PROXIMATE COMPOSITION OF AFRICA LOCUST BEAN HULL (PARKIA BIGLOBOSA) SUBJECTED TO DIFFERENT TREATMENT METHODS

Yisah, L. J., Joseph, M. A., *Adebayo, O. M., Fanwo, R. R., Aliu K. A., Abisoye, F.O. and Aina E.T
Department of Animal Health and Production Technology, Kogi State Polytechnic, P.M.B. 1101, Lokoja, Kogi State, Nigeria.
**** Corresponding author:*** *adebayooluwaseyi@kogistatepolytechnic.edu.ng*

ABSTRACT
The proximate composition of Africa Locust bean hull (Parkia biglobosa) subjected to different treatment methods was evaluated. The Parkia biglobosa bean Hull was collected at various processing sites around Itakpe community, air-dried, ground, divided into five portions and respectively treated with molasses, ashes, urea and water (soaking) while the untreated served as the control. It was thereafter fermented in air-tight containers for a period of 14 days. The result showed that the moisture content was statistically similar (P>0.05) among means of samples soaked in water, urea-treated and molasses-treated but differed significantly (P<0.05) from untreated (highest-11.91%) and ash-treated (lowest-8.43%) samples. The moisture content values ranged: 8.43-11.91%. Different trend was noticed for ash contents as the untreated, urea-treated and ash-treated shows no significant difference (P>0.05) but differed from samples soaked in water and molasses-treated, with highest value recorded for water-soaked sample (9.44%) and lowest value in untreated (2.88%). The crude fibre content differs significantly (P<0.05) among means of the treatment methods. The observed highest (49.26%) and lowest (11.11%) values were recorded for untreated and molasses-treated respectively. The protein content obtained values are, viz: Untreated (25.14%),water-treated (26.71%), urea -treated (29.62%), molasses-treated (15.57%) and ash-treated (20.14%).The crude fibre contents for molasses and ash-treated samples revealed the excellent fibre-reducing ability of molasses and ashes with little effects on the crude protein. It is therefore concluded that molasses and ash-treated samples have proven to be a viable option that could be harness for use in non-ruminant diets.

Keywords: ***moisture contents, Parkia biglobosa, crude protein, crude fibre, molasses.***

INTRODUCTION

High demand for conventional plant protein such as soybean meal and groundnut cake by humans as food, industries as raw materials and as well as its use as livestock feed, has led to its scarcity in supply. The other major challenge faced is farmer-herder crises which has hindered the cultivation of these crops thereby complicating the entire situation. The livestock industry is now bedeviled by high cost of livestock feeds which has invariably impacted the quantity of plant and animal protein available for the physiological and mental development of the populace. Therefore, the need for alternatives energy and protein sources is very necessary to promote sustainable livestock production and least cost formulation (Ari and Ayanwale, 2012).

Parkia biglobosa, also called African Locust Bean Tree is a leguminous crop domicile mainly in the tropics, and particularly, the North Central geographical zone in Nigeria. It is a perennial tree that is not normally cultivated but found across the savannah of West Africa and provides edible products and income to rural households.

A lot of research work has been done on the production of African Locust Bean seeds, leaves and related aspects such as storage, preservation, processing, time taken to be cooked, packaging and other areas (Non-Wood News, 2009). Also, efforts have been made to scientifically study the traditional processing, , physical and chemical changes, and the micro-organisms involved in the processing of African Locust Bean (Babalola, 2012). Alalade *et al*. (2016) reported that Africa Locust Bean leaves have a proximate composition of Crude protein 13.15%, Moisture 57.38%, Dry matter 42.62%, Ether extract 1.90%, Crude fibre 17.97%, and Ash 8.20%. Much scientific work has not been done on the Africa Locust Bean Hull that are often disposed as waste during processing. This present study aims at investigating the proximate composition of Africa Locust Bean Hull using different fermenting substrates such as molasses, ashes, urea and water to reduce their respective fibre

contents in a comparative fashion with a view to harness the potentials in Africa locust bean hull for its utilization in livestock feeds and feeding.

MATERIALS AND METHODS

Experimental Location

The field study was conducted at the Teaching and Research Farm of the Department of Animal Health and Production Technology, Kogi State Polytechnic, Nigeria while the chemical analyses was carried out at the Laboratory of Science Laboratory Technology Department of the same Institution. It is on latitude 7.80^0N and longitude 6.73^0E with an altitude of 45-125m above the sea level.

The African Locust Bean Hull was collected at various processing sites around Itakpe community. It was air-dried and ground. The samples were divided into five portions of 2kg each, and treated with molasses (1litre), ashes (1kg), urea (1kg) and water (1litre) respectively, the untreated serve as a control. The samples were labeled and fermented in air-tight containers for the period of 14 days. Thereafter, the samples were air-dried, crumbs ground, packaged and tagged.

