Phytochemical Screening of Leaves and Seed Extracts of Water Lily (*Nymphaeceae Lotus)*

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Abstract
Phytochemical screening and fractionation of the leaves and the seed extracts of *nymphaceae lotus* was carried out using standard procedures of Trease and Evans, (1989), and Sofowora (1993) to determine the presence and percentage yield of phytochemicals analysed. The plant is used as component for local medicine and comercially used to treat maleria without the knowledge of its phytochemicals. Hence, the need to know the components of phytochemicals present in the plant extract. The fractions obtained for seed extracts were Alkaloids (0.41 %), flavonoid (0.39 %), glycoside (2.86%), saponins (0.14 %) and tannins (2.25 %) while the leaves extract contained Alkaloid (2.42 %), flavonoid 0.68%, glycoside (1.80 %), saponins (0.47%) and Tannins (4.16 %). The research shows presences alkaloids, flavonoids, tannins, saponins and glycosides which is a strong indication that the plant parts have potential medicinal values especially in treatment of fever as it is used locally. More work is recommended on the other parts of the plants to ascertain the phytochemicals present.

Keywords: Alkaloids, Flavoniods, *Nymphaceae lotus*, Plants, Saponins, Glycoside, Tannins.

INTRODUCTION

Medicinal plants (medicinal herbs) have been discovered and used in traditional medicine long time ago. Most Plant synthesize many chemical compounds for their function including defense against infections, numerous phytochemicals with potential to establish biological activity have been identified.

Various part of the plant has been put in used by man for medicinal purpose since pre-history (Chah *et al.*, 2006). Any plant which contains a substance that can be used for the curative goal in one or more of its organs or its essential parts which are the precursors for the formation of useful drugs is known as medicinal plant. They are also those group of plants that are endowed with the unique properties that qualify them to be drug articles used for medicinal purposes (Cragg, 2012). Any plant having atleast one part (stem, bark, root, or leave) that can be used for therapeutic purposes is also termed as medicinal plant (Bruneton, 1993). A herb becomes a medicinally importnat plant only when its biological and active constitutes are been ethnobotanically reported or scientifically proven (Elujoba, 1997). Plants are a great source of medicine which makes them useful in treating human illments. It is no doubt that in today's world, herbal medicines play a vital role in health care, they bridge the gap between the demand and availability for modern medicine (Akerele, 2012) *Nymphaea lotus* which is of the order *Nymphaeaceae* and commonly known as water lily and Bado in Hausa is an aquatic plants. *N. lotus* grows mostly in all part of Nigeria in wetlands, shallow water than the white water, in ponds etc. and in Northern part, since the flooded soil are deficient in oxygen, parenchyma in the leaves transport oxygen to the rhizomes, also there is mass flow of oxygen from the young leaves into the rhizome and out through the older leaves, the rhizome are often consumed by muskrats (Marhrus, 2017).

The aim of this study is to determine the phytochemicals of aqueous leaves and seed extracts of *N. lotus*.

Objectives;

1. To obtain the aqueous extract of the leaves and seed sample.

2. To determine and quantify the phytochemicals present in N.lotus (water lily).

Scientific classification of *Nymphaeaceae lotus (*water lily)

Kindom	Plantea
Sub-kindom	*Tracheobionta*
Super division	*Spermatophyta*
Division	*Magnoliopphyt*
Class	*Magnoliopsider*
Sub-class	*Magnolidea*
Order	*Nymphaeales*
Family	*Nymphaeaceae*
Genus	*Nymphaea*

The species occurs in ponds, lake and slow moving water growing in water up to 5meter deep, different. Plants produce a variety of chemical compounds that are used in performing important biological functions. These chemical compounds produced can remove antimicrobial actions in humans through varoius mechanism. Residents of rural area use medicinal plants in many developing countries. Our ancestors through trial and error elimination made new foundings of the healing ability of plants.

