



Original Article

Effects of *Albizia Julibrissin* Leaf Meal-Based Diet on Carcass and Sensory Characteristics of Broiler Chickens

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ABSTRACT

The carcass and sensory characteristics of broiler chicken fed *Albizia julibrissin* leaf meal (AJLM) was studied. A total of 24 (6 from each treatment) 8 weeks old broiler chickens were randomly selected from 120 broiler chickens fed diets containing 0% (control, T1), 2% (T2), 3% (T3) and 4% (T4) AJLM. The chickens were weighed and slaughtered after a 24 hour feed withdrawal. Carcass and viscera weights were taken, after which viscera and primal cuttings were bagged and labeled for carcass and sensory analysis. The breast muscles were grilled to an internal temperature of 70°C for 15 minutes for sensory analysis. The results showed that, AJLM had no significant effect ($P > 0.05$) on carcass characteristics of broiler chickens. In addition, there was no significant difference ($P > 0.05$) in colour, juiciness, flavour, flavour-liking and overall- liking. However, there was significant difference ($P < 0.05$) in tenderness and taste. Tenderness of T3 was significantly better ($P < 0.05$) than T1, T2, and T4. Taste of T1 and T3 were significantly better ($P < 0.05$) than that of T2 and T4. Feeding of AJLM to broiler chickens up to 4% on weight basis has no adverse effect on carcass and sensory characteristics.

Keywords: *Albizia julibrissin*, carcass, sensory characteristics, broiler chicken.

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INTRODUCTION

With increased production of animal products, there is also increased demand for feed, particularly for ingredients which have high protein and energy value (Mengesha, 2011; Adzitey, 2013). Most of the ingredients of poultry feeds are also used for human nutrition in Africa and that has led to the feed/food competition (Mengesha, 2011). The competition for feed/food between humans and animals is expected to aggravate prices of poultry feeds and that would enforce producers to look for alternative and locally available feed sources. Poultry feed constitutes nearly 70% to 80% of the recurring cost of poultry farms, and as such, any reduction in the cost of feed, will go a long way in reducing the cost of production

of eggs and meat, thereby increasing the profit margin of farmers (Anonymous, 2007; Adzitey *et al.*, 2010).

A number of experiments have been conducted during the past years with a view to explore the possibility of using cheaper ingredients, maintaining quality of eggs and meat, and reducing feed cost and cost of production (Adzitey *et al.*, 2010; Dei *et al.*, 2011; Teye *et al.*, 2011a; Teye *et al.*, 2011b; Teye *et al.*, 2011c; Elmakki *et al.*, 2013; Kalantar *et al.*, 2014; Moreki and Kenaleone, 2014). However, a plant with nutritional potential as feedstuff, *Albizia julibrissin*, is under exploited (Eshie, 2013). It has been reported by Eshie (2013) that, *Albizia julibrissin* leaf meal could be used up to and not above 5% inclusion level in broiler chicken ration without adverse effect on performance. However, the birds developed yellow shanks, beaks and skin. Because of this, *Albizia julibrissin* was used in broiler diets up to 4% to see whether a similar effect will occur (Sasu, 2014). The birds also developed yellow shanks, beaks and skin. This work determines the effects of *Albizia julibrissin* leaf meal at 4% on the carcass and sensory characteristics of broiler chickens.

MATERIALS AND METHODS

Location of Experiment

The experiment was carried out at the Poultry and Meat Units of the Animal Science Department, University for Development Studies, Nyankpala.

Experimental Birds

Twenty-four, eight weeks broiler (Cobb) birds fed on *Albizia julibrissin* leaf meal (AJLM) based diets raised at the poultry unit of the University for Development Studies were used for this experiment.

