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Comprehensive review on *Arishtaka* (*Sapindus trifoliatus* L. and *S. mukorossi* Gaertn)

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ABSTRACT

Introduction: *Arishtaka* is a small to medium sized deciduous tree, mentioned in Ayurveda classics which is botanically identified as *Sapindus trifoliatus* L. and *Sapindus mukorossi* Gaertn. belonging to family Sapindaceae. *Sapindus mukorossi* Gaertn is mainly used in North India while *Sapindus trifoliatus* in Southern India. Fruit, root, leaf and seed are the useful parts. The plant has been mentioned with different synonyms in our classics. **Objective**: To obtain a comprehensive review on *Arishtaka* from Ayurvedic scriptures and ethnomedicinal practices. **Method:** Information regarding the drug *Arishtaka* has been compiled from *Brhattrayi - Charaka Samhita, Sushruta Samhita, Ashtanga Hrudaya* and *Samgraha*, printed and online sources of *Nighantu*, The Ayurvedic Pharmacopoeia of India, Database on Medicinal Plants used in Ayurveda, Quality Standards of Indian Medicinal Plants, Indian Medicinal Plants, Indian Materia Medica, Wealth of India, Dravyaguna Vijnana Volume 2 by Priyavrat Sharma, Dravyakosha by Karnataka Knowledge Commission, Dravyaguna Hastamalaka and Online articles related to experimental study on *Sapindus* species. **Result:** The drug shows wide therapeutic and folklore use. It was found the drug was known with 22 synonyms which was compiled from 6 Nighantus. **Conclusion:** Since the drug is available in the most parts of Indian subcontinent, further experimental, pre-clinical and clinical research on the drug is required to establish the therapeutic efficiency and mechanism of action on the wide spectrum of disorders.

Key words: *Ayurveda, Arishtaka, Sapindus, Soapnut, Ritha.*

INTRODUCTION

Ayurveda has mentioned innumerable herbal drugs for different purposes in *Yuktivyapashraya Chikitsa* i.e., *Ahara* and *Aushadha*. In Ayurveda science, whole drug or the specific part of the drug is used for medicinal purpose and not an isolated chemical compound. Hence, a drug is useful in numerous conditions as there are different constituents in various parts of the drug. *Arishtaka* is one among many herbal drugs mentioned in ayurveda classics which is mainly used as cleansing agent in folklore practice. It is mentioned under different names such as *Phenila, Garbhapatana, Pitaphena,* etc. It is indicated in treatment of various diseases such as *Graharoga, Visha, Visphota, Mutrakricchra, Daha* and *Kushta*. It has *Lekhana* and *Grabhapatana Karma*. Even though there are many references in our classics with the name *Arishta*, the drug *Arishtaka* is considered as the one which belongs to Sapindaceae family. *Sapindus* species are also called as Soapnut trees. *Sapindus mukorossi* and *Sapindus trifoliata* are considered as the two main sources for *Arishtaka*. *Sapindus mukorossi* is mainly used in North India and *Sapindus trifoliata* in South India. The fruits, called as soap nuts are widely used in cosmetics. The major constituents of *Sapindus mukorossi* fruit are saponins (10%-11.5%), sugars (10%) and mucilage

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(10%). Saponins are secondary plant metabolites with divergent biological activities. Sapindus saponins are a mixture of six sapindosides (sapindosides A, B, C, D and mukorozi saponins (E1 and Y1).[1] It is the popular ingredient of many cosmetic products such as shampoo, cleansers and soaps.

Materials and Methods

Search Criteria

Information regarding the drug *Arishtaka* has been compiled from *Brhattrayi - Charaka Samhita*, *Sushruta Samhita, Ashtanga Hrdaya* and *Samgraha*, printed and online sources of *Nighantu - Bhava Prakash Nighantu* (BPN), *Kaiyadeva Nighantu* (KN), *Madanapala Nighantu* (MpN), *Raja Nighantu* (RN), *Shodhala Nighantu, Priya Nighantu* (PN), *Siddhamantra, Dhanwantari Nighantu*, *Nighantu Adarsh*, The Ayurvedic Pharmacopoeia of India, Database on Medicinal Plants used in Ayurveda, Quality Standards of Indian Medicinal Plants, Indian Medicinal Plants, Indian Materia Medica, Wealth of India, Dravyaguna Vijnana Volume 2 by *Priyavrat Sharma*, Dravyakosha Karnataka Knowledge Commission, *Dravyaguna Hastamalaka* and Online articles related to experimental study on *Sapindus* species.

