FUDMA Journal of Agriculture and Agricultural Technology
ISSN: 2504-9496
Vol. 8 No. 1, June 2022: Pp.64-69

https://doi.org/10.33003/jaat.2022.0801.021

EFFECT OF DIETARY SUPPLEMENTATION OF BAKER'S YEAST (*Saccharomyces cerevisiae)* ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF WEANER RABBITS (*Oryctolagus cunniculus)*

H. Ibrahim, J. M. Gajere A. Zahradeen, , and Abdulmalik, S.U.

[1]Department of Animal Production, Faculty of Agriculture, Ibrahim Badamasi Babangida University, Lapai, Niger State, Nigeria.

[2]Department of Microbiology, Federal University of Technology, Minna, Niger State, Nigeria

ihadiza080@gmail.com *GSM No- 08036101761*

ABSTRACT

The study was conducted to evaluate the effect of baker's yeast (*Saccharomyces cerevisiae)* supplement on the growth performance and carcass chracteristics of weaner rabbits. A commercial baker's yeast containing *Saccharomyces cerevisiae* was used as the dietary supplement, four experimental diets were formulated. Diet 1 (basal diet), which was designated T_1 and without supplementation of *Saccharomyces cerevisiae*, serve as control diet. Diet 2, 3, and 4 were designated T_2, T_3 and T_4 respectively, were supplemented with *Saccharomyces cerevisiae* at the rate of 20, 40 and 60g per kilogram of basal diet. The diets were in form of grain. Thirty six (36) weaner rabbits of mixed sex at ratio 2:1 (Females: male) were randomly allotted to four treatment groups in a complete randomized design. Each treatment was replicated three times with three rabbits per replicate. The trial lasted for a period of 8 weeks**.** Data on growth (initial growth, final weight, daily weight gain, total concentrate intake, total feed intake and feed conversion ratio) and carcass characteristics (cut-up parts and visceral organs) were recorded. The results obtained revealed no significant ($P>0.05$) differences among the growth performance parameters except for feed intake which was higher ($P<0.05$) in the control compared to T_3 (40g/kg). Carcass characteristics of the experimental animals showed no significant ($P>0.05$) difference in almost all the parameters measured with the exception of the neck. The values of internal organs and by-products revealed no significant ($p<0.05$) difference in all the values obtained.

Key words: baker's yeast, supplementation, growth, performance, carcass

INTRODUCTION

Increasing demand for animal protein and the economic hardship faced by the populace in the tropics have stimulated greater interest in fast-growing animals with short generation intervals such as the rabbit (Aduku and Olukosi, 1990). 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). However, the massive use of antibiotics for disease prevention and growth promotion in animal production has been implicated in the emergence of antibiotic-resistant pathogens and antibiotic residues in animal products, which is a public health concern. Constraints on the use of antibiotics in animal nutrition globally require alternative feed additives to antibiotics for improved growth performance, sound physiological status and productivity.

There are a number of non-therapeutic alternatives to antibiotics that include enzymes, herbal products, micro flora enhancers, immune modulators, organic acids, probiotic and combination of these products. Several mechanisms of action of these feed additives have been suggested (Inborr, 2000). The alternative will need to meet consumer demands for natural products and maintain high standards of wholesomeness expected in rabbit meat. The appealing properties of probiotic as reported by Strompfova *et al.* (2006) include the ability to reduce antibiotic use, the apparently high index of safety and the positive perception of the public about natural or alternative therapies. The yeast, *Saccharomyces cerevisiae is* a probiotic and a possible strategic alternative because of its availability, safety and cheapness. Its cells contain a lot of proteins, carbohydrates, lipids, vitamins and minerals (Reddy *et al.,* 2006). *Saccharomyces cerevisiae* is a valuable and qualitative growth promoter for feeding livestock (Njike *et al.,* 1987; Falcão-e-Cunha *et al.,* 2007; Shareef and Al-Dabbagh, 2009). The objective of this study is to determine the effect of bakers yeast on the growth performance and carcass characteristics of weaner rabbits supplemented at graded level of inclosion

MATERIALS AND METHODS

Location of experimental site:

The experiment was conducted at the Rabbitry unit of the Teaching and Research Farm, Department of Animal Production, Faculty of Agriculture, Ibrahim Badamasi Babangida University Lapai, Niger State, Nigeria. Lapai lies between latitude 9°31 and 9°45, each of the equators (6). The area falls within the Southern Guinea Savannah Vegetation Zone of Nigeria with

mean rainfall ranges between 1100-1600mm and mean temperature 21°C and 36.5°C.

