

GROWTH PERFORMANCE AND HAEMATOLOGICAL INDICES OF WEANER RABBITS FED DIETS SUPPLEMENTED WITH *SACCHAROMYCES CEREVISIAE*

Osita, C. O., Ani, A.O., Udeh, F. U., Udeh, V. C., and Ezewuzie, V.

Department of Animal Science, University of Nigeria, Nsukka, Nigeria;

Corresponding author: Osita, C. O.; E-mail: charles.osita@unn.edu.ng; Telephone: 08037410712

Abstract

A study was conducted to evaluate the growth performance and haematological indices of weaner rabbits fed varying levels of Saccharomyces cerevisiae. Thirty two weaner rabbits were weighed and randomly allocated into four treatment groups (T1, T2, T3 and T4) having eight rabbits per treatment. Each treatment was replicated four times with two rabbits per replicate. Treatment 1 served as the control and did not contain Saccharomyces cerevisiae supplement, while treatments 2, 3 and 4 contained 1, 1.5 and 2 g/kg of basal diet respectively of Saccharomyces cerevisiae supplement. The experiment lasted ten weeks. Results showed that there were no significant ($p > 0.05$) differences among treatments in initial body weight and feed conversion ratio while average daily feed intake (ADFI), and average daily weight gain (ADWG) were significantly ($p < 0.05$) affected. The study revealed significantly ($P < 0.05$) higher ADWG in the rabbits of treatment groups T2, T3 and T4 compared to the control group (T1). Lowest ADFI and haemoglobin concentration were recorded in T1. The packed cell volume of rabbits in T3 and T4 are significantly ($p < 0.05$) higher than those of T1 and T2. The red blood cell count of rabbits in T4 was significantly ($p < 0.05$) higher than those of other treatment groups. The total white blood cell count of rabbits in T2, T3 and T4 were significantly ($p < 0.05$) higher than that of T1. The mean corpuscular volume, mean corpuscular haemoglobin, and mean corpuscular haemoglobin concentration were not significantly ($p > 0.05$) affected. In conclusion dietary inclusion of Saccharomyces cerevisiae had effect on the rabbits. Based on the results obtained 2g/kg of Saccharomyces cerevisiae is recommended.

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

Introduction

The increasing demand for animal protein in Nigeria has stimulated great interest in the rabbit as a fast growing animal with short generation interval (Aduku and Olukosi, 1990). It has also been reported that rabbit meat plays an important role in the prevention of vascular disease due to extremely low cholesterol and sodium levels (Aduku and Olukosi, 1990).

Low level of antibiotics has over the years been used in rabbit production as growth promoters and prophylactic agents against diseases (Falcão-E-Cunha *et al.*, 2007). However, the unreasonable use of antibiotics as a growth additive has given rise to a fear of the development of resistant bacteria (Aarestrup *et al.*, 1998) that may lead to the transfer of resistant bacteria and its resistant factors from animals to humans (Stanton, 2013). Hence, non-antibiotic alternatives like *Saccharomyces cerevisiae*, a probiotic are being used in rabbit feed to improve growth and production performance.

Inclusion of live yeast in animal feed has been shown to improve the digestibility, efficiency of feed utilization, and performance of animals (Martin *et al.*, 1989). Blood parameters are major indices of physiological, pathological and nutritional status of livestock. Haematological components are of great diagnostic importance in monitoring feed toxicity, especially feed constituents that may affect the formation of blood. The study was designed to evaluate the effect of dietary inclusion of *Saccharomyces cerevisiae* on growth performance and haematological indices of weaner rabbits.

Materials and Methods

The study was carried out at the Rabbit unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria, Nsukka. The study lasted ten weeks. Thirty two weaner rabbits were used for the study. The rabbits were weighed and randomly allocated into four (4) treatment

groups having eight (8) rabbits per treatment in a completely randomized design. Each treatment was replicated four (4) times with two (2) rabbits per replicate. Treatment 1 served as the control and did not contain any *Saccharomyces cerevisiae*, while treatments 2, 3, and 4, contained 1, 1.5, and 2 g/kg of basal diet. The weaner rabbits were fed with a formulated ration of 16% CP. The percentage composition of the formulated ration is shown in table 1. Clean water and feed were provided *ad libitum*. The rabbits were housed in individual cages.