Chemical Analysis

The samples were sent to the Laboratory of Science Laboratory Technology Department of the Kogi State Polytechnic for proximate composition analysis. Parameters were determined in triplicates using the standard procedure of AOAC (2004).

Data Analysis

Data collected were subjected to Analysis of Variance and significant means were separated at 5% ($P< 0.05$) using Least Significant Different (LSD) with the aid of SPSS Version 26.0.

RESULTS AND DISCUSSION

Results

Table 1: Proximate Composition of *Parkia biglobosa* Hull Subjected to Different Treatment Methods

Parameters (%)	Untreated	H_20-Treated	Urea - Treated	Molasses - Treated	Ash-Treated	SEM	LOS
Moisture content	11.91^a	10.63^b	10.47^b	10.40^b	8.43^c	0.38	*
Ash	2.88^c	9.44^a	3.65^c	6.85^b	3.29^c	0.85	*
Crude fibre	49.26^a	25.33^b	21.39^c	11.11^e	15.52^d	0.04	*
Crude fat	1.96^{ab}	1.31^{bc}	2.44^a	1.70^b	2.32^a	0.15	**
Crude protein	25.14^b	26.71^b	29.62^a	15.57^d	20.14^c	1.68	*

^{abcd} Mean on the same row bearing different superscripts are significantly ($P< 0.05$), SEM = Standard Error of Mean, LOS= Level of significance, *= significant ($P< 0.05$).

The moisture content in this study averaged 9.53% for all the samples. The ash-treated sample recorded the lowest value of 8.43%. It is therefore suggestive that this could be favourable for feed formulation. There are tremendous reductions of about 77.5% and 68.5% respectively in crude fibre content for samples that were treated with molasses and ash when compared to the untreated. The value obtained for both are 11.11% and 15.52%. A similar trend was also recorded for crude protein contents for samples that were treated with molasses and ash. The values obtained were respective 15.57% and 20.14% and these values were lower compared to the untreated (control). The percentage reductions were 38.1% and 19.9%. Despite this reduction in the protein values, the molasses –treated and ash-treated remain a viable alternative protein when compared to rice bran and brewery dried grain (Nwanekwu *et al.,* 2016) agro-wastes used in poultry diets.

CONCLUSION

This current study showed that the treatment methods have marginal influence on the moisture content. The crude fibre contents for molasses-treated and ash-treated samples have shown excellent fibre-reducing ability of molasses and ash. However these two treatments have little effect on the

protein content. Therefore, molasses and ash-treated samples could be used as a viable alternative plant protein source in monogastric diets.

RECOMMENDATIONS

It could be recommended from this study that:

i. Ash and molasses could be used to reduce fibre content of agro-based waste especially *Parkia biglobosa* bean hull to enhance its viability for livestock feeds.
ii. Treatment duration (14 days) should be extended to help reduce the crude fibre value more in further study.
iii. Research should be carried out to evaluate the phytochemical status of *Parkia biglobosa* bean hull.

REFERENCES

Ari, M. M. and Ayanwale, B.A. (2012). Nutrient Retention and Serum Profile of Broiler Chickens Fed Fermented African Locust Beans (Parkiafilicoide). Asian Journal of Agricultural Research. ISSN 1819-1894/DOI: 10.3923.

Non-Wood News (2009). An Information Bulletin on Non-Wood Forest Products published by FAO, Rome, Italy. Pp. 1-2.

Alalade, J. A., Akinlade, J. A. Fajemisin, A. N., Aderinola, O. A. Muraina, T. O. and Amoo, T. A. (2016). Proximate, mineral composition and antinutrients contents present in leaves. Nigerian Journal of Animal Production 43(1), 253- 257.https://www.mindat.org/loc-39831.html.

AOAC, (2004). Official Methods of Analysis, 18th edition Association of Official Analytical Chemists Washington, D. C., USA.

Babalola, F.D. (2012). Evaluation of the Marketing Chain of Parkia biglobosa(Jacq.Berth) R. Br. Ex G. Don in Southwest Nigeria. International Journal of Basic and Applied Sciences. Vol. 1 No. 3. Pp. 210-213.

Ikpeama, A., Onwuka, G.I. and Nwankwo, C. (2014). Nutritional Composition of Turmeric and Its Antimicrobial Properties. International Journal of Scientific and Engineering Research, 5, 1085-1089.

Nwanekwu M. a., Horsfall M. Jnr. And Osu C. I. (2016). Brewers spent grain obtained from brewery in Nigeria: Nutritional and Anti-nutritional status. Researcher; 8(10):35-38. www.sciencepub.net/researcher