# PROXIMATE ANALYSIS OF *Ipomea-Turbinata* (MOON PURPLE FLOWER)

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**Abstract:** Proximate content of *Ipomea-turbinate* (moon purple flower) leaves was carried out using standard analytical techniques. The leaves were analyzed to determined proximate nutrient content and some selected minerals elements. The results of the proximate analysis revealed a moisture content of (85.5±0.81%) and (5.2±0.47%), 8.7±0.61%, 2.16±0.03% for ash, crude protein, lipid and crude fibers respectively. The available carbohydrate was observed to be (72.17±0.46%) in the sample while its calorific value is (342.9kcal/100g). The plant leaves contained appreciable amount of mineral elements, with tran as predominant element. The anti-nutritional content of the plant showed the presence of oxalate (0.03mg/100g), phytate (3.21mg/100g), alkaloids (0.0018mg/100g), Nitrates (1.63mg/100g) and cyanide (0.48mg/100g) respectively. The values are lower than the references toxic standard levels. Therefore *Ipomea turbinate* could be used to supplement the potential nutritional uses.

**Keywords**: Proximate, Ipomea Turbinate, Anti-Nutrient and Minerals.

## INTRODUCTION

Most developing countries depend on starch-based foods as the main staple for the supply of both energy and protein. This accounts in part for protein deficiency which prevails among the populace as recognized by food and agricultural organization (Ladeji *et al.,* 1993). Many green vegetables are consumed all over the world, the green leafy vegetables are source of calcium, iron and vitamin, green leafy vegetables contained all importance nutrition required for growth and maintained of health (Chandy, 2011). Leafy vegetables are important sources of diet for many Nigerians homes. A part from the variety which they add to the menu, they are valuables sources of nutrients especially in rural's areas where they contributes substantially to protein, minerals, fiber and other nutrients which are usually in short supply in daily diets (Muhammad and Shaft, 011). *Ipomea-turbinate* belongs to the kingdom plantae, phylum-magnoliophyta, class magnoliopsida, order-solanales and a family-convolvularceae. The genus occurs throughout the tropical and subtropical regions of the world and comprises of annual and prenial herbaceous, plants, most of the species are twining climbing plants. The *Ipomea-turbinata* (purple moon flower) seeds, stems and leaves gangrenous are used for skin wound, cut and burn-blisters (MC-Donald *et al.,* 1995).

## MATERIALS AND METHODS

### Sample Collection and Treatment

The leaves *Ipomea turbinata* was obtained from Gerabshi village of Wamakko Local Government, Sokoto State in Northern part of Nigeria. The sample was identified in botany unit at Usmanu-Danfodiyo University, Sokoto. The sample was washed with water but not excessive; to remove sand and other particles, the leaves were plucked manually. The samples were air dried and ground into fine powder using pestle, mortar and sieved. The dried sample was used for the analysis other than moisture content in which fresh sample was used.

## Proximate Analysis

### Moisture Content

Moisture content was determined by the methods described by AOAC (1990), a known weight of fresh sample, was placed in pre-weight, cleaned dried crucible and ignited in an oven at 105°C for hours.

### Ash Content

Ash content was determined by igniting the sample in a furnace at 600 to constant weight, according to AOAC (1990).

### Crude Protein

The method employed is base on transformation of total nitrogen by Kjeldhal method; the amount of crude-protein is obtained by multiplying nitrogen content with 6.25 as a conversion factor (AOAC, 1990).

### Crude Lipid Content

Crude lipid content was obtained gravimetrically after n-hexane extraction according (AOAC, 1990).

### Crude Fiber Content

Crude fiber was determined by acid-alkaline gravimetric method using AOAC-1990.

### Available Carbohydrates

The method of James (1995) was adopted where the total proportion of carbohydrates in the sample was not determined directly but as a difference between the sum of ash, crude lipid, protein fibre from 100% dry weight as shown by the equation;
% Carbohydrate = 100-(%Ash+%protein+%lipids+%crude fibre).

### Energy Content

The calorific energy value was estimated in (kcal/100g) by multiplying percentage of crude protein, lipid, available carbohydrate by factor 4, 9 and 4 respectively (Hassan *et al.,* 2008).
Energy content = (% available carbohydrate x 4) + (% crude protein x 4) + (%crude lipid x 9).

