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Phyto-pharmacognostical study of *Mocharasa* (exudate of *Shalmali*)

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ABSTRACT

Shalmali (*Bombax malabaricum* DC.) is a very useful Ayurvedic herb. The exudates of *Bombax malabarica* is known as *Mocharasa*. It is a Reddish-brown colored extract that oozes out from the broken crevices of the trunk of the *Shalmali* tree. Medicinal uses of *Mocharasa* have been reported in many traditional system of medicine such as Ayurveda, Siddha and Unani medicine since ancient times. *Acharya Charak* and *Asthanga Samgraha* mentioned *Mocharasa* under *Sandhaniya Mahakashaya* while *Acharya Sushruta* mentioned *Mocharasa* under *Priyangvadigana*, which has property as *Sandhaniya*. In present study, all aspects about *Mocharasa* have been taken like name, geographical source, Macroscopic, Microscopic, Physicochemical, Phytochemical (Qualitative & Quantitative) & Chromatographic activities. The macroscopic features of the *Mocharasa* were observed under magnifying lens. The powder microscopy showed the presence of starch grain, calcium oxalate, and stone cells. The physicochemical properties such as foreign matter, moisture content, pH value, aqueous soluble extract, alcohol soluble extract, petroleum ether soluble extract, total ash, acid insoluble ash, water soluble ash values of stem were carried out. In phytochemical study powder of *Mocharasa* showed the presence of many important classes of phytoconstituents like carbohydrates, alkaloids, amino acid, protein, saponin, glycosides, phenolic compound, steroids and tannins. Estimation of carotene, total flavonoid content, steroidal content, vit C, vit D, calcium and saponin analysis were carried out for quantitative analysis.

Key words: *Mocharasa*, *Bombax malabaricum* DC, *Phytochemical*, *Physicochemical*.

INTRODUCTION

Salmalia malabarica Schott. and Endl. belongs to the family Bombacaceae known as Silk- Cotton tree or Red silk cotton tree in English. *Shimul* in Bengali, *Shimalo* and *Sawar* in Gujraati, *Elavam* in tamil, *Bouroh* in Oriya. It is widely distributed throughout

India, including the Andamans, up to 1500m or even higher. The tree also grows sporadically in the mixed deciduous forest in the Sub-Himalayan region and lower valleys, also in Bhabar tracts of Uttar Pradesh and Bihar. The gum of *Shalmali* known as *Mocharasa* is astringent, cooling, stimulant, aphrodisiac, tonic, stypitic and demulcent. It is useful in Diarrhoea, Dysentery, haemoptysis of pulmonary tuberculosis, Influenza, Menorrhagia, Burning sensation, Strangury and Haemorrhoids.^[1]

Tooth powder containing *Mocharasa* is beneficial for loosen teeth and bleeding gums. *Mocharasa* powder 1.25-2 gm along with sugar is given to cure diarrhea in children. It also cures Dysentery and other gastro intestinal track disorders with loose motion. It has astringent action on uterus if kept in vagina as a pessary, thus used in Leucorrhoea. Nocturnal enuresis of children can be treated with this drug. *Mocharasa* alone or mixed with other drugs is used to treat

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Spermatorrhoea and Urinary incontinence. It cures the Stomatitis if applied locally. It improves the skin complexion when used as face wash. Topically it is applied as styptic, astringent, demulcent in stomatitis, dermatological ailment and burn wound.^[2]

Among the *Brihatrayi*, *Caraka* mentioned it under *Sandhaniya Mahakashaya*,^[3] *Purish-sangrahiya Mahakashaya*,^[4] *Shonitsthapan Mahakashaya*^[5] and *Vedanasthapana Mahakashaya*.^[6] It is also described in *Kashaya Skanda*.^[7] In *Susruta Samhita*, *Mocharasa* is mentioned under *Priyangvadigana* as *Sandhaniya*.^[8]

Table 1: Ayurvedic properties of Mocharasa in different Nighantu.

SN	Property	K.N	M.P.N.	B.P.N
1.	Rasa	Kashaya	-	Kashaya
2.	Guna	Snigdha, Grahi	Grahi, Guru	Grahi, Snigdha
3.	Veerya	Sheeta	Sheeta	Sheeta
4.	Vipaka	-	-	-

MATERIALS

The plants material which was taken for the study is;

- Genuine samples of *Mocharasa*.

Collection of genuine sample of Mocharasa

- *Mocharasa* is dried form of exudate which oozes out from the opening on stem and branches of *Salmalia malabarica* (Silk Cotton Tree).
- The genuine sample of *Mocharasa* i.e. Exudate of *Shalmali* was collected from Rishikul Campus, Haridwar and from Rajrajeshwari herbal garden by making deeper incision on the bark of *Shalmali* trees.

