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PHARMACOGNOSTICAL EVALUATION ON LEAVES OF *WRIGHTIA ARBOREA* (Dennst.) Mabb

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ABSTRACT

The *Wrightia arborea* (Dennst) mabb leaves were collected, dried and studied to determine the various parameters of pharmacognostical standards such as ash and extractive values, phytochemical tests and microscopical characters of leaf powder. The shade dried powder and different types of extracts (viz., methanol, 70% ethanol, aqueous, dichloromethane, chloroform, ethyl acetate and petroleum ether) have also been analyzed for their fluorescence characters.

Key words: *Wrightia arborea*, Pharmacognostical evaluation, Phytochemical tests, Ash values, Extractive values, Fluorescence analysis.

INTRODUCTION

Wrightia arborea (Dennst.) Mabb. (Family Apocynaceae) is found in India, Ceylon, Malay, Peninsula etc., which is commonly used in Indian system of medicine. It is known as Pala, Kudgupalai in Tamil, Krishnakutayata in Sanskrit and Mailampala in Malayalam, respectively[1]. It is a deciduous tree and is upto 14 m in height, young branches are tomentose, abounding in yellow milky juice, with opposite divaricate scabrous branches, smooth bark yellowish grey, pubescent brachelets, leaves 7.5-15 by 3.8-6.3 cm, elliptic-oblong, on drying leaf changes to dark brown. The plant occurs at hills, at 800-1400 m^2. It is well known for its medicinal effects and is being traditionally used for the treatment of various aliments such as to relieve tooth ache when chewed, believed to be used as antidiarrhoeal, bark is useful in menstrual and renal complaints. The stem bark and root bark are believed to be useful in snake bite and scorpion - stings[3]. Due to its medicinal properties, the present investigation was undertaken to standardize the leaf of *Wrightia arborea* by

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carrying out various pharmacognostical studies.

EXPERIMENTAL

Materials and methods

The crude drug (fresh leaves) under the name Palai were collected from Shevaroy Hills in the month of January 2009 and it was identified and authenticated (BSI/SC/5/23/08-09/TECH) by the Botanical Survey of India, Tamil Nadu Agricultural University, Coimbatore. Macroscopical characters were observed as shown in Table 1.

Table 1: Macroscopical characters of *Wrightia arborea* leaves

Macroscopic Parameters	Observation
Colour	Green
Taste	Bitter
Odour	Characteristic
Shape	Elliptic - oblong
Margin	Sparsely
Apex	Caudate - Acuminate
Base	Acute
Surface	Tomentose on both side
Size	7.5 -15 (L) by 3.8- 6.3 (B) cm

Ash and extractive values

Ash values[4] such as total ash, acid insoluble ash, water soluble ash, and sulphated ash; extractive values such as water soluble, alcohol soluble and ether soluble extractive values were determined using the powdered leaf according to Indian Pharmacopoiea[5,6,7] as shown in Table 2.

Table 2: Ash and extractive values of *Wrightia arborea* leaves

Parameters	Percentage (w/w)
Ash values	
Total ash	11.76

Cont…

Parameters	Percentage (w/w)
Ash values	
Water soluble ash	8.82
Acid insoluble ash	3.92
Extractive values	
Alcohol soluble	25.2
Water soluble	20.4
Ether soluble	16

Phytochemical screening

The individual as well as the successive extracts according to increasing polarity were subjected to various chemical tests for the identification of phytoconstituents[8] and the results are shown in Table 3.

Table 3: Preliminary phytochemical screening of various extracts of leaves of *Wrightia arborea*

Phyto-constituent	70 % Ethanol	Methanol	Aqueous	Ethyl acetate	Chloro-form	Petroleum ether	Dichloro-methane
Carbohydrates	+++	+++	+++	-	-	-	-
Tannins	+++	+++	+++	++	++	-	+
Alkaloids	+++	++	-	+	++	+	+++
Flavonoids	++	++	-	++	+	-	+
Triterpenoids	++	++	+	++	+++	+	-
Saponins	++	+	+++	-	-	-	-
Steroids	++	+++	-	++	++	-	-
Amino acids	+	+	-	-	-	-	-
Unsaturated hydrocarbons	++	++	+	-	-	-	-

Cont…

Phyto-constituent	70 % Ethanol	Methanol	Aqueous	Ethyl acetate	Chloro-form	Petroleum ether	Dichloro-methane
Glycosides	-	-	-	-	-	-	-
Observation :-	+++ : High		++ : Intermediate		+ : Low	- : Negative	

The shade dried leaves were ground with wood - grinder and sifted through 40 mesh sieve. The ingredients of powder were observed under microscope. The powder was treated with different chemical reagents and observations were made[9] (Table 4). A small quantity of drug powder mounted in different solvents was also analyzed under UV and visible light[10,11] (Table 5) and fluorescence nature of solvent extracts has been shown in Table 6.

