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PROFILING PHYTOCHEMICALS OF *BAUHINIA RACEMOSA* LEAF EXTRACTS

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ABSTRACT

The leaves of *B Racemosa* were collected from its natural habitat in Wukari Local Government Area of Taraba State, Nigeria. The method of cold maceration was used in the extraction by serial exhaustive extraction method. The phytochemical screening of crudes yield of the chemical constituents of *B. racemosa* showed that alkaloids, steroids, phenols and flavonoids were present in all the leaf extracts. Anthraquinone was present in all the extracts except in ethanol, tannins was absent in hexane extracts but present in all the extracts. Phlobatannins was present in the chloroform and ethanol extracts, while steroid was absent in the acetone and ethanol extracts while glycoside was absent in the ethyl acetate extract. Terpenes was detected in chloroform, acetone and ethanol extracts. The quantitative result obtained from quantitative phytochemical analysis showed that flavonoids has the highest yield of 16.96%, followed by alkaloid (8.44) while saponins has 4.93%.

Key Words: , Alkaloid, *Bauhinia racemosa*, flavonoids, saponins

INTRODUCTION

The use of plants in the management and treatment of diseases started with life. In more recent years, with considerable research, it has been found that many plants do indeed have medicinal values. Many of indigenous medicinal plants are used as spices and food plants. The use of medicinal plants is very wide spread in many parts of the world because it is commonly considered that herbal drugs are cheaper and safer as compared to synthetic drugs and may be used without or minimum side effects. Plants used for traditional medicine contain a wide range of substances that can be used to treat chronic as well as infectious diseases [1].

The medicinal value of plants lies in some chemical substances that produce a definite physiological action on human body and the chemical substances called phytochemicals. These

chemicals are non-nutritive chemicals that have defensive property [1]. In addition, there is evidence of herbs been used in the treatment of diseases and for revitalizing the body system in almost all ancient civilization [2]. For a long period of time, plants have been a valuable source of natural products for maintaining human health, especially in the last decade, with more intensive studies for natural therapies. In developing countries majority of the people living in rural areas almost exclusively use traditional medicine in treating all sorts of diseases. Ojelere et al. [3] pointed out that medicinal plants are plants containing inherent active ingredients used to cure disease or relieve pain. The use of traditional medicines and medicinal plants in most developing countries as therapeutic agents for the maintenance of good health has been widely observed [4]. A good number of world population mostly developing countries like Nigeria depend on mostly on herbal medicine for their health needs [3].

For proper understanding of plants, the medicinal value of the plant most be known, the rightful role at which the plants can play and these plants must be subject to scientific proof base on a proven and phytochemical screening and antimicrobial activities. The traditional medicines have some challenges such as lack scientific proof and lack of prescription [5]. The plant kingdom holds many species of plants that contain substances of medicinal value which are yet to be revealed. *B. Racemosa* has been used in traditional medicine for many years. This research gives more insight on the scientific data on the phytochemistry and antimicrobial activities of *B.Racemosa.* To the best of our knowledge little study no work have been done on *B. Racemosa* in this part of the world. The aim of this research is to study the preliminary phytochemical screening and determine the bioactive components of the leaf extracts of *B.Racemosa.* as a medicinal plant and the major objectives are to carry out the preliminary phytochemical screening of extract of the plants, quantify some of the confirmed phytochemicals and to carry out the antimicrobial tests on microorganisms such as *Escherichia coli, Staphylococcus aureus, Salmonella spp, Candida albicans and Aspergillus niger*.

MATERIALS AND METHODS

Collection Sample and Preparation

The leaves of *B Racemosa* were collected from its natural habitat in Wukari local government area of Taraba state, Nigeria. The sample were collected freshly and taken for identification by Mr Damasius Idiege of Forestry and Wildlife Department of the Federal University Wukari. The

leaves were then washed thoroughly in running tap water and then with distilled water. The leaves were cut into small bits and dried for two weeks under shade. After drying, the plant materials were ground well using mechanical blender into fine powder. Then the powder was stored in airtight containers with proper labeling and kept in the laboratory for use.

Preparation of Plant Extract

The method of cold maceration as described by Pavia [6] was used in the extraction by serial exhaustive extraction method which involves the successive extraction with solvents in order of their increasing polarity from hexane to ethanol to ensure efficient extraction of wide range of compounds present in the leaves. The leaf extracts were prepared by soaking 200 g in 400 ml hexane for four days with frequent agitation until soluble matter are dissolved. The resulting mixture was filtered using Whatman No.1 filter paper, evaporated and concentrated into solid extracts using rotatory evaporator, kept under room temperature overnight to remove all solvent. The process was repeated for chloroform, ethyl acetate, acetone and ethanol sequentially in order of increasing polarity. The extracts were kept in a desiccators until required for test.

