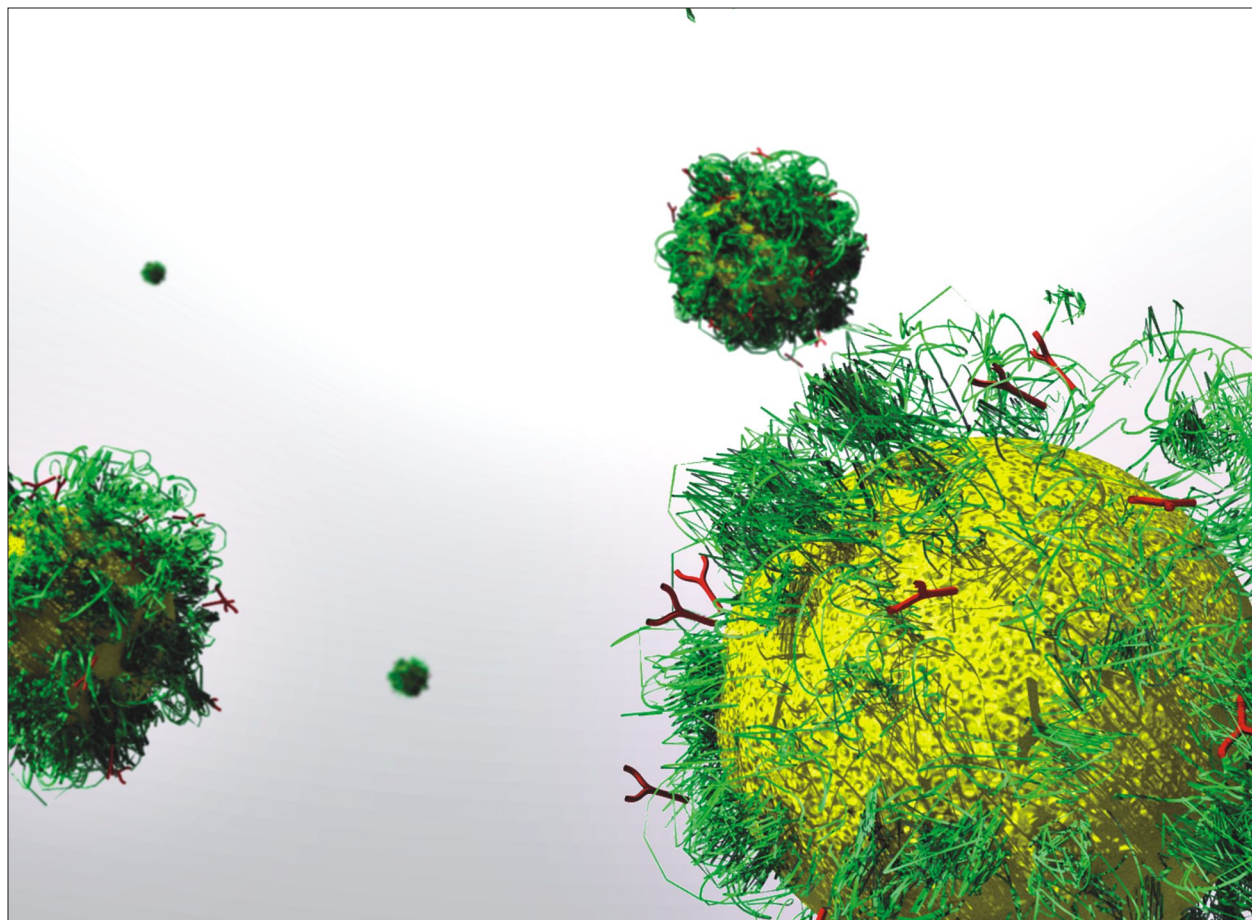




American Journal of
**Drug Discovery
and Development**

ISSN 2150-427X



Academic
Journals Inc.

www.academicjournals.com

Screening of Nutrient and Some Anti-Nutritional Composition of Aduwa Leaf (*Balanties aegytiacalin*)

¹U.S. Hayatu, ²S.O. Obanew, ²A.S. Mashigira and ²M. Kuchali

¹Department of Chemical Engineering, Federal Polytechnic, Mubi Adamawa State, Nigeria

²Department of Food Science Federal Polytechnic, Mubi Adamawa State, Nigeria

Corresponding Author: S.O. Obanewo, Department of Food Science Federal Polytechnic, Mubi Adamawa State, Nigeria

