# EFFECT SOME SELECTED LEAVE MEALS ON MEAT QUALITY OF RABBIT

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## ABSTRACT

This study was carried out to seek the effect of feeding some selected leaf meals on meat quality. A total of 48 cross breed unsexed weaner rabbits of 6 weeks' old were divided into four dietary treatments of 4 rabbits in 3 replicate in a completely randomized design. The initial weight of all the animals in each treatment were taken before the beginning of the experiment. The experimental animal was housed, one per hutch. *Gliricidia sepium*, *Moringa oleifera* and*Leucaena leucocephala l*eaves were harvested from Dagwom Farm Division of the National Veterinary Research Institute Vom, Plateau State (NVRI) by hand picking, washed with distill water and air dried under shade until they were crispy to touch. The leaves were thereafter crushed with hammer mill before incorporation each at 25% inclusion level. After termination of the feeding experiment, three representative rabbits randomly chosen from each group were fasted for overnight, weighed and slaughtered. Meat quality parameters were measured. Data were analysed using descriptive statistics and ANOVA at $_{\alpha 0.05.}$ Cold shortening, thermal shortening and oxidative rancidity were significantly higher in meat from rabbits fed control diet without leaf meal compared to meat from rabbits fed leaf meals. Cooking loss was higher in meat from rabbits fed gliricidia-based diet compared to other diets. The water holding capacity was significantly higher in the meat from treated groups. Inclusion, adding leaf meals such as gliricidia, leuceana and moringa at 25% inclusion level to the diet of rabbit pose no advert effect but rather improves the meat quality.

**Keyword**s: Gliricidia-based diet, moringa-based diet, leuceana-based diet, meat quality and weaned rabbit

## INTRODUCTION

The incorporation of leaf meal is primarily subjected to reduce the use of protein-rich feed ingredients in broiler rations and, hence, reduce the cost of feeds (Adelowo *et al.*, 2020). Leaves from plants contain different bioactive compounds such as carotenoids, phenolic compounds. tocopherols, carotenoids most of which have been reported to have a variety of biological effects such as antioxidant, anti-carcinogenic, anti-inflammatory, and anti-microbial activities. Such plants are *Gliricidia sepium*, *Moringa oleifera* and*Leucaena leucocephala* (Oshibanjo *et al.*, 2019).

Gliricidia leaves have also been reported to contain compounds such as flavonoids, polyphenolics and saponin (Akharaiyi *et al.*, 2012) which could serve as drawbacks/ feed ingredients in compounding their use as animal feeds at relatively high inclusion level. Sarwatt *et al*. (2002) reported that moringa foliages are potential inexpensive protein source for livestock feeding. The advantages of using moringa as a protein resource are numerous, and include the fact that it is a perennial plant that can be harvested several times in one growing season and also has the potential to reduce feed cost. Although rabbits can survive on most forage diet, optimum performance can only be ensured in a mixed feeding regime involving forage and formulated feeds (Oshibanjo *et al*. 2018).

*L. leucocephala* is one the highest quality and most palatable fodder trees in the tropics, often being described as the 'alfalfa of the tropics'. It serves as a good potential, cheaper plant protein source with high nutritive value. Hence, need to study its effects on the physiological status of rabbits fed with *L. leucocephala*. This study was carried out to seek the effect of feeding some selected leaf meals on meat quality of rabbits.

## MATERIALS AND METHODS

### Study Location

The research was carried out at Dagwom Farm Division of the National Veterinary Research Institute (NVRI) Vom, Jos South Local Government Area of Plateau State Nigeria.

### Experimental Animals

A total of 48 cross breed unsexed weaner rabbits of 6 weeks old were divided into four dietary treatments of 4 rabbits in 3 replicate in a completely randomized design.

### Test ingredients

*Gliricidia sepium*, *Moringa oleifera* and*Leucaena leucocephala.* leaves were harvested from Dagwom Farm Division of the National Veterinary Research Institute (NVRI), by hand picking, washed with distill water and air dried under shade to prevent the leaves from being denatured until they are crispy to touch. The leaves were thereafter crushed with hammer mill before incorporation in the test diets at 25% inclusion level.

### Experimental diet

The experimental diet is shown in Table 1.

