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Growth Performance and Cost Benefit of Weaner Rabbits Fed Diet Supplemented with Probiotic in the Tropics

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Abstract: This study investigated the effect of probiotic (*Saccharomyces cerevisiae*) on growth rate and evaluated the economic benefit of this supplementation in growing rabbits. Twenty male crossed-bred weaner rabbits were randomly divided into four groups (A, B, C and D) of five rabbits each. Each rabbit served as a replicate. They were fed pelleted grower mash and groups A to C had probiotic supplementation at varied levels of 0.08, 0.12 and 0.16 g/kg of diet, respectively. Group D had no yeast (control). Feed and water were given *ad libitum*. Daily feed intake was determined and the rabbits were weighed weekly. The study lasted thirteen weeks. Results showed that all the probiotic supplemented groups had higher but not statistically significant ($p>0.05$) feed intake and significantly ($p<0.05$) higher weight gain than the control. Cost of experimental diet per kilogram of live weight gain was cheapest (₦69.68) in group B (0.12 g yeast/kg diet) than other groups. Group B (0.12 g probiotic/kg of diet) was thus recommended for maximum weight gain and optimum economic benefit in rabbit production.

Key words: Rabbit, feed, probiotic, growth rate, economic benefit

INTRODUCTION

Rabbits are convenient sources of palatable and nutritious meat, high in protein and contain low fat and cholesterol, hence its suitability as special diet. Food and Agricultural Organization (FAO, 1997) predicted that by the year 2000, the world animal protein need would have been satisfied for one third of human population by poultry, pork and rabbit. This prediction could not be actualized partly due to scarcity and high cost of cereal grains and animal protein sources for poultry and pigs (Adene, 2004). Rabbit production could have been significantly improved to supply the much needed animal protein for human consumption because rabbits are known to survive successively on diets based on roughages supplemented with agricultural by-products. However, in the tropics forage is dry and scarce during dry season. This makes farmers to feed rabbits with poor quality concentrates made of agro-industrial by-products and kitchen wastes only. Some of the limiting factors associated with using crop residues and agro-industrial by-products as animal feeds include procurement, storage, poor feed intake, high fibre content, toxic substances, low digestibility, low nutrient content and subsequently poor animal performance (Alawa and Amadi, 1991; Adegbola and Oduozo, 1992). Probiotics such as yeast (*Saccharomyces cerevisiae*) secretes enzymes which increase digestibility and efficiency of feed utilization (Matsui *et al*., 1990; Numan, 2001). Inclusion of live yeast in animal feed has been shown to improve the digestibility, efficiency of feed utilization and performance of animals (Glade and Sist, 1988; Martin *et al*., 1989). Fuller (1992) reported that probiotic supplementation improves both growth rate and resistance to diseases by animals. The purpose of this study was to investigate the effect of this probiotic on growth rate of weaner rabbits and to determine how useful it could be to rabbit farmers in the tropics especially during dry season. The economic benefit of the probiotic supplementation was also evaluated.

MATERIALS AND METHODS

The feeding trial was conducted at Vet. Farm, Faculty of Veterinary Medicine. University of Nigeria, Nsukka.

Experimental animals and design: Twenty male crossed-bred weaner rabbits (New Zealand white x Local) aged between 6-8 weeks and weighed between 1.68-3.80 kg were used for the study. They were randomly divided into four groups (A, B, C and D) of five rabbits each. Each rabbit served as a replicate.

Experimental diet and cost: Commercial pelleted grower mash (Vital Feeds) and commercial yeast strain (*Saccharomyces cerevisiae*) produced by B.F.P. Dock Road, Felixstowe, United Kingdom were used for the study.

Cost: The cost of commercial pelleted grower mash was N40.00/kg and yeast was N0.8/gm.

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Table 1: Feed intake and cost of experimental diet of weaner rabbits fed diet supplemented with probiotic

Groups	A (0.08 g yeast/kg)	B (0.12 g yeast/kg)	C (0.16 g yeast/kg)	D (control)
Mean total feed intake/Rabbit (kg)	1.73±0.14	1.82±0.25	1.91±0.28	1.46±0.15
Cost of feed/ Rabbit (N)	69.60	71.60	76.80	58.00
Qty of yeast consumed/ Rabbit (g)	0.14	0.21	0.31	-
Cost of yeast/Rabbit (N)	0.11	0.17	0.25	-
Total cost of Feed+yeast/Rabbit (N)	69.71	71.77	77.05	58.00

Table 2: Mean weight gain, Mean daily feed intake and Feed conversion ratio of weaner rabbits fed diet supplemented with probiotic

