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Short Communication

Macro-Microscopic Identification of Dried Flowers of *Hibiscus rosa-sinensis* L. and its Differentiation from Adulterant *Rhododendron arboreum* Sm.

Nartunai Govindarajan[1,*], Susikumar Sundharamoorthy[2], Narayanan Kannan[3], Ilavarasan Raju[4]

ABSTRACT

Background: *Hibiscus rosa-sinensis* Linn. (Fam.Malvaceae) is a small evergreen shrub cultivated in gardens throughout India. The decoction of flowers is used in Indian system of Medicine for bronchial inflammation, urinary astringent and cardio tonic, to promote growth and to prevent graying of hair. The dried flowers of *Rhododendron arboreum* Sm. (Fam.Ericaceae) are morphologically looking similar to *Hibiscus rosa-sinensis* and used as adulterant in the market. Hence, the morphological, Micro-morphological and powder microscopical studies on dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* was carried out and reported. **Objective:** To identify the dried flowers of *Hisbiscus rosa-sinensis* macro-microscopically and to differentiate it from adulterant *Rhododendron arboreum*. **Methods:** The morphology and powder microscopy were observed following standard methods and photographed. **Results:** The colour, taste, arrangement and appearance of calyx, corolla and stamen, trichomes, calcium oxalate crystals, sclereids, oil globules and pollen grains are found to be differentiating diagnostic characters in raw drug/powdered form of dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum*. **Conclusion:** The finding of present study is helpful in standardization of formulation consists of *Hibiscus rosa-sinensis* as ingredient in their powdered form and also for authentication/identification of dried flowers of *Hibiscus rosa-sinensis*.

Key words: *Hibiscus rosa-sinensis*, Macro-microscopy, Adulteration, *Rhododendron arboreum*, Semparathai, Semparathai.

Nartunai Govindarajan[1,*], Susikumar Sundharamoorthy[2] Narayanan Kannan[3], Ilavarasan Raju[4]

[1]Research Officer, Department of Pharmacognosy, Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, CCRAS, Govt. of India, Chennai – 600 106, Tamil Nadu, INDIA.
[2]Research Scholar, Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, CCRAS, Govt. of India, Chennai – 600 106, Tamil Nadu, INDIA.
[3]Laboratory Technician, Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, CCRAS, Govt. of India, Chennai – 600 106, Tamil Nadu, INDIA.
[4]Assistant Director, Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, CCRAS, Govt. of India, Chennai – 600 106, Tamil Nadu, INDIA.

Correspondence

Dr. Nartunai Govindarajan

Department of Pharmacognosy, Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, CCRAS, Govt. of India, Chennai – 600 106, Tamil Nadu, INDIA.

Phone no : +91-9894154514

E-mail: natrunai@yahoo.co.in

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INTRODUCTION

Hibiscus rosa-sinensis Linn. (Fam.Malvaceae) is a small evergreen shrub cultivated in gardens throughout India.[1,2] The flowers are astringent and used as demulcent, emollient, refrigerant, aphrodisiac and emmenagogue.[2] Decoction of flowers is given for bronchial inflammation, urinary astringent and cardio tonic.[2,3] The flowers are also used to promote growth and to prevent graying of hair.[3] The flowers are reported to possess anti-fertility property and useful to correct menstrual disorders.[4] Even though different colours of flowers are found in varieties, the red flowered variety is preferred in medicine.[5] The Hibiscus flowers contain anthocyanin pigment, cyanidin diglucoside, flavonoids and vitamins, thiamine, riboflavin, niacin and ascorbic acid.[2] The alcoholic extract of Hibiscus flowers reported to possess many potentially active antioxidants and anticancer constituents such as quercetin glycosides, riboflavin, niacin, carotene, malvalic acid, gentisic acid, margaric acid and lauric acid.[5]

The dried flowers of *Rhododendron arboreum* Sm. (Fam.Ericaceae) is morphologically looking similar to *Hibiscus rosa-sinensis* and used as adulterant in the market. Botanically both plants belong to different genus and family and having diverse medicinal properties. Adulteration of *Hibiscus rosa-sinensis* may also due to phonetic similarity of names in Tamil, Semparuthi and Semparathai denotes flowers of *Rhododendron arboreum* and *Hibiscus rosa-sinensis* respectively. It was noticed that the raw drug being sold as 'Semparuthi and Semparathai' in the market was actually the flowers of *Rhododendron arboreum*.

The finding of present study is helpful in standardization of formulation consists of *Hibiscus rosa-sinensis* as ingredient in their powdered form and also for authentication/identification of dried flowers of *Hibiscus rosa-sinensis*.

