

Review

A review on gall karkatshringi

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Karkatasringi (*Pistacia integerrima*) is a well known medicinal plant which belongs to the family of Anacardiaceae. The plant is indigenous to India and is found in the outer ranges of the North-Western Himalayas at an altitude of 500 to 2500 m. The different parts of the plant like leaf, bark, root and galls are reported to contain the secondary metabolites. Among them, the galls are more used in folk medicines. They are used in various Ayurvedic formulation like the "Dasamularista", "Chayavanaprasa" and "Shringyadiurna" which are used in the treatment of diseases like *swasa* (asthma), *yakshma* (tuberculosis), *ajeerna* (indigestion), *hridayaroga* (heart disease), *jwara* (fever) and *yakrit roga* (liver disorder). The secondary metabolites like alkaloids, tannins, terpenoids and flavonoids are reported in the galls. Beside them, minor constituents like crystalline hydrocarbon, gum mastic, resinous substance, crystalline acids are also present. The bark contains terpenoids and flavonoids. The root and leaves contain tannins and terpenoids. Tannin being the major chemical constituent shows the strongest astringent action of the plant. The effect of the plant is due to the presence of these different secondary metabolites that are responsible for pharmacological activities. The aim of this review is to highlight the description of plant in classical literature of Ayurveda as well as therapeutic properties and chemical constituents.

Key words: Karkatasringi, galls, secondary metabolites.

INTRODUCTION

Karkatshringi is a multibranched, single stemmed, deciduous tree of *Pistacia integerrima* which belong to the family of Anacardiaceae. This plant belongs to Amrakula and it is a dioecious shedding tree. It is found in North-West Himalaya including the Siwalik ranges/Rohitkhand from Indus to Kumaon between 500 to 2500 m. Altitudes (Anonymous, 2005). The plant is known as chakra, chandraspada, shikari in Sanskrit, kakra in Hindi. (Chopra and Chopra, 2006) Typical type of worms make horn shaped galls on the branches and leaves. (Vashist

and Anil, 2012) These galls are pale greenish brown or pinkish, elongated, horn-shaped, hollow, twisted, curved or straight. When young they are coriaceous, but later become hard (<http://www.indianmedicinalplants.info/Medicinal-Plants>). This gall is caused by the insect *Dasia aedifactor* (Homoptera), (plant produce resin against insect) (<http://www.ayurvedaconsultants.com/ayurvedaherbs>). They make these galls by sucking juice from the leaves (Vashist and Anil, 2012). Then they are called

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karkatshringi (Vashist and Anil, 2012). Majorly, galls contains resins, pistaciolic acid, tetracyclic triterpenes, camphene, luteolin, pistancin, pistacinin, amino acids, dihydromavalic acids, sterols and tannins (Warrier et al., 1995). These galls are useful in asthma, cough, hiccough, dysentery, diarrhoea, ulcers, bronchitis, fever, irritability of stomach, leprosy, psoriasis, skin diseases, vitiated condition of tridosha, dyspepsia, inflammation, anorexia, pharyngitis, leucorrhoea and general debility. It is also very effective in children at the time of teething. In Pakistan, the galls of *Pistacia chinensis* var. *Integerrima* are used for the treatment of hepatitis and liver. It has been reported to have depressant, analgesic anti-inflammatory activities and hyperuricemic effect disorder (Ghias et al., 2011; Ansari et al., 1993)

REVIEW OF LITERATURE

Literature brush up reveals the different classical categorization of Karkatshringi. Different Acharayas (Ancient scholars) kept it in the different categories according to their own knowledge. Some confusion arises because of all the names related to Karkatika, Karkahvaya, Karkatakya etc. which are generally accepted as Karkatshringi.

Classical categories: Gana

Charak samhita: In Charak samhita Karkatshringi is kept under the gana of (Bhedaniya, Angamardaprasamana, Svedopaga, Madhuraskanda) (http://www.ayurwiki.info/wiki/karkatshringiclassical_categories_gana), (Kasahara, Hikkanigrahna and Madhura skandha) (Sharma, 1981), Charak interpreted it as the small variety of amalaki (Sharma and Bhagwan, 1996).

Sushruta samhita: In Sushruta samhita, Karkatshringi placed under the gana of (Vidarigandhadi, Adhibhagahara, Vatasamshama) (Sharma, 1981). It is important to note that sushruta classified it as a Kanda visa (poisonous tuber). The toxic symptoms of this plant are documented by sushruta samhita (Bhishagratha and samhita, 1991).

Bhav prakash: In this ancient text, some of the properties of the plant are mentioned (Sharma, 1981).

