

**THE PERFORMANCE OF WEANED ALBINO RATS (WISTER STRAIN)
FED BAOBAB (ADANSONIA DIGITATA) LEAVE-BASED DIETS**

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Target Audience: Nutritionists, Food Scientists, Policy Makers.

ABSTRACT

Adansonia digitata seeds were cultivated and their seedling leaves were harvested in large quantities. The seedling leaves were dried and analysed for proteins, lipids and carbohydrates using microjedahl, soxhlet and UV analytical tools respectively. This was done on weekly basis starting from 4th week of germination. The seedling leaf was found to have the highest crude protein value of 13.57% obtained at 6th week after germination. Two diets prepared from A. digitata leaf were fed parallel into albino rats with diets containing roasted full fat soyabean as control. The result reveals that A. digitata leaves can be included in the diet of albino rats at up to 20% level without depression in performance of feed intake, body weight gain and feed to gain ration (feed conversion ratio).

Keywords: Rats, protein, performance, Adansonia digitata, soyabean

DESCRIPTION OF PROBLEM

The problem of acute malnutrition in the third world will continue if alternative cheaper sources of nutritive feedstuffs are not explored. The livestock industry which is the major sources of animal protein is faced with myriad of problems as far as livestock production is concerned, especially with regard to scarcity and high cost of conventional feedstuffs. This problem has been compounded by the recent government policy which dictates that livestock feed producers must source their raw materials locally (1, 2).

In view of the problems associated with production of animal protein, it is therefore necessary to search for a cheaper alternative local feedstuffs rich in protein and energy, particularly from plants. Baobab (Adansonia digitata) a common tree species in the semi and savannah regions of West Africa is valuable in human diet as its dried leaves are used as a condiment and seasoning, and fresh as spinach. The leaves of this tree have potential too as livestock feed (3).

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The objectives of this study, therefore, were to:

- i) investigate the variation in nutrient composition of A. digitata leaves with age.
- ii) determine the period when protein production in growing A. digitata leaves will be at maximum.
- iii) conduct feeding trial to determine the effect of level of inclusion on the performance of albino rats.

MATERIALS AND METHODS

Sampling

A. digitata seeds were obtained from Agbo-Oba area of Ilorin in Kwara State. The seeds were subjected to scarification treatments to soften the seed coat. This was done by soaking the seeds in 100cm³ of dilute tetra-oxosulphate(IV) acid for 15 minutes after which the seeds were rinsed with distilled water and air dried. The seeds were planted in the Botanical Garden of University of Ilorin and watered every morning and evening. Young A. digitata leaves were harvested from fifty seedlings on a weekly basis starting from 4th week of germination: for a period of twelve weeks and their sun dried matters analysed for nutrients such as proteins, lipids and carbohydrates. The microjedahl, soxhlet and UV as contained in Association of Official Analytical Chemists (4) were used to determine proteins, lipids and carbohydrates respectively.

Animal and their Management

Thirty weaned white albino rats of about 5 weeks old were purchased and fed on control diet for one week. This was to expose them to the same treatment particularly the diet before introducing the experimental diet.

Experimental Diet Preparation

The suitability of A. digitata leaf incorporation into animal diet, three experimental diets were prepared based on the analytical data of the leaf. The procedure used in formulating the diets depends on the amount of ingredient required per kilogram of diet (5). The first diet serves as control contained 30% maize, 47% roasted full fat soyabean and other ingredients making up to 100%; in second diet 7% maize and 3% roasted full fat soyabean was replaced by 10% A. digitata leaves with other ingredients remaining constant. A third diet was prepared whereby 18% maize and 2% roasted full fat soyabean was replaced by 20% A. digitata with other ingredients remaining constant. The feed formulated were isonitrogenous (24% CP) and isocaloric (11.76kJ/g)(Table 1).

Diet Treatment

The treatment diets were three as mentioned earlier. Ten rats each were fed with each of the three diets for 6 weeks.

Data Collection

The rats were weighed at weekly interval through the duration of the experiment which lasted for six weeks. Feed intake, body weight gain and feed to gain ration (feed conversion ratio) were determined. The data were subjected to analysis of variance as described by (9).

TABLE I: The Composition (%) of the Experimental Diets

Ingredients	Diets		
	1	2	3
Maize	30	23	12
Roasted full fat Soyabean	47	44	45
<u>Adansonia digitata</u> leaves	0	10	20
Maize offal	20	20	20
Bone meal	2.0	2.0	2.0
Salt	0.5	0.5	0.5
Vitamin premix	0.5	0.5	0.5
	100	100	100

Calculated Analysis:

Crude protein (CP) (%)	24	24	24
Metabolisable energy (ME) (K Cal/g)	2.81	2.79	2.83

RESULTS AND DISCUSSION

The trend of carbohydrate, lipid and crude protein in A. digitata leaves with age are shown in Table 2. The carbohydrate content increases as the leaves mature. Similarly the level of lipids in the leaves slightly increases as the leaves are mature, although there was no significant difference in the lipid content as the leaves mature. This observation further confirms the earlier one made by (6) who reported that younger leaves contain lower levels of carbohydrate and lipid. The values observed are also in agreement with the reports of (7). However, the level of crude protein was highest at the 6th week and decreases gradually after this period. The gradual decrease of protein production after the 6th week could be due to the fact that the protein that should be available is combining with polysaccharides to form monogluco protein as the seedling grow older. This finding agrees with that of (6) who observed that in early stage of growth leaves contain higher crude protein and lower crude fibre and lipid than leaves of advanced age.

The performance attributes of albino rats fed on the experimental diets is presented in Table 3. There is no significant difference in the weight gain, feed intake and feed conversion ratio of rats fed with diet 1 (control) and rats fed with diets 2 and 3. The values were similar to the values previously reported by (8)

TABLE 2. Crude Proteins, Carbohydrates and Lipids Contents of Young *Adansonia digitata* Leaves

Age (weeks)	Crude Protein (N x 6.25%)	Carbohydrates (mg/0.04g sample x 10 ⁻¹)	Lipids (%)
4	11.2±0.02	4.7±0.01	2.8±0.02
6	13.57±0.01	5.2±0.03	3.0±0.01
8	12.60±0.03	6.7±0.01	3.8±0.03
10	10.91±0.04	8.2±0.03	3.6±0.02
12	9.48±0.02	9.3±0.02	3.9±0.01

TABLE 3. Performance of Rats Fed Experimental Diets

Parameters	Diets			SEM	LSD (5%)
	1	2	3		
Daily weight gain (g)	2.44	2.67	2.88	0.32	NS
Feed intake (g)	14.50	13.80	13.67	0.04	NS
Feed conversion Ratio	5.94	5.17	4.75	0.05	NS
Protein efficiency ratio (x 10 ⁻³)	7.01	8.06	8.78	0.03	NS
Mortality (%)	0.00	0.00	0.00	0.00	NS

CONCLUSION AND APPLICATIONS

1. The results indicate that *A. digitata* leaves at six week old gave the highest protein content of 13.57%.
2. It can be concluded that *A. digitata* leaves can be included in the diet of albino rats at up to 20% level without depression attributes such as feed intake, body weight gain and feed conversion ratio.
3. *A. digitata* leaf at about 6 weeks old is proteinous enough to be substituted for roasted full-fat soyabean and maize that is becoming expensive especially to resource-poor small scale farmers.

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