ABSTRACT

Proximate composition, some minerals and some anti-nutritional factors of Aduwa leaf were investigated. The results revealed the following: Carbohydrate, 57.9, 15.6% protein. 9.0% ash, 4.50% fat and 12.80% moisture. The mineral elements analyzed 100 g⁻¹ and their results are: Sodium, 36.0 mg, potassium 420 mg, 46.0 mg calcium, 66.0 mg magnesium and trace amount of iron. The amount of oxalate gave 75.2 and 2.60 mg 100 g⁻¹ phytic acid. This work revealed that Aduwa leaf is a good source of protein, fat, carbohydrate and some minerals. Oxalate content even though is high can be reduced to a tolerance level by pre-heating the leaf in hot water in the presence of potash. Aduwa leaf is therefore rich sources of nutrients that can be used as vegetable for making soup and other African dishes.

Key words: Aduwa leaf, anti-nutritional, minerals, vitamins

INTRODUCTION

Fruits and vegetables are good sources of minerals and vitamins. Some of the leafy vegetables are grown widely in the bush and their value are yet to be discovered. An example is Aduwa leaf which is said to be used in cooking traditional soups long time ago. Aduwa plant (*Balanties aegytiacalin*) is a multi-branched tree which grows up to 10 m in height with white yellowish grey to dark brown bark. It has wide ecological distribution, but is mainly found in alluvial site with deep sandy, loamy soil, free access to water. The plant is found in all the dry land of Africa, Israel, Jordan, the Arabian Peninsula and the drier parts of Pakistan and India. In the Sahel, the plant appears to be evergreen, the flower appears long before the rainy season (April) and fruit ripen in December to January. This plant is commonly found in the northern part of Nigeria particularly in Adamawa, Sokoto, Zamfara, Yobe, Borno and Kano States. The leaves are used as vegetable soup by the people of Margi, Bura and Chibok of Borno State, Tangale of Gombe State, Lunguda, Kilba and Higgi of Adamawa State. Apart from the leaves, the oil is used in cooking, hair cream and ear pain reliever (Onyemachi and Obanewo, 1992). The wood is a good source of firewood, the fresh bark of the tree is used to treat malaria, sore throat, epilepsy, yellow fever and diverpiculipis (Hall and Walker, 1991). The rationale behind this work is to determine the proximate composition, some mineral elements and to investigate possibly the presence of some anti-nutritional factors (phytic acid and oxalates) in Aduwa leaves.

MATERIALS AND METHODS

Aduwa leaves were picked from the free in Love Garden, near Adamawa State University, Mubi. The leaves were sun-dried for two days on a stainless tray, followed by sorting to remove unwanted materials. The dried leaves were pounded using piston and mortar and the powder was sieved using 70 μm sieve for analysis. The percentage moisture content, fat ash and protein were determined using standard methods described by Egan and Ronald (1981). Percentage carbohydrate was determined by difference as described by Egan and Ronald (1981). The amount of calcium, magnesium, sodium, potassium and iron were determined using atomic absorption spectrophotometer described by AOAC (2000). Phytic acid and oxalate were also determined using AOAC (2000) standard method.

RESULTS AND DISCUSSION

Table 1 above shows the carbohydrate content of Aduwa leaf which is relatively lower (57.9%) when compared with that of baobab leaves which is 83.70% as reported by Kalra and Pruthi (1984). The leaf has a high content of protein 15.0% compared to that of okra leaves with 1.5% as reported by Kalra and Pruthi (1984). This indicates that aduwa leaf is a good source of protein than most vegetables (such as sorrel and spinach) leaves. The fat content of aduwa leaf is low (4.5%) compared to most vegetable leaves (Nnam and Onyeke, 2004). But the fat content is high when compared with a bitter leaf (0.4%) and spinach (0.5%) as reported by Ramadan *et al.* (1994). The low fat reduces the risk of rancidity during storage of the dried leaves before use. The moisture content of the dried Aduwa leaf is higher than dried baobab; dried okra and dried bitter leaves (Kalra and Pruthi, 1984). The ash content of the leaf (9.0%) is high. This account for its high mineral contents as can be seen in Table 2 below.

