

EFFECTS OF REPLACING MAIZE WITH PROCESSED MANGO SEED KERNEL MEAL ON PERFORMANCE AND CARCASS CHARACTERISTICS OF WEANER RABBITS

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ABSTRACT

This study was conducted to evaluate the effect of replacing maize with processed mango seed kernel meal (PMSKM) in the diets of weaner rabbit on performance and carcass characteristics. A total of thirty two (32) mongrel rabbits (8 rabbits per treatment, 2 per replicate) were randomly allotted to four experimental diets in which processed mango seed kernel meal replaced maize at 0, 20, 40 and 60% level designed as diets 1, 2, 3 and 4 respectively. The experiment lasted for eight weeks. The result showed that the Average initial weight (500.00-518.75), average final weight (1393.75-1412.50), average daily feed intake (52.98 55.05), average daily weight gain (15.74-16.19) and feed conversion ratio (3.29-3.48) obtained were not significantly ($P < 0.05$) affected by the dietary levels of processed mango seed kernel meal. Most of the carcass traits showed no significant difference ($P < 0.05$) among the treatment except for carcass weight, dressing %, Intestine and loin weight. Diet 2, 3 and 4 (20, 40 and 60% PMSKM) gave highest values for carcass weight, dressing% and intestine while also diet 1, 2 and 3 (0, 20 and 40%) gave higher value for loin weight. It was therefore concluded that processed mango seed kernel meal can replace maize at 60% level in the diet of weaner rabbit as an energy source without any negative effect on their performance and carcass parameters.

Keyword: Mango seed kernel, Maize, Performance, Carcass characteristics, Weaner rabbits

Introduction

There is a continuous rise in the cost of production of cattle, sheep, goats and poultry which has prompted people to explore other less common but potential sources of animal protein like rabbits. Taiwo *et al.*, (2005) indicated several advantages of rabbits over other livestock species in the tropics and advocated for its increased production in Nigeria. However, cost of feeding rabbits is high and accounted for about 65.7% of the total cost of rabbit production in Nigeria. Therefore, there is a need for researchers to find cheap and readily available sources of rabbit feed in Nigeria.

The potential of rabbit meat as a quality or nutritious food stemmed from its higher protein content, lower fat, lower sodium and cholesterol content compared with other meat source such as beef, pork, mutton and chicken. The World Health Organization recommended 76g protein intake of which 34.0g should be of animal origin (Akintola *et al.*, 1999). This has been difficult to achieve in most developing countries due to insufficient availability, high cost of conventional feed stuffs resulting from stiff competition between man and animal for the few available feedstuffs especially cereal and legume grains. Tewe (1988) observed that under the prevailing circumstances, it is unlikely that there will be surplus from conventional cereals and pulses upon which livestock production can develop: thus his suggestion of waste-to-wealth approach to solve the animal feed crisis.

Mango seed kernel meal (MSKM) has been reported to be a good non conventional ingredient. Faniyi (1997) reported its importance in poultry production while Arogba (1997) provided the physical, chemical and functional properties of Nigerian mango (*Mangifera indica*) kernel and its processed flour. Chemical analysis and metabolizable energy of mango seed kernel meal as determined by Arogba (1997) revealed that it contains Tannin an astringent compound, thus necessitate processing the seed before it could be safely fed to animals. The nutrient composition of Mango seed kernel on dry matter basis was estimated in Nigeria to be 6.16% crude protein, 13.63% ether extract, 2.23% ash and 73.35% nitrogen free extract (Farinu *et al.* 1999) while EI-Alaily *et al.* (1996) reported that the gross energy is 4.7Kcal/g. This study was designed to evaluate the growth performance and carcass characteristics of weaner rabbits fed diets containing processed mango seed kernel meal.

Materials and Methods

Experimental Site:

The experiment was conducted at the Rabbitry Unit of Bauchi State College of Agriculture Teaching and Research farm, Bauchi State. Bauchi State occupies a total land area of 49,119 km² representing about 5.3% of Nigeria's total land mass and is located between latitudes 9° 3' and 12° 3' North and longitudes 8° 50' and 11° East.

