

EFFECTS OF FEEDING MISTLETOE (*Tapinanthus bengwensis*) Leaves From DIFFERENT HOST PLANTS ON THE CARCASS CHARACTERISTICS OF RABBITS (*Oryctolagus cuniculus*)

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Abstract

A feeding trial was carried out to investigate the effects of feeding mistletoe (*Tapinanthus bengwensis*) leaves from different host plants on the carcass characteristics of rabbits (*Oryctolagus cuniculus*). Sixteen (16) weaned rabbits of mixed breed and sex were randomly allotted to four treatment groups designated T₁, T₂, T₃, T₄ and replicated in a completely randomized design (CRD). T₁ served as the control and were not fed mistletoe leaves while T₂, T₃, T₄ were fed with mistletoe (*Tapinanthus bangwensis*) leaves from shea butter, almond and locust bean trees, respectively. A common concentrate diet having 17% crude protein and 2780.95Kcal/Kg digestible energy was fed to them throughout the thirteen (13) week study period. At the end of the study, two rabbits were randomly selected from each treatment and subjected to carcass analysis. It was concluded that mistletoe (*Tapinanthus bangwensis*) leaves from locust bean, almond tree and shea butter tree can be fed to growing rabbits with a common feed containing 17 % CP to obtain a high carcass quality.

Key words: rabbits, mistletoe, carcass.

Introduction

In Nigeria and most developing countries the daily dietary intake of animal protein falls grossly short of the recommended animal protein per day (FAO, 1993). This observed low animal protein consumption may be attributed to the declining animal protein production occasioned by high cost of livestock production especially the cost of feeds which usually accounts for about 70% of the total cost of production (Ijaiya *et al.*, 2002). Therefore, any effort targeted at reducing the cost of feeding will be one of the possible remedies to enhancing the low animal protein intake. A possible and most appropriate remedy for the shortage of animal protein for human consumption lies in the production of fast maturing animals like rabbit (*Oryctolagus cuniculus*) which have shorter generation interval, good feed conversion and good efficiency of feed utilization than other livestock. Therefore, any attempt to improve animal protein source must be geared towards improving the production of rabbit meat.

One obvious nutritional strategy would involve feeding rabbits with forage (Hemi-parasitic plant) as leaf meal, with the use of inexpensive locally available feed ingredients that will drastically bring down the production cost while improving the dietary mineral and vitamins for rabbit. An example of such forage is the mistletoe (*Tapinanthus bangwensis*) which is a hemi-parasite that depends directly on the host, is also a promising plant remaining evergreen on host even in the dry season. Earlier studies on use of mistletoe (*Tapinanthus bangwensis*) leaves as supplements' (Oke, 2011; Agbana, 2012) have recorded that the response of animals varied depending on the host plants. While Oke (2011) reported good results when rabbits were fed Mistletoe from shea nut trees, Agbana (2012) reported that mistletoe (*Tapinanthus bangwensis*) from lime tree when infused into savanna brown does did not yield encouraging reproductive responses. Hence, the objectives of this study are to evaluate the carcass performance of rabbits fed Mistletoe (*Tapinanthus bangwensis*) from different host plant and to identify the source of mistletoe (*Tapinanthus bangwensis*) leaves that will yield the best carcass performance among the treated rabbits.

Materials and Methods

The experiment was carried out at the rabbitary unit of the Teaching and Research Farm of the school of Agriculture and Agricultural Technology, Federal University of Technology, Minna, Niger state. Minna is situated on Latitude 9° North and 7° East. It's mean annual rainfall between 1200-1300 mm, annual temperature 38-42° and is located in the Guinea Savanna vegetation belt of Nigeria. The concentrate mixture was prepared using maize, maize offal, Groundnut cake, Bone meal, limestone, salt and premix were sourced in Minna and environs. Mistletoe (*Tapinanthus bangwensis*) leaves were given as leaf meal. The rabbits were obtained from a village at Kaduna borders of Kaduna State. A total of sixteen (16) weaned rabbits of mixed breed and sex were randomly allotted to four treatment groups designated T₁, T₂, T₃, T₄ and replicated in a completely randomized design (CRD).

T₁ served as the control and were not fed mistletoe leaf while T₂, T₃, T₄ were fed with mistletoe (*Tapinanthus bangwensis*) leaves from shea butter, almond and locust bean trees, respectively. A common concentrate diet containing 17 % crude protein and 2780.95kcal/kg digestible energy was fed throughout the thirteen (13) week study period. The rabbits were housed in hutches which measured 60cm by 60cm by 60cm. Each hutch was provided with feeders and drinking troughs which were cleaned daily. The rabbits were placed on conventional feeds for the first two weeks, been the acclimatization period after which the experimental diet was introduced to the rabbits. Feed and water were supplied *ad libitum*. The rabbits were given necessary prophylactic treatments against endo- and ecto- parasites. The concentrate feed and mistletoe (*Tapinanthus bangwensis*) leaves were analysed for their proximate composition and anti-nutritional factors according to the AOAC methods (AOAC, 1990).

