

BLOODPROFILE AND ORGANOLEPTIC PROPERTIES OF BROILER CHICKENS FED DIETS SUPPLEMENTED WITH THREAMINO® AND /OR CREAMINO®

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ABSTRACT

The blood profile and organoleptic properties of broilers fed diets supplemented with Threamino® and /or Creamino® was investigated using 240 day old Arbor acre strain of broilers. The birds were randomly allotted to four dietary treatments of five replicates each after weight balancing. There were 12 birds per replicate in a completely randomized design. Diet 1 was the control with zero inclusion of Threamino® and /or Creamino® at starter, grower and finisher phases, Diet 2 has addition of Threamino® at a rate of 0.1, 0.08, 0.05% for starter, grower and finisher phases respectively , Diet 3 has addition of Creamino® at a rate of 0.06% for starter, grower and finisher phases and Diet 4 has addition of Threamino® at a rate of 0.1% for starter, 0.08% for grower, 0.05% for finisher and Creamino® at a rate of 0.06% for starter, grower and finisher phases. Samples were collected following standard procedures for measuring haematological parameters and serum parameters at the 7th week of the experiment, Organoleptic properties of the meat was also carried out at the termination of the experiment. The results showed that dietary treatments had no significant effect ($p>0.05$) on all the parameters measured. It was concluded that ThreAmino® and /or CreAmino® supplementation at the level used in this experiment had no adverse effects on the blood profile and organoleptic properties of broiler chickens.

Key words: Threamino®, Creamino®, organoleptic properties, haematology, serum

INTRODUCTION

Amino acids plays important physiological roles particularly in thyroid function, addition of threonine in the diet significantly raise the concentration of ALT (Alkaline Transpherase) and AST (Aspartate Transaminase) and modulates immune function of livestock (Li *et al.*, 2007) and diet lack in threonine can lead to diminished physiological function

Creatine supplementation has been proposed as a means to improve meat quality and has been reported to have beneficial effect on post-mortem biochemical process. Many experiments show that the dietary level of lysine improves breast meat yield (Mack *et al.*, 1999). The requirement for maximal meat yield is estimated to be equal to or higher than one requirement for maximal growth or for minimal feed conversion ratio.

Blood parameters change in relation to the physiological status of animal (Etim *et al.*, 2013). Haematology has been defined as the study of blood and important part of clinical pathology as well as diagnostic process (Lutz and Prylusi, 2008) and examination of cellular and fluid portion of blood. Serum is the part of blood that contains substances (called antibodies) that fight disease and also includes all proteins not used in blood clotting and all the electrolytes, antigens, hormones and any exogenous substances (Martin, 2007). End product of broiler production is the meat in particular, birds output depends on the intake (nutrition). This research was embarked upon to determine the effects of diet supplementation with Threamino® and /or Creamino® on blood profile and organoleptic properties of broiler chickens.

MATERIALS AND METHODS

The experiment was carried out at the Poultry unit of the Teaching and Research Farm of Ladoke Akintola University of Technology, Ogbomoso, Oyo State. ThreoAmino® and CreAmino® produced by Evonik industries, Germany were the test ingredients used for the experiment while the premix used was manufactured by Chemoconsult international Ltd.

Four experimental diets were formulated from conventional feed ingredients for starter, grower and finisher phases

Diet 1 - Control diet (0% inclusion level of ThreoAmino® and CreAmino®).

Diet 2 - ThreoAmino® was added at the rate of 0.1, 0.08 and 0.05 g/kg for starter, grower and finisher phases respectively.

Diet 3 - CreAmino® at the proportional rate of 0.06 g/kg for starter, grower and finisher phases respectively.

Diet 4 - ThreoAmino® and CreAmino® at the following proportions; ThreoAmino® 0.1, 0.08 and 0.05 g/kg, CreAmino® at 0.6 g/kg for starter, grower and finisher phases respectively.

Salt, premix, methionine and lysine included at 0.36, 0.25, 0.30 and 0.30g/kg respectively

The gross composition of experimental diets at starter, grower and finisher phases are presented in Table 1

Two hundred and forty (240) day old Arbor Acre strain of broilers chicks were used for the experiment. The birds were managed intensively and wood shaving was used as litter materials for the birds. The birds were offered feed and water on *ad-libitum* basis throughout the experiment that lasted for seven (7) weeks. All necessary vaccinations and medications were carried out according to the standard practice in modern day poultry production and with prevailing conditions in the experimental location.

