

PROXIMATE COMPOSITION AND LEVELS OF SOME ANTI-NUTRIENT CONTENTS OF *Urgineaaltissima*

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ABSTRACT

Proximate composition and levels of some anti-nutrient in *Urgineaaltissima* was investigated. The objective of the study is to investigate the nutritional properties of *Urgineaaltissima* using standard analytical methods. On dry weight basis, the proximate analyses showed it contained moisture ($8.33 \pm 0.57\%$), crude lipid ($2.16 \pm 0.28\%$), ash ($6.66 \pm 0.76\%$), crude protein ($3.70 \pm 0.07\%$), crude fibre ($5.66 \pm 0.57\%$), available carbohydrate ($81.7 \pm 7.90\%$) and calorific value (361.4Kcal/100g). the results of mineral analysis indicated that the sample contained appreciable amount of mineral elements with potassium as the predominant element in the sample. Anti-nutritional analysis showed the presence of phytate (75.62mg%), oxalate (0.07mg%), saponins (4.60mg%) and hydrocyanic acid (1.22mg%). The values are lower than the reference toxic standard levels. Therefore, *Urgineaaltissima* could supplement the potential nutritional uses.

Keywords: Proximate composition, anti-nutritional factors, *Urgineaaltissima*.

INTRODUCTION

Bulbous herb is an underground storage organ, comprising of short flattened stem with roots on its lower surface, and above it fleshy leaves or leaf bases, surrounded by protective scale leaves, it mainly provides the mean for vegetative reproduction or for the survival of the plant from one season to the next. Bulbous herbs are consumed almost throughout the world, for taste as well as health benefits. But recently interest in other bulb species has been increasing for proper exploitation and utilization of the bulb which can be potential source of nutrients (Stajner *et al.*, 2006). *Urgineaaltissima* belongs to the kingdom plantae, super division spermatophytae, division angiospermae, class monocotyledons, order liliales, family liliaceae (Hutchings, 1996). The bulb is 9 to 20cm long with whitish to pale green scales. Leaves are oblong, 20 to 40cm long and 25 to 40cm broad. Peduncles are 70 to 150cm long, usually with 100 to 300 spirally arranged flowers. The stamens are inserted at the top of the perianth tube. The capsule is obovoid, 10 – 12mm long and the seeds are flat and elliptic (Jessop, 1977). The bulbs are used in southern Africa as poultices for rheumatic swellings gouty limbs (Hutchings, 1996). The aim of this study was to investigate the nutrient composition including some anti-nutritional factors in *Urgineaaltissima* to ascertain its contribution to the local populace.

MATERIALS AND METHODS

Sample Collection and Treatment

The bulbs of *U. altissima* were obtained from Shagari Local Government Area of Sokoto State, Nigeria. Identification of the sample was carried out at Botany Unit, Usmanu Danfodiyo

University, Sokoto. The samples were washed, oven dried, and finely ground or used fresh for moisture analysis.

Proximate Analysis

The samples was analysed in triplicate using standard AOAC (1990) methods. The determination of crude nitrogen was based on the Kjeldahl procedure and crude protein values were obtained by multiplying the nitrogen value by a factor of 6.25. Estimation of the available carbohydrate was done by the difference method and crude lipids were extracted using soxhlet apparatus. The crude fibre values were determined by treating sample with dilute solution of H₂SO₄ and NaOH, the energy calculated using the equation: [energy Kcal/100g= (%CHO x 4) + (%CP x 4) + (%CL x 9)] (Hassan *et al.*, 2008) and ash was obtained after incineration of sample in a Murfle furnace.

Mineral Analysis

The minerals were determined after the sample wet digestion with a mixture of nitric/perchloric/sulphuric acids in the ratio of 9:2:1 v/v respectively. Ca and Mg were determined by atomic absorption spectrophotometer. The Na and K content of the sample were determined using atomic emission spectrometer and phosphorus by colorimetric method (AOAC, 1990).

Anti-nutritional Analysis

The method of Ola and Oboh (2000) was adapted for the determination of phytate. Hydrocyanic acid was determined by the AOAC (1990) method. Oxalate and nitrate were determined by the methods of Krishna and Ranjhan (1980).

