IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 15, Issue 12 Ser. II (December 2022), PP 63-68
www.iosrjournals.org

EVALUATION OF BAKER'S YEAST (*Saccharomyces Cerevisiae)* SUPPLEMETNATION ON GROWTH PERFORMANCE AND BLOOD HAEMATOLOGY OF WEANER RABBITS (*Oryctolagus Cunniculus)*

H. Ibrahim
Department of Animal Production, Faculty of Agriculture, Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria
Corresponding Author: ihadiza080@gmail.com. GSM Number: 08036101761

Abstract
Thirty six weaned rabbits aged between 4 and 5 weeks and of mixed breeds and sexes, with average initial weights of 500 g were used to examine the growth and blood haematology of rabbits (Oryctolagus cuniculus) fed baker's yeast supplement.The rabbits were allotted into four dietary treatments; T_1 (0 % as the control diet), T_2, $T_{and,}$ T_4 (containing T_1= Treatment one (Concentrate +0%Baker's yeast)T_2= Treatment Two (Concentrate + 20%Baker's yeast)T_3= Treatment Three (Concentrate + 40% Baker's yeast)T_4=Treatment Four (Concentrate +60% Baker's yeast of three (3) replicates with five (3) rabbits per replicate in a completely randomized design. Data were collected on growth parameters and blood haematology , the trial lasted six weeks. Data generated from the trial were subjected to analysis of variance (ANOVA). The variations in means were separated using the Duncan Multiple Range. (Duncan,1955). The result on growth performance (initial growth, final weight, daily weight fain, total concentrate intake, total feed intake, feed conversion ratio) revealed significant (P<0.05) differences among the growth performance parameters measured except feed intake that was affected and no significant effect on the blood haematology except on the N= neutrophils, L= lymphocytes, ; Haemoglobin (Hb), White Blood Cell (WBC) count, Packed Cell Volume (PCV) and Red Blood Cell (RBC) count , and for serum biochemistry parameters Total protein, was significantly affected by test ingredient,Albumin, and Globulin. Were not not affected.

Keywords*: yeast , rabbit, haematology, growth, cunniculus*

Date of Submission: 15-12-2022 Date of Acceptance: 30-12-2022

I. Introduction

The increasing demand for animal protein in Nigeria has stimulated great interest in the rabbit as a fast growing animal with short generation intervals (Aduku and Olukosi, (1990). However, the indices of productivity both for growth and reproductive performances of rabbits found in the country are inferior to those of their temperate counterparts. Low level of antibiotics has over the years been used in rabbit production as growth promoters and prophylactic agents of diseases (Falcão-e-Cunha et al., 2007). Many of the antibiotics used as growth promoters and therapeutic agents have side-effects on rabbit performance (McNittet al., 1996); Brooks, (1997); Falcão-e-Cunha et al., (2007).

Feed is a major component affecting net return from the livestock enterprise, because 80% of the total expenditure in terms of cash is spent on feed (Farooq *et al.,* 2001). To ensure more net return and to minimize expenditure on feed are the main challenges, for which many research strategies has been practiced such as introducing feed additives (Pervez, 1992). Constraints on the use of antibiotics globally require alternative feed additives to antibiotics for improved growth performance, sound physiological status and high productivity. The alternatives must meet the demands of consumers for natural products and maintain high standards of wholesomeness expected in rabbit meat. One of such alternatives is baker's yeast, *Saccharomyces cerevisiae* (SC) a probiotic, demonstrated to be a valuable and qualitative growth promoter for feeding livestock (Njike*et al.*, 1987); Falcão-e-Cunha *et al*., 2007); Shareef and AI-Dabbagh, (2009). Blood parameters are major indices of physiological and nutritional status of livestock (Akinmutimi, (2004).

Haematological components are of great diagnostic importance in monitoring feed toxicity, especially feed constituents that may affect the formation of blood.

adoption and comparative

Aim and Objectives of the study

Aim :
The aim of the research is to evaluate the effect of baker's yeast supplement on the overall performance of weaned rabbits.

