EVALUATION OF PHYTOCHEMICAL AND NUTRIENT COMPOSITIONS OF HOG PLUM (*SPONDIAS MOMBIN*)

Bishir, B. B.,[1] Adamu, H.Y.,[2] Abdu S.B.[2] & Aliyu, A.M.[1]
Corresponding author: bishirbellobakori@gmail.com. 07069068696
[1]National Agricultural Extension and Research Liaison Services, ABU, Zaria
[2]Department of Animal Science, Faculty of Agriculture, ABU, Zaria

ABSTRACT:
The phytochemical and proximate compositions of *Spondias mombin* leaves were determined using standard methods. The results of the phytochemical analyses showed the presence of phytate (1.01mg), oxalate (0.47mg), tannin (0.38mg) and saponin (2.70mg).The results of proximate compositions shows that the leaves were rich in nutrients such as dry matter was 94.57%,Crude protein 13.36%,crude fibre 10.34%, ash 9.86%, ether extract 2.95%, Nitrogen free extract 67.87% and organic matter 84.71%. The findings indicate that *S. mombin* leaves is a potential source of highly nutritious feed stuff and phytomedicine. They are of nutritional, clinical and veterinary relevance considering the diverse ethnopharmacological uses of the plant in different parts of the world. In conclusion, this study shows that leaves of *S. mombin* are potential source of pharmacologically active phytochemicals. It has also revealed that the leaves are important source of nutrients for domestic animals.

Keywords: *Spondias mombin*, phytochemical and proximate composition.

INTRODUCTION
Spondias mombin is a deciduous tree, usually 20 meters high, its bark is greenish-brown, thick, rough, often deeply grooved, with blunt, spine-like projection. The trunk branches 2-10m above ground level to form a spreading crown up to 15m in diameter. They are dull light orange to yellow or brown in colour, but turn yellow on ripening and contain 3-6 small seeds. The leaves are alternate, once pinnate with an odd terminal leaflet and stipules are absent but have rachis of 30-70cm long. Leaflets are up to 5-10 pairs, apex long acuminate, asymmetric and truncate with entire margins and glabrous leaves (FAO, 1982).The tree thrives under conditions with altitude ranging from 0-587m in a very dry soil, gravelly loam, sandy, or partly clay, throughout much of sub-tropical. Mean annual rainfall suitable for growth is over 1500mm. The bark is used as a purgative and in local application is used for leprosy (Kerharo and Bouquet, 1950). The bark decoction is used for severe cough, causing relief through vomiting. The dry pulverized bark is applied as a dressing to the circumcision wound. The bark contains a certain amount of tannin. A decoction of the mashed leaves is used by the Igbo (Nigeria) for washing a swollen face. The leaves, ground with sugar, are rubbed on the mouth and gums. A leaf infusion is a common cough remedy or used as a laxative for fever with constipation. A leaf decoction is used for gonorrhea. They are also used for leprosy and when crushed with lemon, they are effective on worms among children. A decoction of pounded leaves is used as an eye lotion and the juice pressed from young, warm leaves is given to children for stomach troubles. Hog plum (*Spondias mombin*) is a small deciduous tree plant occurring in a great variety of humid tropical climates. Its fruits, bark, leaves and roots are of great importance agriculturally and otherwise (Oladele, 2008). The leaves are more readily available and cheap especially during the dry seasons when most other forages are in short supply (Aregheore *et al*., 2003).

MATERIALS AND METHODS
Sample Collection and Preparation
The Hog plum *(Spondias mombin*) fresh leaves were collected from Bakori, Bakori Local Government Area, Katsina State. The fresh leaves were spread under the shade and allowed to dry for ten (10) days. All foreign materials such as branches and dead leaves were removed from the sample. The dried leaves were ground into a fine powder using a mechanical grinder, packaged in glass jars and stored at 4^0C until analysis (Ojiako and Akubugwo, 1997).

Quantitative phytochemical Analysis

Prior to quantitative phytochemical analysis, phytochemical screening was carried out on the plant's leaf extract using standard methods as described by Sofowora (1982) and A.O.A.C. (2005). The percentage compositions of saponins, tannins and phytate were determined accordingly to the methods of Harborne (1973) and Treas and Evans (1989). Oxalate content was determined by Spectrophotometric methods of Hang and Lantzsch (1983).

Proximate Analysis:
The hog plum dry leaves were analyzed for ether extract (EE) by soxhlet for 8 hours at 60^0C and crude protein (CP) was determine using micro khedjahl method. The dry matter (DM), crude fibre (CF), ash and nitrogen free extract (NFE) were also analyzed according to standard method of A.O.A.C (2005). The analysis was conducted in the Biochemistry Laboratory, Department of Animal Science, Faculty of Agriculture, Ahmadu Bello University, Zaria.

