DETERMINATION OF PHYTOCHEMICAL ANALYSIS OF DRIED PLANTAIN LEAF (*Musa paradisiaca*)

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ABSTRACT

The analysis of the phytochemical component of the dried leaf of *Musa paradisiacal* (Plantain leaf) were carried out by standard analytical method. The calculate of the percentage contents were done using milligrams per milliters (mg/ml). The results shows that Alkaloid content were 9.25 $\pm$ 0.02, Saponnin content were 3.99 $\pm$ 0.03, Flavonoid content were 1.96 $\pm$ 0.47, tannins were 2.89 $\pm$ 0.60 while the content of cynogenic glycoside were observed to be 1.41 $\pm$ 0.59. The results indicate that *Musa paradisiaca* leaf has a higher contents of alkaloid while cynogenic glycoside and flavonoid had the least concentrations. *Musa paradisiacal* has been used traditionally treating different kind of ailments such as

typhoid, fever, inflammatory boil, malaria, stomach ulcer, etc. by different communities in Nigeria. The results obtained in this analysis has proved the medicinal properties of the plant as an evident.

Key words: *Musa,* components, *Paradisiaca*, leaf, dried, Phytochemicals

INTRODUCTION

Traditional and folk medicine are orthodox methods used by our ancestors in treatment of sickness and diseases in different parts of the world. In Africa as a continent and with our low income level, more than 60% of the population restort to using of plant extract for their treatment, and this understanding has been passed through generations. Using of plant extracts for the treatment of sicknesses and diseases has been a generational methods in Asia, Africa, India and other parts of the world. These had played a vital role in contributing to the development of different system of traditional medications.

However by so doing, much scientific research has been carried out on different plant extracts for their bioactive compounds. The uses of biological active natural products have been found useful in finding new chemical Entitiles (Newman *et al*., 2004).

Plantain is both the tropical and subtropical fruits, it all round season stable food. In developing countries with their low level income rate and highly populated like Nigeria, plantain remain one of their major food. Plantain provides more than 30% of the caloric needed for over 120 million people in Africa, and average plantain gives almost 920 kilo juices (220 kilo calories) of food energy 965.852014 and is a good sources of potassium and dietary (Cronaufeer, and Krikorian, 2012; Luis *et al*., 2012).

Some diseases such as dysentery, intestinal tensions in ulcerative colitis, diarrhea, nephritis, hypertension, gout, cardiac disease can be

treated using unripe plantains. It has also found out that other diseases like excess menstruation, inflammation and pain can be treated with unripe plantain. Plantain leaf contained some bioactive substances such as hexane, ethyl, acetate, methanol and other multi-drug resistant pathogens (Ghanium, 2003; Partha, 2007; Khare, 2007; Coe and Anderon, 1999; Ponmurugan *et al*., 2013). When taking plantain meal, plasma oxidative stress is reduced specifically in human's body because of the content of dopamine, ascorbic acid and other oxiioxidants. Glycosides and monosaccharide components are the responsible for such activity (Mokbed and Hashinaya, 2005). It has be proved that the antidiabetic activity of methanolic extract of plantain fruit contained streptococci used in treating diabetic.

Phytochemical are chemical substance or bioactive substances present naturally in plants which provides health for animal along with micro and macro minerals. It gives protection to plants. From their predictors, it provides antioxidant, it contribute to the plant colour, aroma etc. Phytochemical substances are from different variety of plant source and there have purposeful effect for animal and humans. The phytochemicals also protect plant cells from environmental hazard such as stress, drought, uv exposure and pathogenic attack (Hesler and Blumberg, 1999; Narasinga, 2003; Balasundram and Saman, 2006).

pHytochemicals substances are in different parts of plants such as stems, leaves, root, bark, fruits, flowers and their seeds and their amount in different plants changes from one plant to another. The substance are not necessarily as food human's body, but they play very vital role in preventing some common diseases and sickness.

We have as much as thousands of such substances known, some are well known which includes; flavonoids in fruits, phenol, tannins, saponins, lycophene, cyanogenic glycoside, terpenoid, alkaloids, isoflavonoid, cartonenoid etc.

Alkaloid substance:
These are classes of natural occurring organic substance in plants that contained nitrogen base compound. It has psychological effect on human's and others (Trane *et al*., 2000). There are synthesized naturally in a large amount, it has a bitter taste, and there are functioning in protection of plant against preditors. It has also discovered that alkaloids has been found to be effective in medicine, for instance morphines are classes of alkaloids and it is used as pain relief, codeline in opium is an excellent analgesic, cocaine is used as a cardiac or respiratory stimulants while quinine from cinchon tree is a powerful anti malaria agent.

Flavonoids
These are polyphenolic substance that are so many more than 4,000 flavonoids has been known of which so many of them are found in vegetables, beverages, fruits etc. (Pridham, 2000).

There played a very powerful role in many medical treatment in both traditional and folk medicine even up till this generation.

