MYCOTOXICOLOGY SOCIETY OF NIGERIA

In Collaboration With

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ASSESSMENT OF THE ORGANOLEPTIC ATTRIBUTES OF BROILER CHICKENS FED VARYING LEVELS OF BOILED LEBBECK (ALBIZIA LEBBECK) SEED MEAL BASED DIETS

IBRAHIM, L.[1], ADEPOJU, N.O.[2] & AKANDE, K.E.[1]

[1] Department of Animal Production, Federal University of Technology, Minna.
[2] Bauchi State College of Agriculture, Bauchi.

ABSTRACT
This study assessed the influence of boiled *Albizia lebbeck* seed meal on the sensory attributes of broiler chicken meat. One hundred and sixty (160) day-old Ross-308 broiler chicks were randomly assigned to four treatment groups in a completely randomized design (CRD) with four replicates of ten (10) birds each. Treatment 1 served as the control (0% *Albizia lebbeck*), while Treatments 2, 3, and 4 included boiled lebbeck at 1.5%, 3.0%, and 4.5% inclusion levels, respectively, for seven weeks. Data were analysed using One-way ANOVA. Results indicated that lebbeck inclusion had no significant effect (P>0.05) on sensory parameters, including meat colour (6.67–7.00), juiciness (7.00), appearance (6.67–7.00), flavour (6.67–7.00), aroma (6.67–7.00), tenderness (7.33–7.67), and overall acceptability (7.33–7.00). The study suggests that lebbeck seed meal-based diets do not negatively impact the sensory qualities of broiler meat.

Keywords: *Albizia lebbeck,* broiler chickens, sensory evaluation

INTRODUCTION
Consumer perception plays a vital role in determining meat quality, which is often evaluated based on sensory characteristics such as taste, colour, juiciness, tenderness, and aroma (Schivazappa and Virgili, 2020). These sensory attributes, along with other quality metrics like water holding capacity, cooking loss, shear strength, and meat pH (Font-i-Furnols and Guerrero, 2014), influence consumer preference and shelf life. With increasing demand for healthy, lean, and low-fat meat options (John *et al.*, 2016), broiler meat, known for its low transfat content (Greger, 2014), presents a favourable alternative to beef. The type of feed administered during broiler rearing significantly affects meat quality (Abd El-Hack *et al.*, 2019). However, the high cost of feed, accounting for up to 70% of total production costs, remains a major challenge in broiler production (Abbas, 2013). Conventional feed resources are often inadequate, seasonal, and face competition from human consumption. This necessitates the exploration of alternative feedstuffs to reduce production costs and enhance the affordability of meat products (FAO, 2014).

Albizia lebbeck seed, also known as flea tree, fry wood, siris, woman tongue, or East Indian walnut, is a leguminous tree native to tropical and subtropical regions (Lamb *et al.*, 2005). Traditionally, its leaves have been used to treat various ailments. Reported biological activities include antimicrobial, anti-inflammatory, antifungal, antispasmodic, antiviral, and neuroprotective properties. These diverse properties make lebbeck a potential bridge between food safety and livestock nutrition.

The increasing consumer preference for meat with lower intramuscular fat drives the need for nutritional strategies using accessible and cost-effective feed resources like lebbeck (Yang *et al.*, 2009; Yang *et al.*, 2015). *Albizia lebbeck* seed can replace soybean, groundnut cake, and maize, thereby lowering production costs. However, raw lebbeck seed contains antinutritional substances and toxic factors (Arif *et al.*, 2017) that must be addressed through appropriate processing. Overcoming the challenge of protein insufficiency in animal feeds is essential, and the successful incorporation of lebbeck seeds in broiler chicken feeds could significantly contribute to solving this issue.

Lebbeck seeds offer a rich source of nutrients (Oyelere *et al.*, 2016) and represent an unconventional feed resource that does not directly compete with human consumption, making it ideal for boosting poultry production. Lebbeck's anti-nutritional factors can be degraded by boiling with water.