### Mineral Analysis

Wet digestion procedure was used for determination of mineral element. One gram (1g) of dry powder samples was digested with a mixture nitric/perchloric/sulphuric acids in the ration of (9:2:1: V: V) respectively. The Na and K contents of the samples were analyzed using flame emissions spectrophoto-meter (200A, Model, Buck Scientific Ltd UK), Phosphorus by molybdate methods while other elements like calcium, magnesium was determined using atomic spectrophotometer (Alpha-4, model, Buck scientific Ltd USA). All analysis were carried out in triplicate and reported in mg/100 dry matter.

### Anti-Nutritive Analysis

The method described by (Hassan *et al.,* 2009), was adapted for the determination of phytate, hydro-cyanide, oxalate and nitrate were determined by AOAC (1990).

## RESULT AND DISCUSSION

The result for nutritional and anti-nutritional composition of *Ipomea-turbinata* leaves are summarized in Tables 1-3.

**Table 1: Proximate Composition**

| Parameters | Concentration (%DW) |
|---|---|
| Moisture content | 83.5±0.81 |
| Ash content | 15.2±0.47 |
| Crude protein | 8.7±0.06 |
| Crude lipid | 2.16±0.037 |
| Crude fibre | 1.8±.0.23 |
| Available carbohydrate | 72.17±0.46 |
| Energy values (kcal/100g) | 342.9 |

Values are means ± S.D for 3 determinants.

The results of proximate composition of *Ipomea-turbinata* revealed that the sample has lower moisture content (83.5±0.81%) compared to that of *Spinacia oleracea* (91.7±0.9%) and *Beta valgaris var* (90.74±0.06%) (Chandy, 2011). The ash content of *Ipomea turbinata* (15.2±0.47) is higher than that of *Jatropha curcas* (1.52±0.04) and that of *Argentea murianthus* (2.00±0.03), *Gnetum africanium* (1.92±0.05) and *Ocium gratissium* (1.90±0.05) as reported by (Agbaire, 2011). The lipid content (2.16±0.03) which is higher than that of *Beta vulgar var* (0.1±0.001) and *Trigonella foenum graecum* (0.9±0.06) (Chandy, 2011). The lower lipid content of the plants is in agreement with general observation that a vegetable has lower lipids content (Lintas, 1992). The Crude fibre content (1.8±0.23) was observed to be higher than that of *Beta valgaris var* (1.0±0.04), (1.0±0.3) for *Spinacea oleracea* and *Trigonella foenum graecum* (0.1±0.1%) (Chandy, 2011). Fibre plays a role in the prevention of number of diseases by reducing the level of cholesterol (Hassan *et al.,* 2011). Higher Crude protein in *Ipomea turbinata* (8.7±0.06) was reported compared to *Amaran taceae* (4.9±1.0) and Beta *vulgaris var* (1.7±0.04) (Chandy, 2011) protein is an essential component of diet which supplies adequate amount of amino acid (Pugalathi *et al.,* 2004). The available carbohydrate Ipomea turbinate (72.17±0.46) was higher than that of *Trogonella foenum graecum* (9.8±0.08) and that of *Beta-vulgaris var* (13.6±0.04) (Chandy, 2011). A higher carbohydarate content of food is desirable while its deficiency causes depletion of body tissue (Barker, 1996). Energy value of a food is the measure of a chemical energy in the bonds of the organic substance. The calorific energy value of *Ipomea turbinata* (342.97kcal/100g) revealed that; it is higher than that for *spinacia oleracea* (97lcal/100g) and *Betavulgaris var* (88kcal/100g) (Chandy, 2011).

### Mineral Composition

The concentration of different mineral elements in leaves of *Ipomea* is presented below:

Table 2: Mineral Composition of *Ipomea*

| Elements | Concentration (mg/100DW) |
|---|---|
| Na | 0.067397±4.00 |
| K | 0.12645±2.00 |
| Ca | 1.003116±3.51 |
| Mg | 0.030755±3.00 |
| Ni | 0.000874±2.73 |
| Fe | 0.524373±8.71 |
| Co | 0.002006±2.51 |
| Zn | 0.018125±2.06 |
| Cu | 0.001545±7.93 |
| Mn | 0.071468±4.04 |
| Cr | 0.0000629±4.5 |
| Pb | 0.001137±4.26 |