Phytochemical Screening Assay

Phytochemical examinations were carried out for all the extracts using standard procedures to identify the constituents. Qualitative analysis of the crude extracts were carried out as described by some researchers [7-13] to identify the presence of the classes of secondary metabolites (alkaloids, anthraquinones, flavonoids, tannins, saponins, glycosides, cardiac glycosides, terpenes, steroids, phenol, etc).

Quantitative Test of Phytochemicals

The phytochemicals in the sample extract were quantified using standard procedures [14-17]

RESULTS AND DISCUSSION

Table 1 Qualititative phytochemical results of *Bauhinia Racemosa*

S/N	Phytochemicals	Tests	HE	CE	EAE	AE	EE
1	Flavonoids	Alkaline reagent test					
		(a) Extract+ $NaoH_{(aq)}$	+	+	+	+	_
		(b) Lead acetate test	+	+	+	+	+
2	Phenol	Extract + distilled H_2O+ few drop of 10% $FeCl_3$	+	+	+	+	+
3	Terpenoids	Salkowski Test	_	+	_	+	+
		Extract+chloroform+conc. H_2SO_4					
4	Alkaloids	Mayers	+	+	+	+	+
		Wagner	+	+	+	+	+
5	Steroids	Extract+acetic acid +H_2SO_4	+	+	+	_	_
6	. anthraquinone	Extract + 10ml benzene then filter. Filtrate +5ml of 10% $NH_{3(aq)}$.	+	+	+	+	_
7	Saponins	Froth test	+	+	+	+	+
		Foam test	+	+	+	+	+
8	Glycoside	Extract H_2O+ $NaOH_{(aq)}$	+	+	_	+	+
9	Tannins	Extract+ few drops 1% $FeCl_3$	_	+	+	+	+
10	phlabotannins	Extract + 1% HCl in boiling water	_	+	_	_	+

Keys: - = absence of phytochemical, + = presence of phytochemical . HE = hexane extract, CE = chloroform extract, EAE = ethyl acetate extract AE = Acetone extract, EE = Ethanol extract.

Table 2 : Result obtained from quantification of phytochemicals in of *B. racemosa*

	Phytochemicals	Concentration	% calculated yield
1	Flavonoid	0.4234	16.93
2	Saponin	0.1230	4.92
3	Alkaloid	0.211	8.44

Preliminary phytochemical screening was carried out on the leaf of *B. racemosa* which revealed the presence of medicinally important bioactive compounds such as alkaloid, terpenes, steroids, anthraquinone, flavonoids, tannins, phenols, glycosides phlobatannins and saponins, The presence of phytochemical compounds in *B. racemosa* were evaluated in the leaf extracts using different solvents which includes Hexane, chloroform, ethyl acetate, acetone and ethanol sequentially in order of increasing polarity. Result obtained for qualitative screening of phytochemical leaf extracts of *B. racemosa* in five different solvents are presented in Table I. The quantitative result obtained from quantitative phytochemical analysis shows that flavonoids has the highest yield of 16.96%, follow by alkaloid (8.44) while saponins has 4.93% has the least as represented in Table II.

The preliminary phytochemical screening of leaf extracts of *B. racemosa* showed the absence of flavonoids in ethanol extract (alkaline test), but presence in all the extracts. Phenols are present in all the leaf extracts. Terpenes are present in all the extracts except in hexane and ethyl-acetate extract; alkaloid and saponins are present in all the extracts. Steroids are present in all the extracts except in acetone and ethanol; anthraquinone is present in hexane, chloroform, ethyl acetate and acetone but absent in ethanol. Glycosides are present in all the extracts except in ethyl acetate extract;, tannins is present in all the extracts except in hexane extract. Phlabotannins is absent in hexane, ethyl acetate and acetone extract but present in chloroform and ethanol extracts. The phytochemical analysis of crude yield of *B. racemosa* showed that alkaloids, phenol and flavonoids are present in all the extracts except that flavonoids is absent in ethanol (alkaline test using NaOH). Terpenes, flavonoid ,alkaloid, steroid , glycosides, saponins, phenols phlabotannins, anthraquinone and alkaloid were all detected in the chloroform extract. However these components are all present in most of the extracts except that terpenes is absent in hexane

and ethyl acetate extracts. Steroid and anthraquinone are both absent in both acetone and ethanol extracts. Glycoside is absent in ethyl acetate extract and phlabotannins is absent in the extract of hexane, ethyl acetate, and acetone extracts. These components are naturally occurring in most plant materials, and are well known to be bactericidal, pesticidal or fungicidal in nature thus conferring the antimicrobial property to plants [18].