MATERIALS AND METHODS

The dried flowers of *Hibiscus rosa-sinensis* collected from the CSMRADDI campus and market sample (*Rhododendron arboreum)* sold under the name of Semparathai were purchased from raw drug market. The Voucher specimen of the flowers of *Hibiscus rosa-sinensis* L. (D/313 F15A) and Rhododendron arboreum (D/313 F15B) were deposited in the

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department of Pharmacognosy, CSMRADDI, Arumbakkam, Chennai, India for future reference. The morphological, Micro-morphological and powder microscopical studies were carried out by standard methods.[6-8]

RESULTS

Distinguished differentiating diagnostic features of dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* are given in Table 1 and 2 and Figure 1-3.

DISCUSSION

Semparathai, Gurhal phool and Semparuthi, Gularh phool are similar phonetic vernacular names of dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* in Tamil and Sanskrit respectively.[9,10] It was noticed that the raw drug being sold as '*Hibiscus*, *Semparuthi* and *Semparathai*' in the market was actually the flowers of *Rhododendron arboreum*. Thus, the confusion between this two flowers exists in literature and as well as in the market. In this adulteration, scarcity in availability of genuine drug and similar looking plenty available adulterant is the intension.

Pharmacognostic characters of herbal drugs play an important role since particular macro-microcopic features are unique for each plant. The macroscopic and microscopic studies of the herbs should be the first and fundamental step to authenticate the botanical source. Proceeding for chemical methods of standardization, preclinical and clinical evaluation will bear no value if authentic drugs are not used. Macro-microscopic evaluation is simple and cost effective.[11,12] From the results of this study it is well established that the dried flowers of *Hibiscus rosa-sinensis* can be easily identified morphologically in the crude drug form and microscopically in the powdered form. The findings of the comparative study on dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* will be helpful in differentiating their identity. This study sets specific macro-microscopic protocol on dried flowers and powder of *Hibiscus rosa-sinensis* and also to differentiate it from its adulterant *Rhododendron arboreum*.

CONCLUSION

Macro-microscopic studies on dried flowers of *Hibiscus rosa-sinensis* has been carried out and reported. Findings of this study may be useful for authentication/identification of flowers of *Hibiscus rosa-sinensis* in

Figure 1: Dried Flowers of *Hibiscus rosa-sinensis*.

Figure 2: Dried Flowers of *Rhododendron arboretum*.

Table 1: Macroscopic Characters of Dried Flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboretum*.

S. No.	Macroscopic character	*Hibiscus rosa-sinensis*	*Rhododendron arboreum*
	Colour	Purple	Pinkish Red
	Taste	Slightly sweet and mucilaginous	Sharp and slightly astringent
	Calyx	Persistent, calyx 5 lobed, epicalyx 5	Brief, calyx 5 lobed
	Corolla	Polypetalous	Gamopetelous
	Pista and Stamen	Monadelphous	Polyadelphous

Table 2: Powder Microscopic Characters of Dried Flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum*.

S. No.	Diagnostic powder character	*Hibiscus rosa-sinensis*	*Rhododendron arboreum*
	Pollen grains	Spherical, Spinuous, yellow in colour	Tetrahedral tetrads, Yellowish brown
	Trichomes	Covering trichome, hooked/ Stellate Glandular multicellular trichomes	Covering trichome, Numerous, long embedded with brownish content Glandular multicellular trichomes, Oval/Heart in shape
	Stone cells and Sclereids	Absent	Isolated and in groups, varying in size and shape
	Calcium oxalate crystals	Numerous, Cluster and rosette	A few cluster crystals
	Oil globules	Absent	Present
	Ovules	Kidney shaped embedded with numerous rosette crystals	Ovate in shape
	Starch grains	Numerous, simple and compound (Multi-component)	A few simple, large in size
	Stomata	A few Anamocytic stomata	Scarcely found

