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PHYTOCHEMICAL ANALYSIS OF *CONGRONEMA LATIFOLIUM*

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Abstract
Phytochemical Analysis of Gongronema Latifolium was carried out with standard analytical procedure to establish their normal values in order to ascertain their implications in human health. The result revealed that Alkaloids having the highest value of (36.30 ± 0.42m/100g) follow by saponin (30.38 ± 0.85m/100g), hydrogen cyanide (6.06 ± 0.22m/100g), tannin (4.43 ± 0.39m/100g) and flavonoid (0.83 ± 0.58m/100g). the result shows that G. Latifolium (Benth) leaf possess an appreciable level of phytochemicals. It could be good raw material for the production of some medical drugs and can be used in folk medicine for the treatment of some diseases. An infusion of aerial parts is taken to treat cough, intestinal worms, dysentery, and malaria. A decoction of leaves or leafy stem is commonly taken to treat diabetes and high blood pressure. It is also taken as tonic to treat loss of appetite.
Keywords: Phytochemical. Medicine, Gongronema Latifolium, Diseases.

Introduction

Gongroneme Latifolium (utazi) is a perennial edible plant with soft pliable stem. It is widely used in the west African Sub-region for the number of medicine and nutritional purpose. It belongs to the family of Gongronema Latifolium (utazi) (whose leave are bitter) is commonly called “utazi” and “arokeke” in South Eastern and South Western parts of Nigeria respectively. It is a tropical rainforest plant primary used as spice and vegetable in traditional folk medicine (1)

Phytochemical studies of Gongronema latifolim (utazi) leaves show the presence of Glycosides, Alkaloids, Saponin, Tannin, and Flavonoids. (Egbung et al., 2011) reported the presence of phytochemicals (Cr, Cu, Se, Zn and Fe) and vitamin (A, C, Riboflavin, Niacin and Thiamine) In the root bark and twig extract of Gongronma latifolium (utazi). However, the concentration of this phytochemicals varies among this plant parts. (2), reported that the different composition of the active component in plant give medicinal and edge as better therapeutic agents that chemotherapy in management of different ailment such as atherosclerosis, hypertension and diabetes.

A cold infusion of the pounded stem of Gongronema latifolium (utazi) is used to manage colic and intestinal symptom usually associated with worms. The leaves are used to prepare food for nursing mothers, where is it believe to stimulate appetite, reduce post-partum contraction and enhance the return of the menstrual cycle. Gongronma latifolium (utazi) not only processes hypolycaemic activity, but also hypotensively, hepatoprotective and hypolipidemic effects Gongronema latifolim (utazi) leaf exhibits biochemical and histological change in acetaminophen-induced and histological in albino rats and can be used against some hepatic inflammation (3)

Phytochemicals are defined as the substance found in edible fruits and vegetable that exhibits a potential for modulating human metabolism in a manner beneficial for the prevention of chronic and degenerative diseases. Phytochemical as plant component with discrete bioactivities towards animal

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biochemistry and metabolism as being widely examined for their ability to provide health benefits (4). Phytochemicals could provide health as: substrates for enzymatic reaction: absorbents/sequestrants that bind to and eliminate undesirable constituents in the intestine; ligands that agonize or antagonize cell surface or intracellular receptors; scavengers of reactive or toxic chemical; compounds that enhance the absorption and or stability of essential nutrients; selective growth factors for beneficial oral, gastric or intestinal bacteria (5).

Research supporting beneficial role for phytochemicals against cancers, coronary heart diseases, diabetes, high blood pressure, inflammation, microbial, viral and parasitic. Infection, psychotic disease spasmodic conditions, cultures etc. Is based on chemical mechanisms using the vitro and cell culture system various disease state in animals and epidemiology of humans.

The world health organization has also recognized the important of traditional medicine and has created strategies, guideline and standards for botanical medicines. Over the past decade, there has been a resurgence of interest in the investigation of natural minerals as a source of potential drug substance (10). In recent times, development countries are turning to the use of herbals drugs and remedies and according to the World Health Organization (WHO), almost 65% of the World's population has incorporated the value of plants as a methodology of medicinal agents into their primarily modality of health care (6)

1.2 Objective of the Study

Although modern medicine may be available in developing countries (Nigeria) and have diverse use by people, the use of herbs in treatment of disease has often gained popularity for historical and cultural reasons. Therefore, the aim of this project is to achieve the following objectives;

1. To analyse the phytochemical composition of the leaf of Gongronema latifolium (Utasi)
2. To educate the general public of the medicinal role of Gongronema latifolium (utazi)
3. To create the public awareness of the possible use or important of Gongronema latifolium (utazi).