Asthanga Haridayam: In Asthanga Haridayam, Acharya Vagbhata mentioned the description of Karkatashringi in Kesava Paddhati. (Kaviraj and Sangrah, 1993).

Modern books

Botanical name: *P. integerrima* (Anonymous, 2005; Warrier et al., 1995; Sharma, 1981; Sharma and Bhagwan, 1996; Anonymous, 2000; Anonymous, 2001; Family: Anacardiaceae (Anonymous, 2005; Sharma and Bhagwan, 1996; Anonymous, 2000; Anonymous, 2001;

Anonymous, 2000).

Classical names: (Sharma, 1981) Karkarshringi, Shringi, Kuliravishanika, Ajashringi, Chakara, Karkatkya, Vakra, Visanika

Classical categorization

Caraka: Kasahara, Hikkanigrahana, Madhur skandha.

Sushruta: Kakolyadi, Padmakadi.

Vagbhata: These medicinal plants were described in Kesava Paddhati. Both caraka and Sushruta consider this plant as a poison for a vegetable origin. Acharya Sushruta kept this plant in Visa khand. Similar confusion is apparent in the context of Gunja which is categorized under Mula visa (root poison). Caraka interpreted it as amalaka and the toxic symptoms are mentioned by Acharya Sushruta. Likewise, Dalhana's comments add more confusion about its identification since Mesasringi, Ajasringi and Uttamarni are equated to Karkatshringi because, the Asclepiadaceae family may have the same synonyms (Jivanti).

Botanical description

Deciduous tree, up to 18 m high, barks dark grey or blackish. Leaves alternate, pinnate, 15 to 23 cm. long, with or without terminal leaflet, leaflets 4 to 5 pairs, lanceolate, acuminate, sub-opposite, coriaceous, 7 to 12 cm long. Characteristic galls are produced on the leafy branches. Flowers small, reddish, unisexual, dioecious. malepanicles short, compact. Female flowers have long lax panicles. Drupe globose, wrinkled, rugose and grey when ripe.

Microscopic characters

Transverse section of mature root shows a wide zone of stratified cork, exfoliating at places, consisting of rectangular, thin-walled, tangentially elongated, radially arranged cells, upper few layers filled with reddish-brown contents, remaining cells colourless, cortex, a wide zone of rounded cells with fibre groups towards central and middle region, cells obliterated at places, endodermis barrel-shaped, slightly thickwalled, pericycle and phloem not distinct, xylem forms bulk of root consisting of vessels, fibres and parenchyma, medullary rays not distinct, vessels shows annular or pitted thickening, fibres thick-walled, elongated having a few simple pits. Powder-yellowish-brown, under microscope shows fragments of corks, xylem vessels and fibres.

Distribution

North-West Himalayas (Indus to Kumaon) at 350 to 2500 m. cultivated in Punjab plains.

Chemical constituents

Karkatshringi contains various important phyto-constituent for commercial value and therapeutic potential. Chiefly it contains resin two isomeric triterpenic acids-pistacienoic acids A and B, tannins, a triterpene alcohol-tirucallol, beta-sitosterol, tetracyclic triterpenes, pistacigerrimones A,B,C(galls); alpha-piene, beta-piene, camphene, dl-limonene,1:8-cinol, alpha- terpineol, beta- terpineol, aromadendrene, lactonic stearoptene, caprylic acid, alpha-d-pinene, alpha &beta-phallandrene,amino acids, dihydromalylic acid, protein (seeds); hydrocarbons, sterols, triterpenoids(seeds oil), tannins (leaves,bark).

Pharmacological activities

Karkatashringi is an important medicinal plant whose galls are used in traditional medicines in India for the treatment of asthma, chronic bronchitis, phthisis, diarrhea, fever and other reported activities as antispasmodic, carminative, antiamoebic and anthelmintic.

Toxicology

Essential oil of gall has a depressant action on the central nervous system of guinea-pigs and white rats when given in sub-lethal doses. The animals become deeply unconscious in about an hour. Lethal doses (m.l.d0.1cc/100 gm body wt.) cause deep narcosis leading to death within a few hours. The oil has a slight irritant action on the skin and mucous membrane.

Therapeutic evaluation

In a clinical trail Brihat talisadi churna in which Karkatshringi is one of the ingredients was found useful in the patients of productive cough when administered in the dose of 500 mg QID with honey as adjuvant.

Formulations and preparations

Karkatshringi is one of the major ingredients of various type of Ayurvedic formulations like Shringiadi chura, Karkatadi chura, Balachaturbhadrha churna, Brihat talisadi churna, Devadarvayadi kwath churna, shatavaryadi ghrith, chayanprash-awaleha, Dashmularista, Kanta karyavaleha, Siva gutika and khadiradi gutika used invarious therapeutic purposes.

