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Response of Broiler Chicks to Graded Levels of Alphamune G Supplementation

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Abstract: A study was conducted on 120 day-old broiler chicks fed graded levels of Alphamune G (0.00, 0.04, 0.05 and 0.06%) in a Completely Randomized Design. The experiment was conducted for 8 weeks. Feed intake and weight gain were significantly influenced ($p < 0.05$) by the inclusion levels of Alphamune G. Broiler chicks fed 0.04% inclusion level of Alphamune G had the highest weight gain (35.85 g) with the least feed to gain ratio (2.36). Carcass characteristics also revealed broiler chicks on 0.04% inclusion of Alphamune G to be significantly better than the control diet in weight of keel, drumstick and thigh (20.65, 13.79 and 12.22 g, respectively). Hematological values did not show any significant effect ($p > 0.05$) except in PCV value where 0.04% inclusion of Alphamune had significantly lower value (31.00%). However all values fall within the normal range. Histological studies revealed morphological changes in broilers fed Alphamune G supplemented diet viz- a-viz the control diet. Alphamune G at 0.04% inclusion in diets of broilers may help improve performance.

Key words: Alphamune G, broilers, diets

INTRODUCTION

Antibiotics have been used as a growth promoter for decades and have been shown to improve digestibility, nutrient uptake and inhibit proliferation of pathogenic bacteria by establishing themselves in the gut of poultry animals (NOAH, 2006). The use of antibiotics however, has resulted in the development of resistant bacteria which directly or via the meat, could be transferred from the animals to humans (Bent and Jesen, 2004). Consequently, new concepts have been developed aimed at promoting animal health and growth performance, feed efficiency and product quality as well (Sims *et al.*, 2004).

Alphamune is an alternative to Antibiotics Growth Promoter (AGP) (Alpharma Animal Health, 2004). Alphamune is an extract of *Saccharomyces cerevisiae* that has been spray dried to a tan powder and granulated. It is a feed supplement that improves performance and immuno-competence system of animals. It enables the animal withstand occurring pressure with its own physiological competence (Huff, 2006). Alphamune is a combination of 1-3, 1-6 β -glucans and mannan oligosaccharides. β -Glucan has been found to possess immunomodulatory function and mannans, a prebiotic effect when fed to biological systems (Bent and Jesen, 2004). It has been reported that Alphamune G supplementation in pig diet improved their performance compared to salinomycin (an AGP). Optimal performance, of alphamune has been recorded at 500 g/tonnes of feed (Alpharma Animal Health, 2004).

There is dearth of record on the possible effect of a lower or higher level of alphamune when fed to birds in the Sub-Saharan environment. Production idiosyncrasies in the Sub-Saharan Africa may increase

or lower the dietary inclusion levels that would guarantee optimum performance of broilers.

MATERIALS AND METHODS

One hundred and twenty day-old commercial broilers were used in this study. The chicks were weighed and randomly allotted to 4 treatment groups with 3 replicates of 30 chicks each. Birds were housed in an electrically heated metabolic battery cage. The dietary treatments consisted of 4 graded levels of alphamune G (0.00, 0.04, 0.05 and 0.06%) incorporated into the basal diet formulated to meet nutrient requirement (NRC, 1984) of broilers (Table 1). Routine management and vaccination were followed. Feed and water were given *ad libitum* for the 56 days feeding trial.

Table 1: Composition of the basal diets (g/kg)

Ingredients	Starter (0-4 weeks)	Finisher (5-8 weeks)
Maize	564.70	709.00
Soybean meal	216.80	132.00
Groundnut cake	150.00	90.00
Fish meal	25.00	43.00
Bone meal	25.00	7.00
Oyster shell	11.00	7.00
DL-methionine	1.00	6.00
L-Lysine	1.00	1.00
Salt	3.00	2.00
Premix*	2.50	3.00
Total	1000.00	1000.00
Calculated analysis		
Crude Protein (g/kg)	228.90	193.70
Metabolizable Energy (kcal/kg)	2914.26	3134.27

*Premix supplied/kg of diets, Vitamin A, 8×10^6 iu; Vitamin D₃, 1,200 iu; Vitamin E-31 iu; Vitamin K₃-kastab (2 mg), Riboflavin (3 mg), Nicotinic acid (10 mg), Panthothenic acid (150 mg), Manganese -80 mg, Zinc 50 mg, Copper 2 mg, Iodine 1.2 mg, Cobalt -0.2 mg, Selenium -0.1 mg.

