

EFFECT OF SOLE AND COMBINED HERBAL LEAF MEAL AS FEED ADDITIVES ANTIBIOTICS ON CARCASS CHARACTERISTICS AND MEAT QUALITY OF GROWING PIGS

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ABSTRACT

A total of thirty (30) grower pigs were used to determine the effect of sole and combined herbal leaf meal as feed additives in-feed antibiotics on carcass characteristics and meat quality of growing pigs. The pigs were grouped on weight equalization into 5 treatments (T1: pigs fed diet without antibiotics, T2: pigs fed diet containing synthetic antibiotics, T3: pigs fed diet containing moringa leaf meals, T4: pigs fed diet containing Neem leaf meals, T5: pigs fed diet containing mixture of Moringa and Neem leaf meals). Each treatment consisting of 6 pigs was further subdivided into 3 replicates. Each replicate consisted of 2 pigs. On the last day of the study, 2 pigs from each treatment were slaughtered for carcass analysis and meat quality. Data generated were subjected to Analysis of Variance in a Completely Randomized Design. Results revealed head was significantly ($p < 0.05$) highest (11.40%) in T4 and lowest (9.27%) in T1. Tail was significantly ($p < 0.05$) highest (0.38%) T4 while lowest values (0.21 and 0.22%) were recorded in T1 and T2, respectively. Values (0.43, 0.42, 0.45 and 0.37%) recorded for heart were statistically similar in T1, T2, T3, and T5, respectively which were significantly ($p < 0.05$) lower than 0.56% recorded in T4. Cooking loss and thermal shortening were significantly ($p < 0.05$) highest (22.73 and 38.40%) in T4 and lowest (15.06 and 26.46%) in T5. Chilling loss was significantly ($p < 0.05$) highest (2.30%) in T2 and lowest (1.05%) in T5. Therefore, feeding pigs diet containing Neem leaf meal improved cut parts (head and tail), organs (heart) and meat quality.

Keywords: herbal leaf meal, carcass, meat quality, pigs

INTRODUCTION

The use of antibiotics in feed of livestock has not only been linked to the emergence of antibiotic resistant zoonotic bacterial pathogens but the presence of antibiotic residue contamination of animal products (Gong *et al.*, 2014). Thus, a great number of consumers are concerned about the type and quality of their food. These consumers are rejecting the use of synthetic chemicals, such as antibiotics because their use is associated with animal and human health risks (Hao *et al.*, 2014). This has led to the prohibition of the use of antibiotic for livestock production in many countries and the thorough search for alternatives to antibiotics (Valenzuela-Grijalva *et al.*, 2017). One of such alternative sources is moringa and Neem (*Azadirachta indica*). Moringa (*Moringa oleifera*) is known as a miracle tree because of its numerous nutritional properties. Neem is an indigenous plant known for its useful medicinal properties like antibacterial, antifungal, antiprotozoal, hepato-protective and various others without showing any adverse effects (Esonu 2006). This study therefore aimed to determine the effect of sole and combined herbal leaf meal as alternatives antibiotics on carcass characteristics and meat quality of growing pigs.

MATERIALS AND METHODS

Experimental Site

The study was carried out at the Piggery Unit of the Directorate of Universities farm, Federal University of Agriculture, Abeokuta while analysis of meat was carried out at the Animal Product and Processing Laboratory of the Department of Animal Production and Health, Federal University of Agriculture, Abeokuta.

Preparation of Herbal leaf meals

Neem (*Azadirachta indica*) and Moringa (*Moringa oleifera*) leaves were procured within Odeda Local Government Area, Ogun State. The leaves were air dried for 3-5 days until they became crispy while retaining their greenish coloration. The leaves were afterwards milled and incorporated into experimental diets.