Experimental Animals and their management

A total number of thirty-six (36) weaner rabbits of mixed sexes at 2:1 (female: male) were used in the experiment, the animals were randomly allotted to the four dietary treatment and the treatments were replicated thrice and each replicate consisted of 3 rabbits in complete randomly design (CRD). A control diet was formulated having a crude protein of 17% and metabolizable energy of 2,799.128 Kcal/Kg (Table1). Four experimental diets were formulated such that baker's yeast was included at 0g/kg, 20g/kg, 40g/kg and 60g/kg. The Rabbits were fed twice daily and water provided *ad-libitum* for the duration of trial period (8 weeks). Feed consumption record was taken by weighing the leftover feed and subtracting from the feed offered. The rabbits were weighed on daily basis and at the end of the experiment. One rabbit was randomly selected per replicate making 3 rabbits per treatment and 12 rabbits in total. They were weighed, fasted overnight and re-weighed before they were slaughtered. The rabbits were properly bled by turning their head downward to encourage blood flow. Then they were weighed again before the carcass were dissected and cut into primal parts.

Data generated were subjected to analysis of Variance (ANOVA) using SPSS. Significant differences among treatments means of treatments were compared using Least Significance Difference ($P< 0.05$) (LSD).

Table 1: Composition of the Basal Diet (Control)

Ingredients (%)	Proportion
Maize	76.00
Groundnut cake	20.00
Fish meal	1.50
Limestone	1.00
Bone meal	1.00
Premix	0.25
Salt	0.25
Total	**100**
Calculated values	
Crude protein (%)	17
Metabolizable energy (kcal/kg)	2,799.128

RESULTS AND DISCUSSION

Table 2: Proximate Analysis of the experimental diets

Treatments	T_1	T_2	T_3	T_4
Parameters	0g/kg	20g/kg	40g/kg	60g/kg
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

Table 3: Growth Performance of Weaned Rabbits Fed Different Levels of Baker's Yeast as Supplement

Parameters	T_1	T_2	T_3	T_4		
Inclusion level (g)	0g/kg	20g/kg	40g/kg	60g/kg	SEM±	LSD
Initial weight	633.33	611.11	633.33	633.33	39.89	NS
Final weight	868.67	873.67	923.00	859.00	97.39	NS
Total body weight gain	235.33	262.55	289.67	225.67	69.91	NS
Total Feed intake	3450.73^{b}	4069.00^{a}	4221.00^{a}	4221.00^{a}	246.69	*
Weekly body weight gain	29.42	32.82	36.21	28.21	8.76	NS
Weekly feed intake	431.34^{a}	508.63^{ab}	527.63^{b}	527.63^{ab}	39.28	*
Feed conversion ratio	14.66	15.50	14.57	18.70	6.04	NS

Table 2: shows the proximate analysis of the experimental diet, the results revealed no significant ($p>0.05$) differences in all the proximate components considered. However, higher value of moisture content, crude protein, crude fiber, ash, ether extract and nitrogen free extract were recorded in diet; 3,3,1,2, 1 and 4 respectively.

Table 3: shows that there was no significant differences ($p>0.05$) in almost all the growth performance parameters that were measured. However, the significant difference ($p<0.05$) recorded was in the total feed intake and weekly feed intake with treatments 3 and 4 having the highest feed intake values and treatment 1 (T_1) recording the lowest level of feed intake. 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 are available to growth operations (Habeeb *et al.,* 2017). This finding is in line with Shanmuganathan *et al.* (2004) who stated a favorable leverage of yeast on weight gain for fattening rabbits which was 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 rabbits.

