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Pharmacognostical and Preliminary Phytochemical Studies of *Sapindus trifoliatus Vahl*.

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ABSTRACT

Pharmacognostical parameters for the leaves of *Sapindus trifoliatus* Vahl were studied with the aim of drawing the pharmacopoeial standards for this species. Macroscopical and microscopical characters, physio-chemical constants, extractive values with different solvents, fluorescence analysis of dry powder, its reaction after treatment with chemical reagents under visible light and UVlight at 254 nm and 366 nm. Prelimnary phyto chemical studies on the leaves *Sapindus trifoliatus* was studied. The determination of these characters will aid future investigtors in their Pharmacological analyses of this species.

Keywords: Pharmacognostic, phytochemical, *Sapindus trifoliatus*, Sapindaceae.

INTRODUCTION

Sapindus trifoliatus Vahl is a medium size to large decidous tree, found in Peninsular India especially in Andhra Pradesh and Karnataka[1]. It is commonly known as Soap nut tree and Reetha in Hindi[2,3]. Seeds contain11.5%saponin, 45% fixed oil and 10%glucose. Saponin glycoside emarginotoside has been isolated from the aqueous extract of the fruit of *Sapindus trifoliatus*. The saponin glycoside hederagin3-o (3-o- acetyl-beta–D-xylose was isolated from pericarp of *Sapindus trifoliatus* [4].

Table 1. Ethnomedical information of ***Sapindus trifoliatus* Vahl.**

Parts	**Uses**
Root	Demulcent, hysteria and hemicrania.
Stem bark	Expectorant and epilepsy

Fruit	to induce labour pain and normal contraction of uterus after child birth , ear ache ,eczema,astringent
Seed	No report available
Leaves	No report available
Flowers	No report available

But no pharmacognostical work has been done so far. Therefore, an attempt has been made to study the Pharmacognostic parameters on the leaves of *Sapindus trifoliatus* Vahl in both whole form and powdered form.

Table 2. Macroscopy of ***Sapindus trifoliatus*** Vahl .

Parts	Observation
Bark	Grey
Flowers	White
Fruit	Drupe
Seed	Black
Leaves	Pinnate 2-3
Appearance	Green
Shape	Lanceolate
Length/height	7. 5 -18 by 2.5-10 cm.
Apex	Acute
Petiole	petiolate
Surface	Glabrous
Arrangement	Opposite
Venation	Reticulately Pinnate

Materials and Methods

Plant material

The plant material was collected from the foothills of Tirumlahills, Tiruapthi.A.P.in the month May 2007.The plant was identified and authenticated by Dr.Madhav Shetty, Taxnomist, Dept of Botany, S.V. University, Tiruapthi. A herbarium was preserved in the department for further reference. The leaves were separated, dried, coarsely powdered passed through sieve no 40 and stored in a closed container for further use. All reagents used were of analytical grade obtained from S.D. Fine Chemicals Ltd., Mumbai.

Methods

The macroscopical characters (size, shape colour, odour, texture, venation margin, base, apex and petiole)of the leaves were observed[4]. Then, anatomical study, powder was identified with routine reagents to study the lignified cells, trichomes, stomata, fibres etc. Quantitative microscopy was determined by methods prescribed by Trease and Evans[5,6].

The ash values, extractive values with various reagents and were determined as per the Indian Pharmacopoeia[6]. Extractive values were performed with various solvents like petroleum ether, chloroform, ethyl acetate, alcohol and water was performed as per standard procedure[7]. Measurement of vein islet number, vein termination number, stomatal number, stomatal index and length of trichome were determined[8]. The behaviour of powdered leaves with various chemical reagents was studied[7]. The fluorescence characters of the powder with various acids were observed under visible light and UV light as per the proceduere[9]. Preliminary phytochemical tests of the powder/extracts were performed using specific reagents through standard procedures[10,11].

Results

Analysis and Discussion

Leaves were green**,** odourless with slight bitter taste. Leaves are of size 7.5-18cm in length, shape- lanceolate in shape, glabrous surface ,acute – apex, equal base, entire margin, reticulate venation and petioled . The physical constants such as total ash value

(10.63%) acid insoluble ash (2.65%) water soluble ash (8.69%) and extractive values are specific identification. The soluble extractive values with solvents such as petroleum ether, chloroform,ethylacetate, ethanol and water were (1.4%,1.2%,2%,2.8%and 5.4%) respectively, which indicates the nature of constituents present. Quantitative microscopical study also give valuable information regarding specific leaf constants such as vein islet(11.5/mm^2),vein termination number(13.8/mm$^{2)}$ stomatal number (6.5/mm^2 and 14/mm^2) upper and lower epidermis respectively. Length of trichome (20.43µ-- 40.79µ--80.86µ). The behaviour of leaf powder upon treatment with different chemical reagents was also observed and reported in Table 6. Fluorescence studies of various powders with various reagents revealed the presence of green & orange fluorescence with Conc. sulphuric acid and sodium hydroxide respectively under UV light at 254 nm and 366 nm.

