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Sadhana Singh
Senior Resident & Phd Scholar in
Dept. of Dravyaguna I.M.S.,
B.H.U., Varanasi, Uttar Pradesh,
India

Vinay Verma
Phd Scholar in Dept. of
Dravyaguna N.I.A., Jaipur,
Rajasthan, India

Rashmi Yadav
J.R. in Dept. of Dravyaguna
I.M.S., B.H.U., Varanasi, Uttar
Pradesh, India

Rashmi Yadav
Assist. Professor in Dept. of
Shalya Tantra, Govt. Ayurveda
College Bilaspur, Chhattisgarh,
India

Pharmacognostical study of Amalaki (*Emblia officinalis* Gaertn.)

Sadhana Singh, Vinay Verma, Rashmi Yadav and Brijesh Singh

Abstract

Ayurveda- The science of life of ancient origin is well recognize as traditional system of medicine. Currently global attention is being progressively focused on rediscovering and developing the indigenous system of medicine, *Ayurveda* and its utilization for Primary Health Care. In this review Botanical description, chemical constituent, *Ayurvedic* properties, formulation, dose, and pharmacological outcome of fruit of *Emblia officinalis* Gaertn. Are narrated. The present work deals with the pharmacognostical and preliminary phytochemical studies on fruit of *Emblia officinalis* Gaertn. Macroscopical and Microscopical Characters, physico-chemical constants, quantitative microscopy parameters, extractive values, TLC and HPTLC were studied. Preliminary phytochemical screening on fruit of *Emblia officinalis* Gaertn. Were studied. The discrimination of these characters will assist future researchers in their Phytochemical as well as Pharmacological analyses of this plant.

K-eywords: *Emblia officinalis* gaertn, pharmacognosy, phytochemical, macroscopic, microscopic

Introduction

Botanical classification: According to Benthem & Hooker (1862-1883)

Taxonomical position: *Emblia officinalis* Gaertn. Syn. *Phyllanthus emblica* Linn.

Kingdom: Planate

Division: Angiospermae

Class: Eudicots

Subclass: Archichlamydeae

Series: Unisexuales

Order: Malpighiales

Family: Euphorbiaceae

Group: *Emblia*

Species: *Officinalis* Gaertn.

Vernacular Names

Arabic: Amliy, Amlaj.

Assami: Amalaki, Amluki, sohmyrlain.

Bengali: Ambolati, Amla, Amalaki, Amlati, Amulati, Aunlah, Yeonlah.

Burma: Hziphyu, Shabju, Siphiyusi, Tasha, Zibyu, Ziphiyusi.

Cuttack: Alathanda

English: Emblic myrobalan tree

Gujarati: Amla, Ambala, Ambri, Amla, Bhoza, Bhozzmali.

Hindi: Amalaci, Amla, Amlika, Anola, Anuli, anvula, Anvurah, Anwerd, Aonla, aungra, Aunra, Daula.

Konkani: Anvallo, Dogranvalli, Dogranvallo.

Malayalam: Amalakam, Nelli.

Marathi: Anvala, Aonli, Avla, Arola, Bhuiawali.

Nepal: Amla.

Punjabi: Ambal, Ambli, Ambul, Amla, Aonla.

Sinhalese: Awusadanelli, Nelli, Nellika.

Tamil: Amalagam, Andakoram, Indul, Kattunelli, Nelli, Perunelli, Sirottam, Tattiri, Topunelli.

Telugu: Amalakamu, amalaki, Nelli, pullayusirika, Usirika, Usirikaya, Usiriki.

Tulu: Nelli.

Urdu: Anwala.

Uriya: *Khondona*, Onola.

Correspondence

Sadhana Singh
Senior Resident & Phd Scholar in
Dept. of Dravyaguna I.M.S.,
B.H.U., Varanasi, Uttar Pradesh,
India

Distribution and Habitat

Botanical description

A small or medium sized, deciduous tree.

Leaves: Subsessile, closely set along the branch lets, distichous, narrowly linear, obtuse, having appearance of pinnate leaves.

Flowers: Greenish-yellow, in axillary fascicles on the leaf bearing branchlets, often on the naked portion below the leaves.

Fruits- Fleshy, globose, with obscure vertical furrow, pale yellow.

Seeds: Seed 6, trigonous.

