the response of this bird to antibiotics normally used in **poultry nutrition**.

* Present address: Department of Animal Nutrition, University of Agriculture, Abeokuta.

In the present study, the aim was to evaluate the response of growing guineafowls to recommended levels of three commonly used broiler antibiotics. In particular, the weights of the visceral organs of experimental birds have been compared for possible effects.

MATERIALS AND METHODS

Diets

The three antibiotics used in this study were Oxytetracycline, Roxarsone and zinc bacitracin. The levels of these chemicals recommended (F.A.C., 1985) for increasing rate of weight gain and improved feed efficiency in chickens were used in a 3-phase feeding programme (started 0-4 weeks, grower 5-8 weeks, finisher 9-12 weeks). The composition of these basal diets (unmedicated) is shown in Table 1. There were four treatments as follows: unmedicated (control), treatment with 7.5mg. Oxytetracycline per kg diet, treatment with 50mg. Roxarsone per kg diet and treatment with 50mg. Zinc bacitracin per kg diet. The antibiotics were added to the diets in place of equal amounts of sand (in the salt mix, Table 1) and mixed thoroughly.

Animals

A total of 400 day-old guineas ($28.4 \pm 0.9g$) of a broiler strain were randomised into four groups (one group per treatment) and further subdivided so that each group was made up of four replicates of 25 birds. Each replicate was then randomly assigned a brooder pen that allowed floor space of 0.085 square meter per bird. At the time of the trial the house was four years old and no incidence of disease outbreak had occurred. The guineas were put on fresh litter and continuous lighting for 24 hours. Feed and water were provided ad libitum.

Procedures

In this trial the four treatments were arranged in a randomised complete block design. One pen of 25 guineas constituted the experimental unit and four such pens formed an experimental block. Treatments were allocated at random to

TABLE 1 COMPOSITION OF GUINEA FOWL DIETS(%)

	Starter	Grower	Finisher
Ground Corn	55.55	64.87	73.05
Soybean Meal (49%)	35.60	27.00	19.00
Fishmeal	4.00	2.00	1.80
Vegetable Oil	2.00	3.03	3.30
Limestone	1.25	1.25	1.00
Deflorinated Phosphate	1.00	1.25	1.25
Vitamin Premix*	0.25	0.25	0.25
Salts**	0.35	0.35	0.35
Total	100	100	100
M.E. Kcal/kg	3050	3180	3280
Protein (%)	24	20	17
Ca (%)	1.05	1.03	0.90
P (%)	0.70	0.64	0.61
Lysine (%)	1.40	1.10	0.86
Methionine (%)	0.45	0.36	0.33
TSAA (%)***	0.81	0.67	0.60

Vitamin Premix supplied the following per kilogram of feed: vitamin A, 4,950 IU; vitamin D3, 1,320 ICI; vitamin E, 11 IU; menadione sodium bisulfite, 2.2 mg; vitamin B12, 13.2 ug; folic acid, 1.32 mg; riboflavin, 4.4 mg; pantothenic acid, 11mg; niacin, 27.5 mg; choline chloride, 550 mg; ethoxyquin, 0.0125%.

** The Salt mixture contained the following in constant amounts: NaCl 0.30%, ZnO 0.01%, MnSO4 0.02%, and Ethoxyquin 0.0125%, the balance was made up with sand.

*** TSAA = Total sulphur amino acid.

four blocks. Feed intake and body weights were recorded weekly. Mortality figures were recorded daily. At the end of the growth studies on day 84, ten birds from each treatment were randomly picked, tagged and deprived of food (but not water) for 15 hours and then weighed again. They were then slaughtered by severing the carotid arteries and jugular veins. Birds were processed manually. Processing was aided by first immersing the birds in hot water. After cleaning, each bird was eviscerated carefully and the various organs removed and weighed immediately. Data on liveweight, feed intake and visceral organ weights were subjected to analysis of variance and Duncan's multiple range tests

(Steel and Torrie, 1960) to determine if mean differences were significant.

RESULTS

Growth rate and feed intake.

The data on liveweight of the experimental birds are given in Table II. Significant liveweight increase were recorded for the guineafowls given the antibiotics compared with the control at 12 weeks of age. On average, the guineafowls that received antibiotics had liveweights that were over 12.5% more than the control at 12 weeks of age. The results however showed no significant treatment effect on feed intake. Consequently the feed conversion efficiency of medicated guineafowls was better than that of the control (Oguntona, 1988). Also no differences were recorded in the mortality of experimental guineafowls.