Procedure

Exudates or Resin of *Salmalia malabarica* Schott. and Endl. oozes out after 2-3 months period of time by making deep incisions made to form artificial opening on bark of *Shalmali* tree during summer season and which later on get dried upto obtained reddish brown

colored nodular solid mass of *Mocharasa*. Dried sample collected from the bark after 2-3 months by removing it from stem bark.

Time of incision: Blunt incision penetrating to inner bark (cortex) with help of axe was done in the month of April - May.

Time of collection: Two months apart from incision time.

Precaution: Continuity of transportation of nutrition via vascular bundles should not be hampered in order to prevent damage to trees.

Nature of resin: Milky Reddish brown, jelly like liquid secreted from broken inner bark which get solidify due to oxidation process into blackish brown in color. Impurities may be present like bark of tree, insects infestation, soil particles etc.

Table 2: Details of collection of genuine samples.

SN	Name of the plant	Time of collection	Place of collection
1.	<i>Mocharasa</i>	July 2017	Rishikul Campus, Haridwar and Rajrajeshwari herbal garden.

OBSERVATION AND RESULTS

Pharmacognostical Study

Table 3: Organoleptic characters of Mocharasa.

Character	<i>Mocharasa</i>
Shape	Irregular
Size	3 - 4 cm long, 1.5 - 2cm in diameter.
Surface	Rough
Odour	Odourless
Colour	In fresh state Reddish brown, after drying Blackish brown
Taste	Slightly bitter
Fracture	Irregular

Table 4: Powder Microscopy Study

Features	Mocharasa
Starch grains	+
Calcium oxalate	+
Fragments of vessels	-
Parenchymatous cells	-
Fiber	-
Stone cells	+

Table 5: Physicochemical Study

SN	Test	Mocharasa
1.	Foreign Matter (%)	0%
2.	Moisture content (%)	6.25
3.	pH value	6.4
4.	Aqueous soluble extract (%)	68.21
5.	Alcohol soluble extract (%)	25.65
6.	Petroleum ether soluble extract (%)	5.15
7.	Total ash (%)	10.26
8.	Acid insoluble ash (%)	4.65
9.	Water soluble ash (%)	6.58

PHYTOCHEMICAL STUDY

Table 6: Carbohydrate Test

SN	Name of test	Mocharasa	
		Aqueous extract	Alcohol extract
A.	Molisch test	+ ve	- ve
B.	Benedict test	- ve	- ve
C.	Barfoed's test	+ ve	- ve

D.	Fehling test	+ ve	+ ve
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Table 7: Analysis of Alkaloids

SN	Name of test	Aqueous extract	Alcohol extract
A.	Dragendroff test	- ve	- ve
B.	Wagner's test	+ ve	- ve
C.	Hager's test	- ve	+ ve

Table 8: Analysis of Amino Acids

SN	Name of test	Aqueous extract	Alcohol extract
A.	Ninhydrin test	+ ve	- ve

Table 9: Analysis of Protein

SN	Name of test	Aqueous extract	Alcohol extract
A.	Biuret test	- ve	- ve
B.	Xanthoprotic test	- ve	+ ve
C.	Millon's test	- ve	- ve

Table 10: Analysis of Saponin

SN	Name of test	Aqueous extract	Alcohol extract
A.	Foam test	+ ve	- ve

Table 11: Analysis of Glycosides

SN	Name of test	Aqueous extract	Alcohol extract
A.	Borntrager test	- ve	- ve

Table 12: Analysis of Phenolic Compound

SN	Name of test	Aqueous extract	Alcohol extract
A.	Phenolic test	+ ve	- ve

Table 13: Analysis of Steroids

SN	Name of test	Aqueous extract	Alcohol extract
A.	Salkowaski	+ ve	- ve

reaction		
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Table 14: Analysis of Tannin

SN	Name of test	Aqueous extract	Alcohol extract
A.	FeCl ₃ test	- ve	- ve
B.	Lead acetate test	+ ve	- ve
C.	Potassium dichromate test	- ve	- ve

Quantitative Analysis**Table 15: Estimation of Carotene**

Sample	Concentration	Absorbance	Concentration
Quercetin solutions	10µg/ml	0.025	
	20µg/ml	0.045	
	30µg/ml	0.075	
	40µg/ml	0.098	
	50µg/ml	0.125	
Extract of <i>Mocharasa</i>	1000µ/ml	0	0 µg/g