Phytochemical are chemical or bioactive compounds found in plants which helps nutrients and dietary fibre to guard the human system against different diseases (Usman *et al.,* 2017) They are also formed during normal metabolic processes in plants (Okigbo *et al.,* 2009). These bioactive compounds are not essential nutrients required by man for sustaining life, however, they have significant properties that aid, eradicate or fight common diseases. They have a very wide variety which makes it difficult to classify the them. However, in recent years, Scientist have made effort to classify them asprimary and secondary constituents depending on their role in the metabolism of plants (Sexena *et al.,* 2013). The primary constituents are the common sugars, proteins, amino acids, pyrimidines and purines while the secondary components are the remaining phytocemicals like alkaloids, terpens, flavonoids, ligands, plant steroids saponins, glycosides etc (Hahn, 1998). In modern science, plants are used as intermediate for new synthesis of compounds and as sources of direct medicinal agents and, they are also used as a physiological/taxonomic marker for discovery of new drugs. These plants served as a sarting material for the expansion of more complex semi synthetic chemical compounds (Akerele, 2012). According to (Heldth, 2005), most of these bioactive compounds are processed through biosynthesis in the metabolic pathways. The primary metabolites are of immense importance to plants (Trease and Evans, 1989). Plants have been introduced as the source of drug development and these medicinal herbs have been investigated for their biochemicals that are esentially potent (Fahnsworth, 1988). Most of the medicinal herbs in Nigeria had been recorded (Gill, 1992). The significance of these medicinal plants and their input to medicine has attracted interest of many traditional and modern drug disciplines (Gill, 1992). The tropical rainforest, of which Nigeria is a part, has been characterised by (Sofowora, 1993) as a reservoir of phytomedicines.

Due to these properties possed my plants, there is need to know the chemical compositions of the leaves and seed extract of the plant, also to ascertain the fractions of these phytochemicals present in the exctracts of the leaves and seed of *N. lotus*

MATERIALS AND METHODS

Samples (Leaves and Seeds) were collected from Tudun Jukun of Zaria Local Government of Kaduna State and was taken to Department of Botany, Ahmadu Bello University for identification. Samples were sorted (seed and leaves), air dried and pounded and was used for further analysis.

Extraction of samples:

Samples (leaves and seed) were maceration with 70% ethanol (Analar grade) for 5-days to obtain crude extract (Yinusa *et al.,* 2016).

Phytochemical Screening

Qualitative phytochemical screening was run to determine the presences of alkaloids, flavonoids, glycosides, saponins and tannins in the extract using standard method of Trease and Evans (1989) and Sofowora (1993).

Test for Alkaloids

To a test tube containing 5g of the sample,

Hydrochloric acid (10 ml) was added, the mixture was observed for colour changes, which is brown or presence of precipitate which indicates presence or absence of alkaloids.

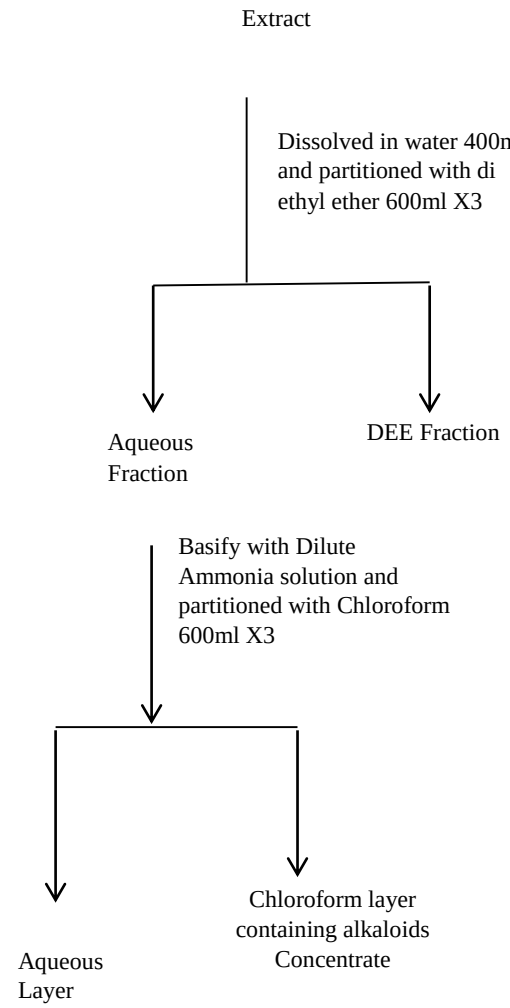
Test for flavonoid
5g of sample was dissolved in 2ml 50% methanol and 5drops of concentrated HCl was added, pale yellow precipitate shows the presence or absence of flavonoids

