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Research Article

STANDARDIZATION OF STEM BARK OF *FICUS BENGALENSIS*

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ABSTRACT

Standardization is the process of delivering a product with a specified minimum level of one or more phytoconstituents, where we can make sure about the quality of the product; broadly it covers the qualitative and quantitative part of analysis. This specification covers the standardization and preliminary phytochemical investigation of the stem bark of *Ficus bengalensis*. It is useful in "Kapha", biliousness, ulcers, erysipelas, vomiting, vaginal complaints, fever and inflammation. The leaves are good for ulcers; the young leaves are efficacious to cure leprosy. The milky juice is aphrodisiac, tonic, vulnerary, maturant, lessens inflammation and useful to treat piles, diseases of the nose. The aerial roots are styptic, aphrodisiac, and utilized to manage gonorrhea, syphilis, biliousness, dysentery and inflammation of the liver. Dried stem bark was subjected to various physiochemical parameters like foreign organic matter, ash values, extractive values, fluorescent analysis, treatment with different chemicals, preliminary phytochemical screening. These parameters can be utilized for quick identification of the bark of *Ficus bengalensis* and are particularly useful in powdered form.

Keywords *Ficus bengalensis*, standardization, UV chamber.

INTRODUCTION

It consists of the stem bark of *Ficus bengalensis* Linn. (Family, Moraceae), commonly known as 'bargad'. All parts of the plant are acrid, sweetish, used as a valuable application to the sole of the feet when cracked or inflammed, and is also applied to the teeth and as a remedy for toothache. An infusion of the bark is reported as a powerful tonic and in the treatment of diabetes. The seeds are regarded as a refrigerant and tonic. The leaves are applied, heated as a poultice, to relieve abscesses, and after they have turned yellow, are given with roasted rice in decoction as a diaphoretic. The root fibers are recommended as a remedy for gonorrhoea. An infusion of the small branches is useful in haemoptysis. The tender ends of the hanging roots are prescribed to stop obstinate vomiting (Kritikar and Basu., 1999b). Three ketones such as 20-tetratriacontene-2-one, 6-heptatriacontene-10-one, pentatriacontan-5-one and two other compounds β-sitosterol, α-d-glucoside and meso-inositol have been isolated from stem bark of *F. bengalensis* (Subramanian and Misra, 1978). The bark yields flavanoid compound A, B and C. A flavonoid and C flavonoid compounds are identified as a different forms of a leucoanthocyanidin A and B as a leucoanthocyanin (Varghese, 1998). Taraxasterol tiglate from heartwood, quercitin 3-galactoside and rutin isolated from leaves. Three new methyl ethers of leuocoanthocyanins-delphinidin-3-0-α-l-rhamnoside, pelargonidin-3-0-α-l-rhamnoside and the leucocyanidin-3-o-β-d-galacotosyl cellobioside along with methyl ether of leucoanthocyanidin have been isolated from stem bark (Rastogi and Mehtora., 1990). A polysaccharide which on hydrolysis afforded xylose, arabinose and small amount of glucose and galactose isolated from the fruits. Fractionation of the polysaccharide yields xylan (Rastogi and Mehtora, 1979).

MATERIAL AND METHODS

Plant Material

The stem bark of *Ficus bengalensis* was collected from botanical garden of Guru Nanak Dev University, Amritsar (Punjab) and authenticated by Dr. Saroj Arora, Head,

Department of Botanical and environmental Sciences, Guru Nanak Dev University, Amritsar (Punjab).

Processing of Plant material
After authentication, the bark was dried at room temperature until they were free from the moisture and subjected to different evaluation parameters.

Reagents
All the reagents were of Analytical grade and purchased from S.D Fine- Chem. Ltd., Mumbai, India.

Methods
The bark was standardized on the basis of quality parameters as per the WHO guidelines (WHO guidelines, 1998). The extractive values were determined by successively starting from petroleum ether, benzene, chloroform, ethyl acetate and methanol (Mukherjee, 2002) by using soxhlet extraction apparatus. The dried extractive values were obtained after evaporation of solvent under reduced pressure using vacuum rotary evaporator. The behavior of the powdered stem bark with different chemical reagents was studied and fluorescence characters were also observed under ultraviolet and visible light (compared with nerolac synthetic and satin enamel colour card). Preliminary phytochemical tests of different extracts of stem bark were performed with specific reagents (Trease, 1985; Tyler, 1985)

RESULT AND DISCUSSION

1. Foreign Organic Matter
Foreign matter ensures the extent of contamination of extraneous matters such as filth and other parts of botanicals, not covered by definition of the herbal drug. The results of foreign matter were recorded in (Table 1)

2. Extractive Values
This method determines the amount of active constituents extracted with solvents from a given amount of medicinal plant material. It is employed for materials for which as yet no suitable chemical or biological assay exists. The air dried, accurately weighed drug was treated with solvents: petroleum ether, benzene, chloroform, ethyl acetate and methanol. The values were recorded in (Table 2)