Collection and Processing of Mango Seed into Mango Seed Kernel Meal

Mango seeds were collected from various dumping sites of major markets within Bauchi town. They are readily available in the area of study. The collection was done during the months of April and May which represents the peak of the mango season in Bauchi town. The kernel were obtained by cutting the seed coat using a knife or crushed with a stone. The Mango Seed Kernel (MSK) obtained was then processed through soaking and boiling.

Mango Seed Kernel was soaked in water for 24 hours at the rate of 100g per liter of water in containers. The water was changed at regular intervals of 8 hours for a day. The Mango Seed Kernels were thereafter boiled for 30 minutes, drained and sundried. Thereafter milled before incorporation into the diets.

Experimental Design and Management of Rabbits

A total of thirty two weaner rabbits were used for the experiment. They were randomly assigned into four dietary treatment groups of 8 rabbits per group in a completely randomized design (CRD) consisting of four replicates of 2 rabbits each. Feed and water were provided *ad libitum*.

Experimental Diets

Four diets were compounded manually. The diets contain 0, 20, 40, and 60% replacement level of proceed mango seed kernel meal for maize coded diets 1, 2, 3 and 4 respectively. The feed were prepared by mixing the various ingredient together at Abubakar Tafawa Balewa University feed mill.

Carcass Characteristics

At the end of the experiment four rabbits (one per replicate, were randomly selected from each treatment and slaughtered for carcass analysis, carcass and internal organ's weight were measured using a sensitive balance.

Determination of the Proximate Composition of Mango Seed Kernel

The proximate composition (Table 2) was obtained by analyzing the different samples of Mango seeds kernel according to the methods described by AOAC(1990).

Results and Discussions

The proximate composition of the test ingredients is presented in Table 2. The PMSKM used in the study contained 89.61, 2.23, 5.39, 9.62 and 3.87% for dry matter, ash, crude protein, ether extract and crude fibre respectively. These values were lower compared to the values reported by Faniyi (1997) and El-Alail *et al.* (1996). It could be due the varietal differences.

The results of performance of weaner rabbits fed processed mango seed kernel meal (PMSKM) as replacement for maize were presented in table 3. The performance characteristics in this experiment revealed that the replacement of maize by processed mango seed kernel meal at 0, 20, 40 and 60% recorded on average daily feed consumption of 52.98, 53.06, 54.45 and 55.05 (g) for treatment 1, 2, 3 and 4 respectively. There was no significant different amongst the treatment means. This agrees with the finding of Saleh *et al.*, (2015) and Shitu *et al.*, (2013). They reported that the average daily feed intake were not significantly different ($P < 0.05$) for weaner rabbit fed mango seed kernel meal and for growing crossbreed rabbit fed PMSK meal respectively. The result also revealed that there was no significant different ($P > 0.05$) in the average daily weight gain of rabbits fed PMSKM as replacement for maize. The values ranged from 15.74-16.19g obtained in this study is higher than 10.1g reported by Adama and Nma (2002) when groundnut leaves were fed to rabbits. This also confirms the report of (Saleh *et al.*, 2015) and (Fayeye and Joseph, 2004). Shitu *et al.*; (2013) reported no significant effect on growing crossbreed rabbits fed processed mango seed kernel meal. The non significant effect of processed mango seed kernel meal based diets on feed conversion ratio among the treatments means contradicts the findings of Diarra *et al.*; (2004) but similar to the finding of Saleh *et al.*, (2015). Table 4 showed the result for carcass analysis of weaner rabbits fed PMSKM base diets. For carcass analysis it also revealed that there was no significant ($P < 0.05$) difference in the live weight, heart,

lung, kidney, stomach and liver which agrees with the findings of Shitu *et.al*; (2013) they reported non significant different between the control diet and the mango seed kernel meal based diet in rabbits. There was a significant difference in the carcass weight and dressing percentage among the treatment means, the significant effects of mango seed kernel meal based diet on carcass weight and dressing percentage among the treatment means contradict the finding of Fayeye and Joseph (2004) who reported non significant difference across the dietary treatments. The weight of stomach also shows significant difference between the control diet and the mango seed kernel meal based diet in rabbits. The weight of head, skin, tail, shoulder and thigh also did not show significant different across the dietary treatments.