Table 4: Data showing the behaviour of *Wrightia arborea* leaf powder with different chemical reagents

Sample treatment with	Observation
Powder as such	Green
I N HCl	Buff
I N NaOH	Orange brown
5% KOH	Light brownish-red
5% $FeCl_3$	Dark brownish-green
5% Iodine	Brown
Picric acid	Orange brown
HNO_3 + Ammonia solution	Light brown
I N HNO_3	Pale orange
Conc. H_2SO_4	Dark brown
Conc. HCl	Light green
Conc. HNO_3	Orange red.
Glacial acetic acid	Greenish yellow
Ammonia solution	Brown

Table 5: Fluorescence analysis of *wrightia arborea* leaf powder under ultra violet (UV) radiation

Treatment	Observation *Wrightia arborea*		
	Short (254 nm)	**Long (366 nm)**	**Visible light**
Powder as such	Light green	Green	Green
Powder +1 N HCl	Buff	Green fluorescence	Buff
Powder +1 N NaOH	Bottle green	Orange brown	Orange brown
Powder +50% HNO_3	Light green	Brown	Orange
Powder + 50% H_2SO_4	Green	Buff	Buff
Powder + Methanol	Green	Light green	Light green
Powder + Acetic acid	Greenish yellow	Dark red	Greenish yellow
Powder + Picric acid	Green fluorescence	Orange brown	Orange brown
Powder +1 N NaoH in methanol	Green fluorescence	Brownish green	Brownish green
Powder +5% $FeCl_3$	Dark green	Dark brown	Dark brownish green

Table 6: Fluorescence nature of difference solvent extracts of *wrightia* leaves under ultra violet (uv) light

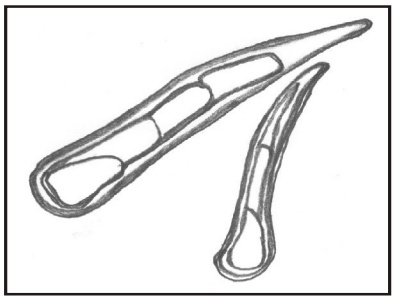
Extract	Observation *Wrightia arborea*		
	Short (254 nm)	**Long (366 nm)**	**Visible light**
Water	Bright green	Dark blue	Dark brown
70% Ethanol	Yellowish brown	Dark purple	Brownish green
Ethanol	Greenish brown	Purplish brown	Brownish green
Methanol	Dark green fluorescence	Purple	Dark green
Petroleum ether	Green fluorescence	Purplish brown	Yellowish brown
$CHCl_3$	Light green	Pinkish red	Dark green

Cont…

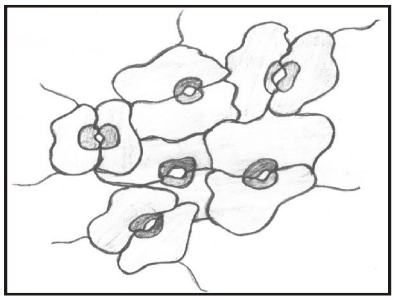
Extract	Observation *Wrightia arborea*		
	Short (254 nm)	**Long (366 nm)**	**Visible light**
Ethyl acetate	Bright green fluorescence	Dark brown	Dark green
Dichlorometahne	Green flourescence	Purple	Bottle green

Study of powdered drug

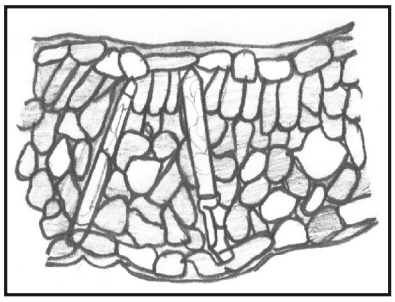
The powder is semi-fine, green coloured with characteristic odour and bitter taste. It exhibits large number of epidermal trichomes are of non - glandular type. They are multicellular, uniseriate and unbranched. The lower epidermis showed paracytic type of stomata. The crystals appeared as prismatic and predominantly styloids. Laticifers are scattered among the ground tissue. Xylem elements occur in fairly long parallel close lines; each line has 5 or 6 xylem elements. Phloem masses occur both; on the inner and outer portions of the xylem. The ground tissue of midrib has 2 - 3 outer layers of collenchyma. Surface view appeared as rectangular to squarish upper epidermis and stomatiferous type of lower epidermis (Fig. 1).