Results
The results of phytochemical analysis revealed the presence of phytate, oxalate, tannin and saponin, with their quantitative estimations in every 100g of *Spondias mombin* powdered dry leaves, phytate (1.01mg), oxalate (0.47mg), tannin (0.38mg) and saponin (2.70mg) (Table 1) The quantitative estimations (in percentages) of the proximate compositions are shown in Table 2. The dry matter 94.57%, Crude protein 13.36%, crude fibre 10.34%, ash 9.86%, ether extract 2.95%, Nitrogen free extract 67.87% and organic matter 84.71% were obtained

DISCUSSION
Basically, the leaves of *S. mombin* make an excellent fodder for goats, sheep cattle especially during the dry seasons and drought, the leaves are more readily available and cheap especially during the dry seasons when most other forages are in short supply and dried leaves can be stored for long periods of time (Aregheore *et al*., 2003).The results of anti-nutritional factors of *S. mombin* leaf shows that there was low content of phytate (1.01mg), oxalate (0.47mg), tannin (0.38mg) and saponin (2.70mg), which is highly tolerable by ruminants (Kumar 1991), who observed that sheep ingesting up to 0.9mg hydrolysable tannins per kilogram body weight showed no toxicity. These phytochemicals exhibit various pharmacological and biochemical actions when ingested by animals. Saponin is a known anti-nutritional factor that can reduce the uptake of certain nutrients including cholesterol and glucose at the gut through intra-lumenal physicochemical interaction or other yet unidentified activity (Price *et al.,* 1987).The nutritional compositions of *S. mombin* leaves were found to be rich in dry matter (94.57%), Crude protein (13.36%), crude fibre (10.34%), ash (9.86%), ether extract (2.95%),Nitrogen free extract (67.87%) and organic matter (84.71%),the good distribution of nutrients in the leaves may explain its use as one of the forage feed given to domestic animals. Findings have established it as a potential source of highly nutritious feed stuff, medicine and phytomedicine, (Ayoka *et al*., 2006; Njoku and Akumefula, 2007; Ayoka *et al*., 2008; Arif and Fareed, 2010; Igwe *et al*., 2010). The *S. mombin* leaves are also of great nutritional value (Oladele, 2008).In conclusion, this study shows that leaves of *S. mombin* are potential source of pharmacologically active phytochemicals. It has also revealed that the leaves are important source of nutrients for domestic animals.

Table 1: Chemical composition of Hog plum leaf meal

Parameter (%)	Values
Dry matter	94.57
Organic Matter	84.71
Crude protein	13.36
Crude fibre	10.34
Ether extracts	2.95
Ash	9.86
Nitrogen free extract	67.87

Table 1: Anti-Nutritional factor of Hog plum leaf meal

Composition	mg/100g
Phytate	1.01
Oxalate	0.47
Tannins	0.38
Saponin	2.70

REFERENCES

AOAC. (2005). Official Methods of Analysis, Association of Official Analytical Chemist, 17th Edition, Washington D.C. U.S.A.

Aregheore, E. M. Abdulrazak, S. A. Fujihara, T., (2003). Evaluation of some agri-industrial by-products available in Samoa for goats. Asian-*Australian Journal Animal Science*, 16(11): 1593-1598

Arif, M. and Fareed, S. (2010). Pharmacognostic investigation and authentication of potentially utilized fruit *Spondias mangifera* (wild). *International Journal of Pharmaceutical and Clinical Research* 2(1): 31-35.

Ayoka, A. O., Akomolafe, R. O., Akinsomisoye, O. S. and Ukponmwan, O. E. 2008. Medicinal and Economic Value of *Spondias mombin*. *African Journal of Biomedical Research*, 11(2): 129-136.

Ayoka, A. O., Akomolafe, R. O., Iwalewa, E. O., Akanmu, M. A. and Ukponmwan, O. E. (2006). Sedative, antiepileptic and antipsychotic effects of *Spondias mombin* L. (Anacardiaceae) in mice and rats. *Journal of Ethnopharmacology*, 103(206): 166–175.

FAO (1982). Fruit bearing forest trees. FAO Forestry paper 34, FAO, Rome.

Hang, W. and Lantzsch, H.J. (1983). Comparative methods for the rapid determination of oxalate and phytate in cereal products. *Journal Science Food Agriculture*, 34:423-1426.

Harborne, I.B. (1973). Phytochemical Methods: *A guide to Modern Techniques of Plant Analysis*. 2nd edition chapman and hall, New York, Pp: 88-185.

Igwe, C. U., Onyeze, G. O. C., Onwuliri, V. A., Osuagwu, C. G. and Ojiako, A. O. (2010). Evaluation of the chemical composition of the leaf of *Spondias mombin* Linn from Nigeria. *Australian Journal of Basic Science*, 4(5): 706 -710.

Kerharo, and Bouquet, (1950) phytochemistry and pharmacology. *Useful Plants of West Tropical Africa*, 2:67–68.

Kumar, R. (1991). Anti-nutritional factors: the potential risks of toxicity and methods to alleviate them. Proceeding of F.A.O Expert consultation held at the Malaysian Agricultural Research and Development institute, Kuala Lumpur, Malaysia. P150.

Njoku P. C. and Akumefula M. I. (2007). Phytochemical and nutrient evaluation of *Spondias mombin* leaves. *Pakistan Journal of Nutrition*, 6(6): 613-615.

Ojiako, O.A. and Akubugwo, E.I. (1997). An Introductory Approach to Practical Biochemistry. CRC Publishers, Nigeria, pp: 46-85.

Oladele, E.O.P. and Oshodi A.A. (2008). Effect of fermentation on some chemical and nutritive properties of berlandier nettle spurge (*Jatropha cathartica*) and physic nut of (*Jatropha curcas*) seeds. *Pakistan Journal of Nutrition*, 7:292-296.

Price, K.R., Johnson, I.T. and Fenwick, G.R. (1987).The chemistry and biological significance of saponins in foods and feeding stuffs. Crit. Rev. *Food Science Nutrition*, 26(1):27-135.

Sofowara, E.A. (1982). Medicinal Plants and Traditional Medicines in Africa. John Wiley and Sons Ltd, Nigeria, Pp 64-79.

Trease, G.E. and Evans, W.C. (1989). .*Pharmacognosy*.13 Edn.BacilliereTinall Ltd, London, P57.