PERFORMANCE OF RABBITS FED TWO VARIETIES OF COMPOSITE SWEETPOTATO (*IPOMOEA BATATAS* LAM) MEAL IN A PALM KERNEL BASED DIET

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Resumo

Oitenta e quatro coelhos fêmea sem raça definida, de idade entre 6 e 8 semanas, pesando entre 550–600g foram utilizados para determinar o efeito da inclusão de duas variedades de farinha de batata doce (*Ipomoea batatas*) sobre o desempenho produtivo. Os animais foram distribuídos aleatoriamente em sete tratamentos sendo T_1 o controle, T_2, T_3, T_4, contendo 25, 50 e 75% de farinha de batata doce alaranjada respectivamente e T_5, T_6 e T_7 contendo 25, 50 e 75% de farinha de batata doce branca fresca respectivamente, com quatro repetições por tratamento em um delineamento completamente cazualizado. A taxa de crescimento foi significativamente diferente entre os tratamentos, onde o ganho de peso diário médio foi maior ($p<0.01$) em T_1 (17.71 g/d), enquanto T_4 teve o pior resultado (8.35 g/d). Não foram observadas diferenças entre os tratamentos para Taxa conversão alimentar. Foram observadas diferenças significativas para a capacidade de sobrevivência dos animais. Estes resultados mostram que a farinha da batata doce das variedades alaranjada e branca fresca podem ser incluídas em níveis de até 50% em rações para coelhos em crescimento, sem efeitos no seu desempenho produtivo.

Keywords: Sweetpotato leaf and vines, Rabbits, Growth, Survivability

Introduction

Animal protein consumption in most developing countries is below the recommended range and this could be attributed to level of animal production. To overcome the animal protein insufficiency, there is need to improve on the feeding and productive performance of livestock (Salisu and Iyeghe-Erakpotobor, 2014). The prolific nature of the domestic rabbit coupled with its short gestation and generation intervals make it a very reliable alternative. The domestic rabbit (*Oryctolagus cunniculus*) is an important non-ruminant herbivore for meat production.

Increased rabbit production could bridge the supply – demand protein gap for subsistence protein production (FAO, 1999). Domestic rabbit production had also witnessed its problems. Amongst others, the task of producing adequate nutrition in terms of forages, especially during the dry season has continually militated against the development of this livestock. Compared with the meat of other farm animals, rabbit meat is rich in proteins, certain vitamins and minerals, it contains little fat and higher proportion of essential polysaturated linoleic fatty acid (Li *et al,* 2012).

Sweetpotato (*Ipomoea batatas* [L.] Lam.) ranks fifth among the most valuable food crops in the world (Olaleru *et al*,2017). The sweetpotato (*Ipomoea batatas* (L.) Lam) is cultivated on about 8 million ha and about 110 million tons are harvested annually throughout the world (Kitahara *et al*, 2017). Sweet potato vine has a high crude protein content (18-30% in DM), which feeding value of vine is close to that of alfalfa (Gebreegziabher *et al,* 2014).

However, there are lots of information on the usage of sweet potato plant but its limited information on the use of the composite sweet potato meal and its effect on growth performance of rabbits. Therefore, this study was carried out to investigate the effect of feeding two varieties of graded levels of composite sweet potato meal on the growth performance of rabbits in southern rainforest of Nigeria.

Material and methods

Test ingredient-Two varieties of sweet potato plants CIP 440293 (Orange flesh) and TIS 87/0087 (White flesh) were collected from the National Roots Crops Research Institute, Umudike Abia State,Nigeria. The composite sweet potato meal contains 65% whole root and 35% of the leaves and vines. The whole root were chipped and shade dried for 3-5 days while the leaves and vines were dried in the similar manner. The composite meal were included at the graded levels. The diets were labeled as T_1-control, 25, 50, and 75% of orange flesh sweet potato composite meal are T_2, T^3 and T_4 respectively and , 25, 50, and 75% of white flesh sweet potato composite meal are T_5, T_6 and T_7 respectively. Other ingredients used include: -soybeans, maize offal, maize, rice offal, premix, bone meal and salt. The diets were formulated to meet 16% crude protein requirement for growing rabbits (Table 1).

Animals-The research was carried out at the Rabbitry Unit, Teaching and Research Farm University of Ibadan, Nigeria. A total of 84 mixed breeds female rabbits weighing 550-600g were allotted to seven dietary treatments of twelve animals per treatment. All rabbits were certified clinically health. Feed and water were provided *ad libitum* for 9 weeks. The same welfare levels were provided throughout the experiment. The diets were in pelletized formed. Feed conversion ratio was calculated.

Data analysis-Data obtained were subjected to analyses of variance using SAS 9.2 statistical package. Significant differences between treatment means were separated using Duncan's Multiple Range Test.

Results and discussion

The final average body weights observed shows that control (1741.19g), 25% white flesh CSPM (1770.19g) were significantly ($p<0.05$) higher than diets that has 25% orange flesh CSPM (1706.00g), 75% white flesh CSPM (1577.06g) 50% white flesh CSPM (1585.28g), 50% Orange flesh CSPM (1531.44g) and 75% orange flesh CSPM (1492.28g). This study agrees with the findings of Akinmutimi and Osuagwu (2008) that implies that even at 15% dietary level of inclusion the effect of anti-nutritional factors is within a tolerable level when using sweet potato root peel to replace maize in rabbit diet.