1.3 Scope and Limitation of the Study

The design of this research project is to carryout phytochemical analysis of Gongronema latifolium (utazi), due to time, financial constrain and in adequate materials and equipment.

This research project is limited to phyto-chemical analysis (Cyanogenic Glycoside Flavonoids, Tannin, Alkaliods, Terpenoids and saponin) of Gongronema latifolium(utazi).

1.4 Definition of Term

Gongronema latifolium (utazi) is a perennial edible plant with soft and pliable stem. It is widely used in the West African sub-region for number of medicinal and nutritional purpose.

It belongs to the family of asclpiadaceae. Gongronema latifolium (utazi) (whose leave are bitter) is commonly called "Utazi" and "Arokeke" in South Eastern and South Western part of Nigerian respectively. It is a tropical rainforest plant primarily used as spice and vegetable in traditional folk medicine.

Phytochemical

Phytochemical are naturally occurring non-nutritive plant chemicals that are largely responsible for the protective health benefit of these plant-based foods beyond those conferred by their vitamins and minerals. (7)

Origin and distribution Gongronema latifolium(utazi) is of West African origin. It is found throughout Nigerian and other tropical countries such as Guinea-Bissau, Western Cameroon and Sirra Leone. It is inedible rainforest plant indigenous to South Eastern part of Nigeria. It is indicated as one of aromatic plant of Medicinal importance from Nigeria (8)

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Gongronema latifolium(utazi) has a very widespread distribution of tropical and subtropical region especially in West African countries (such as Nigeria, Cord'ivoire, Serra Leone, Ghana and Senegal) and America, with an average abundance in Northern South Eastern Asia (9). It is widely dispersed in the African forest and family farms as wild, semi wild and cultivated. It can be propagated by seed or stem (softwood, semi-hardwood and hardwood) cutting (11).

2.2 Morphology of the Plant

Gongronema latifolium(utazi) is a climbing perennial shrub up to 5m long. It climbs by twining around a support and can also run along the ground producing adventitious roots. The stem is hollow, soft and hairy with woody base and contains the latex. The leaves are green, simple, opposite and occasionally whorled, usually without stipules and the margins are nearly always entire; petiole is about 3cm long; blade is broadly ovate to almost circular with deeply chordate base, acuminate apex and 3-veined basis. (12)

The flowers are bisexual, small, regular, yellow and fragrant; pedicel is 2-4mm long; calyx lobes are elliptical to rounded and hairy at apex; corolla is tubular up to 5 mm long, companulate at apex; hairy inside or not with five triangular ovate lobes; corona has five lobes which are fleshy, cream, brown as base, and shorter than stamina column; stamens have five short appendages, resting the short conical style apex. Filaments are connected into a tube; anthers are erect with membranous apical appendages; there are two pollinia per polliniarium; ovary is superior. Inflorescence has a terminal and axillary cymose panille up to 13cm long (13).

The fruit is a dehiscent seed pod called a follicle which is oblong-lanceolate. The colour of the fruit varied from green in small fruit to dark brown, then to black at maturity. During maturity stage, the fruit splits open length wide, along the stem releasing the seeds. The seeds are flat, coma shaped and attached to a white silky tuft (pappus) which aids dispersal. There are strongly compressed and measured about 0.5cm in length (14).

2.3 Uses of the Leaves

Gongronema latifolium(utazi) is widely uses in Africa for medicinal and nutritional purpose. An infusion of aerial parts is taken to treat cough, intestinal worms, dysentery, dyspepsia and malaria. It is also taken as tonic to treat loss of appetite. In Sierra Leone and infusion or decoction of the stems with lime juice is taken as a purge to treat colic and stomach (15). In Senegal and Ghana the leaves are rubbed on the joint of small children to help them walk. The boiled fruit is soups are eaten as a laxative. In Nigeria a leafy stem infusion is taken as a cleansing purge by Muslims during Ramadan. A decoction of leaves or leafy stem is commonly taken to treat diabetes and high blood pressure. The latex applied to teeth affected by caries. It is also taken to controlling weight gain in lactating women and overall health management. Asthma patients chew fresh leaves to relieve wheezing. A cold maceration of the root is also taken as a remedy of Asthma (16).

