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Some Proximate Analysis of Polyaltha Longifolia (Fresh Leaves)

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Abstract

Proximate analysis of fresh leaves of Polyalthia longifolia was carried out using gravimetric method of analysis. The analysis showed that percentages of total moisture, crude protein, crude fiber, ash content, total carbohydrate and the oil content were 51.12, 13.37, 25.20, 8.12, 22.97 and 11.34 present in the sample respectively. The results revealed that the fresh leaves could be a rich source of food and mineral nutrients which can be used for human nourishments and dietary supplements. It is also an implication that the leaves can be used in the medicinal, pharmacological and food industries for production of consumable supplements. The significant oil content is an indication of its ability to combat certain microorganisms that can cause disorders in human health, it can also be applied in the cosmetic industries for the production of a wide variety of cosmetics products it has been commonly found that the extract of the leaves can be used as curatives of haemorhoids, diabetes, fibroid. cancer and ulcer treatments because of the reasonable fibre content.

Keyword: Proximate analysis, moisture, carbohydrate, diabetes.

INTRODUCTION

The interests in natural product especially plants cannot be over-emphasized because of their potency, efficacy and general relevance in medicinal, pharmaceutical, cosmetic and other industrial and traditional applications to humanity and its environment [2, 3]. This is because the viability of these plants is of utmost demand and desire by the world increasing population for several purposes. However, the availability, accessibility and low cost of these vegetable plants have made it possible for some these relevant applications to be achieved [2]. Polyalthia longifolia known locally as Green Champa, is a lofty evergreen tree, native to India, commonly planted due to its effectiveness in alleviating noise pollution [10, 11]. These plants are widely spread in Africa, Asia, Australia, tropical America and India. Reports showed that they contain phytochemicals like terpenes, carotenoids, tannins, alcohols, ketones, aldehyde, esters, alkaloids, flavonoids and saponins among others at different concentrations which may be influenced by their geographical location and content of soil on which the plants are grown. It is mainly used for landscaping purposes because of the exquisite beauty of its leave arrangement and the unique height of the plant itself. Polyalthia longifolia has been of medicinal nature and a typical example is of the bark extract which is used in some part of the west coast of Africa in particular Cote d'ivoire to treat haemorrhoids and fibroid [8], The leaf oil has been demonstrated to exclusively compose of sesquiterpene derivatives while the leaf is used in Nigeria and elsewhere for treatment of skin diseases, fever, diabetes and hypertension. The antimicrobial activity of clerodane diterpenoids from Polyalthia longifolia leaves had been reported. These plants have pharmacological activities such as antimicrobial, antibacterial, antiamoebic, antidiarrhoea, antifilarial, antifungal and anti-inflammatory properties. They also have antimalarial, ant mutagenicin, antimycobacterial, anticoagulant, anti-inflammatory, analgesic, hepatoprotective properties among others [15]. Despite the reported wide usage of these plants (Cymbopogon citratus, Tridax procumbens, Mitracarpus scaber and Polyalthia longifolia) as materials for treatment of different ailments [9].

MATERIAL AND METHODS

MATERIALS

Leaves of Polyalthia longifolia were freshly collected and sent to End-point Laboratories and Equipment Agip, Rivers-State. Nigeria All

determinations were then carried out in triplicates using standard methods of analysis.

METHODS

The proximate analysis of moisture content, carbohydrate, crude protein, crude fibre, oil and ash contents were determined using the method of AOAC with the absorbance measured using spectrophotometer [17, 18].

MOISTURE CONTENT

Procedure

- Place a clean dry petridish in an oven at 105°C for 15 min.
- Cool petridish in desiccator, weigh and record weight as (W_1) Weigh 5g of the sample and record weight of petridish plus sample as (W_2)
- Dry petridish plus sample in oven at 105°C for 18 - 24hrs or overnight.
- Cool in desiccator, weigh back, and record the weight
- Repeat the heating process and weighing until a constant weight (W_3) is obtained.

ASH CONTENT

Procedure

- Dry empty crucible in an oven at 105ºC for at least 2hours.
- Cool crucible in desiccator, weigh and record weight as (W1).
- Accurately weigh 5g of sample in the crucible and record weight of crucible plus sample as (W2)
- Place crucible plus samples in preheated muffle furnace and ash at 550°C for 4 hours
- Transfer crucible into a desiccator and allow to cool to room temperature (approximately 45 minutes).
- Weigh the dish and record weight as (W3).