The rabbits were weighed at the beginning of the experiment to determine their initial body weights. Body weights of the rabbits were measured 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 rabbits 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 ten weeks of the experiment, four rabbits were randomly selected from each treatment. Five mls of blood was collected from the ear vein of each rabbit 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 (HB) 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: The percentage composition of the formulated diet

Ingredients	% composition			
	T1 (control)	T2 (1 g/kg)	T3 (1.5 g/kg)	T4 (2 g/kg)
Maize	36.9	36.9	36.9	36.9
Wheat offal	27.9	27.9	27.9	27.9
Soybean meal	10.57	10.57	10.57	10.57
Palm kernel cake	8.10	8.10	8.10	8.10
Oyster shell	4	4	4	4
Bone meal	2	2	2	2
Brewers dry grain	10	10	10	10
Vitamin premise	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100	100	100	100

Results and Discussion

The effects of different levels of dietary inclusion of *Saccharomyces cerevisiae* on growth performance of weaner rabbits are shown in Table 2. Significant ($p < 0.05$) differences existed in the average daily weight gain (ADWG), and average daily feed intake (ADFI) while there were no significant ($p > 0.05$) differences among the treatments in initial body weight, and FCR. The study revealed significantly ($P < 0.05$) higher ADWG in the rabbits of treatment groups T2, T3 and T4 compared to the control group (T1). Rabbits in T2, T3 and T4 had similar ADWG. The ADFI of rabbits in T3 and T4 are similar but these were significantly ($p < 0.05$) higher than those of T1 and T2. Lowest ADFI was recorded in T1.

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

PARAMETERS	T1 (control)	T2 (1 g/kg)	T3 (1.5 g/kg)	T4 (2 g/kg)	Probability
Initial body weight(g)	661	674	682	701	0.85
Average. daily weight gain (g)	12.93 ^b	14.82 ^a	15.10 ^a	15.93 ^a	0.04
Average. daily feed intake (g)	51.71 ^c	60.01 ^b	67.16 ^a	68.19 ^a	0.03
Feed conversion ratio	3.99	4.01	4.45	4.28	0.10

^{abc} Means on the same row with different superscript are significantly different (p<0.05).

The result is in agreement with the findings of Onafide *et al* (1999) who observed higher feed intake and weight gain between *Saccharomyces cerevisiae* treatment groups and control group. The result of the present study is in conformity with Chang *et al.* (2001) who reported increased weight gain in *S. cerevisiae* supplemented group compared with control group. The improved weight gain in the present study could be attributed to enhanced feed consumption and absorption of nutrients due to addition of *S. cerevisiae* (Chiofalo *et al.*, 2004).

The effects of different levels of dietary inclusion of *Saccharomyces cerevisiae* on haematology of weaner rabbits are shown in Table 3. Significant (p<0.05) differences existed in the HB, PCV, RBC and Total WBC count while there were no significant (p>0.05) differences among the treatments in MCHC, MCH and MCV. The HB of rabbits in T3 and T4 are similar but these were significantly (p<0.05) higher than those of T1 and T2. Lowest HB was recorded in T1. The PCV of rabbits in T3 and T4 are similar but these were significantly (p<0.05) higher than those of T1 and T2. The RBC of rabbits in T4 was significantly (p<0.05) higher than those of other treatment groups. Lowest RBC was recorded in rabbits in control group. The total WBC count of rabbits in T2, T3 and T4 were similar but these were significantly (p<0.05) higher than that of T1.

Table 3: Haematological indices of weaner rabbits fed varying dietary levels of *Saccharomyces cerevisiae*

PARAMETERS	T1 (control)	T2 (1 g/kg)	T3 (1.5 g/kg)	T4 (2 g/kg)	Probability
HB (g/dl)	10.13 ^c	10.70 ^b	11.60 ^a	11.57 ^a	0.03
MCHC(g/dl)	32.23	31.13	34.21	33.25	0.97
MCH(pg)	19.55	19.55	19.86	23.04	0.55
MCV(fl)	70.87	70.55	70.56	70.88	0.65
PCV (%)	34.67 ^b	35.33 ^b	37.33 ^a	38.00 ^a	0.02
RBC (x10 ⁶ /μl)	5.16 ^c	6.22 ^b	6.19 ^b	7.37 ^a	0.03
Total WBC count(x10 ⁹ /L)	6.15 ^b	7.82 ^a	7.42 ^a	7.90 ^a	0.04

PCV= packed cell volume, MCV= mean cell volume, MCH= mean corpuscular haemoglobin
MCHC= mean corpuscular haemoglobin concentration, HB= Haemoglobin concentration, RBC= Red blood cell count, WBC= White blood cell count

^{abc} Means on the same row with different superscript are significantly different (p<0.05)

The increase in PCV and WBC are in agreement with the findings of Aathour *et al* (2002). The result also conforms to Onifade *et al* (1999) who observed that the RBC, WBC, and PCV of rabbits fed diet supplemented with *Saccharomyces cerevisiae* had a significantly (p<0.05) higher value than that of the control group. Increased WBC counts might be related to the production of more immune cells (and thus antibodies) that play an important role in defending the biological system against different diseases. However, the result obtained in this study is in contrast with Shehu *et al.* (2013) who reported that yeast inclusion in the diet of weaner rabbits did not affect HB, RBC and PCV.

Conclusion and Recommendation

In conclusion dietary inclusion of *Saccharomyces cerevisiae* had effect on the rabbits. Based on the results obtained in this study T4 (diet containing 2g of *Saccharomyces cerevisiae* /kg of the diet) was recommended as the most favourable diet.

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