Values are means ± S.D for 3 determinations

The sodium content in the sample was (0.062397±4.00mg/100g) which is higher when compared to (0.006144±0.19122mg/100g) of *Allium satium* reported by (Karppenen, 1995). Sodium if the body fluid helps in transmission of nerve impulse (Mc-Dontal *et al.,* 1995). The potassium content (0.126045±2.00mg/100g) is higher compared to (0.0730225±1.00mg/100g) for *Allium sativum* (Nwinuka *et al.,* 2005). However higher amount of potassium in the body was reported to increase iron utilization (Mc-Donald *et al.,* 1995). Calcium and magnesium content of *Ipomea turbinata*, (1003116±3.51188mg/100g), (0.030755±13.51188mg/100g) respectively which are very low compared to (28.002511±13.51188mg/100g) and (2.730755±2.00mg/100g) for *Allium sativum* reported by (Nwinuka *et al.,* 2005). The Iron content (0.524373±8.71788mg/100g) is lower compared with (5.00±0.35) for *Zingiber officinate* and higher compared to (0.342185±4.35894mg/100g) for *Allium sativum* (Nwinuka *et al.,* 2005). Iron is an essential trace element for haemoglobin formation, normal functioning of the central nervous system and with the oxidation of caborhydrates, proteins and fats (Adeyeye and Otokiti, 1999). Zinc and Copper levels are (0.018125±3.00mg/100g), (0.001545±7.93725mg/100g) lower than respective values reported for *Allium sativum* (2.00±0.25mg/100g) and (22.325±8.7325mg/100g) respectively (Nwinuka et al., 2005). Earlier studies on humans and livestock has shown that optimal intakes of elements such as Na, K, Ca, Mn, Zn, Mg and Cu can reduce individual's risk factor for health problems such as cardiovascular diseases (Sanchez-Castillo *et al,* 1998). The Chromium and Nickel content are (0.000629±4.58258mg/100g), (0.000874±2.7380988mg/100g) lower compare to their respective levels in *Allium sativum* (25.00±2.5125mg/100g and 6.12±0.5mg/100g) (Nwinuka *et al.,* 2005). Lead content (0.000119±2.0423) for *Allium sativum* lower than (5.00±0.0035mg/100g) for *Zingiber officinate* reported by (Karppamen, 1995).

## Anti-Nutritional Composition

The anti-nutritional factors are undesirable substance present in food, these substances are naturally found in food but their activity as anti-nutritional factor depends on the digestion process. The presence of endogenous anti-nutritional factors within plant feedstuffs resulted in limiting their use in food or feed stuff. Anti-nutritional factors interfere with metabolic processes, so that growth and bioavailability of nutrients are negatively influenced. These factors stand as indices for Judging the nutritional value for any giving food substance (Binita and Khtarpaul, 1997). Phytic acid has a strong binding affinity to minerals such as Calcium, Magnesium, Iron, copper and Zinc. This results in precipitation, making the minerals unavailable for absorption in the intestine (Oxford Dictionary of Biochemistry and Molecular Biology, 2006). Oxalate can bind to Calcium in food thereby rendering Calcium unavailable for normal physiological and biochemical roles such as maintenance of strong teeth, nerve impulse transmission clotting factor in blood and cofactor in enzymatic reactions (Ladeji *et al.,* 2004). The levels of anti-nutritional factors are reported in table 3. The phylate, oxalate, cyanide, nitrate alkaloids and saponin are all lower than the recommended toxic levels caused by the presence of anti-nutritional factors (Birgitta G. and Gullick C., 2000).

**Table -3: Anti-Nutritional Composition of *Ipomea Turbinata***

| Anti-nutritional factor | Concentration (mg/100gDW) |
|---|---|
| Phytate | 3.21 |
| Cyanide | 0.48 |
| Oxalate | 0.21 |
| Nitrate | 1.63 |
| Alkaloids | 0.0018 |
| Saponins | 0.34 |

## CONCLUSION

No single plant would provide human with adequate levels of all nutrient, yet *Ipomean-turbinata* plant contains adequate essential nutrients. Moreover, the study shows that leaves contained appreciable amount of mineral elements with Iron as the predominant element. The level of anti-nutritional content of the leaves which interfere with digestion and absorption of nutrients are below the reference toxic standard levels hence their nutritional value will not be affected. It can therefore conclude that; *Ipomea turbinata* leaves might be explored as a viable supplement in human food.

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