Part used: Root Bark, Stem bark, leaf, Fruit, Seed¹

Chemical constituents

Major

Ascorbic acid, chebulinic acid, chebulagic acid, 3-ethylgallic acid, gallic acid, ellagic acid, corilagin.

Other

Isostrictinin, Terchebin, Emblicanin -A and B, Punigluconin, Pedunculagin, trigalloyl glucose, Quercetin².

Image of Plant



Amalaki



Dry fruit Amalaki

Properties

Properties of Amalaki are as below [3, 4].

Rasa: Madhura, Amla, Katu, Tikta, Kasaya

Guna: Guru, Ruksa, Sita

Virya: Sita

Vipaka: Madhura

Dosa Karma: Tridosas Samaka

Rogagnata- Arsha, Kushtha, Hikka, Kasa, Jvara, Raktapitta, Khalitya, Palitya, Aruchi, Shotha, Atisar, Prameha, Udar shula

Karma- Dahaprashamana, chakshushya, Keshya, Medhya, Balya, Vrishya, Kushthaghna, Mootrala, Pramehaghna [5, 6, 7, 8].

Materials and Method

Macroscopic and Microscopic description of Amalaki as described in API

Macroscopic

Drug consists of curled pieces of epicarp and mesocarp of dried fruit occurring either whole or as separated single segment 1 to 2 cm long or united as 3 or 4 segments; bulk colour grey to black, pieces showing, a broad, highly shriveled and wrinkled; external surface convex to somewhat concave, transversely wrinkled showing a few whitish specks; occasionally some pieces may show a portion of stony endocarp; fracture, tough, cartilaginous, taste, sour and astringent; seeds and endocarp must be within the limits prescribed for foreign matter (Ayurvedic Pharmacopoeia of India, Part I, Volume VIII, First edition 2011).

Microscopic

TS of pericarp of fruit shows epicarp consisting of a single layer of epidermis, cell appearing tabular and polygonal in surface view; cuticle present; a few small rosette crystals of calcium oxalate present in epidermal cells; mesocarp cells tangentially elongated parenchymatous and cell with walls showing irregular thickenings; ramified vascular elements occasionally present, lignified having wide lumen; stone cells present, either isolated or in small groups toward endocarp; pitted fibers with walls appearing serrated due to the pit canals leading into lumen, present (Ayurvedic Pharmacopoeia of India, Part I, Volume VIII, First edition 2011).

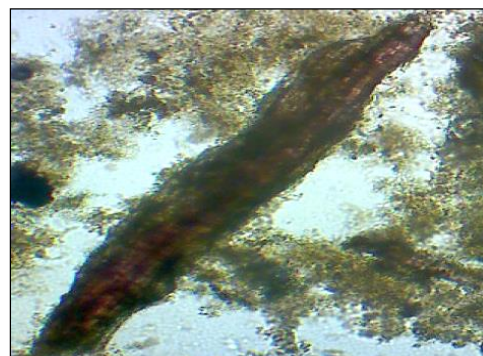
Powder microscopy of fruit powder of Amalaki

Coarse powder of grayish white, dark brownish or black in colour. In microscopic powder study it shows lignified tissues of brown in colour. Aleurone grains of green to brown colour, and prismatic crystals of silica of brown colour are seen [9].

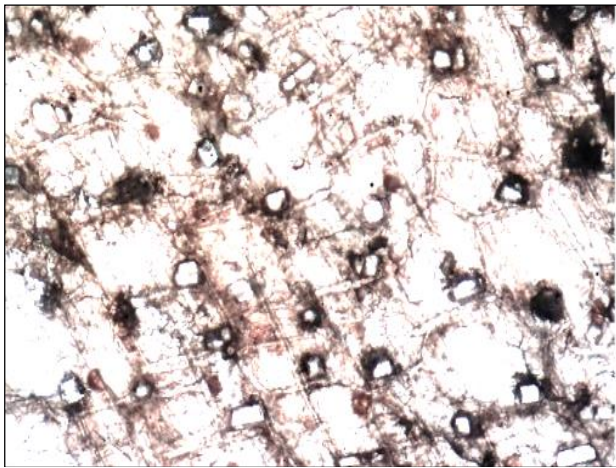
Table 3: Microscopical Characteristics of Powdered Amalaki Friut

S. No.	Reagents	Observations	Characteristics
1.	Phloroglucinol + Conc. Hcl	Pink	Lignified Vessels
2.	Dil. Sulpuric Acid	White	Calcium oxalate crystals
3.	Alcoholic Picric Acid	Yellow	Starch grains
4.	Sudan Red III	Red	Oil globules and cuticles.