Table 1: Composition of experimental diets

Ingredient		Levels of *orange flesh CSPM*			Levels of *white flesh CSPM*		
	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (25%)	T6 (50%)	T7 (75%)
Maize	50.00	37.50	25.00	12.50	37.50	25.00	12.50
*CSPM	-	12.50	25.00	37.50	12.50	25.00	37.50
Soya bean meal	16.00	16.00	16.00	16.00	16.00	16.00	16.00
PKC	19.00	19.00	19.00	19.00	19.00	19.00	19.00
Fish meal	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wheat offal	8. 50	8. 50	8. 50	8. 50	8. 50	8. 50	8. 50
**Others	5. 50	5. 50	5. 50	5. 50	5. 50	5. 50	5. 50
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Calculated Nutrients							
CP	16.90	17.29	17.01	17.60	16.72	16.60	16.40
CF (%)	10.56	11.14	11.09	12.58	11.01	12.01	12.56
ME(Kcal/Kg)	2788.00	2760.00	2690.00	2742.00	2780.00	2680.00	2610.00

*CSPM: Composite sweet potato meal *PKC: Palm kernel meal, OFSP: Orange flesh sweetpotato, WFSP:White sweetpotato **Others: Cassava root meal; 2.00., Table Salt ;0.25., Vitamin Premix; 0.25., Bone Meal; 1.00., Limestone; 2.00

There was progressive decrease in the value of feed intake as the quantity of the test ingredient increased in the diet. It became significant (p<0.05) from the control diet to 75% dietary level of inclusion of the white flesh sweetpotato meal diet. This may be due to slightly higher energy value of the diets containing the test ingredient and hence reduce feed intake since their energy requirement is already met (Abu *et al,* 2015).

For the weight gain, the control diet was similar to the test diets (25% Orange flesh CSPM and 25% white flesh CSPM) but differed significantly from the rest diet. The downward trend observed as a result of an increase in the test ingredient could be attributed to the effect of anti-nutritional factors becoming more pronounced as the quantity of the test ingredient increased. Saponin an anti-nutritional factor in the test ingredient has been reported to cause decrease in daily weight gain through binding to the cells of the small intestine thereby affecting the absorption of nutrients across the intestinal wall and may be due to increase neutral detergent fiber, acid detergent lignin and hemicelluloses contents in experimental diets (Meng *et al*, 2018).

The feed conversion ratio values observed revealed that the control diet was not significantly (P<0.05) differ from the test diets but slightly higher values were obtained for diets and could be attributed to poor nutrient utilization due to increased effect of antinutrients in the diet (Kairalla *et al*,2016).

Survivability was better in the use of 25% orange flesh CSPM and 25% white flesh CSPM in the diet with a value of 91.67% while 75% orange flesh CSPM and 75% white flesh CSPM had the lowest value of 58.33%. This confirms that the effect of anti-nutrient is within a tolerable level except for 75% orange flesh CSPM and 75% white flesh CSPM in the diet that were both below 60%. And this could be attributed to diet overload of carbohydrate (Brown, 2012).

Table 2: Effect of varying dietary levels of two varieties of CSPM on growth of doe rabbits fed in a palm kernel based diet

		Levels of *orange flesh* CSPM			Levels of *white flesh* CSPM			
Parameters	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (25%)	T6 (50%)	T7 (75%)	SEM
Initial Body weight (g)	557.25	590.67	551.56	560.89	569.21	563.17	580.11	5.16
Final Body weight(g)	1741.19^{a}	1706.00^{ab}	1531.44^{bc}	1492.28^{c}	1770.19^{a}	1585.28^{abc}	1577.06^{abc}	41.19
Daily weight gain(g/d)	17.71^{a}	16.56^{ab}	11.67^{bc}	8.53^{c}	16.70^{ab}	10.76^{c}	9.30^{c}	1.46
Daily feed Intake (g)	59.23^{a}	50.07^{ab}	43.08^{bc}	40.05^{bc}	48.04^{ab}	37.30^{bc}	33.78^{c}	3.27
Feed conversion ratio	3.38	3.36	3.68	4.79	2.89	3.51	3.93	0.22
Feedcost/wk/rabbit(**₦**)	50.05^{a}	40.46^{b}	36.62^{bc}	26.92^{d}	35.64^{bc}	37.15^{bc}	30.63^{cd}	2.79
Survialabilty (%)	91.67^{a}	91.67^{a}	75.00^{b}	58.33^{d}	91.67^{a}	66.67^{c}	58.33^{d}	5.87

a,b means in the same row with different superscript as significantly different (p<0.05), 1US Dollar=360 Nigeria Naria

The cost of feed was significantly (P<0.05) higher in control diet than in all the diets.

Conclusion

The findings showed that sweet potato composite meal can be fed to rabbits up to 50% level of inclusion without any detrimental effect on growth performance of rabbits.

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