3. Ash Value
The determination of ash value is meant for detecting low-grade drugs, exhausted drugs, sandy or earthy matter. The results of ash values were recorded in (Table 3)

4. Fluorescence analysis
The drug powder was taken and treated with various chemical reagents like sulphuric acid, hydrochloric acid, nitric acid, 5% iodine solution, 10% sodium hydroxide solution, picric acid and ammonium solution, Methanol, Ethanol, Chloroform, Petroleum ether, Distilled water and the colour obtained was visualized under ordinary light, short UV light (254 nm) and Long UV light (366 nm) in UV chamber. The result were recorded in (Table 4)

5. Treatment of powdered drug with different reagents
The powdered drug was taken and treated with various chemical reagents like hydrochloric acid, nitric acid, sulphuric acid, acetic acid, picric acid, sodium hydroxide and the change in colour was observed. The results were recorded in (Table 5)

6. Phytochemical screening
The various extracts of stem bark of *Ficus bengalensis* were subjected to qualitative chemical examination for the presence or absence of alkaloids, carbohydrates, flavanoids, proteins, saponins and tannins and phenolic compounds, glycosides. The results of preliminary phytochemical screening were recorded in (Table 6).

CONCLUSION
Generated data could be used for determining correct identity and purity of plant parts and for the detection of adulteration. Botanical authentication and physicochemical parameters will give an idea about the quality of drug. All these parameters which were being reported could be useful in identification of distinctive features of the drug. From the preliminary phytochemical study, it was concluded that *Ficus bengalensis* stem bark contained the reported phtoconstituents. Hence, detailed screening need to be done to isolate the active constituents so that it may be scientifically proved to access the pharmacological responses of the plant to ascertain its folklore uses.

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Table 1: Foreign organic matter of powdered bark of *Ficus bengalensis*

Foreign matter
1.53

Table 2: Extractive values of powdered bark of *Ficus bengalensis*

Water soluble extractive value (%)	Alcohol soluble extractive value (%)
13.2	8.6

Table 3: Ash Value of powdered bark of *Ficus bengalensis*

Total Ash (%)	Water soluble Ash (%)	Acid insoluble ash (%)
11	5.13	2.46

Table 4: Flourosence Analysis of Bark of *Ficus bengalensis*

TREATMENT	VISIBLE LIGHT	VW 254NM	UV 366 NM
Drug powder	Dark brown	Brown	Blackish brown
Conc. Sulphuric acid	Brown	Brown	Black
Conc. Sulphuric acid +water	Light brown	Dark brown	Brownish black
Conc. HCl	Blackish brown	Pale brown	Black
Conc. HCl +H_2O	Brown	Black	Black
Conc. Nitric acid	Light brown	Brownish black	Black
Methanol	Brown	Black	Brownish black
Chloroform	Light brown	Brownish black	Black
Petroleum ether	Brown	Black	Black
Dist. Water	Yellowish brown	Brown	Black
10% NaOH	Light green	Light brown	Black
5% Iodine	Dack green	Light brown	Yellowish brown
Picric acid	Yellowish brown	Brownish black	Black
$FeCl_3$ sol	Green	Brownish black	Black
Ammonia sol	Brown	Brown	Black

Table 5: Treatment of dried bark of *Ficus bengalensis* with different chemicals

Treatment with chemicals	Observation
Drug + Conc. HCl	Brown
Drug + Conc HNO_3	Radish brown
Drug + Conc H_2SO_4	Light brown
Drug + Acetic acid	Light brown
Drug + Picric acid	Reddish brown
Drug + 5% NAOH	Light brown

Table 6: Preliminary phytochemical screening of bark of *Ficus bengalensis*

Plant Constituent / Test/Reagent Used	EXTRACTS				
	Petroleum Ether Extract	Benzene extract	Chloro-form Extract	Ethyl acetate extract	Methanol extract
1) Alkaloids					
Hager's reagent	–	–	+	+	+
Wagner's reagent	+	–	+	–	+
Mayer's reagent	–	+	+	+	–
Dragendorff's reagent	–	–	–	–	+
2) Phenolic compounds and tannins					
Ferric Chloride solution	+	–	+	+	–
Lead acetate test	–	–	+	+	–
Gelatin Solution	–	–	–	–	+
Bromine Water	–	+	–	–	+
Acetic Acid Solution	+	–	–	–	+
Pot. Dichromate	+	+	–	+	–
Dil. nitric acid	–	+	+	–	–
3) Flavonoids					
Lead acetate test	–	–	+	+	+
Sodium hydroxide test	–	–	+	–	–
Magnesium ribbon test	–	+	+	–	+
Ammonia test	+	+	–	–	–
4) Glycosides					
Baljet Test	+	+	–	–	+
Legal Test	–	+	+	–	–
Keller Killani Test	–	–	–	+	+
Borntrager's Test	–	–	+	–	–

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