Objectives of the study:
- 1. to evaluate the effect of baker's yeast supplement on growth performance of weaned rabbits.
- 2 to examine the effect of baker's yeast supplement on haematologicalparameters of weaned rabbits.
- 3)o examine the effect of baker's yeast supplement on biochemical parameters of weaned rabbits

II. Materials And Methods

Location of the Experiment

The research work was conducted at the rabbit unit of the Teaching and Research Farm of Ibrahim BadamasiBabangida University Lapai, Niger State. Lapai is very close to Minna which is the State Capital and lies between longitude 9º02N and latitude 6º34 of the equator. (Usman, 2011). The area falls within the southern guinea savanna vegetation zone of Nigeria with mean annual rainfall ranging between 21ºC and 36.5ºC (Usman 2011).

Experimental Animals And Their Management

Thirty-six weaned composite rabbit aged 5-6 weeks were used and of both sexes (twenty-four females and twelve males), were randomly allotted to treatment groups. Each treatment had three replicates with three rabbits per replicate (one male two females). The rabbits were housed intensively in a well-constructed hutch that was made of wire and woods with trays to collect the faeces as well as for easy cleaning of the hutches. The hutches were equipped with feeders and drinkers. The hutches were cleaned twice daily throughout the study period. Which lasted 8 weeks after one week of adjustment period. The rabbits in all the treatments were kept under close observation for proper monitoring indication of ill-health. The rabbits were dewormed against endoparasite using ivermetin, coccidiosis was treated once using sulphadimidine and multivitamin soluble powder (vitalyte) was given as an anti-stress.

Source of Feed Ingredients

Groundnut cake (GNC), Bone meal (BM), Limestone, premix were Obtain from Fauziya farm adjacent GidanMatasa feed Ingredients milling Factory, Minna, while Maize and Salt were l be obtain from Lapai Market.

Source of rabbit

Thirty-six weaned rabbit rabbits of mixed sexes and breeds were obtained from Niger state veterinary clinic, Minna, Niger state.

Experiment diets

A commercial baker's yeast containing *Saccharomyces cerevisiae* was used as the dietary supplement. Four experimental diets were formulated. Diet 1 (control diet), which were designed as TRT_1 and without supplementation of *Saccharomyces cerevisiae*, serve as control diet. Diet 2, 3, and 4 were designated as TRT_2, TRT_3 and TRT_4 respectively, and*Saccharomyces cerevisiae* at the rate of 20, 40 and 60g per kilogram of basal diet. The diets were all in form of grain. Proximate analysis of the basal diet were conducted according to the procedures of Association of Official Analytical Chemists (AOAC, 2000). The diet and clean fresh water were offered*ad libitum.*

Table 1: Composition of Experimental Diet

Ingredients (%)	T1	T2	T3	T4
Maize	43.90	43.90	43.90	43.90
Groundnut cake	29.10	29.10	29.10	29.10
Maize offal	25.00	25.00	25.00	25.00
Lime stone	1.50	1.50	1.50	1.50
Vitamin premix	0.25	0.25	0.25	0.25
Salt	*0.25*	*0.25*	*0.25*	*0.25*
Total	**100**	**100**	**100**	**100**
Baker's yeast	-	20.00	40.00	60.00
Calculated values				

Crude protein(%)	17.00	17.00	17.00	17.00
Metabolizable energy(Kcal/kg)	**2,799.128**	**2,799.128**	**2,799.128**	**2,799.128**

Key:
T_1= Treatment one (Concentrate +0%Baker's yeast*)*
T_2= Treatment Two (Concentrate + 20%Baker's yeast)
T_3= Treatment Three (Concentrate + 40% Baker's yeast)
T_4=Treatment Four (Concentrate +60% Baker's yeast).

Experimental design
The thirty six (36) rabbits were allotted by simple randomization into four treatment groups of nine (9) animals per treatment, after balancing for live weight and sex. each of the four treatment groups were further replicated in to three replicates each comprising 3 rabbits .