Substitues and adultrants

Galls produced on the plants viz. *Rhus succedanea*, *Garuga pinnata*, *Terminalia chebula* are also used and

sold under the name Karkatshringi.

Research work done

1. Oil extracted from *P. chinensis* exhibited central nervous system (CNS) depressant activity (Sharma, 1981).
2. The crude methanolic extract of *P. integerrima* bark evaluated for antipyretic activity (The crude methanolic extract of *Pistacia integerrima* bark evaluated for antipyretic activity, Sharma and Bhagwan, 2011).
3. Phytochemical investigation of the galls of *P. Integerrima* (Ahmad et al., 2010).
4. Ethyl gallate isolated from *P. integerrima* Linn. inhibits cell adhesion molecules by blocking AP-1 transcription factor (Mehla et al., 2011).
5. Pharmacological basis for use of *P. integerrima* leaves in hyperuricemia and gout (Ahmad et al., 2008).
6. Analgesic and anti-inflammatory effects of *P. integerrima* extracts in mice (Ahmad et al., 2010).
7. Propagation of pistachio rootstock by rooted stem cuttings (Almehdi et al., 2002).
8. Phylogenetics and reticulate evolution in *Pistacia* (Anacardiaceae) (Phylogenetics and reticulate evolution in *Pistacia* (Anacardiaceae) (Yi et al., 2008).
9. Analgesic, anti GIT motility and toxicological activities of *P. integerrima* Stewart ex Brandis bark in mice (Ismail et al., 2012).
10. Hepatoprotective effects of berries lyceum, gallium aparine and *P. integerrima* in carbon tetrachloride treated rats (Khan et al., 2008).
11. Pharmacognostical studies on the south Indian market sample of Karkatshringi (Kadukkaipoo)- (Gaertn. Leaf gall) (Santha et al., 1991).

Observation

The profile of the medicinal plant (Karkatshringi) which is present in ancient and modern text carried little confusion related to the synonym of plant. Ancient scholar (Sushruta) kept the plant in poisonous category (Visha khand). They also mentioned the uses of plant in respiratory disorders viz. asthma, hiccough, cough etc. After reviewing the various research articles on the basis of preclinical studies it possess the properties mentioned in Ayurvedic texts and shows some other significant properties like: antipyretic, analgesic, anti-inflammatory, antioxidant, hepatoprotective, antimicrobial, GIT motility and toxicological, hyperuricemia and gout (Table 1).

CONCLUSION

The multipurpose medicinal plant (*P. integerrima*), is the unique source of various types of compounds having

Table 1. Ayurvedic properties.

Parameter	Properties
Rasa	Tikta (Pungent)
Veerya	Ushna (Hot)
Vipaka (Post digestion effect)	Katu (pungent)
Effect on tridosha	Pacifies Kapha and Pitta

Table 2. Vernacular names.

S/N	Language	Names
1	English	Crab's claw
2	Hindi	Kakdashingi, Kakarsingi, Kakra, Kakkatasimgi
3	Punjabi	Kakar, Kakarshingi, Drek, Gurgu, Kakkeran, Kakkrangehe, Kakala, Kangar Masna, Sumak, Tungu, Tanbari, Shne, Karkarshingi
4	Bengali	Kakra, Kakrashingi, Kandashringi
5	Gujrati	Kakadasingi, Kakra, Kakarshingi
6	Marathi	Karkadasringi, Kakra, Kakarsingi, Kakadshingi
7	Malayalm	Karkatasringi, Karkktakasingi
8	Tamil	Karkata, Singi, Kakkatashingi
9	Telgu	Kakarashingi, Kakatakashrungi, Kakarasimga
10	Assam	Kakiasrangi
11	Oriya	Kakadashrungi, Kakadashringi,
12	Urdu	Kakrasinghi, Kakra

Table 3. Identity, purity and strength.

S/N	Identity, purity and strength
1	Foreign matter not more than 2 per cent
2	Total Ash Not more than 11 per cent
3	Acid-insoluble ash Not more than 2 per cent
4	Alcohol-soluble extractive Not less than 9 per cent
5	Water-soluble extractive Not less than 16 per cent

diverse chemical structures. Very little work has been done on the biological activity and plausible medicinal applications of these compounds and hence extensive investigation is needed to exploit their therapeutic utility to combat diseases. The present results therefore, offer a scientific basis for the traditional use of the various extracts of *P. integerrima* (Tables 2 and 3).

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Conflict of interest

Authors have none to declare.

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