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Pharmacognostic Evaluation of Galls of *Pistacia integerrima* stew ex. Brandis and Its Substitute *Populus alba* Linn.

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ABSTRACT

In the traditional system of Ayurveda, the gall of Karkatshringi (*Pistacia integerrima*) is a well-known drug used in paediatric diseases. Anatomical studies of the galls of *Pistacia integerrima* and its substitute *Populus alba* which is also sold under the name of Karkatshringi in Ayurvedic raw drug market were carried out and compared. After taxonomic confirmation, observed galls morphology, galls anatomy and powder microscopy as per standard procedures. Galls of these two species are distinct in their morphology as well as anatomical characters. Based on the external morphological and anatomical characters, a diagnostic key is prepared which can be used as a supporting tool for taxonomic delimitation of the species coming under the Karkatshringi complex as well as to ascertain the identity of the drug Karkatshringi.

Keywords: *Pistacia integerrima*, *Populus alba*, Pharmacognosy, Substitute

1. Introduction

In ancient days, when the vaidyas discovered the medicinal plant, it was collected, processed, formulated and applied by the vaidyas themselves [1]. It becomes must to assure the customer the authenticity of the raw material for its consistency, potency and its efficacy. The problem behind it is that in most cases the supplies are made by traders. Most of these do not have adequate knowledge of medicinal plants. The collection is also organized through children and women in forest areas i.e. layman, who cannot differentiate between related plant species. Therefore many times the manufacturing units receive substituted or adulterated plant materials, further confusion occurs many a times due to vernacular/local names by which the traders supply. It is a known fact that local names of several medicinal plants have different botanical identity in the region of their occurrence [2]. Another major problem faced is of non-homogeneity of the materials. Many times collection is done from different regions with the result that there is no homogeneity of the material both in their organoleptic characters as well as in chemical constituents. Hence it is a must for all vaidyas and scientist engaged in this field to have the collection of standard raw drugs and standardization of the same is must.

While considering the availability of raw material in the local market, two or more samples of the same drug are found. In Ayurvedic text synonyms gives an idea about identification, structure, qualities, habitat, pharmacological actions, nature of Dravya. So in Ayurveda synonyms has more significant value for identification of Dravya [3]. In case of Karkatshringi gall we found its two different samples; one is horn-like, cylindrical in shape while another one is rounded, irregular in shape. To clear the confusion the present investigation deals with authenticity of Karkatshringi according to Ayurvedic literature [4, 5, 6] and its morphological and anatomical evaluation to differentiate the drug used as its substitute [7].

2. Materials and methods

2.1 Plant Material

The dried galls of Karkatshringi were collected from the local markets, sold under the name of Karkatshringi from Dehradun, Delhi, Lucknow, Banaras, Nagpur, Nanded, Akola, Pune, Satara, Kolhapur, Hyderabad, Bangalore and Haridwar.

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Out of that the two different structural varieties of samples were verified authentically by Raw Materials Herbarium and Museum, (National Institute of Science Communication and Information Resources) NISCAIR, Delhi, India.

2.2 Instruments

Microphotographs were taken using a Leica (Dissecting microscope lighting system-DMLS) microscope attached with Leitz (Magnification power system- MPS) 32 camera. Compound microscope, camera lucida, glass slides, cover slips and others common glassware were the basic apparatus and instruments used for study

2.3 Macroscopy

The raw drugs and powders were separately studied by organoleptic characters

2.4 Microscopy

The plant material was microscopically studied. Free hand transverse section of galls were taken and examined. The powders of drugs were studied microscopically and the characters were observed after proper mounting and staining with Phloroglucinol and HCl^[8] Photographs of the microscopically galls and powder characters were taken.

2.5 Macroscopic characters

Externally dried galls of *Pistacia integerrima* (Fig 1) are pale greenish brown in colour, horn shaped, hard, rugose, hallow, thin walled generally cylindrical, length 3.8 to 30 cm or more. On breaking open the galls a reddish inner surface is seen which appears to be covered with whitish particle of dust^[11]. Galls powder is brown in colour, strongly astringent, slightly bitter, while crushing it gives aromatic odour (Table 1). Externally dried galls of *Populus alba* Flat, round, hard and irregular in shape, pale yellow in colour (Fig. 2)



Fig 1: Galls of *Pistacia integerrima* collected from local market sold under the name of Karkatshringi - Collected from Dehradun (Left), Bangalore (Middle), Varanasi(Right)



Fig 2: Galls of *Populus alba* collected from local markets sold under the name of Karkatshringi, Collected from Mumbai (Left), Nanded (middle), Hyderabad (Right)

2.6 Microscopic characters

The microscopic picture of T.S. of the gall of *Pistacia integerrima* (Fig. 3). The outermost layer is of epidermis consisting of single layered cubical epidermal cells, brown idioblast present about 3-4 layers below the epidermis, There are two rows of cavities encircled by 2-3 layers of parenchymatous cells, These cavities are invariably associated with the conducting elements disposed in the

shape of fan, chiefly consisting of spirally thickened vessels, about 1/3rd distance from the outer surface and about 1/3rd distance from inner surface of the galls. The rest of the portion of the T.S. is packed with simple parenchymatous cells which are rounded, square and elongated. On microscopic examination of powder it shows scalariform xylem vessels and parenchymatous tissues. (Fig. 5).