Botanical Name

Sapindus Mukorossi Gaertn.

Sapindus trifoliatus L.

Table 1: *Paryaya*

Paryaya	**BPN[2]**	**KN[3]**	**MpN[4]**	**RN[5]**	**Shodhala[6]**	**PN[7]**
Arishtaka	+	+	+			+
Mangalya	+			+		
Krshnavarna	+					
Arthasadhana	+	+	+			
Rakta Beeja	+	+	+			
Pita Phena	+	+	+			
Phenila	+	+	+	+	+	+
Raksha Beeja		+				
Kumbha Beeja		+		+		
Garbhapati/ Garbhapatana	+	+	+			
Kumbha Virya			+			
Krshna Beeja			+			
Jwalat Pushpa					+	
Bahuphena						+
Vastra Dhavana						+
RN[5] *- Gucha, Gucchala, Gucha Pushpaka, Prakirya, Somavalka, Rudrasangnyak, Arishta*						

Table 2: Vernacular Names[8]

English	Soap nut tree
Hindi / Punj. / Guj./ Marathi	Ritha
Kannada	Antuvala, Kookata kayi, Kugate mara
Telugu	Kunkudu kaya, Kukudu, Kunkudum phenilamu
Tamil	Ponnankottai, Nittavanji
Malayalam	Chavakayimaram, Urunchi, pasakotta
Bengali	Ritha, bararite

Part Used[8]

Fruit, Root, Leaf, Seed

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Habitat[8]

Sapindus *laurifolius* syn *trifoliatus* : A native of South India where it is common along the coast and in the open forests at low elevations. It is also found in some of the deciduous forests and along habitations. Occasionally cultivated in West Bengal, Bihar, Madhya Pradesh and Uttar Pradesh. Distributed in Sri Lanka and Burma.

Morphology[9]

Genus - *Sapindus* Linn

Trees or shrubs. Leaves alternate, paripinnate; leaflets entire; stipules 0. Flowers regular, polygamous, in panicles. Sepals 5, unequal, in 2 series, much imbricate. Petals 4-5. Disk annular, lobed. Stamens usually 8, inserted within the disk; filaments free. Ovary entire or 2-4-lobed, 2-4-celled; stigma 2-4-lobed; ovule solitary. Fruit fleshy or coriaceous, of 1-3 indehiscent drupes; drupes with fibrous pericarp, brittle when dry. Seeds with a very hard outer integument.

Species - *Sapindus trifoliatus* Linn.

A handsome tree. Leaves abruptly pinnate; leaflets subopposite, 2-3 pairs, 7.5-18 by 2.5-10 cm., lanceolate or elliptic-lanceolate, acute or acuminate, entire, glabrous above, more or less pubescent beneath, base acute; main nerves about 8-12 pairs; petioles 3 mm. long, pubescent. Flowers dingy white, in terminal rusty-pubescent panicles, the males numerous, the bisexual flowers few. Sepals 5, rotund-ovate, ciliolate, fulvous-pubescent outside, glabrous within, 4 mm. long. Petals 4-5, shortly clawed, narrower than the sepals, lanceolate, villous outside and more or less so within, usually furnished with 2 villous scales attached at each side of the petal about half way up. Disk concave with a fleshy hirsute margin. Stamens 8; filaments villous; anthers oblong, apiculate. Ovary densely hairy. Fruit fleshy, 2- (usually 3-) lobed, clothed with fulvous hairs when young, glabrous and wrinkled when ripe, with 1 seed in each lobe. Seeds blackish, smooth, about the size of a large pea, very hard.