MATERIALS AND METHODS
Location of Experimental Study
The experiment was conducted at the Poultry Unit of the Teaching and Research Farm of the Department of Animal Production, School of Agriculture and Agricultural Technology, Federal University of Technology, Minna, Niger State.

Source of Experimental Animals and Test Material

One hundred and sixty (160) day-old Ross-308 broiler chicks were obtained from Agri-Tech Ibadan, Oyo State, Nigeria. Seed pods of *Albizia lebbeck* were harvested from trees located within the premises of the Federal University of Technology, Minna, Niger State.

Experimental Design and Management of Birds

The 160-days-old Rose-308 broiler chicks were randomly distributed into four dietary treatment groups, each consisting of 40 birds. Each treatment was further divided into four replicates, with 10 birds per replicate. The experiment followed a completely randomized design (CRD). Standard vaccination protocols and prophylactic treatments were administered to the birds as needed throughout the duration of the study.

Experimental Diets

Four experimental diets were formulated to represent the four treatment groups. Diet 1 (T1) served as the control diet, containing 0% boiled *Albizia lebbeck*. Diet 2 (T2) consisted of 1.5% inclusion of boiled *Albizia lebbeck*. Diet 3 (T3) contained a 3.0% inclusion level of boiled *Albizia lebbeck*, while Diet 4 (T4) included 4.5% boiled *Albizia lebbeck*. All diets were formulated for single-phase feeding to meet the nutritional requirements of the broilers.

Evaluation of Organoleptic Attributes

The Keeton method was used to evaluate the organoleptic attribute of the meat samples. Breast meat samples were collected from randomly selected birds of each treatment group at the end of the experiment. The meat samples were then boiled in a pot containing 150ml of water for ten minutes, and one gramme of salt was added. The meat samples were cut into smaller pieces of about 3-5 grammes of about 1-2 cm thickness according to their treatments and replicates. A panel of trained assessors evaluated the cooked meat samples for tenderness, colour, juiciness, flavour, aroma, and overall acceptability using a 9-point hedonic scale developed by (Peryam *et al.*, 2004). The grading system used was as follows: 9. Like extremely, 8. Like very much, 7. Like moderately, 6. Like slightly, 5. Neither dislike nor like, 4. Dislike slightly, 3. Dislike moderately, 2. Dislike very much, 1. Dislike extremely.

Data Analysis

Data collected on the organoleptic attributes were subjected to one-way analysis of variance (ANOVA) using SPSS (2017) statistical software. Where significant differences were observed, Duncan's multiple range test was applied to separate the means and determine the significance of the differences between treatment groups.

RESULTS

The impact of dietary inclusion of boiled *Albizia lebbeck* on the sensory attributes of broiler chicken meat was evaluated. The results of the sensory evaluation, encompassing parameters such as meat colour, juiciness, appearance, flavour, aroma, tenderness, and overall acceptability, are summarized in Table 1. The analysis revealed no statistically significant differences (P>0.05) between any of the treatment groups across all sensory parameters assessed. Specifically, meat colour scores ranged from 6.67 to 7.00, juiciness remained consistent at 7.00, appearance ranged from 6.67 to 7.00, flavour ranged from 6.67-7.00, aroma ranged from 6.67 to 7.00, tenderness ranged from 7.33-7.67 and overall acceptability ranged from 7.33-7.00. These findings indicate that the inclusion of boiled lebbeck in broiler diets, at the tested levels, did not significantly alter the sensory profile of the resulting chicken meat.