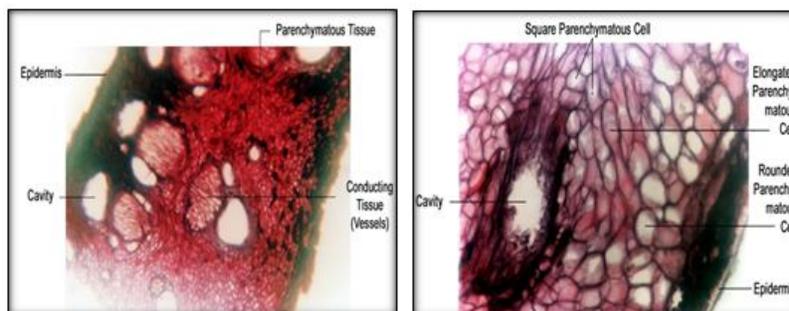


Fig 3: T.S. of galls of *Pistacia integerrima* (Left) an enlarge view of parenchymatous portion and process of cavity formation (Right)

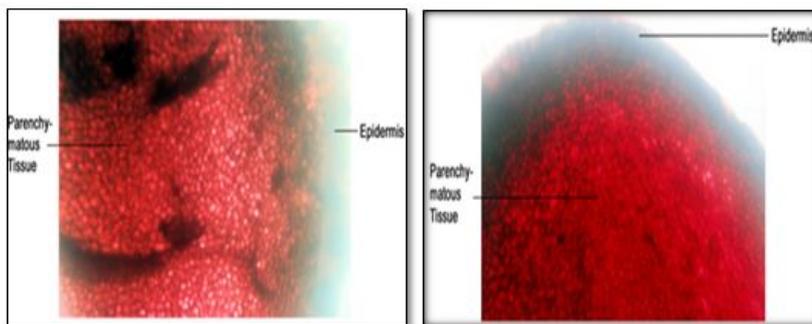


Fig 4: T.S of galls of *Populus alba* (Left) and T.S of galls of *Terminalia chebula* (Right)

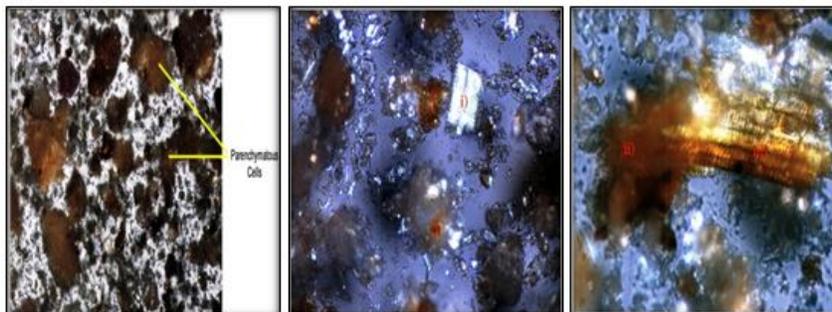


Fig 5: Powder microscopy of galls of *Pistacia integerrima* Parenchymatous cells (Left) Scalariform xylem vessel (Middle) Parenchymatous cells and Scalariform xylem vessel (Right)



Fig 6: Powder microscopy of galls of *Populus alba*

2.7 Others Galls using as Substitute and Adulterants

The galls are also found on the tress of Haritaki (*Terminalia chebula* Retz), Udumbar (*Ficus glomerata* Roxb) (fig. 7) and

Tintidik (*Rhus succedanea* Linn) [2]. These galls are sold in the market as a substitute and adulterants of original Karkatshringi but doesn't have the properties of original Karkatshringi.



Fig 7: Galls using as Substitute and Adulterants galls on *Ficus glomerata* Roxb (left) Formalin preserves galls on *Terminalia chebula* Retz (Right)

3. Result and Discussion

On exploring various markets throughout India, from Dehradun in North to Bangalore in South, we observed mainly two varieties of Karkatshringi commonly being sold in market. One of them is

rounded irregular in shape while other resembled the description from Ayurvedic texts i.e. horn like cylindrical and hallow. The habitat of Karkatshringi described in Medicinal Flora of Garhwal, in Himalaya [9]. but it was hard to visit the place of origin and

collect it in person, hence the samples in the local market usually sold as Karkatshringi were collected and used for this study. The variation can be straightway divided according to the shape as mentioned earlier. The rounded variety is commonly available in Maharashtra State while the long cylindrical variety is from other states. Though the description of long, hollow, cylindrical Karkatshringi resembled as that of Ayurvedic texts, the samples collected were authenticated form NISCAIR, New Delhi.