Test for glycoside
3drops of ferric Chloride was added to a test tube containing 5g of the sample and was immersed into boiling water for 5minutes, equal volume of benzene was added to to cooled mixture, the benzene layer was separated and treated with ammonia solution, formation of rose pink color in the ammonia layer shows the presence of glycoside.

Test for saponins
To 5g of sample in a test tube, 10ml of distilled water was added with shaken vigorously for persistent foam which shows the presence of saponins.

Test for tannins
To 5g of sample in a test tube, 3drops of Ferric chloride ($FeCl_3$) solution was added, the mixture was shaken and observed for colour changes or presence of precipitate, dark brown coloration or white precipitate observed showss the presence of tannin

Quantificationn of Alkaloids from Plant Extract
The sample extract was dissolved in water, partitioned by mixing with Diethyl ether in a separating funnel to remove pigments. The aqueous layer was made alkaline by adding dilute ammonia solution, chloroform was added and allowed to separate according to the chart in figure 1.



Trease and Evans (1989)
Figure 1: Chart showing the general method of fractionation of alkaloids from plant extract (both leaves and seed).

Quantification of glycoside
500 g of samples (leaves and seed) was measured into a thimble and extracted with ethanol using soxhlet apparatus using soxhlet apparatus. After extraction, the extract was collected and treated with lead acetate to precipitate tannins after that, it was filterd and to the filtrate, pass H_2S gas was passed and lead acetate was precipitated as lead sulphide. It was then filtered and concentrated to get glycoside fraction.

Quantification of flavonoid, saponins and tannins

The multiple extraction method was adapted. The crude extract of each sample was dissolved in water and partitioned with diethylether, the aqueous fraction was partitioned with ethylacetate, the aqueous fraction of this was again partitioned with N-butanol, the aqueous residue was boiled with water and concentrated to get the Tannin fraction. The N- Butanol fraction was partitioned with 1% KOH and separated to get the Saponin fraction, the KOH fraction was acidified with dil HCL and partitioned with N-Butanol to get Flavonoid according to the chart in Figure 2.

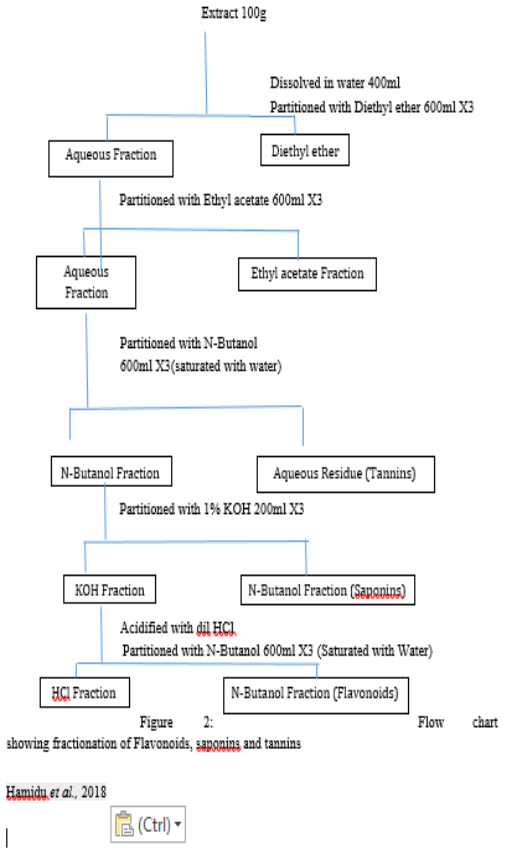


Figure 2: Flow chart showing fractionation of Flavonoids, saponins and tannins

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Figure 2: Chart showing method of fractioning of N- Butanol and KOH