Table 4: Carcass Characteristics of Rabbits Fed with Diet Supplemented Baker's Yeast at Varying Level of Inclusion

Parameters	T_1	T_2	T_3	T_4		
Inclusion level (g)	0g/kg	20g/kg	40g/kg	60g/kg	SEM±	LSD
Live weight	868.67	873.67	809.67	812.00	108.58	NS
Slaughter weight	846.67	850.33	788.67	788.67	104.93	NS
Dressing weight	393.33	413.33	375.33	340.33	59.21	NS
Neck weight	29.33^a	23.00^b	21.00^b	19.67^b	2.73	*
Thoracic weight	57.00	69.67	64.67	61.00	13.53	NS
Lumber sacral	133.00	132.00	119.67	108.00	20.17	NS
Hind limb	105.33	118.33	104.67	93.00	15.49	NS
Fore limb	62.67	68.67	64.00	57.33	10.03	NS

Table 4: shows the carcass characteristic of rabbits fed with different level supplement of baker's yeast in the dietary treatment (T_1= diet without baker's yeast supplement (control), T_2= diet with baker's yeast supplement (0.20kg) T_3= diet with baker's yeast supplement (0.40kg) and T_4= diet with baker's yeast supplement (0.60kg) respectively). Nevertheless, the results obtained from the experiment shows that there were no significant difference ($P>0.05$) in all the parameters obtained with exception of neck weight. However the value obtained for live weight shows that treatment two is statistically greater than all treatments (873.67) while treatment three had the least value (809.67). For the slaughter weight, the values showed that treatment two had the highest value (850.33) while treatment three and four had the lowest value (788.67). For the dressing weight, the result shows that treatment two had the highest value (413.33) while treatment four had the least value (340.33). These findings are in accordance with earlier studies of Onifade *et al.* (1998) and Lambertini *et al.* (2004) who also reported significant increase in body weight and body weight gain of rabbits when their diet was fortified with 3% yeast The results of neck weight show that treatment one had the highest value (29.33) while treatment four had the least value (19.67). Also the result of thoracic weight showed that treatment two had the highest value (69.67) while treatment one had the least value (57.00). For the lumber sacral, value obtained shows that treatment one had the highest value (133.00) while treatment four had the lowest value (108.00). The result of hind limb weight shoes that treatment two had the highest value (118.33) while treatment four had the least value (93.00) and for the fore limb weight, the result showed that treatment two had the highest value (68.67) while treatment four had the least value (57.33). The fore and hind parts of carcass closely related to locomotor activity and so increased at the expense of the intermediate part in the pen rabbits. Metzger *et al.* (2003) also reported similar findings in pen-housed and cage-housed rabbits. Dal Bosco *et al.* (2000, 2002) found an increase only in the portion of hind part.

Table 5: Internal Organs of Rabbits Fed with Diet Supplemented Baker's Yeast at Varying Level of Inclusion

Parameters	T_1	T_2	T_3	T_4		
Inclusion level (g)	0g/kg	20g/kg	40g/kg	60g/kg	SEM±	LSD
Liver	35.00	32.67	33.67	32.33	3.70	NS
Kidney	6.33	8.67	6.67	8.33	1.49	NS
Lungs	6.00	7.33	7.00	7.33	1.94	NS
Intestine	211.00	169.67	169.67	193.33	25.23	NS
Heart	2.33	2.67	2.33	1.67	0.85	NS
Pancreas	7.67	6.67	6.67	8.67	1.75	NS