CRUDE PROTEIN

Procedure

- Weigh accurately 1.0g of well-mixed ground sample and place in Kjeldahl digestion tubes. In each batch use a flask without sample as blank test
- Add two Kjeldah tablets and 20ml of sulphuric acid. If fuming is a problem, add a few drops of anti-forming agent.
- Place the tubes in a digestion unit and connect to the fume removal manifold.
- Digest the sample for at least for 1 hour at 420±20^{O}C.
- Allow the content of the tubes to cool.
- Add distilled water into the cool Kjeldahl digestion tubes to a total volume of 80ml.

Distillation and Titration

- Place a conical flask containing 25-30ml of the concentrated boric acid under the outlet of the condenser of the distillation unit in such a way that the delivery tube is below the surface of the boric acid solution.
- Gently add 50ml of sodium hydroxide solution and distill the ammonium.
- Titrate the content of the conical flask with hydrochloric acid standard solution after adding a few droplets of indicator solution using a titration unit and read the amount of titrant used. The endpoint is reached at the first trace of pink colour in the contents.
- Record the amount of acid used to the nearest 0.05ml for the blank test (Vb) and for each sample (Vs).

CRUDE FAT

Procedure

The fat content of the sample was determined by (AOAC, 1980). 5.0 g of the sample was introduced into an ether-extracting thimble and placed on a soxhlet reflux flask connected to a round bottomed flask of known weight. This was placed on a heating mantle filled with about 250 ml of petroleum ether. The fat content in the sample was extracted by a reflux system. After a series of refluxes, a clear solution was obtained in the flask, and then the sample was removed from the flask. Further heating separated the ether from the extraction oil. The round-bottomed flask containing the oil was finally dried in an oven at 70°C and determination by gravimetric method was done and expressed as a percentage of the sample weighed.

CARBOHYDRATE

Procedure

This was determined by the percentage difference in sum of other proximate parameters (Ash, Moisture, Protein and Fat):

Carbohydrate (%) = 100 – (%Ash content +%Moisture + %Protein + %Fat)

RESULT AND DISCUSSION

Table 1.0

S/N	Parameters	Methods	P. Longifolia leaves (fresh)
1	Ash Content	(%)	8.14
2	Moisture	(%)	51.12
3	Crude protein	(%)	13.31
4	Carbohydrates	(%)	22.97
5	Fat/ Lipid content	(%)	11.34
6	Fibre content	(%)	25. 20

The proximate analysis of the Polyalthia longifolia leaves showed that it is a very good source of nutrients and can be used as a consumable vegetable as seen in (Table 1.0). The results further indicated that it contains a very high percentage of moisture which implies the quantity of water absorbed from the atmosphere by the plant. The moisture contains some mineral elements which can be sources of micro nutrient and energy. The plant could also be a very useful source of energy yielding material due to its carbohydrate and fibre contents [10]. The leaves may therefore be used in the production of food supplements for living organisms both animals and humans by the agro-related industries, vegetables and vegetable oil can also be produced with the leaves of polyaltha longifolia which helps to build immunity and fight micro organisms and respectively. Blends of baby weaning foods and adult flour meals when its toxicity has been ascertained by the food industries [14]. The leaves also contains high protein content which if bioavailable could be used in the development of protein concentrates. Proteins promote human growth, tissue repairs and immune function and are involved in the synthesis of essential hormones and enzymes. The crude fat content of the leaves is very high , but comparable to that of Sorghum and higher than that of maize and some other cereals that are used for production of specialty table oils (salad dressing) and pharmaceutical or cosmetic oils [12]. Fat is necessary for normal growth and development and is the most concentrated source of energy. It is necessary for absorbing certain vitamins (A, D, E and K) and carotenoids [4- 9]. It provides a cushioning for the organs maintains cell membrane, fluidity, tastes, consistency and stability in foods. The crude fiber level is high enough to encourage use in agro-related and food industries as it aids proper digestion, encourages bowel movements, reduction of ulcer by restricting high acidity in the stomach and thereby reducing the risk of constipation. They also aid in the treatment and management of hemorrhoids, heart, obesity, lowers cholesterol levels and maintains normal blood glucose level. The efficacy of this plant wide and requires frequent usage [1- 8].

CONCLUSION

The result of the proximate analysis showed that the plants contain an appreciable amount of moisture, ash, crude fibre, crude fat, crude protein and total carbohydrate which makes it widely applied several industries and as good source of energy and the health implications. Polyalthia longifolia can as well be called a miracle tree due to its potency and efficacy to both humans and the environment.

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