Table 1: Composition of the experimental diet

| Ingredients | Control | 25% gliricidia-based diet | 25% Moringa-based diet | 25% Leuceana-based diet |
|---|---|---|---|---|
| Maize | 38.50 | 33.00 | 33.00 | 33.00 |
| Full fat soya | 17.00 | 5.00 | 5.00 | 5.00 |
| Wheat offals | 15.00 | 15.00 | 14.75 | 14.75 |
| Rice offals | 16.50 | 14.75 | 10.00 | 10.50 |
| Palm kernel cake | 8.75 | 3.00 | 8.00 | 7.50 |
| Gliricidia leaf meal | 0.00 | 25.00 | 0.00 | 0.00 |
| Moringa leaf meal | 0.00 | 0.00 | 25.00 | 0.00 |
| Leuceana leaf meal | 0.00 | 0.00 | 0.00 | 25.00 |
| Bone meal | 2.50 | 2.50 | 2.50 | 2.50 |
| Lime stone | 1.00 | 1.00 | 1.00 | 1.00 |
| Salt | 0.30 | 0.30 | 0.30 | 0.30 |
| Premix | 0.25 | 0.25 | 0.25 | 0.25 |
| Methionine | 0.10 | 0.10 | 0.10 | 0.10 |
| Lysine | 0.10 | 0.10 | 0.10 | 0.10 |
| Total | 100 | 100 | 100 | 100 |
| Calculated: | | | | |
| Crude Protein | 15.89 | 16.00 | 16.25 | 15.99 |
| Metabolizable energy | 2591.68 | 2609.48 | 2601.75 | 2639.12 |
| Crude fibre | 8.96 | 8.82 | 9.40 | 8.90 |

### Parameters measured

Cold and thermal shortening was carried out using the following formula:

$$\text{Cold shortening} = \frac{\text{Initial length} - \text{final length}}{\text{Intial length}} \times 100$$

$$\text{Thermal shortening} = \frac{\text{Initial length} - \text{final length}}{\text{Intial length}} \times 100$$

**Cooking yield**

The weight of meat was recorded before and after cooking and the yield was expressed as percentage

$$\text{Cooking yield} = \frac{\text{Weight of cooked meat}}{\text{Weight of raw meat}} \times 100$$

**Oxidative rancidity**

Thiobarbituric Acid value (TBA) was estimated by modified methods of Buege and Aust (1978).

**pH**

The pH value of raw and cooked meat samples was according to method described by AOAC (2000).

**Water holding capacity**

Water Holding Capacity (WHC) was determined according to Wardlaw, Maccaskill, and Acton (1973).

**Experiment design**

A completely randomized design was used

**Data Analysis**

Data obtained was subjected to analyses of variance using SPSS statistical package version 25. Significant differences between treatment means were separated using Duncan's Multiple Range Test.

## RESULTS

Table 1 shows the meat quality rabbits fed leaf meal-based diet. Cold shortening, thermal shortening, oxidative rancidity and water holding capacity were significantly higher in meat from rabbits fed control diet compered to meat from rabbits fed leaf meals. Cooking loss was higher in meat from rabbits fed gliricidia-based diet compared to other diets.

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Table 1: Meat quality rabbits fed Leave Meal-Based Diets

| Parameters | Control | 25% gliricidia-based diet | 25% Moringa-based diet | 25% Leuceana-based diet | SEM |
|---|---|---|---|---|---|
| Cold shortening (%) | 21.29[a] | 7.23[c] | 11.13[b] | 8.87[c] | 1.67 |
| Thermal shortening (%) | 28.43[a] | 28.00[a] | 27.23[a] | 24.59[b] | 0.51 |
| Oxidative rancidity (mg/g) | 3.35[a] | 1.88[b] | 1.63[b] | 1.91[b] | 0.63 |
| Cooking loss (%) | 17.27[b] | 21.61[a] | 16.47[b] | 16.75[b] | 0.68 |
| Ph | 6.98 | 6.85 | 7.03 | 7.07 | 0.25 |
| Water holding capacity (%) | 55.00[b] | 64.44[a] | 67.22[a] | 68.33[a] | 1.82 |

[a, b] Means in the same row not sharing superscript are significantly different at $P<0.05$.

SEM: Standard error of the mean

## DISCUSSIONS

Meat quality depends solely on the nutritional status and pre-slaughtering of an animal Oshibanjo *et al.* (2019). Cold shortening, thermal shortening, cooking loss and water holding capacity is a pointer to meat tenderness. The higher the value obtained for the cold shortening, thermal shortening and cooking loss, the more the toughness of the meat (Oshibanjo *et al.*, 2019). In this study, the result obtained shows that meat from rabbits fed the control diet will be more tough than meat from the treatment groups. This result reveals that meats from rabbits fed leaf meals are more tender which could be due to the phytochemical profile present in those leaves used.

The oxidative rancidity of meat shows the lipid peroxidation of meat and how easy meat can spoil. The higher the value obtained, the easier the meat can get rancid and spoilt due those water, oxygen, light and microbial contamination (Oshibanjo *et al.*, 2019). In this study, the data obtained shows that leaf meals are capable of reducing or preventing the onset of rancidity in rabbit meat which could be due to the presence of some bioactive compounds found in them.

Water holding capacity (WHC) of meat is the ability of meat to retain its water after external pressure is applied (Oshibanjo *et al.*, 2019). The higher the WHC the more the juiciness and tenderness of meat. In this study, leaf meals improve the WHC of rabbit meat which could be due to the high nutritional value and bioactive compounds in those leaves (Oshibanjo *et al.*, 2019).

## CONCLUSION

Inclusion, adding leaf meals such as gliricidia, leuceana and moringa at 25% inclusion level to the diet of rabbit can improve the meat quality

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