Table 2 showed that Aduwa Leaf contain lower amounts of sodium 36.0 mg 100 g⁻¹. Compared to that of spinach 40.0 mg but higher when compared with okra and sorrel (15.0 and 9.0 mg), respectively. Ihekoronye and Ngoddy (1985) reported that spinach contains 100 mg of potassium and 80.0 mg in Akro, this indicate that Aduwa leaf contains higher amount of potassium with 420 mg 100 g⁻¹.

The amount of calcium in aduwa leaf is low (48.0 mg) when compared with that of okra and baobab leaf of 450 and 350 mg 100⁻¹ g, respectively. But the calcium is higher when compared to

Table 1: Proximate composition of aduwa leaf

Nutrient	Composition (%)
Carbohydrate	57.9
Protein	15.8
Fat	4.5
Moisture	12.8
Ash	9.0

Table 2: Proximate element composition of aduwa Leaf

Element	Composition (9 mg 100 g ⁻¹)
Sodium	36.0
Potassium	420
Calcium	48
Magnesium	66
Iron	Trace

Table 3: Some anti-nutritional factors of aduwa leaf

Substance	Composition (mg 100 g ⁻¹)
Oxalate	75.2
Phytic acid	2.6

that of bitter leaf and sorrel with 20.0 and 5.2 mg 100 g⁻¹, respectively (Ihekoronye and Ngoddy, 1985). The magnesium content of the leaf is too low when compared with spinach 60.0 mg 100 g⁻¹. Aduwa leaf contains negligible amount of iron.

Table 3 showed that Aduwa leaf contains high amount of oxalate 712 mg 100 g⁻¹. Ihekoronye and Ngoddy (1985) reported that this amount is high for human consumption. (The safe range is 2-5 mg 100 g⁻¹). These amounts can be reduced when the leaf is pre-treated with potash and hot water before the soup is prepared (Messina and Messina, 1999). The phytic acid in aduwa leaf is safe for human consumption as reported by Messina and Messina (1999) that the toxic level of phytic acid is when it is above 5 mg 100 g⁻¹.

CONCLUSION

The results obtained showed that Aduwa leaf is a good and rich source of protein, fat and minerals when compared to other common vegetable leaves. The presence of oxalate and anti-nutritional factor in aduwa leaf cannot be a limiting factor for its use in cooking vegetable soup because the oxalate can be reduced by pre-treatment with potash and hot water. The phytic acid is at a tolerable level (2.60 mg 100 g⁻¹) which is lower than the harmful level of 5 mg 100 g⁻¹ as a report by Messina and Messina (1999).

RECOMMENDATION

It is recommended that aduwa leaf is a good vegetable for soup making. Further study should be done on the bitter taste and other anti-nutritional factors in aduwa leaf.

REFERENCES

- AOAC, 2000. Association of Official Analytical Chemist Official Methods of Analysis. 7th Edn., AOAC, Washington DC., USA.
- Egan, F.L. and S. Ronald, 1981. Pearson Chemical Analysis of Foods. 8th Edn., Longman Group Ltd., England.
- Hall, J.B. and D.H. Walker, 1991. *Balanites aegyptiaca*: A monograph. School for Agricultural and Forest Sciences Publication No. 3, University of Wales, Bangor, UK., pp: 70.
- Ihekoronye, N.I. and P.O. Ngoddy, 1985. Integrated Food Science and Technology for the Tropics. 1st Edn., MacMillan Publisher, London.
- Kalra, C.L. and J.S. Pruthi, 1984. Chemistry and Technology of Okra (*Hibiscus esculentus* L.). Central Food Tech. Res. Inst., India, pp: 37-57.
- Messina, M. and V. Messina, 1999. A contributing paper to cancer resource foundation. Bulletin, USA., February 1, 1999, Vol. 59, No. 3, pp: 602-606.
- Nnam, N.M. and M.A. Onyeke, 2004. World agro-forestry centre. Department of Home Science and Nutrition, University of Nigeria, Nsukka, Nigeria.
- Onyemachi, S.E. and A. Obanewo, 1992. A potential source of vegetable oil. Proceedings of the Nigeria Institute of Food Science and Technology, North-Eastern Workshop, July 2-3, 1992, Legon.
- Ramadan, A., F.M. Harraz and S.A. EI-Mougy, 1994. Anti-inflammatory, analgesic and antipyretic effects of the fruit pulp of *Adansonia digitata*. Fitoterapia, 65: 418-422.