Experimental Layout
Treatments

Replicates	T_1C+ SC (0g)	T_2C+ SC (20g)	T_3C+ SC (40g)	T_4C+ SC (60g)
1	T_1R_1	T_2R_1	T_3R_1	T_4R_1
2	T_1R_2	T_2R_2	T_3R_2	T_4R_2
3	T_1R_3	T_2R_3	T_3R_3	T_4R_3

KEY:
T_1C+ SC (0g) = Treatment one (Concentrate + 0%Baker's yeast)
T_2C+ SC (20g) = Treatment Two (Concentrate + 20%Baker's yeast)
T_3C+ SC (40g) = Treatment Three (Concentrate + 40% Baker's yeast)
T_4C+ SC (60g) =Treatment Four (Concentrate +60% Baker's yeast)

Data collection
Data were collected on growth parameters (initial growth, final weight, daily weight gain, total concentrate intake, total feed intake, and feed conversion ratio) over a period of eight (8) weeks using a Camry weighing scale for weekly weighing of the animals. Feed intake was determined on daily basis by weighing the feed offered to the animals and the quantity of feed left unconsumed by the following morning. The difference in weight between the two gave the quantity of feed consumed per day. Mean daily weight gain and feed conversion ratio were also determined. Below are the formulas used in calculating the growth parameters.
Initial weight = is the weight of the animal taken before the commencement of the experiment
Final weight = isthefinal weightof the animal taken before slaughtering
Feed intake = feed offered (g) – left over (g).
Weight gain = final weight (g) – initial weight (g)
Feed conversion ratio (FCR) = feed consumed (g)
Weight gain (g)

Mean daily gain = mean final weight gain
number of days
Mean daily feed intake = mean total feed intake
number of days
Mortality (%) = number of dead rabbits × 100
initial number of the rabbits

Blood sample collection
Haematological study: At the end of the feeding trial, 2 rabbits were randomly selected from each replicate, starved of food for 12 hours. The selected rabbits were slaughtered through jugular vein with sharp knife and blood were collected into bottles containing ethylene demine tetra-acetic acid (EDTA anticoagulant for haematological assay.
Serum biochemical profile : Blood samples for serum studies were collected into plane bottles (without anticoagulant) to determine serum total protein, albumin, and globulin.
Blood samples for serum studies were collected into plane bottles (without anticoagulant).
The blood parameters considered include; Haemoglobin (Hb), White Blood Cell (WBC) count, Packed Cell Volume (PCV) and Red Blood Cell (RBC) count for haematologicalparameters, and were analyzed by an auto Haemoanaliser (BC- 3000plusMindray Auto Haematology analyzer).

The serum biochemistry parameters analyzed included; Total protein, Albumin, and Globulin. The analyses was carried out at the Haematology laboratory section of the Niger State Veterinary Hospital, Minna,Niger State.

III. Results And Discussion

Results

Table 1 : PROXIMATE ANALYSIS

Parameters (%)	Treatment T1	T2	T3	T4
Moisture	6.20	6.20	7.60	6.60
Crude protein	13.65	13.60	13.86	13.00
Crude Fibre	10.50	10.22	7.24	6.00
Ether extract	7.48	6.38	6.74	7.00
Ash	7.21	8.33	7.34	7.63
Nitrogen free extract	54.96	55.27	57.22	59.77

The result of chemical composition of the experimental diets (Table 1) (D1= feed without yeast supplement (control), D2= feed with yeast supplement (20g/kg), D3= feed with yeast supplement (40g/kg), D4= feed with yeast supplement (60g/kg) revealed diet (T3) had the highest value (7.60 %) of percent moisture and lowest was diets of 1 and 2 with values of 6.20 % each,

percent crude protein recorded similar of values 13.65 % for all the treatments groups. . `percent crudefibre the values revealed control diet had the highest value (10.50) while diet four had the lowest value (6.00). For the percent ether extract, the obtained values indicated that control (diet one) has the highest value (7.48) while diet two had the least value (6.38) and for percent ash showed that diet two recorded highest value (8.33) while control (diet one) had the least value (7.21).

Table 2: Growth performance of weaned rabbits fed different levels of baker's yeast as supplement.

