GROWTH PERFORMANCE AND HAEMATOLOGICAL INDICES OF BROILER FINISHER BIRDS FED DIETS CONTAINING *SACCHAROMYCES CEREVISIAE*

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ABSTRACT

A study was conducted to evaluate the growth performance and haematological indices of broiler finisher fed varying levels of *Saccharomyces cerevisiae*. One hundred and twenty (120) four weeks old broiler birds were used for the experiment, The one hundred and twenty (120) birds were weighed and randomly allocated into four (4) treatment groups (T1, T2, T3 and T4) having thirty (30) birds per treatment. Each treatment was replicated three (3) times with ten (10) birds per replicate. Treatment 1 served as the control and did not contain any *Saccharomyces cerevisiae* supplement, while treatments 2, 3 and 4 contained 0.7, 1.2 and 1.7 g/kg of basal diet respectively of *Saccharomyces cerevisiae* supplement. The experiment lasted for four weeks. Results showed that there were no significant ($p>0.05$) differences among treatments in initial body weight and average daily feed intake while significant ($p<0.05$) differences among treatments existed in the final body weight, average daily weight gain, and feed conversion ratio. The study also revealed that there were no significant ($p>0.05$) differences among treatments in haemaglobin concentration, packed cell volume, white blood cell count, red blood cell count, mean corpuscular volume, mean corpuscular haemaglobin, and mean corpuscular haemaglobin concentration. Based on the results obtained in this study, it was concluded that any of the treatment groups T2, T3 and T4 is recommended to enhance broiler production.

Keywords: *Saccharomyces cerevisiae*, growth performance, haematological indices, broilers.

Introduction

There is a public and scientific concern about the widespread use of antibiotics and the possibility for transfer of antibiotic resistance to human pathogenic bacteria (Parvez *et al*., 2006). In addition, the presence of antibiotic residues in the meat may have deleterious effect on human consumers. For these reasons the European Union banned the use of antibiotics for non-therapeutic purposes in January 01, 2006. It is therefore imperative to find safe alternatives to the use of antibiotics. Hence, non-antibiotic alternatives like probiotics are being used in poultry feed to improve growth and production performance. *Saccharomyces cerevisiae* , one of the most widely commercialized types of yeast, has long been fed to poultry. It has been reported (Hana *et al*., 2015) that feeding yeast to chicks improves body weight gain and feed/gain ratio. *Saccharomyces cerevisiae* is a rich source of protein, vitamin B complex and trace minerals. Lutful Kabir (2009) stated that the yeast acts by (i) maintaining normal intestinal microflora by competitive exclusion and antagonism (ii) altering metabolism by increasing digestive enzyme activity and decreasing bacterial enzyme activity and ammonia production (iii) improving digestion, and (iv) stimulating the immune system. The study was designed to evaluate the effect of dietary inclusion of *Saccharomyces cerevisiae* on growth performance and haematological indices of broiler birds.

Materials and Methods

The study was carried out at the poultry unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria, Nsukka. The study lasted for four weeks. One hundred and twenty 4 weeks

old commercial broilers were used for the study. The birds were weighed and randomly allocated into four (4) treatment groups having thirty (30) birds per treatment in a completely randomized design. Each treatment was replicated three (3) times with ten (10) birds per replicate. Treatment 1 served as the control and did not contain any *Saccharomyces cerevisiae*, while treatments 2, 3, and 4, contained 0.7, 1.2, and 1.7 g/kg of basal diet. Commercial broiler finisher diet was used. Clean water and feed were provided *ad libitum*. The required drugs and vaccinations were administered appropriately according to the vaccination routine for broilers. The experimental diets were assayed for proximate composition (Table 1) by the method of the Association of Official Analytical Chemist (AOAC, 1990).

The birds were weighed at the beginning of the experiment to determine their initial body weights. Body weights of the birds were taken on a weekly basis. Daily feed intake was obtained from the difference between the quantity of feed offered and that of the left over from the previous day divided by the number of birds per replicate. Feed conversion ratio (FCR) was then calculated as quantity (gram) of feed consumed per unit (gram) weight gained over the same period.

At the end of the experiment, six birds were randomly selected from each treatment. Five mls of blood was collected from the wing vein of each bird using a sterilized syringe and emptied into sterilized sample bottles containing the anti-coagulant Ethylene Diamine tetra acetic acid (EDTA) for laboratory analysis to determine hematological indices. The packed cell volume (PCV) was determined by the microhematocrit method (Thrall and Weiser, 2002). The haemoglobin concentration (HbC) was determined by the cyanomethaemoglobin method (Higgins *et al*., 2008). The red blood cell (RBC) and the total white blood cell (WBC) counts were determined by the haemocytometer method (Thrall and Weiser, 2002). The mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated using the standard formula (Schalm *et al*., 1975).