Group Mean±standard error	A (0.08 g yeast/kg)	B (0.12 g yeast/kg)	C (0.16 g yeast/kg)	D (No yeast-control)
Mean initial live weight (kg/Rabbit)	0.775 ± 0.048^{b}	0.825 ± 0.052^{ab}	0.950 ± 0.113^{a}	0.570 ± 0.061^{c}
Mean final live weight (kg/Rabbit)	1.725 ± 0.111^{ab}	1.850 ± 0.061^{a}	1.588 ± 0.072^{b}	1.193 ± 0.151^{c}
Mean weight gain (kg/Rabbit)	0.950 ± 0.092^{b}	1.025 ± 0.006^{a}	0.638 ± 0.097^{c}	0.623 ± 0.099^{c}
Mean daily feed intake (g/rabbit)	19.00±0.001	20.00±0.001	21.00±0.002	16.00±0.001
Mean daily weight gain (g/rabbit)	10.40 ± 0.0010^{b}	11.30 ± 0.0008^{a}	7.00 ± 0.0012^{c}	6.80 ± 0.0012^{c}
Feed conversion ratio	1.835	1.747	3.000	2.320

$^{a, ab, b, c}$: Different superscripts in a row indicate significant difference ($p<0.05$) between the means

Table 3: Cost-Benefit Analysis of weaner rabbits fed diet supplemented with probiotic

Groups	Total Feed Intake/rabbit (kg)	Cost of Feed+yeast/kg (N)	Cost of Feed+ yeast/Rabbit (N)	Wt.Gain/ Rabbit (kg)	Cost of feed+yeast/kg live wt gain (N)
A (0.08 g yeast/kg)	1.74	40.06	69.71	0.95	73.42
B (0.12 g yeast/kg)	1.79	40.09	71.77	1.03	69.68
C (0.16 g yeast/kg)	1.92	40.13	77.05	0.64	120.39
D (control)	1.45	40.00	58.00	0.62	93.55

Feeding management: They were fed pelleted grower mash for two weeks to acclimatize. Thereafter, feed for groups A, B and C had probiotic (yeast) supplement at inclusion levels of 0.08, 0.12 and 0.16 g/kg, respectively. Group D was the control (No yeast). Feed and water were given *ad libitum* to all the animals. Quantity of feed consumed each day was determined. All the rabbits were weighed weekly. The experiment lasted for thirteen weeks.

Data analysis: The results obtained were subjected to one way analysis of Variance (ANOVA) and treatment means were separated using the least significant difference (LSD) method. Level of significance was accepted at p = 0.05. The statistical package used for the analysis was the SPSS for windows 9.0 version.

RESULTS

The results of the feed intake and cost of the experimental diet are presented in Table 1. Total feed intake per rabbit was higher in all the supplemented groups (A, B and C) than the control (D), though the differences were not statistically significant ($p>0.05$). The cost of experimental diet was highest (₦77.05) in group C (0.16 g/kg of diet) and least (₦58.00) in control (group D).

Results of the weight gain and feed conversion ratio are shown in Table 2. Probiotic supplemented groups had significantly ($p<0.05$) higher weight gain than the control. Group B (0.12 g yeast/kg diet) mean weight gain/rabbit (1.025±0.006 kg) was significantly ($p<0.05$) heavier than other groups while weight gain for group D (control) was significantly ($p<0.05$) lower than the rest.

The cost-benefit analysis is presented in Table 3.

Cost of experimental diet per kilogram of live weight gain was cheapest (₦69.68) in group B (0.12 g/kg diet) than other groups. The cost was highest (₦120.39) in group C (0.16 g yeast/kg diet) followed by the control-group D (₦93.55).

DISCUSSION

The slightly higher feed intake in probiotic supplemented groups is in agreement with observation made by earlier workers (Adejumo *et al*., 2005; Onifade, 1997; Onifade *et al*., 1999). Supplemented groups had significantly ($p<0.05$) higher weight gain than the control. This result is in conformity with earlier reports that probiotic (*Saccharomyces cerevisiae*) is a growth promoter in farm animals (Chang *et al*., 2001; Ezema, 2007).

Researchers attributed part of the growth promoting properties of yeast to its ability to stimulate feed intake by improved palatability (Wallace and Newbold, 1992). The increased weight gain could also be as a result of improved protein digestibility and increased efficiency of feed utilization (Martin *et al*., 1989; Matsui *et al*., 1990; Glade and Sist, 1988; Numan, 2001; Ezema, 2007).

The cost of experimental diet/kg of live weight gained was highest in group C because group C had the highest probiotic inclusion of 0.16 g/kg of diet but did not

gain as much weight as group B (0.12 g/kg of diet). This might be explained by the fact that probiotics are not dose dependent but are threshold dependent (Ortwin, 2005). Based on the above results, 0.12 g probiotic (*Saaccharomyces cerecisiae*)/kg of diet was thus recommended for maximum weight gain and optimum economic benefit in rabbit production all the year round in the tropical environment.

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