T_1	T_2	T_3	T_4		
parameters	0 g/kg yeast	20g/kg yeast	40 g/kg yeast	60 g/kg yeast	LSD	SEM±
IW (g)	633.33	611.11	633.33	633.33	0.92	39.87
FW (g)	868.67	873.67	923.00	859.00	0.91	97.39
TBWG (g)	235.33	262.55	289.67	225.67	0.79	69.91
FI (g)	3450.73^{b}	4069.00^{a}	4221.00^{a}	4221.00^{a}	0.03	246.69
WBWG	29.42	32.82	36.21	28.21	0.79	8.76
WFI	431.34^{a}	508.63^{ab}	527.63^{b}	527.63^{ab}	0.13	39.28
FCR	14.66	15.50	14.57	18.70	0.22	6.04

a, b, c: Means with different superscripts on the same row differ significantly (P<0.05), NS=not significant, * = significant, S.E.M=Standard error of mean, LS= level of significance, IW= Initial weight, FW= Final weight gain, TBWG= Total body weight gain FI= Feed intake, WBWG= weekly body weight gain, WFI= weekly feed intake, FCR= feed conversion ratio T_1=treatment one, T_2=treatment two, T_3=treatment three, T_4=treatment four

The results of the growth performance of rabbits fed different level of baker's yeast as supplement. (Table .2) revealed significant (P<0.05) difference observed across the treatment groups, the value of feed intake and weekly feed intake, treatment three (T3) and four (T4) recorded the highest value of (4221.00 g) and (527 .63 g) . No significant (P>0.05) differences were observed in the values of other parameters measured.Enhancement in feed intake may be attributed to test ingredient yeast addition increases the population of total glandular stomach bacteria and which in turn helps increase feed intake as well as feed digestibility, therefore, more nutrients were available for growth operations (Habeeb *et al.*, 2017). This finding is in line with Shanmuganathan *et al.* (2004) who stated that favorable leverage of yeast on weight gain for fattening rabbits that aided by feed intake increment. Habeeb *et al.* (2006) found that average daily gain improved by 12.6 %, when yeast added to rabbit's diet. No significance (P>0.05) differences were observed in the value of initial weight gain, final weight gained, total body weight gained and feed conversion ratio. However, the highest final weight gain (923.00g), Total body weight gain (289.67) and the best feed conversion ratio (14.57) were all recorded in treatment three that is rabbits fed with 40g/kg of baker's yeast in the diet. This results coincided with the observation of Belhassen *et al.* (2016) who recorded same body weight gain despite not significantly affected by yeast supplementation to rabbit's diet after weaning (5-11 wk). The result of the

feed conversion ratio recorded from this experiment was similar to that of Kustos *et al.* (2004); Matusevičius *et al.* (2006) who observed non-significant difference in FCR using a commercial probiotics in rabbits diet. However, Shanmuganathan *et al.* (2004) recorded a favorable impact of yeast on feed conversion in fattening rabbit

Table 3. HaematologyParameters of Rabbit Fed With Different Dietary Level of Yeast as Supplement.

T_1T_2 T_3T_4

parameters	0 g/kg yeast	20g/kg yeast	40 g/kg yeast	60 g/kg yeast	LSD	SEM±	NM
HB g/dl	9.50	12.06	10.87	9.87	1.29	0.27	11.6-16.6
PCV %	28.67	35.67	32.67	29.67	3.86	0.33	35-50
RBC × 10^{12}/1	4.73	6.03	5.40	4.90	0.65	0.27	4-6
TWBC × 10^{9}/1	2.67	3.83	3.47	2.93	0.58	0.26	4-10
N%	62.33^{a}	62.67^{a}	62.67^{a}	56.33^{b}	1.29	0.03	30-70
L%	96.00^{a}	100.00^{a}	97.00^{a}	88.00^{ab}	4.51	0.13	30-100

a, b, c: Means with different superscripts on the same row differ significantly (P<0.05), NS=not significant, * = significant, S.E.M=Standard error of mean, LS= level of significance, LSD=least standard deviation.WBC= White Blood Cell, PCV= Packed Cell Volume, HB= Hemoglobin and RBC= Red Blood Cell, N= neutrophils, L= lymphocytes, NM= Normal rangeT_1=treatment one, T_2=treatment two, T_3=treatment three, T_4=treatment four.

