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Effect of *Albizia saman* Seed Meal on the Performance and Carcass Characteristics of Finisher Broilers

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Abstract: ***Albizia samanseed was cooked, dried, toasted and milled to obtain the seed meal. The meal was used in formulating diets for broiler finishers at 0%, 2.5%, 5.0% and 7.5% inclusion rate tor treatment 1, treatment 2, treatment 3 and treatment 4 respectively. The treatment diets were fed to a total of 120, four weeks old marshal breed of broilers. The broilers were randomly assigned to the four treatment groups in a complete randomized design at 30 broilers per group. The birds were raised in a deep litter pen. The experiment lasted for 28days. The result showed a significantly different (P<0.05) increase in weight gain as inclusion rate of the seed meal increases. There were no difference (P>0.05) in all the organs and breast muscle while the thigh/drumstick was highest in treatment 4. The study recommends the use of Albizia saman seed meal at up to 7.5% inclusion level in broiler finisher diet.***

Keywords: *Albizia saman,* diet, performance, broiler production

1. Introduction

The prevailing scarcity and high cost of feed ingredient have greatly affected the livestock industry. Feed alone accounts for over 70% of the total cost of poultry production and out of which 50% is expended in protein and energy source (Madubuike, 2012). The unprecedented cost of feed ingredient has made the cost of producing these mono-gastric animals high, the industry unattractive.In recent times, significant proportion of livestock (mono-gastric) producers have scaled down the scope of their operation, some have abandoned production entirely due to high cost of feed(Ndubuisi, 2011).To sustain the livestock industries, it becomes very necessary and urgent to discover other sources of feed ingredient that can replace either totally or partly the already existing ones whose cost is presently too high because of the current pressure on their usage.

*Albizian samani*also called *samanea saman*, saman tree,rain tree,cow bean tree or monkey podis one the shrubs whose seed can fit into as protein source in the livestock industry. The plant originated from American dry tropics and is presently found throughout the whole humid and sub humid tropics (Staples and Elevitch, 2006).The mesocarp of the pod of *S. saman* contains a sweet nutritious pulp which smells of honey when the pods are broken and which contains 12-18% crude protein, highly digestible (40% digestibility), thus making the pods a good source of proteins, carbohydrates and minerals for livestock (Escalante, 1997). The study therefore, is aimed at investigating the effect of *Albizia saman* seed meal on the performance and carcass characteristics of finisher broilers.

2. Materials and Methods

Study area
The study was conducted at the Teaching and Research Farm of the Imo State University Owerri. Owerri and is within the rain forest belt of Nigeria.

Collection and processing of A*lbizia saman* seed meal: The seeds were collected at Egbu road in Owerri North Local Government Area of Imo State, South East Nigeria. The seeds were soaked in water for twenty four (24) hours and the water discarded. The soaked seeds were boiled for twenty five (25) minutes, dried in an oven to a moisture content of 9-10% and toasted on fire for 5 minutes to denature any possible anti-nutrient present in the seed. The seeds were then milled in hammer mill to obtain the seed meal.

Analysis of the seed meal: Sample of the seed meal was taken to the laboratory to analyze its proximate and phytochemical composition. The proximate composition was analyzed adopting the A.O.A.C. procedure while the phytochemical composition was analyzed adopting the methods of Harborne (1998).

Experimental Diets: The seed meal was used in formulating four experimental diets. Treatment 1 which is the control treatment contained no *Albizia saman* seed meal while in treatments 2, 3 and 4 the *Albizia saman* seed meal replaced soya bean meal at 2.5%, 5% and 7.5% inclusion rate respectively on weight to weight basis. The ingredient composition of the experimental diets is presented in table 3.

Table 1: Ingredient composition of the experimental diet
Treatment levels in %

INGRIEDIENTS	T1(0.00)	T2(2.50)	T3(5.00)	T4(7.50)
Yellow maize	55.00	55.00	55.00	55.00
Soya Bean	15.00	12.50	10.00	7.50
Albizia saman seed	0.00	2.50	5.00	7.50
meal	10.00	10.00	10.00	10.00
Groundnut Cake	5.00	5.00	5.00	5.00
Brewer's Spent Grain	5.00	5.00	5.00	5.00
Palm Kernel Cake	3.00	3.00	3.00	3.00
Fish Meal	3.00	3.00	3.00	3.00
Bone Meal	0.25	0.25	0.25	0.25
Common Salt	0.25	0.25	0.25	0.25
Vit/mineral Premix	0.25	0.25	0.25	0.25

DL-Methionine	0.25	0.25	0.25	0.25
L Lysine	**100**	**100**	**100**	**100**
TOTAL				
Calculated nutrient composition of the diets				
Crude Protein	22.61	21.91	21.21	20.51
Crude Fiber	4.03	4.06	4.10	4.14
Ether Extract	4.60	4.69	4.78	4.87
Metabolizable Energy (kcal/g)	2863.68	2853.43	2863.31	2822.93

Experimental birds and design: A total of one hundred and twenty (120) Marshal Breed finisher broilers of four weeks of age were used for the experiment. The broilers were divided into four experimental groups of 30 broilers each which was replicated 3 times to give 10 broilers per replicate. The groups were randomly assigned to the experimental diets and raised on deep litter system of management. Feed and water were given *adlibitum* and proper routine management practices and medication adopted. The experiment lasted for twenty eight (28) days.

Data collection: The broilers were weighed at the beginning and end of the experiment to obtain their weight gain. Feed intake was determined by subtracting the weight of the leftover feed from the weight of feed offered after 24 hours. At the end of the 35 days feeding trial, 3 broilers were randomly selected from each replicate for carcass and organ weight assessment. The broilers were starved of feed for 12 hours prior to slaughter while water was provided. Slaughtering was done by severing the jugular vein with a sharp knife.