RESULTS

This study shows the distribution of some bioactive constituents in the samples. Tables 1 and 2 shows the percentage yields of the crude and phytochemical constituents respectively while Table 3 shows the phytochemicals characters of the samples studied. The yield of Alkaloid, tannins and glycoside was greater than 0.7 % in both samples except alkaloids in seed while Flavonoids and Saponins had a yield of less than 0.7% All the samples (leaves and seeds) contains all the phytochemicals studied (Alkaloids, Flavonoids, Glycosides, Saponins and tannins)

Table 1: qualitative phytochemical constituents

Phytochemicals	Leaves	Seeds
Alkaloids	presence	presence
Flavonoids	presence	presence
Glycosides	presence	presence
Saponins	presence	presence
Tannins	presence	presence

Table 2: % yield of crude extract

SAMPLES	% YEILD
Leaves	19.83
Seeds	8.77

Table 3: Percentage yield of phytochemicals

Phytochemicals	Leave (% yield)	Seeds (% yield)
Alkaloids	2.42	0.41
Flavonoids	0.68	0.39
Glycosides	1.80	2.86
Saponins	0.47	0.14
Tannins	4.16	2.25

DISCUSSIONS

Phytochemical screening of the leaves and seeds parts of the plants shows the presence of alkaloids, saponins, tannins, glycosides, and flavonoids in both parts. The occurance of these bioactive compounds in the various extracts accounts for their functions as medicinal plants. Presences of alkaloids, phenols, tannins, in some medicinal plants was also reperted (Edeoga *et al.*,2005). The occurance of flavonoids in both samples gives a good support to the use of plants in herbal medicine and development of new drugs. Other secondary metabolites like alkaloids, and saponins contained in plant parts are equally of interest in pharmacy.

Robin (2001) reported the presences of alkaloid in nymphaceae as good depressant agents. This makes the plant to produce calming and soothing effect on the nervous system making it important in the remedy of insomnia and other related disorder (Robin, 2110). Yisa (2009) also repeorted the presences of these phytochemicals (Alkaloids, Saponins, Tannins, flavoniods and glycosides) in ethanolic and aquoes extract of *N.lotus*. This is in line with the report of Afoloyan *et al.,* (2013)which comfirmed the presence of phytochemicals in both aquoes and acetic extract of *N.lotus*. Alkaloids, the well known of all the bioactive compounds, are known to be pharmacologically active and their activeness are felt in the autonomic nerve system, blood vessels, promotion of diuresis, respiratory system, gastrointestinal tract, uterus, malignant diseases, infections and malaria (Trease and Evans, 1989). Flavonoid have been discovered to contain hypolipidemic potential and also posses high anti oxidant property due to the presences of hydroxy group which helps protect man against diseases related to free radical (Vaya *et al.*, 2003). Flavonoids are well recognized for their anti-oxidant, anticarcinogenic, antimicrobial and antitumor properties (Manikandan *et al.*, 2006), while glycoside acts on the muscles of the heart and increase the renal flow (diuresis).

Tannins have high anti-oxidant and anti-microbial characteristics, as well as for calming relief, body aches, and anti-inflammatory and diuretics (Okwu and Okwu, 2004). The presences of saponins in the extract also boost their anti oxidant properties. Saponins also help to lower the cholesterol level in the body system and have anti-diabetic and anti-carcinogenic characteristics (Trease and Evans, 1989). In addition, Saponins are expectorants, cough suppressants and for haemolytic activities (Sofowora, 1993; Okwu, 2005).

The presence of alkaloids, saponins, tannins, flavonoids and glycosides in the samples indicated that they have antimicrobial properties Leven *et al.*, (1979) had linked the antimicrobial properties in plants to the presence of tannins, alkaloids, flavonoids and saponins.

CONCLUSION

The phytochemistry of N. lotus showed the presences of an array of medically important secondary mtabolites which includes alkaloids, flavonoids, tannins, saponins and glycosides which is a strong indication that the plant parts have potential medicinal values especially in treatment of fever as it is used locally.

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