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

Nartunai Govindarajan1, *, Susikumar Sundharamoorthy2, Narayanan Kannan3, Ilavarasan Raju4

ABSTRACT
Background: Hibiscus rosa-sinensis L. (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 Hibiscus 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, Semparathi, Semparathai.

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.3 Decoction of flowers is given for bronchial inflammation, urinary astringent and cardio tonic.4,5 The flowers are also used to promote growth and to prevent graying of hair.6 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.6 The Hibiscus flowers contain anthocyanin pigment, cyanidin diglucoside, flavonoids and vitamins, thiamine, riboflavin, niacin and ascorbic acid.7 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.8 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 Semparathi denotes flowers of Rhododendron arboreum and Hibiscus rosa-sinensis respectively. It was noticed that the raw drug being sold as ‘Semparuthi and Semparathi’ 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 Semparathi 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.5-8

**RESULTS**

Distinguished differentiating diagnostic features of dried flowers of *Hisbiscus 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 *Hisbiscus 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 intention.

Pharmacognostic characters of herbal drugs play an important role since particular macro-microscopic 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...
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.

REFERENCES

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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.

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 microscopic 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.
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**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 Srinivas 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.