A decoction of the roots, combined with other plant species, is taken to treat sickle cell anaemia'. A maceration of a leave in alcohol is taken to treat biharzia, viral hepatitis as a general antimicrobial agent (19).

In Southern Nigeria the Igbo people call the leaves 'utazi' and the Yoruba people 'arokeke'. They are sharp-bitter and sweet and widely used as a leafy vegetables and as a spice for sauces, soup and salads. The leaves are used to spice
locally brewed beer. In Sierra Leone the pliable stem are used as chew sticks. The bark contains much latex and has been tested for exploitation (17).

2.4 Properties of the Plant

Few chemical analyses have been performed on Gongronema latifolium(utazi). From the leaves several 17B-marsdenin derivatives (pregnane glycosides) were isolated, as well as B-sitosterol, lupenyl oil from the leaves contains as main component linalool (19.5%), (E) phytol (15.3%) and aromadendrene hydrate (9.8%) (18).

The oil leave did not show significant antibacterial activity against staphyloccus aureus, Salmonella enteritidis, Salmonella chlerasius, SAmonella typohimurium, listeria monocytytogenes and pseudomonas aeruginosa, and an aqueous leaf extract showed moderate antibacterial activity against Escherichia coli, Staphylococus arures and pseudomonas aeruginosa.the ethanol extract also exhibited antifungal activity against Basidiobolus haptosporus and Basiclibolus ranaruim. A methanolic extract showed significant antileishmanial activity against Leishmania chagasi in vitro (22)

Different methanolic and ethanoic leaf extract showed promising hypoglycaemic and antithyperglyaemic activities in a dose dependent way on normal and alloxan-induced or streptozotocin-induced diabetic rabbits. An ethanolic leaf extracts possessed significant anti-lipid perodative activities. In a small clinical trial, the blood glucose concentration of healthy human was determined after consumption of the leaves, and leave moderate to promising antioxidant, anti-inflammatory, hepatoprotective, antiplasmodials, anti-asthmatic, anti-sickling, anti-ulcer, analgesic, antipyretic, gastrointestinal relaxing, laxative and stomachic activities. An cute toxicity test in rats gave an LD30 of 1678.6mg/kg when intraperitoneally injected (20)

2.5 Nutritional Values

Nutritionally, Gongronema latifolium(utazi) is a good source of protein, minerals and vitamins. Previously researched have shown that the leaves are suitable for use in food production due to their high amino acid contents. The leaves can be eaten fresh, dried and used as local powdery spice or as vegetable for food preparations such as unripe plantain porridge, white soup, sauces and salad in which they add a bitter sweet flavor. They are also used spice locally brewed beer (23)

Gongronema latifolium(utazi) leaves are rich is fats, protein, vitamins, minerals and essential amino acids. Its protein contain (27.2%) dry matter is quite high and compares favourably with percentage dry matter (DM) value reported for chickpea (24.0%), fluted pumpkin leaves (22.4%), Hibiscus esculentus (23%),v Tamarindus indica (24.3%) and Mucuna flagellipes (24.9%) (21)

The dominant essential and non-esential amino acids are leucine, valine, phenyalanine and aspartic acid, glutamic acid, glycine respectively. These essential non-essential amino acids are involved in protein synthesis and as metabolic intermediates respectively. High concentration of vitamin (A, C, E an niacin) is also indicated in the leaves of Gongronema latifolium(utazi). These vitamins have antioxidant activities. Vitamin A (Carotene) is essential for food health especially for eyesight and can help prevent early age blindness in children. Vitamin C (ascorbic acid) is important for growth and repair of tissues in all parts of the body (16)
Vitamin E (Tocophenol) a well-known antioxidant that can mitigate lipid oxidation and helps to reduce the occurrence of atherosclerosis which predispose to increased risk of heart diseases. The crude fat content of Gongronema latifolium(utazi) leaves (6.7%DM) compares fovourably with percentage DM value reported for leafy vegetable like Brachystegia eurycoma (5.8%) and Tamarcindus inica (7.2%) (12)