Flavonoids stand out among many vascular plants in form of glucosides and methylated derivatives, aglycones etc. More than 4,000 types of these substances found in plant naturally taken by human and almost 650 flavones and 1030 flavonoids are known. These bioactive compounds has show a wide range of biological and pharmacological properties like; anti-allergic, anti-inflammatory, antioxidant, anti-bacterial, anti-fungal, anti-viral, anti-diarrheal activities. The most powerful of all, which is to protect human body from free redicals and reactive oxygen species (Latay and Gillzquierdo, 2008; Tapes *et al*., 2008).

Saponins
Saponins are chemical substances found in certain abundance in different parts of plant species, having soap-like foaming when shaken in a aqueous solution saponins function in the body as anti-feedant and

it also protect plant against microorganism and fungi. Some of the biological functioned are nutrient absorption and digestion, it also help in controlling of blood cholesterol level, bone health, cancer and building up of the immune system of the body (Tapes *et al*., 2008).

Saponins play a vital role in mining and ore separation as well as in preparation of emulsion for photographic films and it is an additive in cosmetics industries (Serrano *et al*., 2009).

Tannin

Tannin is a type of phytochemical compound found in plant; it has an astringent aromas, a bitter taste and a polythenolic compound that binds to and precipitates proteins and other organic compounds including amino acids (Schofield *et al*., 2001).

These compounds are heterogeneous group with high molecular weight. There have the capacity to form reversible and irreversible complexes with protein compounds and other polysaccharides, such as cellulose, hemicelluloses, alkaloids, nucleic acids and other minerals. These compounds spread widely and are distrusted in many different plants. There also play a role on protection of plant from inserts, pests, predator, and also regulating the growth of the plant (MacAllan, 2000).

Tannin is used against diarrhea, as diuretics against stomach and as anti-inflammatory, antiseptic, antioxidant, pharmaceuticals in medicine. The industrial uses of Tannins includes production of inks (iron gallate ink, caustic for cation dyes (Tannins dyes) textile and in food industries, in wine, beer, fruit juices as anti-oxidant.

Cyanogenic glycosides

It belong to the group of secondary metabolites that is naturally produced by plant. These substances are comprises of an α-hydroxynitrile hype aglycones and a sugar moiety (mostly D-glucose). These compounds are gotten from the five protein amino acids which from the non proteinogenic amino acid and cyclopentenyl, glycine. The

content are very small amount of hydrogen cyanide (HCN) and there are derived from six different block.

The cyanogens are glycosides of sugar, glucose which combined with cyanide containing aglycone. The substances are classified as phyto anticipants. There releases toxic volatile HCN as well as a ketones or aldehydes to tend off herbivore and pathogen attack (Gibson *et al*., 2002).

Materials and Methods

The dried leaves of plantain plant were obtained from plantain plantation farm in Ukana Uwa East, Essien Udim Local Government Area, Akwa Ibom State, it was brought to the Department of Chemical Sciences, Akwa Ibom State Polytechnic, Ikot Osurua, Ikot Ekpene for identified sample leaf were washed with distilled water, cutted and sun dried for two weeks. The dried sample were ground into a powdery form using electrical grinding machine and the grounded sample were stored in an air tight container for further analysis. Ethanol extract of the sample was prepared by soaking 300 g of the dried grounded sample in 2500 ml of ethanol for 48 hrs with intermittent stirring. It was filtered using funnel and whatman filter paper. The extracts were evaporated to dryness at 40^0C in a water bath.

Determination of Alkaloids

Determination of Alkaloids was done using Harbone (1973) procedure. 5 g of the sample was weighted into 250 ml beaker 200 ml of 100% acetic acid was added, then ethanol was also added and corked, it was allowed to stand for 4 hours, then the heat mixture to a quarter of the original volume (50 ml) concentrated Ammonium hydroxide (NH_4OH) was added drop by drop to the extract until the precipitation was formed. Then allow to the solution of settle down and the precipitate was collected and wash with diluted ammonium hydroxide (NH_4OH) then filtered. The alkaloids which is the residue was dried and weight.

Determination of Tannins

5 g of the ground sample was weighted into 100 volumetric flask and 50 ml of distilled water was added and be shaking and allowed to stand for about 7 hours. It was then filtered using whatman filter paper into another 50 ml volumetric flask. The 1 ml of the filtrate was pipette into a test-tube and mixed with 1 ml of 10 % Fe and made up to 5 ml with distilled water. The incubation of the mixture was carried out at 37^0C using water bath. The reading of the absorbance was done using spectrophotometer at 72 mm wavelength.

Determination of Flavonoids

Bohama and Kocipi of 1994 method was used, which 5 g of the ground sample extract was repeatedly done in 100 ml of 80% aqueous methanol at room temperature. Whatman filter paper was used in filtering crucible and was evapoured into dryness over water and the weigh was recorded.