Results of the effect of yeast on the haematological parameters of rabbitsas shown(Table 3.) revealed significant (P < 0.05) differences in the values of neutrophils and lymphocytes concentration across the treatments. Higher value of neutrophils (62.7%) were recorded in reatment 1, 2 and 3 with lower value in treatment 4 (56.33 %) and lymphocytes result was similar to trend obtained neutrophils. Higher value of neutrophils (62.7%) and lymphocytes (100%) were all obtained in treatment two (T2.). This results coincides with the findings ofKhaksefidi and Ghoorchi (2006) who reported that probiotic caused increases in total erythrocyte and leukocyte cell counts and marked increase in percentage of lymphocytes and monocytes. The effect may be direct on the lymphatic tissues (Kabir*et al*., 2004) or indirect through the impact of live yeast on microbial population of gastrointestinal lumen (Jin *et al*., 1997). The lymphocyte population demonstrates immune competence and lack of chronic infection in the rabbits. Yeast has been reported to possess immune stimulatory properties due to its complex carbohydrate components and nucleic acid content, which in turn improve growth performance and disease resistance ability (Cetin *etal*., 2005). The lymphocyte population demonstrates immune competence and lack of chronic infection in the rabbits. The non significant (P > 0.05) difference in the packed cell volume, haemoglobin, red blood cells and white blood cell. Higher value of packed cell volume (35.67%), hemoglobin (12.06g/dl), red blood cells (6.03 × 10^{12}/1), and white blood cells (3.83 × 10^{9}/1) were all recorded in treatment two. This findings is in accordance with the observation of Rolfe (2000) and Athouri*et al.*, (2001) which both observed that yeast have immune stimulatory effects.

Table 4: Serum biochemistry parameters of rabbit fed with different dietary level of yeast as supplement

T1 T2 T3 T4

parameters	0 g/kg yeast	20g/kg yeast	40g/kg yeast	60 g/kg yeast	LSD	SEM±	NM
TP g/ml	4.33^{a}	5.70	$^{ab}5.83^{b}$	$5.47^{a\,b}$	0.60	0.13	2.8-10.1
AL mg/l	2.40	3.60	3.53	2.40	0.49	0.06	1.3-6.4
GL g/ml	21.33	26.00	25.00	22.33	2.33	0.23	20-35

a, b: Means with different superscripts on the same row differ significantly (P<0.05), NS=not significant, *=significant, S.E.M= Standard error of mean, LS= level of significance, TP= Total Protein, GL= Globulin and, NM=Normal range,T_1=treatment one, T_2=treatment two, T_3=treatment three, T_4=treatment four.8g

The result of serum biochemistry profile of the rabbits. (Table 4) revealed significance (P<0.05) variation in the value of total protein with treatment three (T3) having the highest value of (5.8g/ml) while treatment one (T1) had the least value of (4.33g/ml). No significant differences were observed in the values of globulin and albumin across the groups

IV. Conclusion

Based on the results obtained, rabbits in treatment two and three i.e. Rabbits fed 20g/kg and 40g/kg of yeast as supplement had the best performance in growth performance and blood indices parameters considered

than those in treatment one (control)and treatment four (60g/kg of yeast supplement). Thus, it can be concluded that yeast supplementation on rabbits had no any detrimental effect on the growth performance and blood indices parameters of rabbits.

Recommendations

Based on the conclusion drawn from this study, 20g/kg and 40g/kg level of yeast supplementation can be recommended for further study in the diet formulation for rabbits.

References

[1]. Athouri, N., Bouras M., Tome D., Marcos A., andLemonnier D. (2001) Oral ingestion of lactic acid bacteria by rat's increases lymphocyteproliferation and interferon production. Br J Nutr 87:367–373

[2]. Aduku, A..O. and Olukosi J.O. (1990). Rabbit management in the tropics; production, processing, utilization, marketing, economics. Practical training research and future prospects. G.U. Publications, Abuja, Nigeria

[3]. AOAC (2000) Association of Official Analytical Chemica. Association of Analytical Chemist. Oxford methods of analysis, 13th edition, Washington D.C

[4]. Akinmutimu, A. H. (2004). Evaluation of sword bean (Canavalia gladiate) as an alternative feed Resources for broiler chickens. Ph.D thesis.Department of Non ruminant Animal Production. Micheal Okpara University of Agriculture, Umudike, Nigeria.