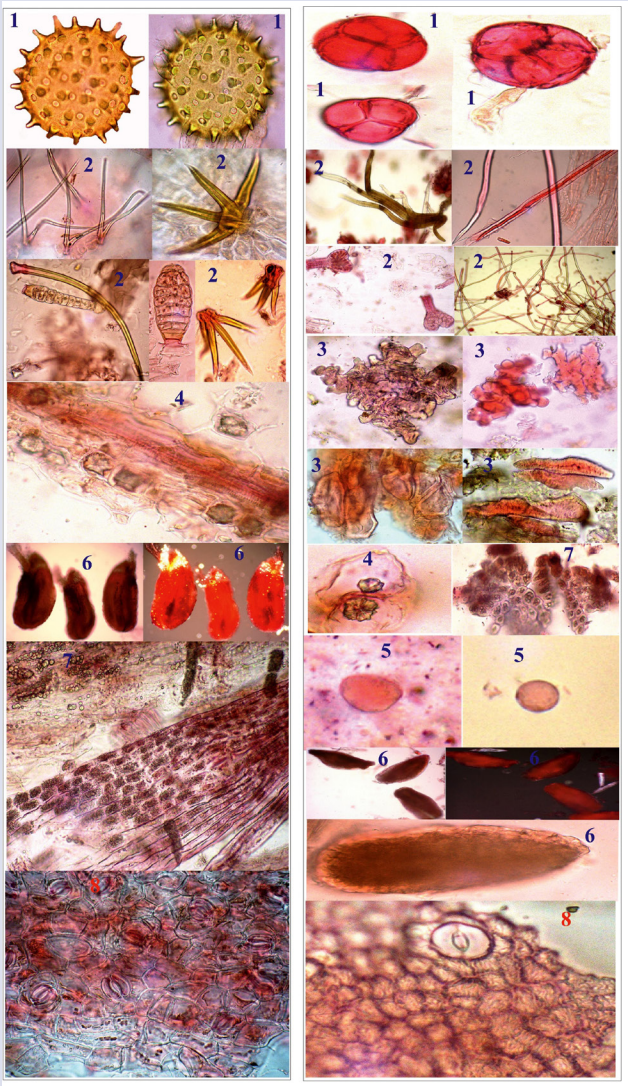

Figure 3: Powder Microscopic Characters of Dried Flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* 1, Pollen grains; 2, Trichome; 3, Stone cells and sclereids; 4, Crystals; 5, Oil globules; 6, Ovule; 7, Starch grains; 8, Stomata.

crude drug and also in powdered formulation in which it is one of the ingredients.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

Fam: Family; **Fig:** Figure; **CSMRADDI:** Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute.

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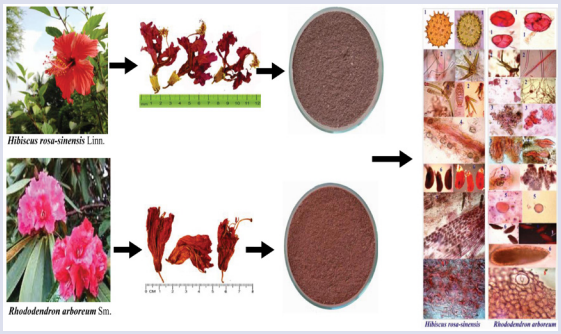
GRAPHICAL ABSTRACT



SUMMARY

- *Hibiscus rosa-sinensis* Linn. (Fam.Malvaceae) is a small evergreen shrub cultivated in gardens throughout India.
- The decoction of flowers is used in Indian system of Medicine for bronchial inflammation, urinary astringent and cardio tonic, to promote growth and to prevent graying of hair.
- The flowers of *Rhododendron arboreum* (Fam.Ericaceae) are morphologically looking similar to *Hibiscus rosa-sinensis* and used as adulterant in the market.
- Hence, the morphological, Micro-morphological and powder microscopical studies on dried flowers of *Hibiscus rosa-sinensis* and *Rhododendron arboreum* was carried out and reported.
- Findings of the study helpful in authentication of raw drug and standardization of formulations containing *Hibiscus rosa-sinensis* Linn. flower as ingredient.

ABOUT AUTHORS

Nartunai Govindarajan is a Research Officer (Pharmacognosy) at Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, Chennai – 600 106, Under CCRAS, Ministry of AYUSH, Govt. of India. His research focused on developing quality standards for medicinal plants used in Ayurveda. He has projects in Intra Mural and Extra Mural Research Schemes. He has experience in the area of Pharmacognosy, developed monographs for Ayurvedic Pharmacopoeia of India and Quality Standards for Indian Medicinal Plants by ICMR.

Susikumar Sundaramoorthy is a Research Scholar at Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, Chennai – 600 106, Under CCRAS, Ministry of AYUSH, Govt. of India. His doctoral research focused on developing quality standards for medicinal plants used in Ayurveda. He has worked under the ICMR project titled on "Quality Standards for Indian Medicinal Plants and preparation of monograph thereon". He Has experience in the area of Pharmacognosy and Botany.

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