Difference

Ovary hairy - ***S. trifoliatus***

Ovary glabrous, anthers short - ***S. mukorossi***

Table 3: *Gana Vargeekarana*

Charaka Samhita	Not mentioned
Sushruta Samhita	
Ashtanga Hrdaya	
Ashtanga Sangraha	*Pitta Shamana Dravya* (Su.14/11)
Bhava Prakash Ni.	*Vatadi Varga*
Kaiyadeva Nighantu	*Aushadhi Varga*
Madanapala Ni.	*Vatadi Varga*
Dhanwantari Ni.	Not mentioned
Raj Nighantu	*Prabhadradi Varga* /71
Shodhala Nighantu	*Lakshmanadi Varga* *Guna Sangraha* / 577
Siddhamantra	*Pittaghna Varga*
Priya Nighantu	*Haritakyadi Varga* /250
Nighantu Adarsh	*Pheniladi Varga*
Guna Ratnamala	*Vatadi Varga*

Types

a) Based on the size of fruit, it is of two types:[10,11]

1. Small variety - *S. trifoliatus*
2. Bigger variety - *S. mukorossi*

b) Raja Nighantu mentions 6 varieties of Karanja, among which one belongs to Sapindus sp[5]:

1. *Karanja,*
2. *Ghritha Karanja,*
3. *Maha Karanja,*
4. *Puti Karanja,*
5. *Guccha Karanja* and
6. *Ritha Karanja* which is suggested as S. *trifoliatus* or S. *mukorossi*.

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Priyavrat Sharma mentions *S. trifoliatus as* the source plant for South India *and S. mukorossi* for Northern part of India.

Table 4: *Rasa Panchaka*

Rasa Panchaka	**B.P.**[2]	**K.N.**[3]	**Mp N.**[4]	**R.N[**5]	**Sh.N.**[6]	**P.V.S[**12]	**PN**[7]
Rasa	-	-	-	*Tikta*	*Tikta*	*Tikta, Katu*	-
Guna	-	*Tikshna, Laghu,*	-	*Snigdha*	-	*Laghu, Tikshna*	*Tikshna*
Vīrya	-	*Ushna*			*Shita*	*Ushna*	-
Vipāka	-	*Katu*	-	*Katu*	-	*Katu*	-
Doshaghnata	*Tridosha Hara*			*VK Hara*	*P Hara*	*VPK Hara*	-

Prabhava[12] **-** *Vamaka*

Karma[2,3,4,7,10]

Garbha Patana, Lekhana, Graha Nashana, Vamaka, Vedanasthapana, Kapha Nissaraka.

Pharmacological Action[9]

Anti-inflammatory, analgesic, hypotensive, insect repellant, antifungal, insecticidal, antiviral, spermicidal, pesticidal, anti-implantation. Alexipharmac.[10]

Tonic, expectorant, emetic and purgative. Seeds are narcotic and acrid poison.[13]

Pharmacological activity - Research Profile

1. Anti-inflammatory activity[14]
2. Anti-hyperalgesia activity[15]
3. Insecticidal activity[16]
4. Anthelmintic activity[17]
5. Anti-trichomonas[18]
6. Anti-tumour effect[19]
7. Anti-oxidant activity[20]
8. Anti-ulcer activity[21]

Rogaghnata[2,3,4,5,6,10]

Graha Roga, Kushtha, Visphota, Daha, Mutrakrcchra, Krimi, Rajo Rodha, Ahiphena Visha, Jangama Visha Vikara, Kandu, Kasa, Shwasa, Rakta Vikara, Kashta Artava.

Phyto-Constituents[9]

Fruit pericarp: Emarginatosides B & C (hederagenin glycosides), hederagenin, oleanolic acid, sapindic acid, trifolioside, sapindoside A characterised as hederagenin-3-a-L arabino-pyranosyl-2a-L-rhamnopyranoside, sapindoside B characterised as hederagenin-3-a-L-arabinopyranosyl-2a-L-rhamnopyranosyl-38-D -xylopyranoside, sapindoside C, D, E, glucopyranosides of stigmasterol;

Nut : kaempferol, quercetin, ß-sitosterol.

Seed oil : fatty acid diester of-1. cyano-2-hydroxymethyl-prop-1-ene-3-ol.

Kernel : arachidic, behenic, linoleic, oleic, palmitic, stearic acids, eicosenoic acid, protein, carbohydrate, starch.