Table 1: Composition of the concentrate diet fed to rabbit.

INGREDIENTS **COMPOSITION %**

Maize	39.22
Groundnut	20.28
Maize offal	35.95
Bone meal	2.55
Limestone	1.5
Premix	0.25
Salt	0.25
Total	100
Crude Protein	17.01
Total Energy (Kcal/Kg)	2780.95

Table 2: Experimental layout

T ₁	T ₂	T ₃	T ₄
Concentrate diet	Concentrate diet +	concentrate diet +	concentrate diet +
Only	mistletoe from the	mistletoe from the	mistletoe from the
	Shea butter	tree Almond tree	Locust bean

Carcass characteristics

At the end of the experiment, two rabbits were randomly selected from each treatment and fasted for 12 hours before slaughter for carcass analysis. The rabbits were slaughtered using a sharp knife and allowed to bleed for 2 minutes, before flaying. The rabbits were flayed by removing the pelt and dressed. Carcasses were prepared according to the norms of the World Rabbits Science Association (WRSA) indicated by Blasco and Ouhayoun, (1996). The Liver, Lungs, Heart, intestine and Kidneys were then removed to obtain the carcass containing meat, fat and bone. Data collected were; live weight, carcass weight, liver weight, kidneys weight, intestines, spleen, skin, fat, lung and heart weight. The weights were expressed as percentage of live weight using the expression below; Dressing % = carcass weight – live weight ÷ live weight × 100.

All the data obtained were subjected to analysis of variance (ANOVA) and differences between the treatments means under study were separated using Duncan Multiple Range Test (Duncan, 1955)

RESULTS AND DISCUSSION

1.3.1 Chemical composition of the experimental diet and mistletoe leave from different host plants.

The chemical composition of the mistletoe (*Tapinanthus bangwensis*) leaves from different host plants and the concentrate diet is presented in table 3. The results show that mistletoe (*Tapinanthus bangwensis*) leaves from locust bean, almond and shea butter trees had high levels of Crude protein and Crude fibre which makes them a choice of forage for livestock feeding. The 21.90 % Crude protein level of all the mistletoe (*Tapinanthus bangwensis*) leaves has placed them at the edge were

some other forages like *Tridax procumbens*, *Luffa aegyptica*, *Leuceana leucocephale* and a host of others that have been experimented for livestock feeding (*et al.*, 2002)

1.3.2 Anti-nutritional factors in mistletoe leaves from different host plants

The composition of anti-nutritional factors present in the mistletoe (*Tapinanthus bangwensis*) leaves is presented in table 4. The mistletoe (*Tapinanthus bangwensis*) leaves from the shea butter tree had the highest contents of alkaloids, flavonoids, tannins and saponins while that from the locust bean tree had the highest values for phytates and oxalates.

1.3.3 Carcass characteristics of rabbits fed mistletoe (*Tapinanthus bangwensis*) leaves from different host plant

The results of the carcass parameters measured is presented in table 5. There were significance difference ($P < 0.05$) in the slaughter weight, eviscerated weight and dressed weight. These results showed that better result were obtained from rabbits on mistletoe (*Tapinanthus bangwensis*) leaves from almond and locust bean tree. The results also showed that with exception to the weight of the skin and tail, there were no significant differences ($P > 0.05$) with respect to the cut up parts.

1.3.4 Weight of internal organs of rabbits fed mistletoe (*Tapinanthus bangwensis*) leaves from different host plants.

The weight of the internal organs of the experimental animals is presented in Table 7. The results shows that there were significant differences ($p < 0.05$) in the weights of the kidney and gall bladder, with the rabbits fed mistletoe (*Tapinanthus bangwensis*) leaves from almond tree recording the highest value for kidney weight. There were no significant differences in ($P > 0.05$) in the weights of other internal organs. For gall bladder, Treatment 2 (rabbits fed mistletoe leave from shae butter tree) and the control (Treatment 1) had higher (0.07) values than those fed mistletoe leave from almond and locust bean tree.

The results in this study showed a generally higher performance for all the carcass traits measured by the rabbits fed mistletoe (*Tapinanthus bangwensis*) leaves from almond trees and lowest levels in those fed control (T_1) and those fed mistletoe (*Tapinanthus bangwensis*) leaves from the sheabutter trees. This might be attributed to the levels of anti-nutritional factors in the leaves. They were lowest in the mistletoe (*Tapinanthus bangwensis*) leaves from the almond tree. The high levels in mistletoe (*Tapinanthus bangwensis*) leaves from the shea butter tree added to the physical nature might have negatively influenced its palatability to the rabbits and subsequently lowered its utilization.