Table 1: Sensory Evaluation of Broiler Chickens Fed Varying Levels of Boiled lebbeck (*Albizia lebbeck*)

	Treatment						
Parameters	**T1**	**T2**	**T3**	**T4**	**SEM**	**P.V**	**LS**
Colour	7.00	6.67	7.00	7.00	0.08	0.441	NS
Juiciness	7.00	7.00	7.00	7.00	0.12	1.000	NS
Appearance	7.00	6.67	7.00	7.00	0.08	0.441	NS
Flavour	7.00	6.67	6.67	7.00	0.11	0.596	NS
Aroma	6.67	7.00	7.00	7.00	0.08	0.441	NS
Tenderness	7.67	7.33	7.67	7.67	0.15	0.859	NS
Overall Acceptability	7.67	7.33	7.33	7.67	0.15	0.802	NS

Keys: T1 = 0 % inclusion level of boiled Albizia lebbeck, T2 = 1.5 % inclusion level of boiled Albizia lebbeck, T3 = 3.0 % inclusion level of boiled Albizia lebbeck, T4 = 4.5 % inclusion level of boiled Albizia lebbeck, SEM = Standard Error of Mean, P.V = Probability Value, LS = Level of significance, NS = Not significant

DISCUSSION

The results of this study demonstrate that the inclusion of boiled *Albizia lebbeck* (*A.* lebbeck) seed meal in broiler diets did not significantly affect the sensory characteristics of the resulting chicken meat (P>0.05). Specifically, the panel of assessors found no discernible differences in colour, juiciness, appearance, flavour, aroma, tenderness, or overall acceptability across the treatment groups, as presented in Table 1. These findings align with previous research by Tsado *et al.* (2018), who also reported that dietary treatments did not significantly influence colour, tenderness, and overall acceptance in poultry.

The consistent meat colour scores, ranging from 6.67 to 7.00 across all treatments, suggest that lebbeck did not negatively impact the visual appeal of the meat. Meat appearance is a critical factor influencing consumer choice (Eldesouky *et al.*, 2015), as it often serves as the initial indicator of quality. Similarly, the uniform juiciness scores (7.00) indicate that *Albizia lebbeck* inclusion did not compromise the water-holding capacity or perceived moistness of the meat.

Flavour and aroma, both essential sensory attributes that drive appetite and overall eating experience, also remained unaffected by the dietary treatments. The similar flavour scores (6.67-7.00) and aroma scores (6.67-7.00) suggest that *Albizia lebbeck* did not introduce any undesirable tastes or odours to the chicken meat. The tenderness scores, ranging from 7.33 to 7.67, further confirm that *Albizia lebbeck* did not alter the textural properties of the meat.

Overall acceptability, a comprehensive measure of consumer satisfaction, exhibited no significant variation among the treatment groups, with scores ranging from 7.33 to 7.00. This finding underscores the potential of *Albizia lebbeck* as a feed ingredient without compromising the overall sensory quality of broiler meat.

A detailed assessment of meat quality through sensory evaluation is essential for informing producers, distributors, and consumers in making informed decisions about broiler breeds and meat products. The current study suggests that boiled *Albizia lebbeck* can be included in broiler diets without negatively affecting sensory attributes.

It is possible that the boiling process used to treat the *Albizia lebbeck* seed meal effectively mitigated any potential negative effects on sensory parameters. Boiling may have reduced the levels of antinutritional factors or volatile compounds that could have otherwise impacted the taste, odor, or texture of the meat. Further research may be warranted to investigate the effects of other processing methods or higher inclusion levels of lebbeck on sensory characteristics.

CONCLUSION

Based on the findings of this study, dietary supplementation with *Albizia lebbeck* seed meal, at the tested inclusion levels, did not exert any statistically significant influence on the sensory attributes of broiler chicken meat, including colour, juiciness, appearance, flavour, aroma, tenderness, and overall acceptability. Therefore, *Albizia lebbeck* appears to be a viable feed ingredient that does not negatively impact the palatability and consumer acceptance of broiler meat.

RECOMMENDATION

Considering the sensory evaluation results, a supplementation level of 1.5% *Albizia lebbeck* is suggested, given that this treatment group was perceived to be slightly superior to the control group (T1). To further optimize the utilization of *Albizia lebbeck* in broiler diets, future research should focus on exploring a wider range of inclusion levels and investigating various processing techniques aimed at enhancing the flavour, tenderness, and overall acceptability of the resulting broiler meat.

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