The fat content is good source of energy for the body. Apart from energy, the lipid fraction of Gongronema latifolium(utazi) contain useful amount of essential fatty acids known as linocleic acids (31.0%) which is an important component of membrane phospholipid, a professor to arachidonie acid found in virtually all tissue membranes of humans. Arahidonic acid is metabolished to various prostaglandins which regulate many normal processes including blood pressure and gastric acid secretion.

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Mineral elements like siodium, calium, postasium, iron, and magnesium are reported to be present in Gongronema latifolium(utazi) leaves (24).

Methodology

Beakers conical flask, test tube holders, filter papers weighing balance, spatula, burettes, measuring cylinder, funnels, water bath, cotton wool, aluminum foil, maceration, marking tape calorimeter, syringe.
Regnts
Ethanol, acetic acid, 10ml of ammonium hydroxide solution, tannic acid, distilled water, Na2, CO3, sodium carbonate, picrate acid, diethyl ether, sodium hydroxyls, normarl-butanol, sodium chloride.

3.1.1 Sample Collection

Fresh leaves of gongroneme latifolium (Utazi) were plucked from the stem at Mbiabet Ikpe Annang Essien Udim Local Government Area. The leaves sample was washed with tap water and then rinsed with a distiller water and then sliced into sizable pieces. The fresh leaves were then sundried for some days and milled to powder. The milled leaves powder was taken to Microbiology Department on University of Uyo, then the leaves powder was weighed and used for the phytochemical analysis.

3.2.1 Determination of Alkaloids

Producers

2g of the milled leaves sample was measured into a beaker containing 50mls of 10% acetic acid solution in ethanol. The mixture was well shaken and allowed to stand for four hours before filtering.
It was evaporated to one quarter id its original volume. And drop wise of 10ml of concentration ammonium hydroxide solution. The filter paper then dried and allowed to cooled and weighed. And then alkaloid was filtered and reweighed.
The precipitate was oven dried for 30 minutes at 60 ^ 0 C and re-weighed. The alkaloid contents of the sample were determined using the equation.

$$\text{Percentage alkaloid} = \frac{W2-W1}{W} \times 100$$

Where W = Weight of sample
W 1 = Weight of empty paper
W 2 Weight of paper + precipitate

3.2.2 Determination of Saponin

Procedure

2g of the sample was measured into a beaker and 50ml aqueous solvent (20%ethanol) was also added into the beaker. The mixture was incubated with periodic agitation in a water bath at 55°C for 3 hours. It was then filtered. The residue was retracted with 100ml of extracting. Both extract were pooled together. The combine extract was reduced by evaporating to about 40ml and then transferred to a separating funnel and equal volume of diethyl ether was added and shaken vigorously. Separation was by partition during which the ether layer was discarded and the aqueous layer reserved Re-extraction by partition was done repeatedly until the aqueous layer became clear in color. (18). The pH was adjusted to 4- 5 using dilute NaOH in drops. The saponin was extracted finally with successive portion of 60ml and 10ml of normal butanol added to it. The combine extract (ppt) was washed with 5% HaCL solution and evaporated to dryness in a pre-weighed beaker (W_1) in an oven 60°C and reweighed (W_2).

$$\text{Saponin \%} = \frac{W2-W1}{\text{WT of sample}} \times \frac{100}{1}$$

3.2.3 Determination of Cyanogenic Glycosides

Procedure

Ig of the sample was weighed into a corked conical flask and 50ml of. distilled water was added to it. The extract was allowed to stay overnight. The solution was filtered and the extract was used for the cyanide determination 1ml of the filtrate was corked in a test tube and 4ml of alkaline picrate was added and was incubated in a water bath for 5 minutes.

And the absorbance was read at 490nm. The absorbance of the blank which contained only 1ml of distilled water of 4ml of alkaline picrate solution was read and used to stabilize the spectrophotometer taking the absorbance of the samples.