At the end of 7 weeks of experiment, blood samples of about 3 ml were collected from four (4) birds per treatments from the jugular veins of each bird with the use of needle and syringe into sterilized labeled bottle containing EDTA (Ethylene Diamine Acetic Acid) for haematological analysis and another set of blood samples was dispersed into bottle devoid of anti-coagulant for serum biochemical analysis. The samples were stored in cool packs and transported immediately to the laboratory for analysis.

100g of meat samples were collected from breast part of the bird of each treatment, washed individually in clean water and packed into labeled polythene nylon bag for identification. Samples were put in water of 100 degrees Celsius and boiled for 10mins without any seasoning. The samples were allowed to cool to room temperature and served to panelist.

Ten semi trained taste panelists were used for the sensory evaluation of the boiled meat samples. Each panelist was required to masticate one sample per treatment with ranked preference in the following categories: colour, juiciness, flavour, tenderness, general acceptability. A nine-point hedonic scale was used, 1 referring to extremely dislike and 9 as extremely like (Cross *et al.*, 1986).

The proximate composition of the starter, grower and finisher feeds was determined using the method of A.O.A.C (2005) and data collected were analyzed using one-way analysis of variance (ANOVA) of the GLM of SAS (2003). Means were separated using Duncan Multiple Range Test of the same statistical package.

RESULTS AND DISCUSSION

Results obtained from tables 2, 3 and 4 showed that the dietary treatment had no significant ($p>0.05$) effect on all parameters measured.

The PCV values (32.55-39.43%) falls within the range of standard values (26.0-45.20%) for normal chickens reported by Mitruka and Rawnsley (1977). The HB value (9.30-11.77 g/dl) obtained is similar to the value (11.30±1.82 g/dl) reported by Oladele and Ayo (1999). Aletor and Egberongbe (1992), reported that MCV, MCHC, MCH are used in the diagnosis of anaemia and index of capacity of bone marrow in RBC. The MCV (126.35-133.33 fl) is similar to the value (124.45-129.27) reported by Adeyeye *et al.*, (2013) but their MCH values contradicts this report while the MCHC (28.58-29.85g/dl) is in line with Opoola *et al.*, (2017) which reported (28.91-31.70 g/dl).

The RBC values (2.49-3.12 10^6 /UL) recorded falls within the normal range of values reported by Jain (1989). The TP (5.56-6.43 g/dl) and Urea (12.09-16.66 mg/dl) values recorded contradicts the values reported by Opoola *et al.*, (2017) but falls within the range of standard values of normal chickens as reported by Mitruka and Rawnsley (1977).

Sonayia *et al.*, (1990) states that there is no age related difference in the tenderness of breast and thigh meat of broilers but the older birds had more juiciness. Meat Juiciness (5.80-6.70) of the meat reported in this study falls within the range of values (4.8-6.8) reported by Amao *et al.*, (2015). Northcutt, (2009) reported that Colour is the appearance of the meat which is determined by the level of carotenoid pigments deposition. The meaty color (6.30-7.00) recorded in this study contradicts (5.8-6.6) reported by Amao *et al.*, (2015).

Table 2: Effect of diets containing Threamino® and /or Creamino® on the Haematological parameters of Broiler Chickens

Treatment	T1 (Control Diet)	T2 (0.1g/kg ThreAmino®)	T3 (0.06g/kg CreAmino®)	T4 (ThreAmino® 0.1g/kg + CreAmino® 0.06g/kg)	P-Value	SEM
White blood cell (10 ³ /UL)	238.58	244.98	236.63	232.73	0.35	2.37
Red blood cell (10 ⁶ /UL)	2.78	3.12	2.68	2.49	0.09	0.09
Haemoglobin (g/dl)	10.43	11.77	10.50	9.30	0.17	0.39
Packed cell volume (%)	35.53	39.43	35.60	32.55	0.12	1.04
Mean corpuscular volume (fl)	127.95	126.35	133.33	130.95	0.10	1.11
Mean corpuscular haemoglobin (pg)	37.30	37.70	39.18	37.40	0.35	0.40
Mean Corpuscular Haemoglobin (g/dl)	29.20	29.85	29.43	28.58	0.59	0.32
Platelet (10 ³ /UL)	235.25	267.50	167.50	102.25	0.35	34.09

Table 3: Effect of diets containing Threamino® and /or Creamino® on the Serum biochemical parameters of Broiler Chickens