Data Analysis

The Data obtained were expressed as mean \pm standard deviation of triplicate determination.

RESULTS AND DISCUSSION

The results of the nutritional and anti-nutritioal composition of *U. altissima* are Summarized in Tables 1-3.

DISCUSSION

Proximate Composition: The result of proximate analysis of *U. altissima* revealed that the sample had low moisture content of $8.33 \pm 0.57\%$. Nwinuka *et al.*, (2005) also reported low moisture content of $6.67 \pm 0.01\%$ in *Zingiberofficinale*. However, the value is high than that of *Alliumsativum* ($4.88 \pm 0.13\%$) reported by Onyeike *et al.*, 1995. The ash content of the sample ($6.66 \pm 0.76\%$) was low in comparison to $48.00 \pm 0.15\%$ in *Allium cepa*, but within the range of 4.06 to 6.40% in commonly consumed spices (*Allium sativum* and *Zingiberofficinale* respectively) (Nwinuka *et al.*, 2005). The crude protein content of *U. altissima* is $3.70 \pm 0.07\%$. The value obtained was relatively low when compared to $11.70 \pm 0.13\%$ reported in *Allium cepa* (Nwinuka *et al.*, 2005). Protein is an essential component of diet which supplies adequate amounts of amino acids (Pugalenthi *et al.*, 2004). As expected, the crude lipid was low ($2.16 \pm 0.28\%$). The value obtained is high than that of *Allium sativum* ($0.68 \pm 0.01\%$) and *Allium cepa* ($0.95 \pm 0.06\%$), also much high value of $5.53 \pm 0.15\%$ was reported in *Zingiberofficinale* (Nwinuka *et al.*, 2005). The sample had a substantial level of crude fibre ($5.66 \pm 0.57\%$). In

comparison to other work on bulb, the value is higher when compared to *Allium cepa* $1.60 \pm 0.01\%$ (Nwinuka *et al.*, 2005). The available carbohydrate content of *U. altissima* is $81.7 \pm 7.90\%$. The value obtained is higher than those of *Allium sativum* ($73.03 \pm 0.06\%$) and *Allium cepa* ($76.71 \pm 0.11\%$) reported by (Onyeike *e. al.*, 1995). A higher carbohydrate content of feed is desirable while deficiency causes depletion of body tissue (Barker, 1996). The major function of the carbohydrate is to provide the body with energy. The caloric value ($361.4\text{kcal}/100\text{g}$) which is within the range ($357.2 - 375.4\%$) reported by (Odebiyi and Sofowora, 1979).

Table 1: Proximate Composition of *Urgineaaltissima* (%)

Component	Composition (%)
Moisture (% wet weight)	8.33 ± 0.57
Ash content	6.66 ± 0.76
Crude protein	3.70 ± 0.07
Crude lipid	2.16 ± 0.28
Crude fibre	5.66 ± 0.57
Carbohydrate	81.7 ± 7.90
Energy value (Kcal/100g)	361.4

All values are the mean of triplicate determinations expressed in dry weight basis \pm standard deviation.

Table 2: Mineral Composition of *Urgineaaltissima* (mg/100gDW)

Element	Composition
K	93.00 ± 2.40
Na	43.67 ± 0.45
Ca	0.47 ± 0.04
Mg	2.03 ± 0.02
P	0.22 ± 0.01

All values are the mean of triplicate determinations expressed in dry weight basis \pm standard deviation.

Mineral Composition

The concentrations of different mineral elements of *Urgineaaltissima* analysed, indicate low level of calcium, magnesium, sodium, potassium and phosphorus were observed when compared with recommended dietary allowance by (NRC, 1989). Low amount of calcium and phosphorus in the sample may still contribute in bone formation. Also low potassium may still reduce the risk of stroke while low sodium content may add value in osmotic regulation of the body fluids and transmission of nerve impulse (Hassan *et. al.*, 2009).

Anti-nutritional Composition

The levels of the anti-nutritional factors are reported in Table 3. The phytate (75.62mg), oxalate (0.07mg), hydrocyanic acid (1.22mg) and saponin (4.60mg) determined are all below the recommended toxic levels caused by the presence of anti-nutritional factors (Birgitta and Gullick, 2000). Furthermore, this indicates probable lack of interference with the availability of mineral elements.