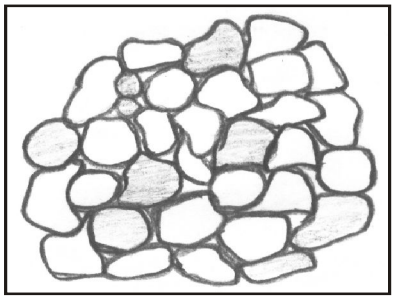
Tirchome



Stomata



Syloid



Lacticifers

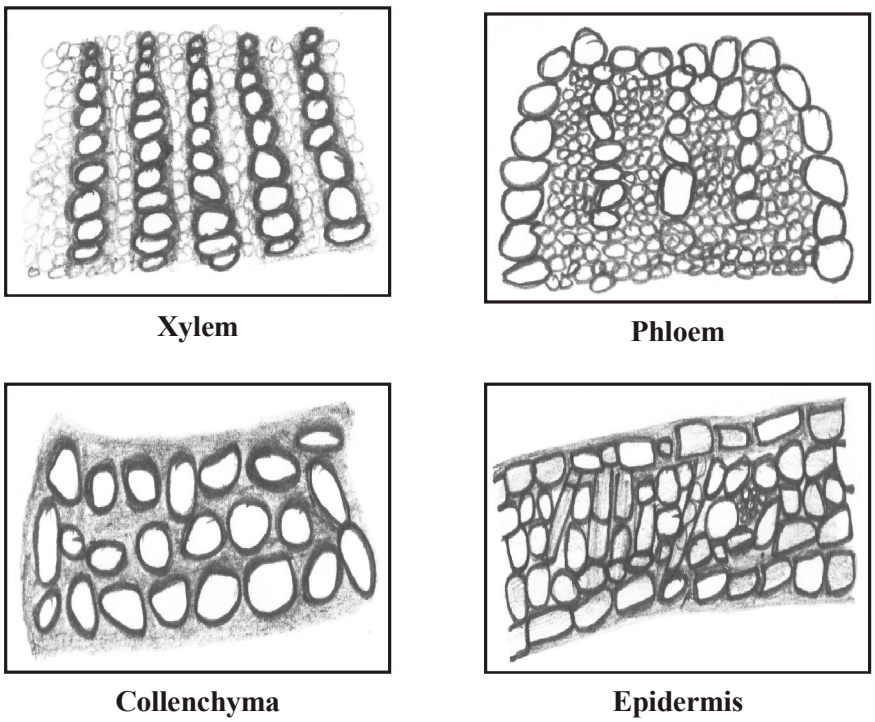


Fig. 1: Powder characters

RESULTS AND DISCUSSION

Consistent quality for products of herbal origin can only be achieved, if the starting plant materials are defined in a rigorous and detailed manner. All the results obtained are mentioned in Tables 1-6.

The pharmacognostical evaluation on *Wrightia arborea* (Dennst.) mabb comprising determination of parameters like macroscopical (Table 1); physiochemical, analytical parameters like ash and extractive values (Table 2) were carried out. The phytoconstituents in each extract were determined and the results were tabulated in Table 3. The behaviour of powdered leaf drug with different chemical reagents is given in Table 4, fluorescence nature in Table 5 and fluorescence nature of solvent extracts has been shown in Table 6.

CONCLUSION

Characterization of a herbal drug is, therefore, essential to allow specifications to be established, which are both; comprehensive and relevant. The observations in the present

study have brought out several diagnostic features of the leaf on the basis of which identification of the crude drug can be ascertained. As the drug has been standardized on the basis of certain pharmacognostical characters, such as the powder character showed paracytic type of stomata, multicellular uniseriate trichome, styloid type crystals, scattered laticifers, parallely closed mylem, masses of phloem and stomatiferous type of lower epidermis, besides the leaf characters, inference of other studies can serve as characteristic features of the drug.

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