EFFECT OF YEAST (*Saccharomyces Cerevisiae*) SUPPLEMENTATION ON THE GROWTH PERFORMANCE AND HAEMATOLOGICAL PARAMETERS OF BROILER CHICKEN

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Abstract
An experiment was conducted for 56 days to evaluate the effect of yeast (Saccharomyces cerevisiae) supplementation on the growth performance and haematological parameters of broiler chicken. The yeast was incorporated into the experimental diets at varying levels; 0, 1.5, 2.0, 2.5 and 3.0% respectively to formulate five dietary treatments. A total number of one hundred and sixty five (165) unsexed day old Cobb® 500 broiler chicks were randomly allotted into five (5) dietary treatment groups. Each treatment group consisted of three (3) replicates of eleven (11) birds per replicate. Data were collected on the growth performance and haematological parameters of the broiler chickens. Results showed that the yeast supplemented diet significantly (P<0.05) influenced growth performance of the experimental birds. Birds fed 3.0% yeast supplemented diet recorded the highest total weight gain (2044.80 g/b) and the best feed conversion ratio (1.94). Significant differences (P<0.05) among treatments were observed on all the haematological parameters except the mean corpuscular haemoglobin, mean corpuscular volume, lymphocyte, haemoglobin and red blood cells. Values obtained in this study fell within the normal range recommended for healthy broiler chickens. It can therefore be concluded that yeast can be supplemented up to 3.0% in the diets of broiler chicken without any detrimental effect on the performance and the health status of broiler chicken.

Keywords: Yeast (*Saccharomyces Cerevisiae*), Growth Performance and Haematological Parameters

Introduction

For a long time, yeast in form of yeast fermented mash produced on farm and yeast by-product from breweries, distillers or commercial yeast product have been successfully included in feed as natural growth promoters for animals (Saied *et al.*, 2011). Yeast is considered as one of the living micro-organism that when administered through digestive tract has a positive impact on broiler health through its nutritional effects (Patterson and Buckholder, 2003). It boosts immune level resulting in a better protection against infection (Panda *et al.*, 2000). Yeast is a performance enhancer through improvement in protein utilization and significant retention of crude fibre, and degradation of fibrous materials in poultry feeds. Some studies have confirmed that the effects of yeast culture could be an alternative to antibiotics in feed of broiler chicks (Stanley *et al.*, 2004). Yeast cells improve the internal mucosa aspect and it might suggests why the performance of broiler chicken is improved. Broiler receiving yeast to replace part of the premix had better average weight gain and feed conversion ratio (Nilson *et al.*, 2004). Better weight gain and feed conversion ratio were found among broilers fed with 0.2 to 1.0% of brewer's yeast (Churchil and Mohan, 2000). Blood is a major index of physiology, pathology and nutritional status of any animal (Adejinmi *et al.*, 2000). The studies of haematological parameters in broiler chicken provide a means of accessing the health status of the birds (Kral and Suchy, 2000). Therefore, the objectives of this study were to evaluate the effect of yeast (*Saccharomyces cerevisiae)* supplementation on the growth performance characteristics and haematological parameters of broiler chickens.

Materials and Methods

Experimental site: The experiment was conducted at the Teaching and Research Farm of the Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan.

Experimental Animals, Management and design: A total of one hundred and sixty five (165) day old Cobb® 500 chicks were purchased from a reputable hatchery in Ibadan and used for this experiment. They were brooded for two (2) weeks under similar managerial and hygienic conditions. All vaccination schedules and medication were followed accordingly. Birds were supplied with feed and water *ad libitum*. After one week of adaptation period, the birds were randomly allotted to five dietary treatments in a completely randomized design and the experiment lasted for nine weeks.

Preparation of Experimental Diet: Yeast was incorporated into the diets at varying levels of 0, 1.5, 2.0, 2.5 and 3.0% respectively to formulate

five dietary treatments as indicated in Table 1 and 2.

Data Collection

Feed intake and live weight changes: The growth of the birds.in response to the experimental diets was monitored by taking their pre-experimental body weights, followed by weighing on a weekly basis prior to feeding. Feed offered daily per bird was recorded and refusal was weighed and recorded to compute feed intake on daily basis.

Collection of blood samples: 3ml of blood samples was collected from the nine (9) randomly selected experimental birds per treatment via the jugular vein using hypodermic needle and syringe into the sample bottles containing Ethyl Diamine Tetra Acetic Acid (EDTA) as anticoagulant and the bottles were gently rolled over to ensure proper mixing of the blood with EDTA to prevent coagulation.

Chemical Analysis and Statistical Analysis

Aliquot of daily feed samples (concentrates) was collected, oven-dried, ground and sieved through a 2-mm sieve and stored in airtight container for proximate (AOAC,2000). Data collected were subjected to analysis of variance while significant means among variables were separated using Duncan Multiple Range test according to procedure of (SAS, 2004).