Table 3: Anti-nutritional Composition of *Urgineaaltissima*

Parameters	<i>U. altissima</i> (mg/100gDW)
Oxalate	0.07±0.01
Phytate	75.62±0.91
HCN	1.22±0.03
Saponin	4.60±0.08

Data are mean ± standard deviation of triplicate result

CONCLUSION

From the result of the analysis, it is apparent that *U. altissima* suggests enough essential nutrients like carbohydrate, calorific value, lipid, and protein, mineral elements that can serve as potential sources of food. The level of anti-nutrients (phytate, oxalate, HCN, saponin) which interfere with digestion and absorption are all below the toxic level or daily intake. It can therefore be concluded that *U. altissima* can contribute significantly to the nutrient requirement of man and could be used as a source of nutrients supplement.

REFERENCE

- AOAC, (1990). Official Methods of Analysis 14th Edition. *Association of Official Analytical Chemist*, Washington DC.
- Barker, M.M. (1996). Nutrition and Dietetics for Healthcare. 9th Edition Churchill Livingstone, New York, NY p92-101.
- Birgitta, G. and Gullick, C. (2000). *Exploring the Potential of Indigenous Wild Food Plants in Southern Sudan*. Proceeding of a workshop held in Lokichoggio, Kenya p22-25.
- Hassan, L. G., Dangoggo, S. M., Umar, K. J., Saidu, I and Folorunsho, F. A. (2008). Proximate, Minerals and Anti-nutritional Factors of *Daniellia Oliveri* Seed Kernel. *Chem. Class Journal*, 5: 31-36
- Hassan, L. G., Usman, B. B., Kamba, A. S., Hassan, S. W. (2009). Nutritional Composition of Vegetable Spaghetti (*Hasta la pasta*). *Nigerian Food Journal*, 27 (2).

- Hutchings, A. (1996). Zulu Medicinal Plants, an inventory. University of Natal Press, Pietermaritzburg.
- Jessop, J.P. (1977). Studies in the bulbous Liliaceae in South Africa: The Taxonomy of *Drimia* and Certain Allied Genera. *Journal of South African Botany* 43, 265 – 319.
- Krishna, G. and Ranjhan, S. K. (1980). Laboratory Manual for Nutrition Research, Vikas Publishing House PVT Ltd. Ghaziabad, Up (India).
- National Research Council (NRC) (1989). Recommended Dietary Allowance, National Academic Press, Washington DC. Pp 151 – 154.
- Nwinuka, N.M., Ibeh, G.O. and Ekeke, G.I. (2005). Proximate Composition and Levels of Some Toxicants in Four Commonly Consumed Spices. *Journal of Applied Science and Environmental Management* 9(1): 150 – 155.
- Odebiyi, O.O and Sofowora, E.A. (1979). Phytochemical Screening of Nigerian Medicinal Plants. 2nd OAU/STRC Inter-Afr. Symp. Trade, Pharm. Afr. Med. Plants, **115**:216 – 220.
- Onyeike, E.N., Olungwe, T., and Uwakwe, A.A. (1995). Effect of Heat Treatment and Defatting on the Proximate Composition of Some Nigerian Local Soup Thickeners, *Food Chem.* 53:173 – 177.
- Ola, F.C. and Oboh, G. (2000). Food Value of Two Nigeria Edible Mushrooms (*Termitomycetusstratus* and *Trmitomycetusrobustus*). *The Journal of TechnoScience*, **4**: 1-3.
- Pugalthi, M., Vadivel, V. Gurumoorthi, P., Janardhannan (2004). Comparative Nutritional Evaluation of Little Known Legumes, *Tamarindusindica*, *Erythrinaindica* and *Sesbaniabispinosa*. *Tropical. Subtropical Agroecosystem*, **4**: 107-123.
- Stajner, D., Milic, N., Canadonoric, B.J., Kapor, A., Stajner, M. and Popovic, B.M. (2006). *Phytotherapy Research Journal* 20: 581 – 588.

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