Parameters	T1 (Control Diet)	T2 (0.1g/kg ThreAmino®)	T3 (0.06g/kg CreAmino®)	T4 (ThreAmino® 0.1g/kg + CreAmino® 0.06g/kg)	P-value	SEM
AST (U/L)	58.37	58.99	65.12	68.04	0.20	1.88
Total Protein (g/dl)	6.37	5.87	6.43	5.56	0.57	0.24
Albumin (g/dl)	2.27	2.84	2.63	2.84	0.17	0.11
Globulin (g/dl)	4.10	3.03	3.80	2.72	0.11	0.23
Cholesterol (mg/dl)	143.11	145.80	125.89	144.76	0.78	7.23
Creatine (mg/dl)	0.72	0.94	0.80	0.94	0.57	0.06
UREA (mg/dl)	16.66	14.88	15.56	12.09	0.38	0.93
Alkaline Phosphatase (U/L)	41.15	36.83	41.93	41.67	0.28	1.04
Alkaline Transpherase (U/L)	29.37	24.99	32.60	38.00	0.71	3.78

Table 4: Effect of diets containing Threamino® and /or Creamino® on the organoleptic properties of broiler Chickens

Parameters	T1 (Control Diet)	T2 (0.1g/kg ThreAmino®)	T3 (0.06g/kg CreAmino®)	T4 (ThreAmino® 0.1g/kg + CreAmino® 0.06g/kg)	P-value	SEM
Color	6.40	7.00	6.40	6.30	0.47	0.17
Flavor	6.30	6.20	6.50	6.50	0.91	0.17
Juiciness	5.90	6.70	6.20	5.80	0.35	0.19
Ease of Eradication	6.70	6.90	6.50	6.10	0.53	0.20
Tenderness Apparent Adhesion	6.10	6.30	6.20	6.10	0.99	0.21
Residue after chewing	5.40	5.60	6.20	6.10	0.49	0.21
Acceptability	6.80	6.90	7.70	7.30	0.13	0.15

CONCLUSION AND RECOMMENDATION

It could be concluded from the study that ThreAmino® and /or CreAmino® could be included in broiler diets without adverse effects on the blood profile and organoleptic properties of broiler chickens.

REFERENCES

- Adeyeye, S.A., Olowu, O.P.A., Adu, O.A., Sule, K., Ogunsipe, M.H., Ahaotu, E.O. and Agbede, J.O. (2013). Haematological and Biochemical studies of broiler chickens fed copper chloride supplemented diets. Proceedings of the 38th Annual Conference of the Nigerian Society for Animal Production, Rivers State University of Science and Technology, Port Harcourt, Rivers State, 17-20 March, pp: 144-146.
- Aletor, V.A., Hamid, I.I., Nieß E. and Pfeffer, E. (2000). Low-protein amino acid supplemented diets in broilers chickens: Effects on performance, carcass characteristics, whole-body composition and efficiencies of nutrient utilization. *Journal of Food and Agricultural science* 80:547-554.

- Amao, S.R., Oyewumi, S.O., Olatunde, A.K. and Oguntunde, M.M. (2015). Carcass characteristics and organoleptic properties of organically raised broiler chicken. *Journal of Natural Science Research*, 5(17): 2224-3186.
- A.O.A.C. (2005). Official methods on analysis of the Association of Official Analytic Chemists. 18th edition. Washington D.C, U.S.A. Association of Official Analytic Chemists.
- Cross, H.R., Durland, P.R. and Seideman S.C. (1986). Sensory qualities of meat. In: Betchtel P.J., editor. Muscle as food. New York Academic Press, pp: 297-320..
- Etim, N.N., Enyenihi, G.E., Williams, M. D., Udo M.D. Offiong E.A. (2013). Heamatological parameters: Indicators of the physiological status of farm animals. *British Journal of Science*, 10(1): 33-35.
- Jain, N.C. (1989). Veterinary Heamatology, 4th Edition Lea and Febiger, Philadelphia, USA.
- Li, P., Yin, Y., Li, D., Kim, S.W. and Wu, G. (2007). Amino acids and immune function. *Brazillian Journal of Nutrition*, 98: 237-252.
- Lutz, C. and Pryztulski, K. (2008). Nutrition and diet therapy. 4th Edition Jaypee Brothers Medical Publishers, New Delhi, pp 312.
- Mack, S., Bercovici, S., De Grootte, G., Leclercq, G., Lippens, M., Pack, M., Schutte, J.B. and van Cauwenberghe, S. (1999). Ideal amino acid profile for broiler chickens of 20 to 40 days of age. *British Journal of Poultry Science*, 40:257-265.
- Martin, C.N., (2007). Concise medical dictionary (7th Ed) oxford, England, oxford University press.
- Mitruka, B.M. and Rawnsley H. (1977). Clinical Biochemical and Haematological values in normal experimental animals. Masson Publishing USA Inc., New York, pp: 106-112.
- Northcutt, J.K. (2009). Factors affecting poultry meat quality. The University of Georgia, Cooperative Extension, College of Agricultural Sciences and Environmental Sciences and Family Consumption Sciences Bulletin 1157.
- Opoola,E.,Ogundipe,S.O.,Bawa, G.S. and Onimisi, P.A. (2017). Effect of diets formulated on the basis of four critical essential amino acids on performance and blood biochemical indices of broiler finisher chickens reared under tropical environment. *Iranian Journal of Animal science*, 7(2): 303-311.
- Sonayia, E.B., Ristic, M. and Klein, W.F. (1990). Effect of environmental temperature, dietary energy, age, sex on broiler carcass portions and palatability. *Brazilian Journal of Poultry Science*, 31:121-128.
- Statistical Analysis System (2003) User's guide statistics version, 10th Edition, SAS Institute Incorporated, Carry, North Carolina, U. S. A.