Table 1 : Proximate analysis of the experimental diet containing varying levels of yeast at starter phase

Parameters	T_1 (0%)	T_2 (1.5%)	T_3 (2.0%)	T_4 (2.5%)	T_5 (3.0%)
Dry Matter	88.95	89.24	89.08	89.44	88.97
Crude protein	21.58	20.97	21.29	21.65	21.78
Crude Fibre	3.94	3.94	3.94	3.94	3.94
Ether Extract	3.57	3.68	3.64	3.55	3.73
Total Ash	6.57	6.71	6.49	6.89	6.38
Nitrogen free extract	53.60	53.80	53.87	53.32	53.03

Table 2 : Proximate analysis of the experimental diet containi ng varying levels of yeast at finisher phase

Parameters	T_1 (0%)	T_2 (1.5%)	T_3 (2.0%)	T_4 (2.5%)	T_5 (3.0%)
Dry Matter	95.31	89.36	88.92	89.15	88.89
Crude protein	20.89	20.97	21.15	20.78	21.49
Crude Fibre	2.65	2.65	2.65	2.65	2.65
Ether Extract	3.61	3.66	3.59	3.63	3.72
Total Ash	6.66	6.28	6.93	6.85	6.37
Nitrogen free extract	54.33	54.12	53.37	53.67	53.43

Table 3: Effect of yeast Supplementation on the Performance Characteristics of Broiler Chicken

Parameters	T_1 (0%)	T_2 (1.5%)	T_3 (2.0%)	T_4 (2.5%)	T_5 (3.0%)	SEM±
Initial wt (g/b)	115.37	112.43	109.20	108.40	107.70	1.25
Final wt (g/b)	1329.00^b	2045.00^a	2090.50^a	2041.9^a	2152.00^a	98.95
TWG (g/b)	1233.70^b	1932.50^a	1981.30^a	1933.50^a	2044.80^a	99.57
DWG (g/b/d)	22.03^b	34.51^a	35.38^a	34.53^a	36.51^a	1.78
TFI (g/b)	3444.20^b	4100.00^a	3970.40^a	3779.00^{ab}	3854.6^{ab}	82.26
ADFI (g/b/d)	61.50^b	73.21^a	70.90^a	67.48^{ab}	68.83^{ab}	1.47
FCR	2.85^a	2.44^b	2.00^b	1.97^b	1.94^b	0.11

$^{a, b,}$ Means in the same row having different superscripts are significantly different ($P<0.05$).DWG: Daily weight gain, ADFI: Average daily feed intake, FCR: Feed Conversion Ratio

Table 4: Haematological Parameters of Broiler chicken fed varying levels of yeast

Parameters	T_1 (0%)	T_2 (1.5%)	T_3 (2.0%)	T_4 (2.5%)	T_5 (3.0%)	SEM±	*Range
PCV (%)	23.00^{c}	23.50^{c}	25.00^{c}	28.00^{b}	36.00^{a}	1.14	24-45
Haemoglobin(gb/l)	7.66	8.33	8.66	7.66	9.33	0.37	7-13
RBC ($x10^{3}\mu l$)	1.68	1.96	2.30	1.96	2.38	0.16	1.5-4.1
WBC($x10^{6}\mu l$)	16.75^{c}	18.35^{c}	17.70^{c}	31.30^{a}	27.05^{b}	1.39	9-31
Lymphocytes (%)	41.75	44.25	43.00	40.75	46.50	1.12	18-43
Heterophils (%)	22.00^{c}	41.00^{b}	52.00^{a}	14.00^{d}	13.00^{e}	3.56	16-44
Monocytes (%)	3.00^{c}	5.00^{a}	5.00^{a}	4.00^{b}	3.00^{c}	0.21	0-6
Eosinophil (%)	2.00^{d}	6.00^{a}	3.00^{c}	6.00^{a}	5.00^{b}	0.37	0-6
MCV(fl)	1541.7	1305.2	1165.1	1540.4	1606.2	89.97	
MCH(pg/cell)	491.38	447.08	388.59	404.44	404.39	17.06	
MCHC (%)	33.04^{ab}	35.22^{a}	34.08^{ab}	27.16^{bc}	25.79^{c}	1.24	25-34

^{abcde} Means in the same row having different superscripts are significantly different (P<0.05),
PCV- Packed cell volume, RBC - Red blood cell, WBC - White blood cell, MCV -Mean Corpuscular Volume, MCH-Mean Corpuscular Haemoglobin, MCHC-Mean corpuscular Haemoglobin Concentration.
*** Mitruka and Rawnsley (1977)**

Results and Discussion

The effects of feeding graded levels of yeast *Saccharomyces cerevisiae* on the growth performance of broiler chicken is shown in **Table 3**. Yeast supplemented based diet significantly (P<0.05) affected growth performance of broiler chicken. Feed intake in broilers was significantly (P<0.05) increased by yeast supplemented diet supplemented diet significantly (P<0.05) increased the feed intake when compared to the control. The result obtained in this study was in consonance with the result reported by Gao *et al.* (2008).

The total weight gain values observed in this study increased significantly across the dietary treatments as the yeast inclusion level increased. Birds fed 3% yeast supplemented diet recorded the best feed conversion ratio (1.94). Similar result was reported by Onifade *et al.* (1999) who stated that yeast supplemented diets improved feed conversion ratio. It was also in harmony with the findings of Saied *et al.* (2011) who stated that birds supplemented with yeast consumed more, grew faster and had better body weight gain than birds fed without yeast.

Presented in Table 4 are the haematological parameters of broiler chicken fed varying levels of yeast supplementation. Significant difference (P<0.05) was observed on all the haematological parameters of broiler chicken except the haemoglobin, red blood cell, lymphocytes, mean cell volume and mean corpuscular haemoglobin. Most of the values obtained fell within the normal range of values recommended by Mitruka and Rawnsley (1977) for broiler chicken. This may probably be as a result of the beneficial effects conferred on the birds by yeast which favours the haematological indices of the birds.

Conclusion

It was concluded that yeast can be included in broiler diets at 3% without detrimental effects on performance and the health of broiler chickens. It might therefore serve as a natural substitute for antibiotics. More research is however required in both experimental and productive conditions to confirm this conclusion.

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