Leaves : 3-O-rutinosides of isorhamnetin and quercetin.

Peels : triterpenoid saponin.

Amayika Prayoga

1. In case of *Jwara* associated with *Daha* - The paste of leaves of *Phenila* triturated with sour gruel added with *Kola* (*Badara*), *Amalaka*, and *Shukta Dhanyamla* should be applied.[22]
2. Application of the froth of *Badari Pallava* or *Arishta Pallava* (Dalhana opines *Arishta* as *Nimba* or *Phenila Vrksha*), it pacifies burning sensation, thirst and fainting completely.[23]
3. Seeds used locally to kill lice stuck on bodies of animals.[24]
4. In case of *Madatyaya* associated with *Daha – Lepa* of tender leaves of *Badara* and *Arishtaka* should be applied. (Ch.Chi.24/160)

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Formulation

1. *Kapitthadi lepa* - Indicated in *Jwara* associated with *Daha, Vedana, Moha, Chardi* and *Trsna*.[25,26]
2. *Bimbyadi Dravya Lepa* - Indicated in *Vataja Luta Visha Chikitsa*.[27]

Ethnomedicinal Use[10,13,28]

Leaf: Fragrant leaves are used in baths for painful joints and the root in gout, rheumatism and paralysis. Leaves are lopped for fodder. Externally it is detergent, and is given for the stings and bites of poisonous insects. In snake-bite the fruit is ground with water and used as a collyrium (Nighantu Ratnakara). In cases of scorpion-sting the fruit is ground to a pulp and given internally, while the smoke from the burning nut is being inhaled (Subodhavaidyaka). In China the bark, grounded and macerated in cold water, is used to remove vermin from the hairy parts of the body.

Fruit: Fruits are employed as emetic in doses of 1-2 drachms; as purgative in larger doses; nauseant and expectorant in doses, of 10-20 grains of the pericarp or pulp and kernel of the fruit. In 4-grain doses it is useful in colic, and is given with sherbet. Pulp is given in small doses as anthelmintic. Pulp is given to people bitten by venomous reptiles, also to those suffering from severe diarrhoea or cholera. It is administered as follows: Pulp is rubbed in water until it soaks and is then strained and given by the mouth. The fruit is alexeteric, aphrodisiac; useful in chronic dysentery, diarrhoea, cholera, hemicrania, tubercular glands, paralysis, of the limbs, lumbago, epileptic fits of children; allays uterine pain; fumigation good in melancholy.

The fruits are used in salivation, epilepsy, and chlorosis. In Lakhimpur, Assam, a paste of the nut is used internally in fevers.

Root: The root is expectorant; used as a collyrium in sore eyes and ophthalmia. A thick watery solution of the drug dropped into the nostrils relieves hemicrania, hysteria and epilepsy by irritating the mucous membrane and increasing its secretions. Fumigations with it are useful in hysteria and melancholia. Made into paste with vinegar it is externally applied to bites of reptiles and of centipedes, scorpion-sting, etc., and to lessen scrofulous swellings.

Seeds: The seed is sweetish; used locally to stimulate the uterus in childbirth and to increase menstruation (Yunani). Seeds pounded up with water and introduced into the mouth cut short the paroxysm of epilepsy. The seeds pounded with water are given in epilepsy. In Malaya the seeds are supposed to remove tan and freckles from the skin, and a solution of the fruits is a remedy for cutaneous diseases. Powdered seeds are said to possess insecticidal properties. They are employed in the treatment of dental caries. They are also made into rosaries. Pessaries made of the kernel of the seeds are used to stimulate the uterus to child-birth and in amenorrhoea.

Soapnuts are largely used as detergent for washing cloth before dyeing and for washing hair. They are utilized by Indian jewelers for restoring the brightness of tarnished ornaments. They are used as a substitute for soap in washing silk, woolens and other delicate fabrics; in Kashmir, soapnuts are preferred to the best soap for washing woolen shawls. Soapnuts are reported to be used for washing and bleaching cardamoms; the treatment is reported to improve the color and flavor of the Spice. Extracts of the pericarp mixed with DDT are used as a fungicide and insecticide.