The carcass were dressed and cut into parts according to the method of Okorie (2006). The cut parts and organs were expressed as a percentage of live weight.

Data Analysis: The data obtained from this study, was subjected to statistical analysis using analysis of variance procedure and computed with IBM SPSS version 22. Significantly difference (P<0.05) means were separated using Duncan Multiple Range Test of the statistical software.

3. Results

The result of the proximate and phytochemical analyses of *Albizia saman* seed meal are presented in table 2 and table 3 respectively. The seed meal contains reasonable amount of protein. The quantity of tannin was high, cardiac glycoside, saponin, alkaloids and flavoids were moderate while oxalate, phytate and phenols were low.

Table 2

Nutrients	**Amount (%DM)**
Moisture	10.9
Ash	5.1
Ether extract	7.2
Crude fiber	8.0
Crude protein	16.0
Carbohydrate	52.8

Table 3
Proximate composition of *Albizia Saman* seed meal.
Phytochemical composition of *Albizia saman* seed meal

Component	**Qualitative value**
Tannin	+++
Saponins	++
Alkaloids	++
Flavonoids	++
Cardiac glycosides	++
Oxalate	+
Phytate	+
Phenols	+

DM = Dry Matter

The result of performance of the finisher broilers fed diets containing *Albizia saman* seed meal is presented in table 4. The result showed that there was a significant (P < 0.05) progressive increase in the average weight gain as the inclusion rate of *Albizia saman* seed meal increased in the treatment diets.The results for feed intake, was significantly highest in control group, treatment2 and treatment3 were uniform and significantly higher than treatment4.Feed conversion ratio has a significantly highest value in control and least in treatment4. No mortality was recorded.

Table 4: Performance of finisher broilers fed different dietary levels of Albizia saman Seed meal
Treatment levels %

PARAMETERS	**T1(0.00)**	**T2(2.50)**	**T3(5.00)**	**T4(7.5)**	**SEM**
Average Initial weight (g)	793	783	801	794	1.95
Final Average Weight (g)	2900^{d}	3033^{c}	3100^{b}	3366.67^{a}	4.13
Average Daily Weight gain (g)	75.25^{c}	80.18^{b}	82.11^{b}	91.88^{a}	1.82
Average Daily Feed Intake (g/day)	213.33^{a}	207.10^{b}	208.69^{b}	195.52^{c}	1.98
Feed conversion ratio (*feed intake/ weight gain*)	2.83^{c}	2.58^{b}	2.54^{b}	2.13^{a}	0.76
Mortality	0	0	0	0	

Without subscript= *Not Significant* a,b,c,d means with different superscript are significantly (P<0.05) different.SEM= standard error mean

The result for carcass characteristics of finisher broilers fed the diets is presented in table 5. The result showed that there was no significant difference (P>0.05) among the treatments for plucked weight, eviscerated weight, breast muscle and the organs. The result forthigh/drumstick showed significantly (P>0.05) highest in treatment4, treatment 2 and 3, and

significantly higher than control.

Table 5: Result of carcass and organ characteristics of finisher broilers Fed different levels of *Albezia saman* seed meal

Parameters	Treatment levels % T_1(0.00)	T_2(2.50)	T_3(5.00)	T_4(7.50)	SEM
Live weight (g)	2900^c	3033^b	3100^b	3366.67^a	4.67
Plucked weight (% L-W)	95.29	95.48	96.3	96.91	0.20
Eviscerated weight (%L-W)	89.34^a	89.56^a	89.73^a	70.54^b	2.48
Breast muscle (%L-W)	22.14	23.08	23.60	25.26	0.34
Thigh/drumstick (%L-W)	12.61^c	13.58^b	13.63^b	14.34^a	0.19
Gizzard (%L.W)	1.72	1.85	2.41	2.40	0.95
Liver (%L.W)	1.72	1.75	2.41	2.40	0.95
Heart (%L.W)	0.12	0.12	0.11	0.11	0.03
Intestinal length (cm)	278	280	283	287	1.61

Without subscript= *Not Significant* a,b,c,d means with different superscript are significantly ($P<0.05$) different.SEM= standard error mean

4. Discussion

The proximate composition of *Albizia saman* showed a crude protein level of 16% whichagreed with the report of Escalante, (2009) thatits crude protein is 12-18%. The birds on the treatment diets at all levels performed better than the control, showing that the phytochemical compounds were moderate. Bennick (2009) reported that high presence of phytochemical compound tannin in a diet could have a major impact on animal including inhibition of growth rate. The progressive increase in the performance of the birds as the inclusion rate of *Albizia saman* increases in the diet, despite the progressive reduction in the protein level of the diets and the progressive reduction in feed intake, confirms the report of Ahn *et al*., (1989) which indicated that, the pods of *Albizia saman* can be dried and milled into a meal that makes an excellent animal feed. Ukoha *et al*., (2011) also reported that ground fruit of *Albizia saman* could be used as an antimicrobial and antifungal natural source due to the presence of metabolites mainly condensed tannins that is capable of fulfilling these functions. This could have resultedto the better utilization of the consumed feed by broilers on the treatment diet.The organs of broilers on treatment groups were uniform with control.This indicates that the broilers were healthy and that *Albizia saman* seed meal did not have any toxic effect on the experimental broilers. Bamgbose and Niba (1995)reported that, heavy liver weight for birds suggests the presence of toxic factor in their diets.

5. Conclusion and Recommendation

The incorporation of *Albizia saman* seed meal up to 7.5%inclusion level, in the diet of broiler finisher, resulted to better performance than the control and uniform organ values.

This study therefore recommends the use of *Albizia saman* seed meal up to 7.5%inclusion level in feeding of broiler finishers.

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