The sample which was horn, cylindrical and hollow was identified as galls on *Pistacia integerrima* stew ex. Brandis. caused by *Dafia aedifactor* insect (Homoptera) [12]. The other sample which was rounded, irregular in shape was identified as galls on *Populus alba* linn. cause by *Erisoma taskhiri* insect.

The Organoleptic characters of powdered galls of *Pistacia integerrima* stew is brown in colour, strongly astringent, slightly bitter in taste and having aromatic odour while crushed and that of *Populus alba* is greenish yellow in colour, astringent in taste and no aromatic odour. While studying the microscopic botanical identification, we have taken T. S. of both the samples. The T. S. of *Populus alba*. is clearly distinctuishable and different from the T. s. of galls of *Pistacia integerrima*. So, on the anatomical basis this is a very important pharmacognostic character to distinguish the genuine Karkatshringi which is due to biochemical interaction of the insect and the plant. For the substitute of it, galls of *Populus alba*, *Ficus glomerata* roxb, *Terminalia chebula* Retz is not advisable as it does not have the similar pharmacological effects. That is also suggested in Bhavprakash Nighantu where it is mentioned that the galls of *Ficus glomerata* Roxb and *Terminalia chebula* cannot use as a substitute for Karkatshringi.

Table 1: Macroscopically/organoleptic characters

	<i>Pistacia integerrima</i>	<i>Populus alba</i>
Part used	Galls	Galls
Nature of powder	Coarse	Coarse
Colour	Light brown	Light yellow
Taste	Astringent	Astringent
Odour	Specific aromatic	Odourless

Table 2: Comparative pharmacognostic study of different insects galls

Features of Galls	Genuine Gall	Substitute Gall No. 1	Adulterant Gall No. 2
	Galls on <i>Pistacia integerrima</i>	Galls on <i>Populus alba</i>	Galls on <i>Terminalia chebula</i>
Morphological	Horn, Cylindrical Shape, pale brownish in colour	Flat, round, hard and irregular in shape, pale yellow colour	Small rounded, irregular in shape and pale yellow in colour
Anatomical	Presence of large cavity, fan shaped vascular bundles, presence of idioblast cells which are diagnostic features	Compact parenchymatous tissue with small rounded cells, no cavities and fan shaped vascular bundles, absent of idioblast.	Compact parenchymatous tissue no cavities and fan shaped vascular bundles, absent of idioblast

4. Conclusion

Establishing the standard is an integral part of establishing the correct identity and quality of a crud drug. Authentic karkatshringi and its substitute drugs available in the markets which is sold under the name of karkatshringi are not match by its Pharmacognostic (macroscopic and microscopic) characters. While there is an availability of genuine drugs in the markets don't use its substitute drugs. The present work was undertaken to produce some

pharmacognostical standards and the observation can be considered as reference standard for further study.

5. Acknowledgement

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6. References

- Sharma RK, Bhagwan D. Charak Samhita. Edn 4, Vol. 2, Chowkhamba Sanskrit Series, Varanasi, 1996, 17-101.
- Warrier PK, Nambiar VPK. Ramankutt. Indian Medicinal Plants. Vol. 4, Universities Press, Hyderabad, 304-307.
- Acharya PS. Dravyaguna Vigyan. Vol. 2, Chaukhamba Bharati Academy, Varanasi, 2003, 284-286.
- Kaviraj AG. Astang Sangrah. Krishnadas Academy Orientalia Publishers and Distributors, Varanasi, 1993, 4-32.
- Pandey G. Dravyaguna Vignyan. Vol -II, Chaukhamba Krishnadas Academy, Varanasi, 2004, 158-162.
- Kirtikar KR, Basu BD. Indian Medicinal Plants. Edn 2, Vol. 1, International Book Distributers, Deharadun, 2005, 649-651.
- Namjoshi AM. Studies in the Pharmacognosy of Ayurvedic Drug. Board of Research in Ayurveda, Bombay.
- Khandelwal KR. Practical Pharmacognosy. Edn 11, Nirali Prakashan Pune, 2002, 7-10.
- Uniyal MR. Prayogmatmak Abhinav Dravyaguna Vignyan. Edn 1, Chaukhamba Orientalia, Varanasi, 2009, 514-517.
- Dwivedi JN, Singh RB. Essentials of Plant Technique. Scientific Publishers Jodhpur, 1985.
- Nadkarni KM, Nadkarni AK. Indian Materia Medica. Edn 2, Vol. 1, Popular Prakashan, Mumbai, 1062-1063.
- Jaques HE. How to Know to Insects. Iowa academy of science, Iowa, 1936, 33.