Table 16: Estimation of Total Flavonoid Content

Sample	Concentration	Absorbance	Concentration
Quercetin solutions	10µg/ml	0.107	
	20µg/ml	0.325	
	30µg/ml	0.519	
	40µg/ml	0.831	
	50µg/ml	1.120	
Extract of <i>Mocharasa</i>	1000µ/ml	0.229	16.086

Table 17: Estimation of Total Steroids Content

SN	Name of Sample	% of Steroids
1.	<i>Mocharasa</i>	0.03

Table 18: Estimation of Vitamin C

SN	Name of Sample	Mg/100 gm dry weight
1.	<i>Mocharasa</i>	Not detected

Table 19: Estimation of Calcium

SN	Name of Sample	Result
1.	<i>Mocharasa</i>	0.012 % w/w

Table 20: Estimation of Saponins

SN	Name of Sample	Result
1.	<i>Mocharasa</i>	5.32 % w/w

Table 21: Estimation of Vitamin D

SN	Name of Sample	Result
1.	<i>Mocharasa</i>	0

Chromatographic Study**Thin Layer Chromatography analysis for different samples [Plate No. 8]**

Mobile solution: Toluene : Ethyl Acetate (9 : 1) for *Mocharasa* sample.

Sample : Ethanol Extract

Visualization: Iodine Vapour, Vanillin-Sulphuric Acid for *Mocharasa* sample.

Table 22: TLC Profile of samples on Silica Gel 60 F₂₅₄

Samples	Iodine vapour		Vanillin-Sulphuric acid reagent	
	No. of spots	R _f Value	No. of spots	R _f Value
<i>Mocharasa</i>	4	0.31, 0.45, 0.57, 0.60	7	0.21, 0.31, 0.45, 0.57, 0.60, 0.74, 0.81

DISCUSSION

Standardization is the essential preliminary part for establish identity, purity and strength of any drug. In powder microscopy *Mocharasa* had found Calcium oxalate, Starch grains and Stone cells. Moisture content of *Mocharasa* sample was found 6.25%, pH value 6.4, Water soluble extract value 68.21 %, Alcoholic soluble extractive value 25.65 %, Petroleum ether extractive value 5.15 %, Total ash in sample 10.26 %, The acid insoluble ash 4.65 %, and Water

soluble ash 6.58 % in *Mocharasa* sample. Most of the major plants metabolites such as Carbohydrate, alkaloid, amino acid, saponin, phenolic compounds, steroids, tannin were positive in aqueous extract. While Carbohydrate, alkaloid and protein were positive in alcoholic extract too. In quantitative analysis *Mocharasa* had found 16.086 µ/ml flavonoid content, 0.03% steroid content, and 0.012 % calcium content. In Chromatography Study, T.L.C. of *Mocharasa* shows under Iodine vapors, 4 spots were found, R_f values of spots are 0.31, 0.45, 0.57, 0.60, and in Vanillin-Sulphuric acid reagent 7 spots were found, R_f values of spots are 0.21, 0.31, 0.45, 0.57, 0.60, 0.74, 0.81.

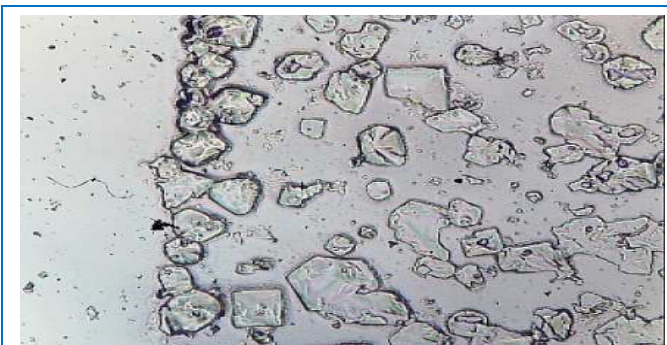
Macroscopic Characters of Mocharasa



Powder Microscopy of Mocharasa



Calcium oxalate crystals



Starch grains



Stone cells

CONCLUSION

Mocharasa is a traditionally important medicinal plant used to treat various ailments. In the present study, the phyto-chemical and physico-chemical characteristics of *Mocharasa* were studied. It can be concluded that the Physico-pytochemical analysis of *Salmalia malabarica* have shown the presence of various versatile constituents such as flavanoids, tannin, saponin, steroid contents and calcium. The present investigation adds to the existing knowledge of *Salmalia malabarica* and will be quite useful to pharmaceutical industries for quality control, pharmacological evaluation and development of a formulation for treating various ailments.

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