UTILISATION OF MAIZE OFFAL ON GROWTH PERFORMANCE OF WEANER RABBITS

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Abstract
An experiment was conducted to evaluate the proximate analysis of maize offal and growth performance of weaner rabbits fed varying levels of maize offal as replacement for wheat offal in a completely randomized design. A total of sixty weaner rabbits of both sexes average weight of 535g were randomly allocated to five dietary treatments in which groundnut haulms formed 20% of the diet. Five iso-nitrogenous diets were formulated to meet 16% crude protein nutritional requirements of the weaner rabbits and similar levels of crude fibre by varying the levels of maize offal respectively in which groundnut haulms constituted 20% of each diet. The diets were designated T1, T2, T3, T4 and T5. T1 contained wheat offal which served as the control, while treatment (T2-T5) contained maize offal at 25, 50, 75, and 100% respectively. Data were collected on feed intake and weight gain. The proximate analysis obtained for maize offals is crude protein (8.26%), crude fibre (16.99%), ether extract (4.28%), ash (4.26%), Nitrogen free extract (66.21%) and metabolisable energy (2970.25Kcal/kg). Results revealed there were no significant difference ($p>0.05$) between treatment means for the average weight gain of rabbits. Mortality was less than 5% throughout the study. The results show that rabbits have the capacity to utilise agro industrial by-product of maize which is maize offal in diet.

Keywords: Rabbits, maize offal, groundnut haulms, performance.

Introduction

The ever-increasing population growth in the developing countries means a greater demand for animal protein which is already in short supply in this region. The animal shortage is due largely to low level of animal productivity. The cost of conventional feed ingredient such as maize, soyabean, wheat among others has been on the increase from year to year leading to increase in the price of animal protein source (Adejinmi *et al.*, 2007). The utilization of agro-industrial by–product in animal feed has increased so as to reduce the cost of feed ingredients. Due to economic situation of the Nation, which indicates drought, famine, scarcity and limited resources, there is inadequate supply of protein from the traditional livestock such as cattle, sheep, goats, dogs and poultry. There is therefore a protein deficiency in Nigeria resulting in malnutrition whose effect can be deteriorating especially on children (NRC, 1991). Therefore, the key to abundant animal production is the availability of feed stuff sources that are cheap and reaching available, posing minimal competition to man (Akinmutimi, 2007). Feed dictates how many animals you can grow and how fast they can mature for market (Aduku, 1990). Faced with the shortage of grains and the competition between humans and livestock sector there is a need to bridge the gap of animal protein consumption by accepting the use of non-conventional feed stuff and fast growing animals as rabbit over the conventional ones. Some of the advantages of keeping rabbits includes its short generation interval, high fecundity rate low cost of investment and small body size which makes it suitable for backyard rearing and easily consumable by a family (Taiwo *et al.,* 2005). Rabbits produce healthy meat that is suitable for producing healthy people, because of its low salt and fat content, being a white meat like poultry. (Oyawoye, 1989; NRC, 1991, Mclean *et al.*, 1994; Aderemi and Wuraola, 2010; Njidda and

Isidahomen, 2011). It has a dressing percentage of 74% (Aduku, 1990; Etchu *et al.*, 2013). The recent understanding of the usefulness of the meat for diabetics, hypertensive and middle aged people has further raised awareness on the production of rabbits, thus increasing the demand for rabbit meat (Iyeghe-Erakpotobor *et al.*, 2012).

Materials and methods

The experiment was carried out at the rabbitry unit of National Veterinary Research Institute Vom, Plateau state Nigeria. The maize offal obtained from a local milling factory in Bukuru Town, Jos south Local Government of Plateau State, While the groundnut haulms were purchased from a cattle market in Bukuru, Jos South both were obtained wet and sun dried to reduce the moisture content. Sixty, 5-6 weeks old cross breed weaned rabbits of both sexes were used for the experiment. Five iso-nitrogenous diets were formulated to meet 16% crude protein nutritional requirements of the weaner rabbits and similar levels of crude fibre by varying the levels of maize offal respectively in which groundnut haulms constituted 20% of each diet. The diets were designated T1, T2, T3, T4 and T5. T1 contained wheat offal which served as the control, while treatment (T2-T5) contained maize offal at 25, 50, 75, and 100% respectively. The test ingredients and five diets were analysed for their proximate composition. The composition of the diet is shown in Table 1.