Visceral organ weights

Table II shows the 12 week liveweights and visceral organ weights of control as well the guineafowls given different antibiotics. The data show that not only liveweights but also dressed (New York) weights, (DW) of medicated guineas were statistically higher than controls.

Abdominal fat was small in all samples and the weights ranged from 2.9g in the control to 4.0g in oxytetracycline treated birds. No significant differences were observed among the treatments although control birds had, overall, smaller fat pad. No treatment effects were not affected by treatments include the lungs and the male reproductive organs. For both organs, dietary antibiotics seem to have no noticeable effect on size up to 12 weeks of age. Significant increases were observed, on the other hand, in the weights of heart, intestine and liver of guineafowls fed antibiotics compared with control. On average the hearts of medicated birds weighed between 20 and 25% more than the hearts of controls, while the mean wet weight of the liver of medicated birds weighed approximately 30% more than those of controls.

The pattern of response of the intestine to the different antibiotics was similar to that of the liver. While no significant differences were observed between the weights of intestine of guineafowls given antibiotics, the intestinal weight of birds given control was significantly ($P < .05$) lower than that of the treated birds. Table 2).

TABLE 2: LIVERWEIGHT AND VISCERAL ORGAN WEIGHTS (g)
AT 12 WEEKS OF AGE OF CONTROL AND GUINEA FOWLS

	GIVEN DIFFERENT ANTIBIOTICS			
	Antibiotic Treatment			
	Control	Oxytetra- cycline	Roxar- sone	Zinc bacitracin
Liverweight (LW)	887.8 ^a	996.5 ^c	995.7 ^b	998.4 ^b
Dressed Weight (DW)	712.0 ^a	843.0 ^b	835.4 ^b	848.6 ^b
% LW	80.3	84.6	83.9	85.0
Abdominal Fat	2.9 ^a	4.0 ^a	4.0 ^a	3.7 ^a
% LW	0.33	0.40	0.40	0.37
Gizzard	18.5 ^a	16.8 ^b	18.3 ^a	17.9 ^a
% LW	2.1	1.7	1.8	1.8
Heart	4.4 ^a	5.6 ^a	5.3 ^b	5.5 ^b
% LW	0.50	0.56	0.53	0.55
Intestines	26.5 ^a	32.8 ^b	31.4 ^b	32.1 ^b
% LW	3.0	3.3	3.2	3.2
Liver	7.85 ^a	10.21 ^b	10.16 ^b	10.27 ^b
% LW	0.82	1.02	1.02	1.03
Lungs	2.22 ^a	2.54 ^a	2.39 ^a	2.40 ^a
% LW	0.25	0.25	0.24	0.24
Reproductive organs	1.69 ^a	1.77 ^a	1.90 ^a	1.86 ^a
% LW	0.19	0.18	0.19	0.19

Values across a row with different superscripts are significantly different ($P < 0.05$).

DISCUSSION

Antibiotics as feed additives to improve live-stock growth rate and feed efficiency have been in use for over 30 years now. The effect on broiler chicken growth rate in particular has been confirmed in several studies in the past (Potter et al., 1971; Waldroup et al., 1986) and responses to various levels documented (FAC, 1985). The results of this study indicate that small levels of these antibiotics will (as in chicken) also stimulate growth rate and feed conversion in guinea fowls. This is in agreement with our earlier studies (Oguntona and Zubair, 1988) using zinc bacitracin and the studies of Vo et al., (1985) in which four different antibiotics were used. In both studies significant body weight increases were recorded in medicated guinea fowls.

As the dressed weights indicate, the increased weight gain by guineas given antibiotics was in tissue materials other than feathers, legs or head.

Taken together with data on abdominal fat it would appear therefore that the feeding of antibiotics has resulted in muscle protein being produced preferentially to fat by the guineafowls. This will be in agreement with the generally recognised (Walton, 1985) effect of dietary antibiotics on livestock performance, and corroborated by a concomitant study (Oguntona, 1988) which, in fact, showed a higher nitrogen retention values for medicated guineafowls than controls.

Visceral organ weight data show additionally that liveweight improvement of medicated guineafowls were achieved with no changes in the percentage weight (of Liveweight) of many of the internal organs. The significant increases in heart weight of the medicated birds could be a morphological response to a bigger body size rather than the effect of antibiotics per se. The reasons for the significant increase in the liver of medicated birds are not known and further studies are needed to understand the effects.

In conclusion this study shows that the level of Oxytetracycline, Roxarsone and Zinc bacitracin respectively, recommended for broiler chicken will not only produce significant improvement in liveweight and feed conversion in the guineafowl, but also this improvement is achieved without significant changes in most of the visceral organs

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