Sampling and Slaughtering

Two broiler birds, one male and one female were randomly selected from each replicate. The broilers were taken off feed for 24 hours and their live weights recorded with a digital scale (Scales world, UK) before bleeding. The birds were bled and scalded with hot water of about 80°C and de-feathered manually. The birds were eviscerated on a working table. The viscera for individual birds were weighed, bagged, labeled and refrigerated overnight. The eviscerated carcasses were also weighed, bagged, labeled and chilled in a refrigerator overnight.

Carcass Characteristics

Eviscerated weights were taken after evisceration using a digital scale before refrigerated. Chilled weights were taken 24 hours after slaughtering using the same scale. The weights of the head, heart, liver, empty gizzard and abdominal fat were also taken and recorded.

Sensory Evaluation

A total of fifteen (15) panelists were randomly selected and trained according to the British Standard Institute (BSI, 1993) guidelines to evaluate the sensory characteristics of the products. The breast muscles were thawed, cut and grilled at a temperature of 150°C in an electric oven (Turbofan, Blue seal, UK) to an internal temperature of 70°C for 15 minutes. During the grilling, they were turned over regularly to prevent the meat from burning. The products were sliced into uniform sizes (about 2cm²) and wrapped with coded aluminum foils and presented to the panelists. Each panelist was provided with water and pieces of bread to serve as neutralizers between products. Assessors used a five-point hedonic scale as shown in Table 1 to evaluate the sensory characteristics of the meat products.

Table 1: Five (5)-point hedonic scale used for the sensory evaluation

Attribute	Scale				
	1	2	3	4	5
Colour	Very light	Light	Intermediate	Dark	Very dark
Chicken flavor	Very weak	Weak	Intermediate	Strong	Very strong
Juiciness	Very juicy	Juicy	Intermediate	Dry	Very dry.
Flavor liking	Like very much	Like	Intermediate	Dislike	Dislike very much
Taste	Like very much	Like	Intermediate	Dislike	Dislike very much
Tenderness	Very tender	Tender	Intermediate	Tough	Very tough
Overall liking:	Like very much	Like	Intermediate	Dislike	Dislike very much

Statistical Analysis

Data obtained was analyzed using Analysis of Variance (ANOVA) of Genstat Discovery.

RESULTS AND DISCUSSION

Carcass Characteristics

The weights of the carcasses and the primal cuttings of the birds fed *Albizia julibrissin* leaf meal (AJLM)-based diets are presented in Table 2. The results showed no significant difference ($P > 0.05$) between birds fed the control and AJLM-based diets for live, eviscerated, chilled, primal cuttings and viscera yields.

Table 1: Effect of AJLM on carcass characteristics and primal cuttings of broiler chicken

Parameter (g)	T1	T2	T3	T4	S.E.D	P-value
Live	1825	1952	1792	1799	122.20	0.553
Eviscerated	1437	1573	1420	1520	157.80	0.746
Chilled carcass	1423	1550	1397	1493	154.80	0.756
Liver	48.70	41.60	43.60	46.70	3.32	0.219
Heart	8.80	7.58	7.67	8.21	0.82	0.456
Empty gizzard	42.90	44.80	43.90	41.80	2.87	0.766
Abdominal fat	17.30	20.50	17.20	29.90	8.32	0.427
Head	46.40	50.00	45.00	46.60	2.83	0.391
Wing	72.80	74.90	68.00	71.20	6.00	0.713
Drum stick	94.60	102.10	90.00	91.80	8.09	0.498
Breast muscle	144.20	133.50	127.90	129.80	28.25	0.937
Thigh	110.60	108.70	99.90	107.70	13.47	0.862