Table 5: shows the internal organs characteristics of rabbit fed diets supplemented with baker's yeast (T_1 = diet without baker's yeast supplement (control), T_2 = diet with baker's yeast supplement (0.20kg), T_3 = diet with baker's yeast supplement (0.40kg), and T_4 = diet with baker's yeast supplement (0.60kg) respectively). However, the results obtained from the experiment shows that there were no significant difference ($P>0.05$) in all the parameters obtained. The result of liver showed that treatment one had the highest value (35.00) while treatment four had the least value (32.33). Also for the kidney, the result shows that treatment two had the highest value (8.67) while treatment one had the least value (6.33). The result of lungs shows that treatment two and four had the highest with the same value (7.33) while treatment one had the least value (6.00). For intestine the result obtained showed that treatment one had the highest value (211.00) while treatment two and three are the least with the same value (169.67). For the heart, the result obtained show that treatment two had the highest value (2.67) while treatment four had the least value (1.67). The result of pancreas showed that treatment four had the highest value (8.67) while treatment two and three had the least with the same value (6.67). This could be attributed to the fact that during the digestion process, yeast might have stimulated the secretion of the pancreatic digestive enzyme, such as α-amylase, which is effective in the digestion of dietary starch. This was as reported by Matur *et al.* (2010) that influence yeast extract on pancreatic amylase could be useful in the digestion of dietary starch. Moreover, β-glucan, known as a component of S. cerevisiae, could stimulate cholecystokinin from enteroendocrine cells, where cholecytokinin was effective to stimulate the pancreatic secretion (Chandra and Liddle, 2009; Matur *et al.,* 2010). However, the weight of the intestine lungs, liver, and heart in this study was not affected by any dietary treatments level. The similar results were reported by Rahbar *et al.* (2011) that the weight of the spleen and liver of broilers when feed added to *S. cerevisiae* in the rations were not significantly different.

Table 6: By-products of rabbits fed with diet supplemented baker's yeast at varying level of inclusion

Parameters	T_1	T_2	T_3	T_4		
Inclusion level (g)	0g/kg	20g/kg	40g/kg	60g/kg	SEM±	LSD
Blood	20.67	23.33	23.67	22.67	5.74	NS
Pelt/skin	53.67	66.00	55.33	57.00	13.48	NS
Head weight	85.67	89.33	85.00	84.67	7.65	NS
Tail weight	5.00	6.00	6.00	6.33	1.25	NS
Fore leg	7.33	7.00	6.33	6.67	0.91	NS
Hind leg	16.00	16.00	13.00	15.33	2.01	NS

Table 6: shows by-products of rabbit fed with supplement of baker's yeast in the diet with four different treatments. (T_1 = diet without supplement of baker's yeast (control), T_2= diet with baker's yeast supplement (0.20kg), T_3= diet with baker's yeast supplement (0.40kg), and T_4= diet with baker's yeast supplement (0.60kg) respective). However, the result obtained from the experiments shows that there were no significant different ($P>0.05$) among the values obtained for by-product. However, the result of blood weight showed that treatment three had the highest value (23.67) while treatment one had the least value (20.67). For the pelt/skin the result shows that treatment two had the highest value (66.00) while treatment one had the least value (53.67). Also for the head weight, treatment two had the highest value (89.33) while treatment four had the least value (84.67). For the tail weight the result shows that treatment four had the highest value (6.33) while treatment one had the least value (5.00). The result obtained for fore legs show that treatment one had the highest value (7.33) while treatment three had the least value (6.33). And hind leg, the result shoes that treatment one and two are the highest with the same value (16.00) these findings is similar to the observation of Paryad and Mahmoudi (2008) who reported that dietary probiotics could improve the performance and decrease the weight of inedible offals. The yeast in feed might have decreased the inedible offals weight by improving the edible offals and fur yield due to better-feed effect on rabbit growth rate as also obtained by Al-bar *et al.* (1991).

CONCLUSION AND RECOMMENDATION

The result of the experiments revealed that rabbit fed diet T_3 had better performance in body weight gained, there was no significant difference in the carcass parameters of rabbits between the control diets and rabbits fed with diet supplemented with baker's yeast with exception of neck weight from the parameters. It was also observed that there were no significant difference both internal organs and by-product of rabbits in all the parameters obtained. Therefore, the result of the experiments showed that inclusion level of baker's yeast at (40g/kg) in the diet can be used for growing rabbit diet without any negative effect on the growing performance and carcass characteristics of growing rabbits.

From the conclusion, diet three (40g/kg) recorded best results for body weight gained, hence, it can be fed to weaned rabbits for optimum and performance. Treatment three is therefore, recommended and that more research should be carry out in order to ascertain the standard level of yeast supplementation for the optimum performance of weaned rabbits.

REFERENCES

Al-Bar, A., Cheeke, P.R., Patton, N.M. and Forsberg, N.E. (1991). Effect of cimaterol on growth, feed efficiency and carcass characteristics of rabbits. *J. Appl. Rabbit Res.* **14**: 11-13. cerevisiae extract on the weight of some organs, liver and pancreatic digestive enzyme activity inbreeder hens fed diets contaminated with aflatoxins. Poult. Sci., 89: 2213-2220.

