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Short communication

Pawpaw seed meal-based diets enhanced growth performance of rabbits

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Abstract

This study was carried out to investigate the growth performance of rabbits fed pawpaw seed-based diet. In ten-week trial, 60 mixed breeds of weaner rabbits aged 5 - 6 weeks were allotted to five treatments in a completely randomized design. Five concentrate diets were compounded with the inclusion of pawpaw seed meal (PSM) at 0, 10, 20, 30 and 40% graded levels. The rabbits were weighed before the commencement of the experiment and subsequently weekly throughout the experiment to calculate the daily weight gain. The proximate composition and the metabolizable energy of experimental diets were carried out in the laboratory. The feed intake was estimate from the differences between the feed offer and the feed refusal. The proximate components of the diets contained inclusion of PSM were similar and comparable to the control diet in this study. The metabolizable energy of 10%PSM, 20%PSM and 40%PSM diets were higher than the 0%PSM. There were no significant differences (P>0.05) among the means of feed intake, initial and final weight of rabbits across the experimental treatment. The rabbits fed diets 0%PSM (6.52) and 30%PSM (6.82) had significantly higher (p<0.05) daily weight gains as compared to 10%PSM (5.82) and 40%PSM (4.85) diets whereas rabbits fed 20%PSM (4.59) had the best feed conversion ratio compared to 10%PSM (5.92), 0%PSM (6.55), 30%PSM (6.71) and 40%PSM (7.75). It could therefore be concluded that inclusion of pawpaw seed meal in the diet of rabbits up to 30% improved feed intake and growth performance of rabbits.

Keywords: agro-waste, non-conventional feed, livestock,

Les régimes à base de farine de graines de Papaye ont amélioré la performance de croissance des lapins

Résumé

Cette étude a été réalisée pour étudier les performances de croissance des lapins nourris à base de graines de papaye. Au cours d'un essai de dix semaines, 60 races mixtes de lapins sevrés âgés de 5 à 6 semaines ont été attribuées à cinq traitements d'une conception complètement randomisée. Cinq régimes concentrés ont été composés avec l'inclusion du repas de graine de papaye (le 'PSM') aux niveaux classés 0, 10, 20, 30 et 40%. Les lapins ont été pesés avant le début de l'expérience et par la suite chaque semaine tout au long de l'expérience pour calculer le gain de poids quotidien. La composition immédiate et l'énergie métabolisable des régimes expérimentaux ont été réalisées en laboratoire. L'apport alimentaire a été estimé à partir des différences entre l'offre alimentaire et le refus d'alimentation. Les composants proximate des régimes qui ont de 'PSM' étaient semblables et comparables au régime de contrôle dans cette étude. L'énergie métabolisable de 10% PSM, 20%PSM et 40%PSM régimes étaient plus élevés que les 0%PSM. Il n'y avait pas de différences significatives (P>0,05) entre les moyens d'apport alimentaire, le poids initial et final des lapins dans le traitement expérimental. Les lapins nourris régimes 0%PSM (6.52) et 30%PSM (6.82) ont eu sensiblement plus haut (p<0.05) gains quotidiens de poids par

rapport à 10%PSM (5.82) et 40%PSM (4.85) régime alors que les lapins nourris à 20% PSM (4,59) avaient le meilleur ratio de conversion des aliments contre 10%PSM (5,92), 0%PSM (6,55), 30% PSM (6,71) et 40% PSM (7,75). On pourrait donc conclure que l'inclusion de farine de graines de papaye dans l'alimentation des lapins jusqu'à 30 % a amélioré l'apport alimentaire et les performances de croissance des lapins.

Mots clés : agro-déchets, aliments non conventionnels, bétail

Introduction

Rabbits have been recognized to have a very important role to play in the supply of animal protein to Nigerians especially in the rural and peri-urban areas. They are efficient converters of feed to meat and can utilize up to 30% crude fibre as against 10% by most poultry species (Makinde *et al.,* 2015). Rabbit meat is tasty, low in cholesterol, sodium and fat but high in protein. There is no known religious/cultural taboo against the consumption of rabbit meat (Biobaku and Oguntona, 1997). Rabbit has the ability to convert feedstuff such as forages, most agricultural by-products, kitchen wastes that human being cannot consume directly into highly nutritious meat. Though rabbits have been found to perform best when fed on concentrates (Farinu, 1994), the ever increasing costs of grains has created a need to augment both the energy and protein requirement with agro-industrial waste products which are cheap and relatively available. For any livestock enterprise to be profitable and sustainable, it has become necessary to find alternative cheap feedstuff which can adequately replace the more expensive and highly competitive ones (Akpodiete *et al*., 1999). An example of such alternative feedstuff is pawpaw seed which is a waste from consumption of pawpaw fruit. Bolu *et al*. (2009) reported that pawpaw seed contains 97.27% DM, 30.08% CP, 34.80% EE, 1.67% CF and 7.11% Ash. Thus pawpaw seed is a cheap and available protein source for livestock animals. However, limited information is available on the utilization pawpaw seed as protein source in the diets of rabbits. Hence, this study examines the growth performance of rabbits fed pawpaw seed meal (PSM).