Conclusion and Recommendation

It can be concluded that processed mango seed kernel meal can be use to replace maize in the diet of weaner rabbits as an energy source without any negative effect on their performance and carcass values, thereby reducing competition and improving consumer access to animal protein. Thus the use of mango seed kernel meal is there by advocated at up to 60% replacement.

Table 1: Ingredients and Percentage Composition of Experimental Diets

Parameters (60%)	Diets			
	T ₁ (0%)	T ₂ (20%)	T ₃ (40%)	T ₄
Maize	31.32	25.06	18.79	12.53
Soya bean	17.98	17.98	17.98	17.98
MSKM	0.00	6.26	12.53	18.79
Maize brand	25.00	25.00	25.00	25.00
Groundnut hay	20.00	20.00	20.00	20.00
Fish meal	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Total (%)	100	100	100	100
Calculated composition (%)				
Crude protein	18.00	17.85	17.69	17.55
Crude fiber	9.33	9.46	9.49	9.57
ME (kcal/kg)	2552.66	2542.84	2532.99	2523.16

Table 2: The Proximate Composition of Mango Seed Kernel Meal

Parameters (%)	Mango Seed Kernel Meal
Dry matter	89.61
Ash	2.23
Crude protein	5.39
Ether extracts	9.62
Crude fibre	3.87

Table 3: Performance of Weaner Rabbit Fed Processed Mango Seed Kernel Meal Based Diets

Parameters	Dietary treatment				SEM	LOS
	T ₁ (0%)	T ₂ (20%)	T ₃ (40%)	T ₄ (60%)		
Average initial weight (g)	500.00	500.00	512.50	518.7	61.18	NS
Average final weight (g)	1393.75	1400.00	1412.5	1406.25	21.35	NS
Total weight gained (g)	893.75	900.00	900.00	887.50	20.40	NS
Average daily feed intake (g)	52.98	53.06	54.45	55.05	1.57	NS
Average daily weight gain (g)	15.74	15.96	16.07	16.19	0.75	NS
Feed conversion ratio	3.66	3.33	3.39	3.40	4.51	NS

LOS: Level of significance
NS: Non significance difference (P<0.05)

Table 4: Carcass Characteristics of Weaner Rabbits Fed Processed Mango Seed Kernel Meal Based Diets

Parameters	Dietary Treatments				SEM	LOS
	T ₁ (0%)	T ₂ (20%)	T ₃ (40%)	T ₄ (60%)		
Live Weight	1361.25	1378.75	1385.00	1355.00	22.95	NS
Slaughter weight	1323.75	1330.00	1332.50	1307.50	20.43	NS
Carcass weight	765.50 ^b	882.50 ^a	880.00 ^a	830.00 ^{ab}	30.89	*
Dressing %	56.22 ^b	64.01 ^a	63.53 ^a	61.23 ^a	1.74	*
Heart	0.46	0.43	0.45	0.41		0.10 NS
Lung	0.78	0.81	0.73	0.71		0.11 NS
Liver	3.90	4.40	4.10	3.56		0.49 NS
Kidney	1.19	1.30	1.38	1.25		0.26 NS
Stomach	1.80	1.62	1.75	1.68		0.14 NS
Intestine	14.80 ^b	20.45 ^a	21.48 ^a	20.18 ^a	1.34	*
Head	11.07	12.41	11.90	12.13		0.59 NS
Skin	11.65	12.48	12.40	12.35		0.64 NS
Tail	1.21	1.49	1.22	1.15		0.17 NS
Shoulder	26.68	25.80	26.60	25.78		0.45 NS
Loin	22.80 ^{ab}	23.60 ^a	22.70 ^{ab}	22.10 ^b	0.42	*
Thigh	27.35	26.62	27.43	26.37		40.77 NS

^{abc}: means within the same row bearing different superscript are significantly different (P<0.05)

LOS: Level of significance

NS: Non significance difference (P<0.05)

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