Data collected were subjected to analysis of variance in a completely randomized design as described by Steel and Torrie (1980). Significant differences between treatment means were separated using Duncan's New Multiple Range Test (Duncan, 1955).

Table 1: Proximate Composition of the broiler finisher diet

Components (%)	
Dry matter	91.05
Crude protein	20.05
Crude fibre	5.52
Ash	6.13
Ether extract	2.95
Nitrogen-free extract	56.40

Results and Discussion

The effects of different levels of dietary inclusion of probiotics (*Saccharomyces cerevisiae)* on growth performance of broiler finisher are shown in Table 2. Significant ($p<0.05$) differences existed in the final body weight, average daily weight gain, and FCR while there were no significant ($p>0.05$) differences among the treatments in initial body weight, and average daily feed intake.

The final body weight values for T2 (0.7g/kg), T3 (1.2g/kg) and T4 (1.7g/kg) (3.0, 2.97 and 3.05 kg), respectively were similar but these were significantly ($p<0.05$) higher than that (2.56kg) of T1 (control). The average daily weight gain values for T2, T3 and T4 (76.31, 73.10 and 77.50 g), respectively were similar but these were significantly ($p<0.05$) higher than that (59.76g) of T1. The FCR values for T2, T3 and T4 (2.15, 2.17 and 2.18), respectively were similar but these were significantly ($p<0.05$) lower than that (2.84) of T1.

Table 2: Growth performance of broiler finisher fed varying dietary levels of *Saccharomyces cerevisiae*

PARAMETERS	T1 (control)	T2 (0.7g/kg)	T3 (1.2g/kg)	T4 (1.7g/kg)	Probability
Initial body weight(kg)	0.89	0.88	0.92	0.88	0.45
Final body weight (kg)	2.56[b]	3.0[a]	2.97[a]	3.05[a]	0.04
Average. daily weight gain (g)	59.76[b]	76.31[a]	73.10[a]	77.50[a]	0.05
Average. daily feed intake (g)	167	164	159	167	0.23
Feed conversion ratio	2.84[a]	2.15[b]	2.17[b]	2.18[b]	0.03

[ab]Means on the same row with different superscript are significantly different ($p<0.05$).

The result of the present study agrees with Shanmuga and Saravana (2013) who reported that yeast culture supplementation in the diets of broilers improved body weight gain. However, the result obtained in this study is in contrast with Adebiyi *et al*. (2012) who reported that yeast inclusion in broiler diet did not affect body weight gain. Significant higher body weight gain in the yeast supplemented groups observed in this study might be due to beneficial effects of probiotic in the gut, which might have increased the activities of digestive system, resulting in improved digestibility and feed utilization.

The better FCR observed in the current study agrees with Hana *et al.* (2015), who reported that FCR was better in broilers fed diet supplemented with yeast compared to control. The better FCR observed in yeast supplemented group in this study might be due the vital role of yeast in the establishment of favourable microbial environment in the gut which had resulted in better utilization of feed and better absorption of nutrients.

The effects of different levels of dietary inclusion of probiotics (*Saccharomyces cerevisiae)* on haematological indices of broiler finisher are shown in Table 3. There were no significant ($p>0.05$) differences among the treatments in MCH, MCHC, MCV, PCV, RBC, HbC and WBC counts. The result of the present study agrees with Al- mansour *et al.* (2011) who reported no significant ($p>0.05$) effect in Hb, RBC count, MCV and MCH when broilers were fed diets supplemented with yeast culture as compared to control. However, the result obtained in this study is in contrast with Onifade (1997) who reported that yeast inclusion in the broiler diet affected RBC and PCV.

Table 3: Haematological indices of broiler finisher birds fed varying dietary levels of *Saccharomyces cerevisiae*

PARAMETERS	**T1 (control)**	**T2 (0.7g/kg)**	**T3 (1.2g/kg)**	**T4 (1.7g/kg)**	**Probability**
Hb (g/dl)	11.02	11.72	11.57	10.75	0.81^{NS}
MCHC(g/dl)	33.23	33.13	33.21	33.25	0.57^{NS}
MCH(pg)	9.55	9.55	9.86	10.04	0.95^{NS}
MCV(fl)	2.87	2.88	2.97	3.02	0.95^{NS}
PCV (%)	33.17	35.17	34.83	32.33	0.82^{NS}
RBC Count(10^6/µl)	1.16	1.22	1.19	1.07	0.35^{NS}
Total WBC count(10^3/µl)	9.15	9.82	8.42	8.30	0.75^{NS}

Conclusion and Recommendations

It was concluded that any of the treatment groups T2 (0.7g/kg), T3(1.2g/kg) and T4(1.7g/kg) is recommended to enhance broiler production.

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