This bioactive components are known to show medicinal activity and also exhibiting physiological activity; known to show curative activity against several bacterial. These extracts are used by herbalist traditionally to cure bacterial related ill- health [19, 20]. Tannins act in iron deprivation, hydrogen bonding or specific interactions with vital proteins such as enzymes [21]. Tannins generally possess as a stringent flavour and activity, which relates to their ability to indiscriminately bind proteins. Tannins draw tissues together as proteins congeal, causing a peculiar puckering feeling in the mouth. This also tends to inactivate bound proteins. Tannin-rich leaves are frequently used to slow protein discharges of all types, most notably, such as those associated with atopic dermatitis skin lesions, diarrhea, dysentery and hemorrhages from the skin or in the gastrointestinal tract. Since *B. racemosa* contain alkaloid, it has the potential to act as antarrhythmic, anticholinergic, as stimulant, adenosine receptor antagonist, cough medicine, analgesic, remedy for gout, antiprotozoal agent, vasodilator, antihypertensive, antipyretics, antimalarial antihypertensive, muscle relaxant and antitumor [22].

Flavonoids exert antioxidant activity that is generally more potent and effective than traditional antioxidant nutrients vitamin C and E, beta-carotene, selenium, and zinc. Flavonoids are sometimes called "nature's biological response modifiers" because of their anti-inflammatory, antiallergenic, antiviral, and anticancer properties. Flavonoids, particularly *flavan-3-ols and proanthocyanidins*, have been associated with decrease in the risk of cardiovascular disease preventing narrowing of the blood vessels, also decrease cholesterol oxidation through their high antioxidant activity. This implies that *B. racemosa* has the potential to serve as anti - inflammatory, antiallergenic, antiviral, and anticancer properties.s *B. racemosa* lower the cholesterol and reduce the risk of heart disease. Saponins occur in many plant foods and get their name from their soap-like qualities. Since saponins is presence in *B. racemosa*, it help lower the cholesterol and reduce your risk of heart disease. The immune function benefits from these plant compounds as well.. Eating more saponins will boost the immune function and fight off fungal infections [24]. Glycosides have been found to be useful in treatment of several

illness for instance cardiac glycoside have long been used as important ingredient for arrow poison and drugs. Chances are the strain has traceable levels, a terpene also found in leaves that has anti-bacterial, anti-fungal, anti-inflammatory, and antiseptic properties, *B. racemosa* be as serves as anti-bacterial, anti-fungal, anti-inflammatory, and antiseptic**.**

B. racemosa can be used as anti- inflammatory, antispasmodic ,anti-analgesic and diuretic properties which can be attributed to their high flavonoids, alkaloids, glycosides, flavonoids and steroids [25]. The alkaloids contained in plants are used in medicine as anaesthetic agents and analgesic properties [26]. Alkaloids has contributed to the majority of the poisons, neurotoxins and traditional psychedelics and social drugs (e.g. nicotine, caffeine, methamphetamine (ephedrine) cocaine, and opiates) consumed by humans. *B. racemosa* is an important in pharmacy since it contain most of these phytochemical compounds. Glycosides have been known to lower blood pressure and this effect is could be attributed to the presence of steroidal nucleus and deoxy-sugar and both of which are presence in glycosides [27].

CONCLUSION

The phytochemical screening of crude yield of the chemical constituents of *B. racemosa* showed that alkaloids, steroids, phenols and flavonoids were present in all the leaf extracts. Anthraquinone was present in all the extracts except in ethanol, tannins was absent in hexane extracts but present in all the extract. Phlobatannins was present in the chloroform and ethanol extracts, while steroid was absent the acetone and ethanol extracts, while glycoside was absent in the ethyl acetate extract. Terpenes was present in chloroform, acetone and ethanol extracts. This class of secondary metabolites are known to show medicinal activity as well as exhibiting physiological activity. These phytochemical compounds are known to show curative activity against bacteria. Leaves that contain tannins as well as their components in nature are used for treating diarrhea and dysentery.

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