3.2.4 Determination of Tannins

Procedure

2g of the sample was measured into a beaker using weighing balance. And 50mls of distilled water was also added into the beaker and was shaken.

The mixture was allowed to stand for 30minutes at 28°C before it was filtered through whatman No.42 grade of filter paper.

Exact 2ml of the filtrate dispersed into volumetric flask. Similarly, 2ml standard tannin solution (tannin acid) and 2ml of distilled water were put in separate volumetric flask to serve as standard and the reagent was added to each of the flask and 2.5ml of saturated Na2CO3 solution was added. The content of each flask was made up to 50ml with water and allowed to incubate at 200C for 90minutes.

Their respective absorbance was measured in a spectrophotometer at 560nm using to calibrate the instrument.

3.2.5 Determination of Flavonoids

2g of the plant sample was measured into a beaker. And was extracted repeatedly with 100ml of 80% aqueous methanol at room temperature. The whole solution was filtered through whatman filter paper. The filtrate was later transferred into water bath and weighed (15)

4.1 Results

The results of phytochemical analysis of Gongroneme latifolium(utazi) obtained from Mbiabet Ikpe Annang in Essien Udim L.G.A is presented on table 1. The result recorded highest concentration in Alkaloid (36.3 ± 0.42m/100g) followed in descending order by a saponin (30.38 ± 0.83mg/100g) HCN (6.6 ± 0.22mg/100g) tanning (4.43 ± 0.39mg/100) and flavonoid (0.83 ± 0.58mg/100) as the least.

Parameters	**Concentration in Mg/100g**
Alkaloids	36.3 ± 0.42m/100g
Saponin	30.38 ± 0.83mg/100g
HCN	6.6 ± 0.22mg/100g
Tanning	4.43 ± 0.39mg/100
Flavonoid	0.83± 0.58mg/100

4.2 Discussion

Different authors (1), have noted that consumption of fruits, vegetables including the leave Gongroneme latifolium(utazi) helps to prevent disease sad cancer ulcers etc. and as remedy to disease condition such as gastrometestinal disease malaria, pile etc. studies have shown that these fruits and

vegetables are able to play these vital roles due to the presence of chemical constituents found in them, which are bioactive in nature and are known as phytochemical. The phytochemical analysis of Gongroneme latifolium(utazi) revealed the highest concentration of Alkaloids (36.3 plus/minus 0.42) follow descending order by a saponin (30.38 ± 0.83mg/100g) HCN (6.6 ± 0.22mg /100g) tanning (4.43 ±0.39mg / 100) and flavonoid (0.83 ± 0.58mg / 100) as the leas Alkaloids have antipyretic effects (4) the presence of alkaloids in the leaves of Gongroneme latifolium(utazi) suggest and increase in disease resistances and stress as well as algesic and anti-inflammatory potentials (10). The appreciable concentration of Alkaliod in this finding was in line with (12) but was not in line with the work of (7), that recorded in Gongroneme latifolium(utazi) could be due to the need preserve the plant from microbial attack.

5.1 Summary

Gongroneme latifolium(utazi) belongs to the family of asclepiadeceae. It is a climbing perennial shrub up to 5m long. The leaf is a perennial edible plant with soft pliable stem and rich in fats, proteins vitamins, minerals and essential amino acids. The leaves are used as spice and vegetable in traditional folk medicine for the treatment of cough, intestinal worms, dysentery, dyspepsia and malaria.

Gongroneme latifolim (utazi) contains phytochemical which are known to carryout important medical food in the body. (11)

Conclusion

The present study has the phytochemical composition of Gongroneme latifolium(utazi) (Utazi). These phytochemical contribute to the acclaimed medical properties of Gongroneme latifolium(utazi) leaf. The result show that Gongroneme latifolium(utazi) leaf is a good raw material for the production of some medical drugs and can be used in folk medicine for the treatment and prevention of some diseases.

5.2 Recommendations

Based on the result of this analysis, the follow recommendations are made;

Gongroneme latifolium (utazi) should be consumed in sufficient quantities because of its active bio constituents if taken as supplement.

Further studies to be carried out to isolate, characterize and elucidate the structure of the bioactive compounds from the plant for industrial drug formulation. (19).

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