Aduku, A. O. and Olukosi, J. O. (1990). Rabbit Management In the tropics: Production, Processing, Utilization, Marketing, Economics, Research and Future Prospects. Abuja: Living Books Series.

Belhassen T., Bonai A., Gerencsér ZS., Matics ZS., 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

Chandra, R. and R.A. Liddle, (2009). Neural and hormonal regulation of pancreatic secretion. Curr. Opin. Gastroenterol., 25: 441-446.

Dal Bosco, A., Castellini, C. and Bernardini, M. (2000). Productive performance and carcass and meat characteristics of cage or pen-raised rabbits. *World Rabbit Sci*. **8(1)**: 579-583.

Dal Bosco, A., Castellini, C. and Muanai, C. (2002). Rearing rabbits on wire net floor or straw litter: behaviour, growth and meat qualitative traits. *Livestock Prod. Sci.* **75**: 149-156.

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.

Habeeb, A.A.M., Saleh H.M. and 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

Inborr, J. (2000). Swedish poultry production without feed antibiotics. A tesing ground or a model for the future? Australian Poultry Science Symposium, 12, 1-9.

Kustos K., Kovács D., Gódor-Surmann K. and Eiben CS., (2004.) Effect of probiotic bioplus 2B® on performance of growing rabbit. *Proceedings of the 8th World Rabbit Congress*; Puebla (México). p. 874–879.

Lambertini, L., Vignola, G., Beone, G.M., Zaghini, G. and Formigoni, A. (2004). Effects of chromium yeast supplementation on growth performances and meat quality in rabbits. *World Rabbit Sci*. **12**: 33-47.

Matur, E., E. Ergul, I. Akyazi, E. Eraslan and Z.T. Cirakli, 2010. The effects of Saccharomyces

Metzger, S., Kustos, K., Szendrõ, Z., Szabó, A., Eiben, C., and Nagy, I. (2003). Effect of alternative housing on carcass traits of rabbits. *Agriculturae Conspectus Scientificus.* **68(3)**: 151-154.

Matusevicius P., Asmenskaite L., Zilinskiene A., Gugolek A., Lorek M.O. and Hartman A. (2006) *Veterinary Medicine Zootechnicha*, 36(58), 54-59.

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.*

Onifade, A.A., Obiyan, R.I., Onipede, E., Adejumo, D.O., Abu, O.A. and Babatunde, G.M. (1998). Assessment of the effects of supplementing rabbit feeds with a culture of *Saccharomyces cerevisiae* using growth performance, blood composition and clinical enzyme activities. *Anim. Feed Sci. Technol.* **77(1)**: 25-32.

Paryad, A. and M. Mahmoudi, (2008). Effect of different levels of supplemental yeast (Saccharomyces cerevisiae) on performance, blood constituents and carcass characteristics

Ibrahim, H., Aliyu, Z., Oluwawuni, T.B., Awolola, G. And Abdulmalik, S.U.
of broiler chicks. African J. Agric. Res., 3: 835-842.

Rabbit Sci. **12**: 33-47.

Rahbar, M.G., P. Farhoomand and A. Kamyab, (2011). The effect of different concentrations of Peganum harmala seeds with or without a yeast cell wall product on the live performance, intestinal histomorphology and weights of visceral organs of broiler chickens. J. Applied Poult. Res., 20: 454-462. DOI: 10.3382/japr.2010-00261

Reddy, V.R., Rama, S.V. and Panda, A.K. (2006).Yeast: Multifunctional feed supplement for poultry. *Poultry International Journal, 1, 16-20.*

Shanmuganathan T. Samarasinghe K. and Wenk C. (2003) *Asian-Australasian Journal of Animal Science*, 17(5), 678-683.

Strompfova, V., Marcinakova, M., Simonva, M., Bogovic-Matijastic, B. and Laukova, A.(2006). Application of potential probiotic Lactobacillus fermentum AD1 strain in healthy dogs. Anaerobe, 12, 75-79.