Non-conventional feedstuffs including *Mucuna pruriens*, *Icacina oliviformis*, *Gossypium hirsutum*, *Azadirachta indica*, *Cassia obtusifolia*, *Albizia julibrissin* and many more have been shown to contain some anti-nutritional factors which hampers growth when feed to birds (Pugalenthi et al., 2005; Adzitey et al., 2010; Dei et al., 2011; Teye et al., 2011b; Teye et al., 2011c; Eshie, 2013; Sasu, 2014). Dazala et al., (2010) reported that the concentration of anti-nutritional factors increased at higher inclusion levels of non-conventional feedstuffs in the diets which resulted in decreased weight gain and final live weight. Teye et al., (2010c) found that when broiler chickens were fed on a non-conventional feed meal (raw *Icacina oliviformis* seed meal) at inclusion level beyond 5%, it adversely affects the carcass characteristics. Increasing the dietary level of a non-conventional feed (sun-dried *Icacina oliviformis* at 0, 3, 6, and 9% inclusion level) decreased carcass yield of broiler chickens (Dei et al., 2011). However when the birds were fed boiled *Icacina oliviformis* at 0, 3, 6, and 9% inclusion level, no differences were observed in growth performance. In the current study, there is no specific trend in the results to associate it to the presence and concentration of anti-nutritional factors in the diets. Since the findings of this study cannot be associated to the presence and concentration of anti-nutritional factors in AJLM, it could be said that, AJLM has no adverse

effect on broiler birds up to 4% inclusion level. Similarly to this finding, Adzitey *et al.* (2010) reported that feeding processed *Mucuna pruriens* beans meal at an inclusion level of 25% and 30% had no effect on live weight, bled, feet, head, intestine, carcass, bones/boneless weight and primal cuttings. Rosa *et al.* (2007) also reported that heat exposure decreased heart, liver and gizzard yields, and increased carcass and thigh plus drumstick yield. Thus heat could play a role or influence the irregular trend of the result obtained for the carcass characteristics and primal cuts yields. Also pre and post-slaughter animal has an influence on meat quality (Warris, 2010; Adzitey, 2011; Adzitey and Nurul, 2011; Adzitey and Huda, 2012).

Sensory Characteristics

The results obtained from the sensory evaluation of the breast meat of broiler chickens fed *Albizia julibrissin* (AJLM-based) diets are presented in Table 3.

Table 3: Sensory characteristics of broiler chickens fed AJLM-based diets

Parameter	T1	T2	T3	T4	SED	P-value
Colour	2.00	1.93	1.47	2.20	0.27	0.061
Juiciness	3.00	2.33	2.47	3.07	0.35	0.086
Tenderness	2.27 ^a	2.67 ^a	1.47 ^b	2.67 ^a	0.23	0.001
Flavor	3.27	2.93	3.33	3.00	0.33	0.547
Flavour-liking	2.20	2.47	2.00	2.27	0.26	0.367
Taste	1.87 ^b	2.33 ^a	1.80 ^b	2.33 ^a	0.22	0.024
Over-all liking	2.00	2.47	2.00	2.20	0.25	0.206

There was no significant difference ($P > 0.05$) in colour, juiciness, flavor, flavor liking and overall liking between broilers fed the control diet and those fed the AJLM-diets. However, there was significant difference ($P < 0.05$) in tenderness and taste. Tenderness of T3 was significantly better ($P < 0.05$) than T1, T2, and T4. Taste of T1 and T3 were significantly better ($P < 0.05$) than that of T2 and T4. Sensory characteristics of meat are very important factors consumers consider when buying meat and meat products (Bell and Weaver, 2002). Since the broiler chickens fed on the test diets and the control diet had no significant difference in colour, juiciness, flavor, flavor-liking and overall liking, consumers are likely not to detect any difference in the sensory characteristics of birds fed traditional diets and those fed AJLM-diets. However, consumers could detect differences in taste and tenderness between the treatments. Agbolosu and Abu (2015) feed rabbits with *Albizia julibrissin* leaf Meal at 0%, 5%, 7.5% and 10% and found no significant difference ($P > 0.05$) in sensory attribute except off-odour. They concluded that inclusion level of up to 10% does not affect eating quality.

CONCLUSION

The use of *Albizia julibrissin* (AJLM) based diet as an energy source up to 4% inclusion level has no adverse effect on carcass and sensory characteristics of broiler chickens.

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