Experimental pigs and management

A total of thirty (30) grower pigs were purchased from a reputable farm in Abeokuta, Ogun State. The pigs were grouped on weight equalization into 5 treatments (T1: pigs fed diet without antibiotics, T2: pigs fed diet containing synthetic antibiotics, T3: pigs fed diet containing moringa leaf meals, T4: pigs fed diet containing Neem leaf meals, T5: pigs fed diet containing mixture of Moringa and Neem leaf meals). Each treatment consisting of 6 pigs was further subdivided into 3 replicates. Each replicate consisted of 2 pigs. Feed and water were provided *ad libitum* throughout the experimental period that lasted for 12 weeks.

Data Collection

Carcass Characteristics

On the last day of the study, 2 pigs from each treatment were selected, weighed, fasted overnight, stunned using percussion method and slaughtered by severing the jugular vein. The carcass weights as well as weights of cut-parts and offals were recorded and expressed as percentages of the live weights.

Meat Quality

The following meat quality parameters were determine;

- Cooking loss (%) = $\frac{(\text{Weight of meat before cooking} - \text{weight of meat after cooking})}{\text{Weight of meat before cooking}} \times 100$
- Chilling Loss (%) = $\frac{\text{Weight before refrigeration} - \text{Weight after refrigeration}}{\text{Weight before refrigeration}} \times 100$
- Thermal Shortening = $\frac{\text{Length before cooking} - \text{length after cooking}}{\text{Length before cooking}} \times 100$
- Cold Shortening = $\frac{\text{Length before refrigeration} - \text{length after refrigeration}}{\text{Length before refrigeration}} \times 100$

Statistical Analysis

Data generated were subjected to Analysis of Variance in a Completely Randomized Design using SAS (2003). Significantly ($p < 0.05$) different means were separated using Duncan Multiple Range Test as contained in the same statistical Package.

RESULT AND DISCUSSION

The effect of sole and combined herbal leaf meal as alternative feed additives antibiotics on carcass characteristics of growing pigs is presented in Table 1. Values recorded for head was significantly ($p < 0.05$) highest (11.40%) in T4 and lowest (9.27%) in T1. Tail was significantly ($p < 0.05$) highest (0.38%) on T4 while lowest values (0.21 and 0.22%) were recorded in T1 and T2, respectively. Similar means (14.30, 14.65 and 14.39%) were recorded for GIT in T1, T3 and T4, respectively which were significantly ($p < 0.05$) lower than 17.75% recorded in T5. Values (0.43, 0.42, 0.45 and 0.37%) recorded for heart were statistically similar in T1, T2, T3, and T5, respectively were significantly ($p < 0.05$) lower than 0.56% recorded in T4. Full stomach was significantly ($p < 0.05$) highest (2.45%) in T5 and lowest (1.38%) in T3. In terms of these characteristics, literature is limited on the use of herbal leaf meal in pig production. However, few studies with phytochemicals that assessed carcass characteristics in poultry revealed improvement in parameters, including carcass weight, breast weight, and carcass dressing percentage and reduced abdominal fat and relative abdominal fat (Hong *et al.*, 2012; Kanduri *et al.*, 2013).

Table 1: Effect of sole and combined herbal leaf meal as alternative feed antibiotics on carcass characteristics of growing pigs