Powder analysis of *Sapindus trifoliatus* Vahl .

It is pale green, fine, odourless powder with slight bitter taste. The powder microscopy reveals the presence of trichomes, fibres, epidermal cells with anticlinal walls, calcium oxalate crystals and spiral thickenings were recorded.

Table 3. **Determination of Ash Values *Sapindus trifoliatus* Vahl** .

S. No.	Ash type	Percentage of Ash
1.	Total ash	10.63% w/w
2.	Acid insoluble ash	2.5 % w/w
3.	Water soluble ash	8.69% w/w

Table 4. **Determination of Extractive Values *Sapindus trifoliatus* Vahl** .

S. No.	Solvent	Percentage of extractive
1.	Petroleum ether	1.4 % w/w
2.	Chlororform	1.2% w/w
3.	Ethyl acetate	2% w/w
4.	Ethanol	2.8% w/w
5.	Water	5.4% w/w

Table 5. **Determination of phytoconstants *Sapindus trifoliatus* Vahl**.

Leaf constants	**Report**
Vein islet number	11.5/mm^2
Vein termination number	13.8/mm^2
Stomatal index (upper epidermis)	6.5/mm^2
Stomatal index (lower epidermis)	14/mm^2

Similarly the fluorescence characteristic of the leaf powdered leaf, when treated with various chemical reagents and its extracts have also been extensively studied. The extractive values of the powder with different solvent were determined and its result was reported in Table 6.

The various qualitative chemical tests of powder, ethanol extract and aqueous extract (Table 7) indicates the presence of sterols, flavanoids, phenols, tannins and saponins in large amount whereas aromatic acids, carbohydrates,triterpenoids, gums and mucilage and volatile oils were totally absent in the leaf extract of this plant.

Table 6. Behavior of Powdered leaves of ***Sapindus trifoliatus* Vahl** . with different

chemical reagents.

S. No.	Particulars	Under Visible light	U.V. light	
			Short wavelength	Long wavelength
1.	Powder as such	Dull green	Dark green	-----
2.	Powdered drug + Conc. HCl	Dull green	-----	-----
3.	Powdered drug + Conc. H_2SO_4	Dull green	-----	Green
4.	Powdered drug+Conc. HNO_3	Brown	Dull green	-----
5.	Powdered drug+ Glacial Acetic acid	Dull brown	-----	-----
6.	Powdered drug+ Aqueous NaOH	Dull green	Dark green	-----
7.	Powdered drug +alcoholic NaOH	Dark green	Dark green	Orange
8.	Powdered drug + 10%Hcl	Dull green	Dark green	Yellow
9.	Powdered drug + 10% H_2SO_4	Dull brown	Dark green	Dull Yellow
10.	Powdered drug + 10% HNO_3	Dull green	Dark green	Dull yellow
11	Powdered drug + 10% Glacial Acetic acid	Dull green	Dark green	Dull yellow
12.	Powdered drug + Water	Dull green	Dark green	-----

Table 7. **Preliminary phytochemical screening of *Sapindus trifoliatus*** Vahl .

S. No.	Tests	Powder + Water	Ethanol extract	Water extract
1.	**Alkaloids:**			
	Dragendroff's test	+ ve	+ ve	+ ve
	Mayer's test	+ ve	+ ve	+ ve
	Hager's test	+ ve	+ ve	+ ve
	Wagner's test	+ ve	+ ve	+ ve
2.	**Carbohydrates:**			
	Fehling's test	+ ve	+ ve	+ ve

	Molish test	+ ve	+ ve	+ ve
3.	**Gums/Mucilage:**			
	Water	-ve	- ve	- ve
	Alcohol	-ve	- ve	- ve
4.	**Tannins:**			
	Aq. $FeCl_3$ Test	+ ve	+ ve	+ ve
	Alc. $FeCl_3$ Test	+ ve	+ ve	+ ve
5.	**Flavonoids:**			
	Lead acetate test	+ ve	- ve	+ ve
	Shinoda test	+ ve	- ve	+ ve
	Alkaline test	+ ve	- ve	+ ve
6.	**Sterols:**			
	Salfowaski test	+ ve	+ ve	+ ve
	Liberman Burchad test	+ ve	+ ve	+ ve
7.	**Saponins:**			
	Foam test	+ ve	+ ve	+ ve
	Lead acetate test	+ ve	+ ve	+ ve

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