Table 2: Effect of Graded levels of Alphamune G on weight gain, feed intake, efficiency and nutrient retention of broiler chicks

Alphamune G (%)	Feed intake (g/bird/day)	Weight gain (g/bird/day)	Feed/Gain ratio	Protein retention (%)	Fat retention (%)
0.00	78.45 ^a	30.99 ^a	2.53	54.36 ^a	70.75 ^a
0.04	84.57 ^b	35.85 ^b	2.36	61.39 ^b	83.91 ^b
0.05	80.43 ^b	32.91 ^{ab}	2.44	56.13 ^a	70.17 ^a
0.06	83.49 ^b	35.40 ^b	2.36	58.40 ^{ab}	74.22 ^a

^{a,b}Values in a column with the same superscript are similar ($p>0.05$)

Table 3: Relative weight of organs and commercial cuts of broilers fed grade levels of Alphamune G (g/100g body weight)

Alphamune G (%)	Dressing percentage	Liver	Spleen	Gizzard	Proventriculus	Neck	Keel	Heart	Thigh	Drum stick
0.00	88.20	2.79	0.14	2.29	0.77	13.56	14.18 ^a	0.63	9.74 ^a	8.65 ^a
0.04	93.30	5.20	1.14	3.73	1.27	19.04	20.65 ^b	1.24	12.22 ^b	13.79 ^b
0.05	93.01	4.52	0.21	2.71	0.81	18.52	15.38 ^a	0.56	11.77 ^b	10.24 ^b
0.06	92.45	3.44	1.25	2.80	0.78	15.82	15.09 ^a	0.85	10.00 ^{ab}	10.84 ^b

^{a,b}Values in a column with the same superscript are similar ($p>0.05$)

Feed intake and body weight gain were recorded weekly and used to determine the feed to gain ratio. Nutrient retention was determined 3 weeks after the trial began. Proximate analysis of the diet and faecal samples were determined according to the method of AOAC (1990). At the end of the experiment, four birds were selected/treatment fasted overnight and slaughtered by severing the jugular vein for carcass evaluation. The relative weights of different cut parts and organs were taken and expressed as g/100g body weight of the birds. Blood samples were collected and used for haematological and serological indices according to Maxwell *et al.* (1990) using Wintrobe's microhaematocrits improved Neubauer haemocytometer and cyanomethaemoglobins method respectively. Following carcass analysis, the organs required for histological studies were dissected and preserved in 10% formalin solution. Histological study was carried out according to methods described by Ker *et al.* (1982). Data obtained from the experimental trial were analyzed using the completely randomized design (Steel and Torrie, 1980). Any significant differences were further analyzed by Duncan (1955) multiple range test.

RESULTS AND DISCUSSION

Dietary Alphamune G significantly affected ($p<0.05$) performance of broiler chicks when compared with the control birds. Birds fed on 0.04% dietary inclusion of Alphamune G had highest feed intake and weight gain (84.57 and 35.85 g/bird/day, respectively). Feed to gain ratio showed no significant difference ($p>0.05$) for all the graded levels of Alphamune inclusion viz-a-viz birds fed the control diet. The lowest feed: gain ratio (2.36) was recorded for birds fed 0.06% dietary alphamune inclusion. Zhang *et al.* (2005) reported that dietary alphamune improved body weight in broiler chicks. In the same vein, Huff *et al.* (2006) reported an increase in weight of poult's supplemented with alphamune. The result of nutrient retention showed protein and fat retention at 0.04% dietary of alphamune G were significantly higher ($p<0.05$) than the control. Broiler

chicks fed other levels of alphamune G inclusion (i.e., 0.05 and 0.06%) had higher nutrients retained compared with the control birds although these values were not significantly different ($p>0.05$). Thus further confirming the earlier reports of feed intake and weight gain.