Determination of Cyanogenic glycosides

Titrimetric method of Voyed (1875) was used by weighing 5 g of the ground sample, it was dissolved in 50 ml of water in a corked flask then filtered, and 1 ml of the filtrate was measured into a test-tube and 4 ml of picrate was added, a prepared blank solution was incubated in the water bath for 5 minutes, after the development of the colour, the absorbance was read using spectrophotometer at 490 mm of wavelength.

Determination of Saponnin

Abadomin and Ochuko (2001) method was used in determination of saponnins were weighted into a conical flask and 20 % of 100 ml of ethanol was added into the flask of the ground sample and was heated over a hot water bath for 4 hours and stirred continuously at 55^0C. Then the mixture was filtered, while the residue was re-extracted where the combined extract was reduced to 4 ml over water bath at about 90^0C. 20 ml of diethyl-ether was added in a 5 ml separating funnel of the

transferred concentrate and was vigorously shaken, and the aqueous layer was discovered while others was discarded.

Result and Discussion

Table 1.0 result of the analysis of the photochemical components of dry leave of plantain

PARAMETERS	**CONCENTRATION (mg/ml)**
Alkaloids	9.25 ± 0.02
Flavonoids	1.96 ± 0.47
Saponnins	3.99 ± 0.03
Cynogenic glycoside	1.41 ± 0.59
Tannins	2.89 ± 0.60
Phenols	0.56 ± 0.10

Results expressed as mean of triplicates values ± standard deviation

Discussion

The above table 1.0 shows the results obtained from the analysis of the phytochemical properties of dried plantain leaf were as follow; the concentration of parameters were calculated in mg/ml.

The alkaloids content were 9.23 ± 0.02, flavonoids content were 1.96 ± 0.47, saponnins content were 3.99 ± 0.03. Then cynogenic glycoside were 1.41 ± 0.59, Tannins content were 2.89 ± 0.60 while phenols content results obtained by Tiwari *et al*., (2011 & 2021), shows that less, this may be due to some environmental factors. While other parameter such as flavonoids when compared to the analysis carried out by Otung, (1998); Tepas *et al*. (2008) show a little difference in concentration. Going by individual parameters, the results shows some common variations in their concentrations.

The bar chart below also shows the phytochemical concentration that are present in the plant leaf.

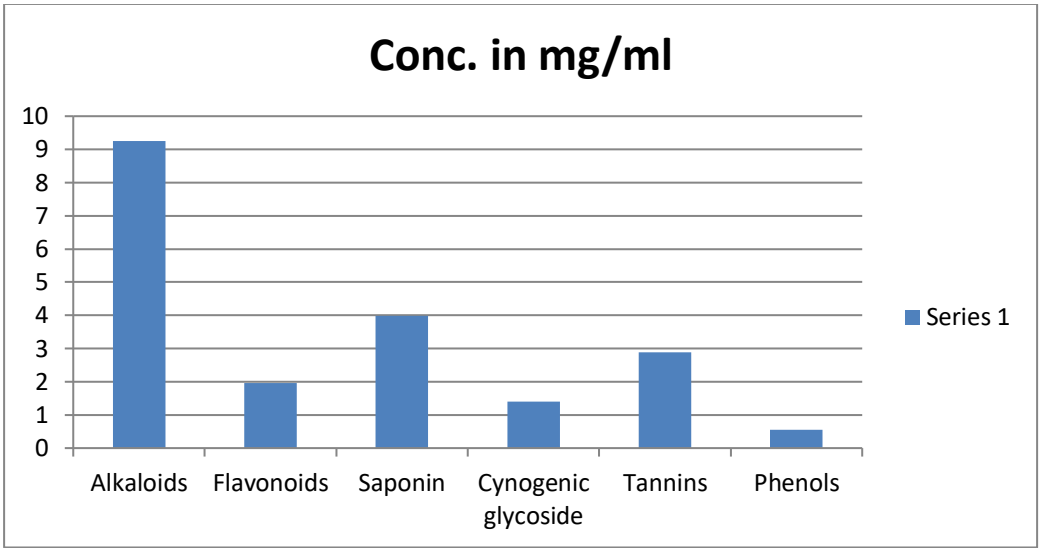

Fig. 1 A bar chart showing phytochemical conc. present in plantain leaf

This is the reason why communities in the southern region of Nigeria is using the dried plantain leaves to cure some common diseases due to certain percentage of bioactive compounds present in the leaf.

Conclusion

From the results of the present analysis, it was confirm that the usefulness of dried plantain leaf for the treatment of different ailment of the body due to the appreciateable content of phytochemical bioactive compounds presence in the plant. The little different in the values of the components when compared to previous works may be due to environmental factors.

Recommendation

Since dried plantain leaf has some essential phytochemical constituents, further studies and analysis of full isolation and characterization of the plant should be carried out in other compounds that may be more useful to human's body.

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