Parameters	T1	T2	T3	T4	T5
Live weight (kg)	57.25±10.18	52.50±4.84	50.75±0.85	53.75±3.57	51.50±2.63
Hot carcass weight(Kg)	35.35±6.55	33.00±3.70	34.00±0.82	33.00±3.51	33.75±3.68
Eviscerated weight (kg)	41.58±7.38	39.33±4.02	40.80±1.38	40.32±3.79	40.55±3.83
Dressing Percentage (%)	61.40±2.83	62.52±1.35	66.97±0.63	61.03±3.20	65.11±4.60
Cut part ¹					
Head	9.27±0.52 ^b	9.76±0.56 ^{ab}	11.06±0.83 ^{ab}	11.40±0.26 ^a	10.64±0.44 ^{ab}
Fore trother	0.88±0.06	1.02±0.09	0.94±0.14	1.04±0.12	1.10±0.04
Hind trother	1.22±0.09	1.40±0.14	1.33±0.08	1.48±0.20	1.50±0.07
Ham	10.14±0.37	10.24±0.46	9.90±0.33	10.90±0.68	10.35±0.33
Shoulder	10.06±0.82	11.36±0.63	10.92±0.49	10.69±0.41	9.80±0.47
Tail	0.21±0.02 ^b	0.22±0.02 ^b	0.26±0.03 ^{ab}	0.38±0.09 ^a	0.25±0.01 ^{ab}
Offal ²					
GIT	14.30±0.67 ^b	16.72±1.22 ^{ab}	14.65±1.02 ^b	14.39±1.15 ^b	17.75±0.94 ^a
Spleen	0.23±0.05	0.25±0.06	0.64±0.39	0.28±0.04	0.31±0.11
Heart	0.43±0.03 ^b	0.42±0.03 ^b	0.45±0.05 ^b	0.56±0.01 ^a	0.37±0.02 ^b
Liver	1.83±0.11	1.87±0.12	1.75±0.04	1.91±0.06	1.85±0.15
Kidney	0.37±0.04	0.40±0.06	0.35±0.03	0.36±0.02	0.32±0.02
Lung	1.19±0.13	1.24±0.25	1.10±0.08	1.04±0.09	1.19±0.06
Full stomach	1.59±0.15 ^{bc}	1.83±0.24 ^{bc}	1.38±0.15 ^c	2.01±0.07 ^{ab}	2.45±0.24 ^a

^{a, b, c} means values with different superscripts within row are significantly different (p<0.05)

^{1, 2} values are expressed as percentages of the live weight

In Table 2, the effect of sole and combined herbal leaf meal as alternative feed antibiotics on meat quality of growing pigs is shown. Values for cooking loss was significantly (p<0.05) highest (22.73%) in T4 and lowest (15.06%) in T5. Chilling loss was significantly (p<0.05) highest (2.30%) in T2 and lowest (1.05%) in T5. Cold shortening values were significantly (p<0.05) higher (11.38 and 11.30%) in T1 and T3 and lowest (7.24, 5.52 and 7.52%) in T2, T3 and T5, respectively. Thermal shortening was significantly (p<0.05) highest (38.40%) in T4 and lowest (26.46%) in T5. Although, there are few studies on the effect of herbal leaf meal on meat quality of pigs, the present study contradicted the findings of Liu *et al.* (2016) who reported no effect of *S. baicalensis* and *Lonicera japonica* extract mixture supplementation on cooking loss and drip loss of meat from finisher pigs. Lei *et al.* (2018) also reported negligible results for drip loss and cooking in pigs fed natural and fermented herbs. This contradiction may be due to the kinds of herbs used and the age of the animal.

Table 2: Effect of sole and combined herbal leaf meal as alternative feed additives antibiotics on meat quality of growing pigs

Parameters (%)	T1	T2	T3	T4	T5
Cooking loss	20.55±0.73 ^b	21.24±0.20 ^{ab}	19.77±0.44 ^b	22.73±0.74 ^a	15.06±0.86 ^c
Chilling loss	1.60±0.18 ^{bc}	2.30±0.22 ^a	1.57±0.18 ^{bc}	1.85±0.38 ^{ab}	1.05±0.08 ^c
Cold Shortening	11.38±1.89 ^a	7.24±0.67 ^b	5.52±0.80 ^b	11.30±1.56 ^a	7.57±0.95 ^b
Thermal shortening	34.69±1.80 ^{ab}	32.38±1.63 ^b	36.12±1.42 ^{ab}	38.40±1.45 ^a	26.46±1.16 ^c

^{a,b,c} means values with different superscripts within row are significantly different (p<0.05)

CONCLUSION AND RECOMMENDATION

From this study, it was concluded that feeding pigs diet containing Neem leaf meal improved cut parts (head and tail), organs (heart) and meat quality while feeding pigs diet containing moringa and moringa and neem leaf meal improved dressing percentage and reduced cooking loss.

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