The results of the relative weight of organs are shown on Table 3. There were no significant differences ($p>0.05$) observed for the dressed weight, spleen, gizzard, proventriculus, neck and heart. Birds fed 0.04% dietary alphamune had the highest percentage dressed weight (93.34 g) and significantly higher relative weight of keel, thigh and drumstick (20.65, 12.22 and 13.79 g, respectively) compared to the control diet. This corroborates the reports of Young *et al.* (2001) that the yield of body component changed with increase body weight and dietary Alphamune as a potent growth promoter.

The results of the haematological and biochemical indices are shown on Table 4. There were no significant differences ($p>0.05$) in all parameters measured except in Packed Cell Volume (PCV) where the value was significantly lower for birds fed 0.04% dietary alphamune (31.00 g). All other values measured were within the normal range MVM (1986). Blood parameters are potent indices of physiological, pathological and nutritional status of an organism (Babatunde and Olusanya, 1992). Changes in blood constituent are indirect indices to assess the metabolic stage of an animal as well as quality of feed Prescott and Baggot (1993) have reported that growth promoters perform best when the animal is in poor health and unhygienic living condition. The result on serum biochemical parameters is shown on Table 5. Birds fed dietary alphamune had significantly lower ($p>0.05$) total protein and creatinine level. However, all values falls within the normal (MVM, 1986). Organ histology of broilers fed varying inclusion level of alphamune were affected, (micrograph 1, 2 and 3). Morphological changes were observed in the ileum, liver and breast muscles. Birds fed the control diet did not

Table 4: Effect of Graded Levels of Alphamune G on Haematology of Broilers

Alphamune G (%)	Haemoglobin (g/dl)	Packed cell volume (%)	White blood cell ($\times 10^9/l$)	Red blood cell ($\times 10^{12}/l$)	Lymphocyte (%)	Neutrophil (%)	Monocyte (%)	Eosinophil (%)	Basophil (%)
0.00	8.93	33.33 ^a	6.53	4.33	81.33	17.33	0.33	1.00	0.00
0.04	8.17	31.00 ^b	6.57	4.03	82.67	15.67	0.67	0.67	0.33
0.05	8.67	34.67 ^a	5.40	4.83	79.33	20.67	0.00	0.33	0.00
0.06	9.37	35.33	5.33	4.77	73.67	25.33	0.33	0.67	0.00

^{a,b}Values in a column with the same superscript are similar ($p>0.05$)

Table 5: Effect of Graded levels of Alphamune G on some Serum Biochemical Indices

Alphamune (%)	Total protein (%)	Serum Albumin (Mmol/L)	Cholesterol (Mmol/L)	Glucose (Mmol/L)	Uric Acid (Mmol/L)	Creatinine (Mmol/L)
0.00	32.67 ^a	15.00 ^a	3.47	10.53	0.66	104.67 ^a
0.04	26.00 ^b	16.33 ^a	3.43	2.03	0.58	74.33 ^b
0.05	24.00 ^b	11.33 ^b	3.43	5.90	0.62	79.00 ^b
0.06	29.00 ^b	17.33 ^a	3.10	2.17	0.48	70.33 ^b

^{a,b}Values in a column with the same superscript are similar ($p>0.05$)

show these morphological changes. The major morphological changes associated with birds fed were focal loss of mucosa and lymphocytic infiltrations. This was mild in diet 2 with 0.04% inclusion while it was more pronounced with increase in the inclusion levels of alphamune. This is in line with Macari and Maic, (2000), who reported positive effects of the use of prebiotics on intestinal mucosa. Significant increase in villus height in the segment of the small intestine of birds supplemented with mannans oligosaccharide. This observation is an indicator of the immunomodulatory function of Alphamune.

The result of this study suggest that Alphamune at a level of 0.04% in the diet of broilers could still perform effectively as that of 0.05% which is the recommended dosage. However if the flock can be maintained in a good state of health, the use of alphamune as growth promoter and an immunomodulator will further enhance performance and flock herd status.

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