Table 1: Gross composition of Experimental Diets (g/100g)

Ingredients(g/100g)	Starter Diet				Grower Diet				Finisher Diet			
	Diet1 (Control)	Diet 2	Diet 3	Diet 4	Diet1 (Control)	Diet 2	Diet 3	Diet 4	Diet1 (Control)	Diet 2	Diet 3	Diet 4
Maize	50.02	52.49	49.04	53.51	54.59	55.32	50.07	53.86	59.16	59.43	52.88	56.39
Soya oil	3.26	3.50	2.80	2.60	4.02	4.64	4.35	4.28	4.95	5.67	5.67	5.67
Soya bean meal (SBM)	39.93	31.92	39.47	31.72	36.17	27.91	35.13	27.46	30.81	22.42	29.51	21.62
Wheat offal	3.09	8.29	4.93	8.31	1.79	8.62	6.96	10.83	1.83	9.18	8.63	12.96
Bone meal	2.49	2.49	2.49	2.49	2.22	2.22	2.22	2.22	2.04	2.04	2.04	2.04
Calculated Analysis												
Dry Matter (%)	82.70	82.30	83.07	83.03	82.19	81.47	81.87	81.75	81.42	80.65	80.77	80.62
Crude Protein (%)	22.30	20.06	22.32	20.09	20.95	18.72	20.94	18.76	19.17	16.92	19.15	16.92
M.E (Kcal/kg)	2853.58	2819.3	2841.8	2849.3	2884.68	2814.4	2798.0	2793.4	2897.65	2817.3	2774.0	2762.5
		7	8	9		5	7	9		8	5	3
Ether Extract (%)	3.46	3.51	3.12	3.22	3.51	3.49	3.12	3.22	3.51	3.48	3.16	3.25
Crude Fibre (%)	2.66	3.83	3.08	3.84	2.51	3.65	3.88	3.78	2.42	3.43	3.71	3.63
Lysine (%)	0.50	0.53	0.59	0.64	0.50	0.53	0.59	0.64	0.50	0.53	0.59	0.64
Methionine (%)	0.34	0.37	0.51	0.46	0.34	0.37	0.51	0.46	0.34	0.37	0.51	0.46
Threonine (%)	0.72	0.74	0.81	0.87	0.72	0.74	0.81	0.87	0.72	0.74	0.81	0.87
Calcium (%)	1.01	1.00	1.01	1.00	0.90	0.89	0.90	0.89	0.82	0.81	0.83	0.81
Available Phosphorus (%)	0.67	0.64	0.67	0.64	0.60	0.58	0.61	0.58	0.55	0.52	0.56	0.53
Feed cost per kg (#)	148.96	142.33	147.73	140.04	149.36	142.94	148.35	140.83	148.66	142.14	148.35	140.56

***Premix composition per kg diet:** Vitamin A 12,500,000 IU, Vitamin D3 2,500,000 IU, Vitamin E 40,000 mg; Vitamin K3 2,000mg; Vitamin B1 3,000mg; Vitamin B2 5.500mg; Vitamin B6 5,000mg; Vitamin B12 25mg, Niacin 55,000; Calcium Pantothenate 11,500mg; Choline Chloride 500,000mg; Folic Acid 1,000mg; Biotin 80mg; Manganese 120,000mg; Iron 100,000mg; Zinc 80.000mg; Copper 8,500mg; Iodine 1,500mg; Selenium 120mg; Cobalt 300mg; Anti-oxidant 20,000mg

M.E=Metabolizable energy