Matra

Phala Churna

3 to 6 gm[12,29]

0.5 to 1.2 gm[8]

0.5 to 1gm[10]

For Vamana: 3 to 6gm[10]

For Rechana: 4 to 5gm[10]

Adulterant/ Substitute[8,29]

S.mukorossi Gaertn. and *S.emarginatus* Gaertn. Used as substitute in North India.

Fruits of *Sapindus laurifolius* Vahl (syn. S. *trifoliatus* sensu Hook.f.. p.p. (non Linn.)) and *S. mukorossi* are substitutes to each other.

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The main distinguishing characters between *S. laurifolius* and *S. mukorossi* are the presence of one type of stone cells in the former and three types of stone cells in the latter. The fruit is in cluster of 2-3 in S. *laurifolius* and distinct solitary in S. *mukorossi*.

Controversy

Confusion was due to synonyms i.e., *Arishta* and *Arishtaka*.

The synonyms of *Arishta* is attributed to various drugs like *Nimba* (*Azadirachta indica* A.Juss.), *Lashuna* (*Allium sativum* L.), *Katuki* (*Picrorrhiza kurroa* Royle ex Benth.) (RN. *Pippalyadi Varga*/131)

The term *Arishta* is considered for 2 drugs by commentators of Charaka as well Sushruta Samhita i.e., *Arishtaka* and *Nimba*. The term *Phenila* is identified as *Upodika* by Chakrapani in *Vatarakta Chikitsa*,[30] while mentioning about *Mahapadma Taila* and similar by *Dalhana*.[22] Also *Dalhana* in *Jwara Chikitsa* mentions *Arishta* as *Nimba* and *Phenila Vrksha*[23] There is a difference of identification by commentators for *Arishta* and *Phenila*. Ayurvediya Shabdakosha mentions *Arishtaka* as *Phenila*. Thus, we can accept *Arishtaka* and *Phenila* as a same drug in context of Brhattrayi which is botanically identified as *Sapindus* sp.

Toxicity[8]

Fruit and root are used as fish poison.

Honey from the flowers is reported to be poisonous to bees.

Discussion

Arishtaka is botanically identified as *Sapindus mukorossi* Gaertn., *Sapindus trifoliatus* L. It is a medium-sized tree whose Fruit, Root, Leaf, Seed are useful parts. Authors of Brhattrayi have not mentioned under any specific *Varga* or *Gana* except Ashtanga Sangraha in *Pitta Shamana Dravya* and scanty references were found in *Samhitas*. This review includes compilation of 22 synonyms by 6 Nighantus. The synonym '*Phenila*' is used by all *Nighantukaras* while comparing to the synonym *Arishtaka.* There is slight controversy of the drug due to its synonym mentioned in Brhattrayi. Chakrapanidatta mentions *Phenila* as *Upodika* in context of *Mahapadma Taila* in *Vatarakta Chikitsa* and Dalhana also mentions *Phenila* as *Upodika* in *Jwara Pratishedha Adhyaya.* Dalhana in the same verse mentions *Arishta* as *Nimba* or *Phenila Vrksha. Raja Nighantu* mentions *Arishtaka* as one among the 6 varieties of *Karanja* in *Prabhadradi Varga*. P.V. Sharma mentions *S. trifoliatus as* the source plant for South India *and S. mukorossi* for Northern part of India. The drug finds its use in various therapeutic aspects described in Nighantus. Apart from its clinical use, the drug also is practiced by folklore practitioners and widely used in detergent industries.

Conclusion

Through thorough investigation of the drug *Arishtaka* - *Sapindus trifoliatus* and *Sapindus mukorossi,* it can be concluded that the drug possesses various therapeutic action like in cases of *Graha Roga, Kushtha, Visha Vikara, Mutrakrcchra, Krimi, Ahiphena Visha, Jangama Visha Vikara, Kandu, Kasa, Swasa, Rakta Vikara, Kashta Artava*. Apart from therapeutic use, the drug is also widely used as detergent for washing cloth and hair. Since the drug is available in the most parts of Indian subcontinent, further experimental, pre-clinical and clinical research on the drug is required to establish the therapeutic efficiency and mechanism of action on the above mentioned disorders.

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