

EVALUATION OF PROXIMATE AND MINERAL COMPOSITION IN *Cajanus cajan* LEAVES

Adaramola, K.A, Amusat, A.I, Oyelakin, A.O, Tairu, H.M and Olawale, B.R
Department of Science Laboratory Technology, Oyo Of Agriculture And Technology P.M.B.10,
Igboora, Oyo State.

Corresponding email: tairuhafeez@gmail.com +234-806-218-0495

Abstract

The leaves of *Cajanus cajan* was evaluated for the proximate and mineral composition. Atomic absorption spectrometry was used in determination of the leaves for Phosphorus, Potassium, Magnesium, Calcium. The results of proximate analysis indicate that the leaves had high crude protein (17.06%), moisture (55.04%), ether extract (2.39%), crude fibre (25.82%), and ash (9.12%). Mineral analysis indicate the *Cajanus cajan* leaves contained some essential mineral such as Potassium (K) (0.80%), Calcium (Ca) (0.37%), Phosphorus (P) (0.36%), and Magnesium (Mg) (0.38%). The overall results suggest that *Cajanus cajan* leaves is of high nutritional quality due to high CP and mineral contents.

Keyword: *Cajanus cajan*, Proximate and Mineral content.

Introduction

Browse plants constitute one of the cheapest sources of feed for ruminants (Ahamefule *et al.*, 2006). These plants are important for animal production owing to the Olawaleir potentially good nutritive value (Ramirez, 1998). Their year round evergreen presentation and nutritional abundance provides for year round provision of fodder (Oji and Isilebo, 2000). The merit of browse feeding to ruminants are better noticed during the critical season when availability of pasture and grassland forage is low. Browse are known to contain higher level of protein, vitamin and minerals than what is obtainable in some grasses (Mecha and Adegbola, 1980). Browse plants such as *C. cajan* are common in many part of Nigeria. *C. cajan* is a leguminous plant that can be found mostly in wood hard habitats and the leaves are browsed by ruminant during the dry season. The leaves are edible and many be chewed to relieve thirst (Chidumayo, 1994). Although there is considerable information on the nutrient composition of legumes cultivated in Nigeria, little information is unknown about the nutritional properties of *Cajanus cajan* leaves. Thus, in this study the proximate, and mineral composition in *C. cajan* leaves.

Materials and Methods

Experimental Site: The experiment was carried out at Teaching and Research farm of Oyo State College of Agriculture and Technology, Igboora which is located within 7°15'North and 3°30' East of the equator with an average rainfall of 1278mm and average animal temperature 27° (Sanusi, 2011)

Sample Collection: Sample was taken from edible plant of *C. cajan* leaves within the college premises. The sample was oven dry at 70°C cooled in a desiccators and finely ground or used fresh for moisture analysis. The dry sample was used for the analysis except for moisture content determination in which fresh sample was used.

Proximate Analysis: Moisture content was determined at 105°C in an oven. Ash, content was determined at 550°C. Crude protein, fiber and lipid were determined according to the procedure of AOAC (1990).

Mineral Analysis: The mineral element was analyzed using Walinga *et al.*, (1989) method; the elements in the sample were brought in to solution by wet digestion technique using a mixture of concentrated nitric, perchloric and sulphuric acid. In the ratio 9:2:1 respectively. K, Ca and Mg were determined by Atomic Absorption spectrometer and Phosphorus was determined using calorimetric method.

Statistical Analysis: The experiment design was a completely randomized. Data was analyzed using one way analysis of variance with the use of statistical package to generate means and standard error.

Results and Discussion

Proximate nutrient composition: Table 1 shows the result obtained for the proximate composition of *C. cajan* leaves. The result for moisture content was (55.04%), crude protein (17.06%), ether extract (2.39%), crude fiber (25.82%) and Ash (9.12%) respectively. Higher moisture contents of *C. cajan* leaves at the month of January showed that the water reserved in plants will aid

acceptability and digestion of the feed by ruminant animals. The crude protein content (17.06%) from this study was above 8% crude protein required to satisfy maintenance requirement of ruminant animals (Norton, 2003). The result is in line with the reports of Getachew *et al.*, (2000) that browse plant are higher in crude protein than tropical grasses and roughages such as hay, straw and stover. The crude fibre content (25.82%) of this browse plants is above the range of 15-20% crude fibre content recommended for improved intake and production in flushing ruminants (Buxton, 1996). The higher crude fiber of browse plants reported will aid digestion and improve absorption of water. Fiber softens stool and therefore prevents constipation in farm animals (Ayoola and Adeyeye, 2009). The values of ether extract content (2.39%) of *C. cajan* fall below the range of 4-10% EE recommendation (Campbell *et al.*, 2006). Ether Extract is the lipid component and the energy derived from it is utilized by the animal for body maintenance and production. This is a major form of energy storage in plants which is being utilized by the animals for body maintenance and production. The ash content of *C. cajan* (9.12%) obtained was higher than 6.29% reported by Mecha and Adegboola, (1980) and also falls within a range of 3.0-9.6% by (Okoli *et al.*, 2001) for South East Nigeria

browse plants. Ash content is useful in assessing the mineral elements present in the selected browse leaves (Smart, 1996). This suggests that the sample could be a better source of essential valuable and useful minerals needed for good metabolic that will enhance good production.