Table 1: percentage composition of diet

	Diet				
Ingredient	**T1**	**T2**	**T3**	**T4**	**T5**
	0%	**25%**	**50%**	**75%**	**100%**
Maize	31.87	30.54	29.22	27.90	26.58
Soya beans	14.88	16.21	17.53	18.85	20.17
Wheat Offal	30	22.5	15	7.5	0
Maize Offal	0	7.5	15	22.5	30
Groundnut haulms	20	20	20	20	20
Bone meal	1.5	1.5	1.5	1.5	1.5
Limestone	1.0	1.0	1.0	1.0	1.0
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.13	0.13	0.13	0.13	0.13
Methionine	0.12	0.12	0.12	0.12	0.12
Total (%)	100	100	100	100	100
Calculated analysis					
Crude Protein (CP)	15.999%	16.001%	16.000%	15.999%	15.997%
Metabolisable Energy(ME Kcal/Kg)	2619.7058	2657.1936	26904.7548	2723.316	2769.871
Crude fibre (CF)	8.8066	9.1289	9.4508	9.7727	10.0946
Either Extract (EE)	4.6316	4.5724	4.5133	4.4542	4.3951
Calcium	1.1219	1.1177	1.1269	1.1092	1.1319
Phosphorus	0.4963	0.4849	0.4025	0.4621	0.4507
Lysine	1.3885	1.3670	1.3453	1.3236	1.3019
Methionine	0.5397	0.5289	0.5382	0.5374	0.5367
Ash	4.7571	4.4221	4.0866	3.7512	4.1574

Bio-premix supplied per kg of diet: Vitamin A, 12500I.U; Vit. D3, 2500 I.U;Vit E, 50mg; Vit K3, 2.5mg; Vit B3.0mg; VitB6 6.0mg; Niacin, 40.0mg; Calcium pantothenate 10.0mg; Biotin 0.8mg; VitB 12 0.25mg; Folic acid 1.0mg; Choline chloride 300mg; Manganese 100mg; Iron 100mg; Zinc,50mg;Iodine 1.55I.U; Selenium 0.1mg

Proximate Analysis

The proximate composition of the test ingredients and experimental diets were carried out as outline by AOAC (2007).

Statistical Analysis

All the data generated were subjected to analysis of variance (ANOVA) using SPSS statistical package version 23(SPSS 2015) were, applicable, significant difference between mean were separated using Duncan New Multiple Range Test (Duncan, 1955).

Result and discussion

The proximate composition of the maize offal is as shown in Table 2, while the diet is presented in Table 1. Table 3 shows the performance characteristics of the experimental animals. There was no significant ($p<0.05$) differences in live weight, initial weight, final weight, weight gained average daily weight gain, feed conversion ratio and carcass dressing percentage.

Table 2: Chemical composition of maize offal

Ingrediets	Chemical composition
Crude protein (%)	8.26
Crude fibre (%)	16.99
Ether extract (%)	4.28
Ash (%)	4.26
Nitrogen free extract (%)	66.21
Metabolisable energy (kcal/kg) (%)	2970.25

Table 3: Growth performance of rabbit fed maize offals

Parameters	**T1 0% maize offals**	**T2 25% maize offals**	**T3 50% maize offals**	**T4 75% maize offals**	**T5 100% maize offals**	SEM
Live weight (g)	1080.00	1490.00	1260.00	1430.00	1470.00	70.00
Daily Feed intake (/g)	79.45	76.53	76.55	73.97	80.78	2.07
Initial weight (g)	554.17	550.00	541.33	529.00	574.67	7.60
Final weight (g)	1230.00	1281.33	1424.67	1280.67	1263.33	31.93
Weight gained (g)	675.83	731.33	883.33	751.67	688.67	35.30
Daily weight gain (/g)	12.07	13.06	15.77	13.42	12.30	0.63
FCR	6.89	5.85	4.85	5.76	6.71	0.36

FCR= Feed conversion ratio

SEM = Standard Error of Mean

Discussion

The non-Significant ($P>0.05$) variation observed in all the parameters evaluated in rabbit fed maize offal (MO) probably suggest the attainment of the delicate balance in the nutrient of the feed (Cheek *et al.*, 1997), who documented that optional growth rabbits are obtained when adequate nutrient is containing in the feed ingredient. Rabbit fed treatment three attained the highest weight gain followed by those fed treatment four and treatment one had the least body weight gain. The values recorded for feed intake was comparable among the treatment groups. This present finding was in line with the previous finding of (Onifade and Abu, 1998). The poor growth performance on the control diet may have been due to inadequate fibre in the diet was always in agreement with the report of Osakwe and Nwose (2008). According to Champe and Maurice (1983) rabbit require crude fibre in excess of 9 % for normal growth. Reduced growth rates as observed in diets 1 may be due to decrease in dietary fibre (Bamgbose *et. al.*, 2002). The mean weight gain recorded in this study compared favourably with the reports of Agunbiade

et. al. (1999) and Schiere (1999). The increased mean weight gain of rabbits fed diets 3, 4 and 5 over those fed diets 1 and 2, respectively, could be attributed to the favourable effect of fibre, termed a "ballast" effect (Colin *et al.,* 1976). The daily feed intake and feed conversion ratio obtained in our study was in line with the values reported by other workers (Onifade and Tewe, 1993; Agunbiade *et al.,* 2002) who fed diets containing about 30 % of maize offal to growing rabbits. The low feed intake (73.97 – 80.78) g/day as per the value 131 g/d reported by Cheeke (1984) for rabbits reared in temperate countries may be due to the variation in ambient temperature. Felding (1991) reported that high ambient temperature has adverse effect on feed intake.

Conclusion

From the result above, it can be concluded that rabbits fed with maize offal at all levels performed well. Therefore, maize offal could be used as fibre sources in the diet of weaner rabbits without any side effects on performance.

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