Materials and methods

This experiment was carried out at the Rabbit Unit of The Oke Ogun Polytechnic Teaching and Research Farm Saki, Oyo State. Nigeria. The study lasted for 10 weeks. Pawpaw seeds were sourced, dried, ground and stored for subsequent use. Five concentrate mash diets were compounded with the inclusion of pawpaw seed meal (PSM) at 0, 10, 20, 30 and 40% graded levels (Table 1). Sixty mixed breeds of rabbits (4-6 weeks) were randomly allotted to five treatments in a completely randomized design. The rabbits were housed individually in iron net cages netted with wire mesh measuring 23 x 18 x 15 inch in dimension. The rabbits were provided with the moist mash experimental diets and clean water *ad-libitum* daily. The animals were subjected to a 7-day adaptation period before the commencement of the experiment. Data estimated were the feed intake, daily weight gain, feed conversion ratio and nutrient digestibility coefficients of rabbits. Also animals were subjected to a 7-day digestion trial where sample of faeces collected were bulked, thoroughly mixed, ground and sub-sampled for chemical analysis. The proximate analysis of experimental diets and faecal samples was done while the nitrogen content of the urine samples was also determined (AOAC, 2000). Data obtained were subjected to analysis of variance procedure of General Linear Model and the Duncan's New Multiple Range Test options of SAS (2008) was used to test treatment effect and detect significant differences among means.

Results and discussion

The proximate components of the diets contain inclusion of PSM were similar and comparable to the control diet in this study (Table 1). There were no significant differences (P>0.05) among the means of feed intake, initial and final weight of rabbits across the experimental treatment (Table 2). The rabbits fed diets 0%PSM and 30%PSM had significantly higher daily weight gains as compared to 10%PSM and 40%PSM diets whereas rabbits fed 20% PSM had the best feed conversion ratio compared to other diets.

Table 1: Gross composition of the experimental diets

Ingredients	0%PSM	10%PSM	20%PSM	30%PSM	40%PSM
Maize	34.11	34.11	34.11	34.11	34.11
Wheat offal	41.75	41.75	41.75	41.75	41.75
Groundnut cake	10.52	9.42	8.42	7.35	6.31
Pawpaw seed	-	1.10	2.10	3.17	4.21
Bone meal	4.00	4.00	4.00	4.00	4.00
Salt	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100

Table 2: The proximate composition of the experimental diets

Parameters (%)	0%PSM	10%PSM	20%PSM	30%PSM	40%PSM
Dry Matter	90.77	90.19	90.15	90.11	90.27
Crude Protein	22.49	22.88	22.69	22.78	22.97
Crude Fibre	3.73	3.76	3.79	3.79	3.68
Ether Extract	3.56	3.61	3.67	3.67	3.59
Ash	6.74	6.52	6.48	6.48	6.43
NFE	53.78	53.45	53.51	53.39	53.45
ME (Kcal/kg)	3029.68	3036.44	3033.97	3035.47	3038.15

The crude protein content of diets in this study was higher than 15-18% required by newly weaned rabbits (Fielding, 1991). The metabolizable energy of all the experimental diets in this study was higher than 2588.63 – 2995.59kcal/kg obtained by Mufwa *et al*. (2011) for growing rabbits. The daily feed intake values obtained was lower than Moringa inclusion diet of 60.10 - 63.40g/day reported for rabbits (Federick, 2010) and concentrate feed intake of 61.08 – 133.9g/day reported for rabbits (Okorie, 2003). The daily weight gain recorded in this study was lower than 6.78 – 8.64g/day (Odeyinka *et al.,* 2008). The feed conversion ratio values were higher than 2.63- 3.00 reported by Okorie (2003) but was comparable to 5.11 – 7.66 by Mmereole *et al*. (2011). The inclusion of PSM in the diet of rabbit up to 30% had the highest feed intake and weight gain. Therefore, inclusion of PSM met the nutrient requirement of rabbits for growth and metabolic functions.

Table 3: Performance characteristics of rabbits fed PSM

Parameters	0%PSM	10%PSM	20%PSM	30%PSM	40%PSM	0%PSM
Feed intake (g/day)	36.08	34.83	32.78	39.13	33.18	2.06
Initial weight (g)	874.00	890.00	822.00	962.00	778.00	53.12
Final Weight (g)	1176.00	1160.00	986.00	1278.00	990.00	53.24
Weight gain (g)	302.0^{a}	270.0^{ab}	164.0b	316.0^{a}	212.0^{ab}	19.95
Daily Weight gain (g)	6.52^{a}	5.82^{ab}	3.50^{b}	6.82^{a}	4.58^{ab}	0.433
FCR	6.55^{b}	5.92^{b}	4.59^{a}	6.71^{b}	7.75^{ab}	1.25

Conclusion

It could be concluded that inclusion of pawpaw seed meal in the diet of rabbits up to 30% improved growth performances.

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