Table 3: Chemical composition of the experimental diet and mistletoe (*Tapinanthus bangwensis*) leaves from different hosts' plants (%)

Parameters	MISTLETOE SOURCE			
	Locust Bean tree	Almond tree	Shea butter tree	Concentrate diet
Dry matter	68.00	49.65	53.70	86.20
Moisture content	32.00	50.35	46.30	11.80
Crude protein	21.90	21.90	21.90	18.10
Crude fibre	14.70	14.70	13.33	5.35
Ether extract	5.00	2.00	3.00	13.25
Ash	9.00	7.50	8.00	4.81
Nitrogen free extracts	17.40	3.35	7.74	44.69
Energy (kcal/kg)	2022	1395.5	1668.3	3704.10

Table 4: Composition of anti-nutritional factors present in the mistletoe leaves

MISTLETOE SOURCE

Parameters	locust bean	Almond	Shea butter
Alkaloid (%)	0.92	0.85	1.08
Flavonoid (%)	0.25	0.15	0.78
Phytate (mg/g)	175.04	102.99	89.04
Tannin (%)	0.20	0.80	2.4
Oxalate (%)	5.94	3.74	0.84
Saponin (%)	1.18	3.55	5.04

Table 5: Carcass Characteristics of the rabbits fed mistletoe leaves from different host plants

TREATMENTS						
Parameters	T ₁	T ₂	T ₃	T ₄	SEM	LS
Average live weight (g) 1200	1300	1150	1300	47.78	NS	
Slaughter weight (g)	78.01 ^b	88.13 ^{ab}	97.99 ^a	92.08 ^a	3.01	*
Eviscerated weight (g) 58.86 ^a	67.97 ^{ab}	75.89 ^a	68.13 ^{ab}	2.52	*	
Dressed weight (%)	38.00 ^b	43.82 ^{ab}	51.51 ^a	44.40 ^{ab}	2.06	*
Head	9.83	10.19	11.24	10.69	0.29	NS
Neck	3.01	2.88	3.04	3.14	0.13	NS
Legs	3.18	3.67	3.71	3.29	0.15	NS
Lumber 13.83	13.18	16.65	13.75	0.63	NS	
Thorax	7.27	8.07	9.13	7.84	0.40	NS
Tail	0.30 ^{ab}	0.18 ^b	0.37 ^a	0.24 ^{ab}	0.03	*
Skin	7.89 ^b	10.29 ^a	9.44 ^{ab}	9.76 ^a	0.40	*
Hind limb	13.53	12.17	14.85	12.49	0.48	NS
Fore limb	7.46	7.31	9.03	7.84	0.34	NS

KEY;

a, b = means with different superscript in the same row are significant different (P<0.05), SEM = Standard error of means. LS = Level of significant, * = Significant different (P<0.05). NS = Non-significant (P>0.05). T₁ = Control, T₂ = Mistletoe leave from shea butter tree, T₃ = Mistletoe leave from almond tree

T₄ = Mistletoe leave from locust bean tree

Table 6: Visceral Organ of Rabbits fed mistletoe leave

TREATMENTS						
Parameter	T ₁	T ₂	T ₃	T ₄	SEM	LS
Heart	0.26	0.24	0.30	0.27	0.01	NS
Spleen	0.04	0.06	0.06	0.08	0.01	NS
Liver	2.71	2.91	2.61	2.33	0.14	NS
Lungs	0.57	0.49	0.61	0.58	0.05	NS
Kidney 0.79 ^{ab}	0.61 ^c	0.82 ^a	0.63 ^{bc}	0.04	*	
Gall bladder	0.07 ^{ab}	0.07 ^a	0.04 ^b	0.05 ^b	0.01	*
Intestine	14.73	16.21	17.50	19.43	0.84	NS
Lipid/fat	0.01	0.32	0.20	0.60	0.16	NS

KEY;

a, b = means with different superscript in the same row are significant different (P<0.05), SEM = Standard error of means. LS = Level of significant, * = Significant different (P<0.05). NS = Non-significant (P>0.05). T₁ = Control, T₂ = Mistletoe leave from shea butter tree, T₃ = Mistletoe leave from almond tree

T₄ = Mistletoe leave from locust bean tree

CONCLUSION AND RECOMMENDATION

Mistletoe is forage or a hemi-parasite that grows everywhere but could be unfriendly if not properly managed. The usage of this mistletoe leave as a supplement will help to reduce scarcity of rabbits feed and also dependency on conventional feeds. From, the results from this study, the mistletoe

(*Tapinanthus bangwensis*) leaves from locust bean, almond tree and shea butter tree can be fed to growing rabbits with a common feed containing 17 % CP to obtain a high carcass quality, but the best carcass quality will be obtained when mistletoe (*Tapinanthus bangwensis*) leaves from almond tree is used.

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