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Sapindus mukorossi: A review article

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Abstract
Sapindus mukorossi, well known as soapnut, belong to family Sapindaceae. It is popular ingredient of ayurvedic preparation such as shampoo, cleansers and medicine for treatment of eczema, psoriasis and for removing for removing freckles and also have gentle insecticidal property and traditionally used for removing lice from the scalp. The species is widely grown in upper reaches of the Indo-Gangetic plains, Shivaliks and sub-Himalayan tracts at altitudes from 200m to 1500m. It is also called as Soapnut or Aritha tree, it is most valuable trees of tropical and sub-tropical region of Asia.

Keywords: *Sapindus mukorossi*, antifungal, antibacterial

Introduction
Sapindus mukorossi, is also known as 'soapnut' or 'aitha', belong to family Sapindaceae. It is use medicinally as an expectorant, contraceptives, and for cure of excessive salivation, epilepsy, chlorosis and migraine. It is also a popular ingredient for ayurvedic preparation such as shampoo, cleansers and medicine for cure of eczema, psoriasis and for removing freckles and also have moderate insecticidal property and traditionally used for removing lice from the scalp [1-3].

History
Sapindus mukorossi is an acient fruit, leaving some to claim the origin in China, while other states in India. Acient Indian texts make references to soapberries. The book, "Saint Heritage of India" points out the Hatha yoga Founder Machindranath was converted under a soapmut tree some time during his life in the 9th to 10th century. The "Chronological Dictionary of Prehistoric India" explains that the paper title "Some Notes on the History of Soapnut, Soap and Washermen of India-between 300 BC and AD 1900" hints at even earlier roots [4].

Geographical Region
This species is commonly grown in higher reach of the Indo-Gangetic plains, Shivaliks and outer Himalayas of Uttar Pradesh, Uttarakhand, Himachal Pradesh, Haryana, and Jammu & Kashmir at altitudes from 200m to 1500m. It is a deciduous tree originate in north India, generally with 5-10 pairs of leaves with large drupes. This tree belongs to the order Sapindeae and family Sapindaceae [5]. Also known as soap-nut tree, it is one of the most important trees of tropical and sub-tropical regions of Asia [1].

Species Information [6-8]

Species	Common Name	Geographical Region
Sapindus mukorossi	Chinese Soapberry	India, Southern China
Sapindus emarginatus	NA	Southern Asia
Sapindus trifoliatus	South India Soapnut, Three-leaf Soapberry	Southern India, Pakistan
Sapindus delavayi	NA	India, China
Sapindus oahuensis	Hawaii Soapberry, Lonomea	Hawaii
Sapindus rarak	NA	Southeast Asia
Sapindus saponaria	Wingleaf Soapberry	Caribbean, Central America
Sapindus marginatus	Florida Soapberry	Florida
Sapindus tomentosus	NA	China
Sapindus drummondii	Western Soapberry	Southern United States, Mexico

Botanical Information [9, 10]

Biological Name:	*Sapindus mukorossi*
Kingdom:	Plantae
Subkingdom:	Tracheobionta
Superdivision:	Spermatophyta
Division:	Magnoliophyta
Class:	Magnoliopsida
Subclass:	Rosidae
Order:	Sapindales
Family:	Sapindaceae
Genus:	Sapindus
Species :	*Sapindus Mukorossi*
Tribe:	Andropogoneae
Phyllum:	Spermatophyta
Subphyllum:	Angiospermae
Common Name	Soapnut, Soapberry, Washnut, Ritha, Aritha, Dodan, Doadni, Doda, Kanma and Thali

Phytoconstituent

S. No.	Chemical constituent	Part of the plant
1	Triglyceride [11] • Oleo-palmito-arachidin glyceride • Oleo-di-arachidin glyceride • Di-olein	Seed
2	Lipid [12]	Seed
3	Sesquiterpeneoidal gtlycosides [13]	Fruits
4	Flavanoids [14] Quercetin, Apigenin, Kaempferol, Rutin	Leaf
5	Saponin [15] Triterpene [16] • Oleanane (sapindosideA & B) [17] • Dammarane(sapinmusaponin A-E) [18] • tricullane (sapinmusaponin F-K) [19]	Gall, fruit & root fruit gall gall & root

Pharmacological Activity [37]

S.no.	Author	Activity	Methods used	Part used
1	Ibrahim *et al.* [20]	Anti-Bacterial activity	Ethanolic and chloroform extracts.	Leaf
2	Garg *et al.* [21] Rastogi *et al.* [22]	Spermicidal Activity	Saponins	Fruit Pericarp
3	Tiwari *et al.* [23]	Anti-Trichomonas Activity	Mixing of sapindus and saponin	
4	Geyter *et al.* [24]	Insecticidal Activity	Ethanolic extract	
5	Chakraborty *et al.* [25]	Anxiolytic Activity	Metanolic extract	
6	Man *et al.* [26, 27, 28]	Anticancer Activity	Saponin from galls extracts	galls
7	Ibrahim *et al.* [29]	Hepatoprotective Activity	Fruit pericarp extract	fruit
8	Upadhyay and Singh *et al.* [30]	Molluscicidal Activity	Extract	fruit
9	Virdi *et al.* [31]	Piscicidal Activity		Fruit pericarp
10	Tsuzuki *et al.* [32]	Fungicidal Activity	Crude extract	pericarp
11	Takagi *et al.* [33]	Anti-Inflammatory Activity	Crude extract / isolated saponin and hederagenin	plant
12	Huan *et al.* [34]	Anti-Platelet Aggregation Activity	Isolation of compounds	gall
13	Chen *et al.* [35]	Tyrosinase Inhibition and Free Radical Scavenging	Methanolic extract	Seed

Evaluation Parameter

Organoleptic parameters

S.no.	Organoleptic parameters	Inference
1	Colour	Brown
2	Odour	Characteristics
3	Taste	Bitter
4	Nature	Crystalline
5	Texture	Rough
6	Solubility	Soluble in water

Physiochemical Studies

S.no	Parameters	Percentage (%w/w)
1.	Ash Value Total ash Acid insoluble ash Water soluble ash	 3.60 0.24 14.69
2.	Successive extractive values Petroleum ether Di ethyl ether Chloroform Ethyl acetate Ethanol Aqueous	 1.1 1.4 1.8 2.2 3.2 4.8
3.	Loss on drying	9.6
4.	pH value 1% water solution 10% water solution	 5.9 5.3
5.	Bulk density	1.2
6.	Saponification values	148.66

Conclusion

In present study, a set of pharmacognostical standardization parameter studies were studied on *Sapindus mukorrossi* as per pharmacopoeia and WHO guidelines. These methods may help in standardization, identification and in carrying out further research in *Sapindus mukorrossi* based drugs which are used in Ayurveda and modern pharmacopoeia.

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