[5]. Arrington, L.R. and Kelley K.C. (2001).Domestic rabbit biology and production. pp. 230

[6]. Belhassen, T., Bonai A., Gerencsér Z.S., Matics Z.S., Tuboly T., Bergaoui R., and Kovacs M.(2016). Effect of diet supplementation with live yeast saccharomyces cerevisiae on growth performance, caecal ecosystem and health of growing rabbits. World Rabbit Sci., 2016, 24: 191-200 doi:10.4995/wrs.2016.3991
Cetin, N., Guclu, B.K. and Cetin, E. (2005).The effects of probiotic and mannanoligosaccharide on some haematological and immunological parameters in turkeys.Journal of Veterinary Medicine, 52, 263-267

[7]. Falcão-e-Cunha, L., Castro-Solla, L., Maertens, L., Marounek, M., Pinheiro, V.§, Freire, J. and Mourão, J.L. (2007). Alternatives to antibiotic growth promoters in rabbit feeding: A review. World Rabbit Science, 15, 127 - 140.

[8]. Habeeb, A.A.M., Attia SAM., Mona N. and Sharoud, (2006). Performance of growing rabbits fed rations supplemented with active dried yeast (Saccharomyces cerevisiae). Egyptian J. of Applied Sciences, 21(4A): 1-18

[9]. Habeeb, A.A.M., Saleh H.M., EL-Tarabany A.A., (2017). Effect of yeast on Ruminal function of farm animals. A Review. Merit Research Journal of Agricultural Science and Soil Sciences, 5(5), 80-88.

[10]. Jin, L.Z., Ho Y.W., Abdullah N, and Jalaludin S. (1997) Probiotics in poultry: modes of action. World's PoultSci J 53:351–368

[11]. Kabir, S.M.L., Rahman M.M., and Ahmed S.U. (2004) the dynamics of probiotics on growth performance and immune response in broilers. Int J PoultSci 3:361–364

[12]. Khaksefidi, A, Ghoorchi T (2006) Effect of probiotics on performance and immunocompetence in broiler chicks. J PoultSci 43:296–300

[13]. Kustos, K., Kovács D., Gódor-Surmann K., andEiben C.S.(2004). Effect of probiotic bioplus 2B® on performance of growing rabbit. Proceedings of the 8th World Rabbit Congress; Puebla (México). p. 874–879.

[14]. Matusevicius, P., Sliaudaryte R.,Antoszkiewicz Z., and Bednarska A.(2006). A natural way to improve productivity of rabbits using probiotic yeasture. VeterinarijairZootechnika, 26: 61-64

[15]. Njike, M. C., Ahmed, A.S. and Haruna, E.S. (1987). Evaluation of brewer's dried yeast protein in broiler diet. Nigerian Journal of Animal Production, 14, 83-87.

[16]. Rolfe, R.D (2000) the role probiotic cultures in the control of gastrointestinal health. J Nutr 130(2S):396S–402S

[17]. S.A.S, Institute. (1994). SAS/STAT User's guide: Statistics,Version 6.04. SAS Institute Inc., Cary, NC.

[18]. Shanmuganathan, T., Samarasinghe K., Wenk C.(2004). Supplemental Enzymes, Yeast Culture and Effective Microorganism Culture to Enhance the Performance of Rabbits Fed Diets Containing High Levels of Rice Bran. Asian-Aust. J. Anim. Sci., 17: 678-683.

[19]. Shareef, A.L Dabbagh, Saipaul S., Das K.S, Gangwar M. and Sikka S.S. (2009). Effect of probiotics on the nutrient digestibility in rabbits. Indian Journal of Animal Nutrition. 22(2): 138-140.

[20]. Usman, H. I. (2011). Effect of time of intercropping soy beans on weed suppression and performance of upland rice in southern guinea savanna of Nigeria. PhD thesis, Department of crop production. Federal University of Technology Minna. Pp 2

H. Ibrahim, et. al. "EVALUATION OF BAKER'S YEAST (Saccharomyces Cerevisiae) SUPPLEMETNATION ON GROWTH PERFORMANCE AND BLOOD HAEMATOLOGY OF WEANER RABBITS (Oryctolagus Cunniculus)." *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, 15(12), 2022, pp. 63-68.