Mineral Composition: The present investigation for the level of K (0.80%) in *C. cajan* leaves was the same value 0.8% recommended for grazing animal (Under wood, 1981). However it has been suggested that ruminant with high producing, may require K level above 1.0% under stress particularly heat stress (Khan *et al.*, 2005). The level of Ca content (0.37%) observed for *C. cajan* leave in this present study was above 0.30% Ca requirement in diet needed for all forms of production in ruminant (ARC, 1980). Phosphorus contents for *C. cajan* leaves was (0.36%) which was lower than 1.3% reported by (Ladipo and Akinfemi, 2014). The *C. cajan* leaves (0.38%) for Mg content more than the recommended requirement of 0.12-0.20% in the diet of ruminant (ARC, 1980).

Conclusion and Recommendation: It can be concluded from the result of this study that leaves of *C. cajan* appear to have the potential to offer better nutritional value. High content of protein and mineral in the leaves make it useful and good as source of feed for live-stock animal.

Table 1: Proximate Composition of *Cajanus cajan* leaves

Parameter (%)	Concentration
Moisture content	55.04
Crude protein	17.06
Ether extract	2.39
Crude fiber	25.82
Ash	9.12

Values are means of triplicate determination

Table 2: Mineral Composition present in *Cajanus cajan* leaves.

Parameter	Concentration (%)
%K	0.80
%Ca	0.37
%P	0.36
%Mg	0.38

Values are means of triplicate determination

References

- Ahamefule, F.O., J.A. Ibeawuchi and C.I. Agu. 2006. Comparative evaluation of some forages offered to goats in Umudike, Southeastern Nigeria. *J. Sustain. and Agric. Res. (In press)*.

- AOAC. 1990. Official methods of analysis (15th ed.). Washington D.C USA. Association of Official Analytical Chemists inch. 400 - 2200 Wilson Boalevard, Arlinton Virginia USA, 2, 910 - 928. <http://dx.doi.org/10.3923/pjn.2009.1204.1208>

- ARC. 1980. The Nutrients Requirements of Ruminant Livestock. *International, Wallingford*, 4th ed 73-310. CAB
- Ayoola, P. B. and Adeyeye, A. 2009. Proximate Analysis and Nutrient Evaluation of Some Nigerian Pawpaw Seeds Varieties. *Science Focus* 14(4): 554-558.
- Buxton D.R. 1996. Quality related characteristics of forages as influenced by plant environment and agronomic factors. *Anim. Feed Sci. Technol.* 59:37-49.
- Chidumayo, A. 1994. Growth Response of African Savanna Tree, *Bauhinia thonningii* schumachm to defoliation. *journal of tree structure and function* March, 2007 Springer BelinHeidel. 21:2.
- Campbell, K.L., Garforlk, C., Heffernnan, J., Morton, R., Paterson, C and Upton, M. 2006. Small stock in development. Natural resources International Ltd. Aylesford Kent, UK
- Gatachew, G., Said, A.N and Sunti, F. (1994). The effect of forage legume supplementation on digestibility and body weight gain by sheep fed a basal diet of maize stover. *Animal feed science and Technology* 46: 97-108.
- Khan, Z.I., M. Ashraf, A. Hussain and L.R. McDowell. 2005. Seasonal variation of trace elements in a semiarid field pasture. *Communications in Soil Science and Plant Analysis*, 37: 1471-1484.
- Ladipo M.K. and Akinfemi A. 2014. Evaluation of some selected browse plants as ruminant feed using *in vitro* production technique. *International Journal of Agricultural Science.* 4(5): 260-266.
- Mecha, I. and T.A. Adegbola. 1980. "Chemical Composition of Some Southern Nigerian Forages Eaten by Goats". In: *Browse in Africa*. H.N. Le Houerou (ed.). International Livestock Centre for Mrica (ILCA): Addis Ababa.
- Norton, B.W. (2003). *The nutritive value of tree legumes*
<http://www.fao.org/ag/AGPC/doc/publicat/Gutt-shel/x55556eoj.htm.pp1-10>
- Oji, U.I. and Isilebo, J.O. 2000. Nutrient characterization of selected browse plants of the humid tropics. *Proceedings 25th Annual Conf. of Nigeria Society for Animal Production*, 18th -21st March, 2000, Umudike, Abia State, Nigeria. pp: 54-56.
- Okoli, I.C., Ebere, C.S., Emenalom, O. O.Uchegbu, M. C. and Esonu, B.O. 2001. Indigenous livestock paradigms revisited 11: An assessment of the proximate value of most preferred indigenous browses of south eastern Nigeria. *Tropical Animal Production Investigation* 4(2): 99-107.
- Ramirez, R.G. 1998. "Nutrient digestion and nitrogen utilization by goats feed native shrub *celtis pallida*, *leucophyllum texanum*, and *Porlieria angustifolia*". *Small Ruminant Research* 28: 47-51.
- Sanusi, W.A. 2011. Effect of poverty on participation in non- farm activity in Ibarapa Central Local Government Area of Oyo State, Nigeria. *IJAART*. 182:86-95.
- Smart, J., 1996. *Canavalia gladiata* (Jacq) D.C. (Sword bean). *Tropical Pulses*. Longman Group Ltd, London, Pp 58.
- Underwood, E.J. 1981. *The mineral nutrition of livestock. Common wealth Agricultura Bureaux, Slough, England*, Pp. 10.
- Walinga, I., Van-VEAK, V. W. Houba, V. I. G. and Van-der lee. J. J. 1989. Plant Analysis, Procedures (Soil and Plant Analysis, Part 7) Wageningen Netherland, 18.2005