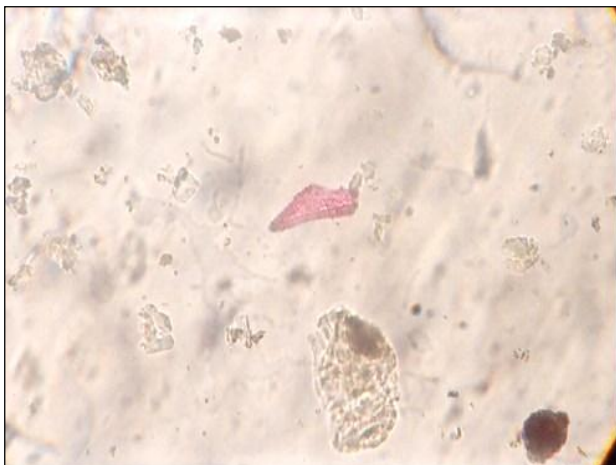
Powder microscopy of fruit powder of Amalaki



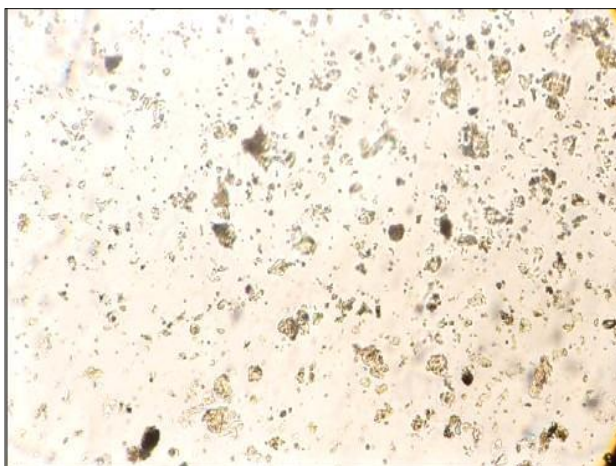
Lignified Tissues



Prismatic crystals



Aleurone grains



Cuticles Amalaki

Table 1: Certificate of Analysis of Amalaki

S. No.	Parameters	Observation
I	Physical tests	
	Nature	Coarse powder
	Colour	Brownish or black
	Odour	Characteristic
	Taste	Bitter & sour followed by sweet astringent
II	Foreign matter	Nil
III	Moisture content (w/w %)	6.8
IV	Ash value (% w/w)	
	Total ash	4.55
	Acid insoluble ash	1.9
	Water soluble ash	1.6

Table 2: Percentage yield of Extracts of Amalaki

S. No	Extracts	Nature of Extract	Weight (gm)	% Yield w/w
I	Hydro-alcohol	Viscous	44.775	44.77

Genuine sample of amalaki gave the presence of following phytochemicals

Phytoconstituents	
Alkaloids	+
Glycosides	+
Flavonoids	+
Steroid	-
Phenolic & tannins	+
Terpenoid	-
Sterol	-
Carbohydrates	-
Proteins	+
Amino Acids	+

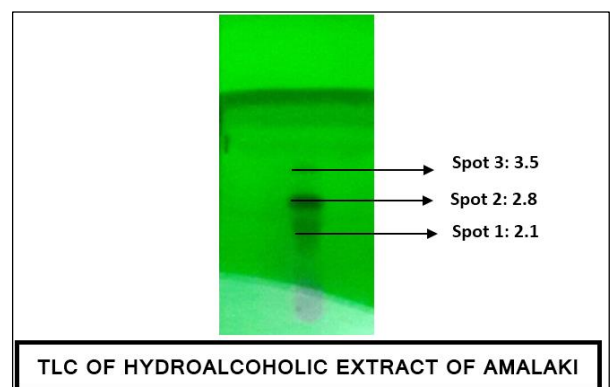
(+) indicate present, (-) indicate absent

TLC of hydroalcoholic extract of amalaki

Thin layer chromatography is a technique in which a solute undergoes distribution between two phases, a stationary phase acting through adsorption and a mobile phase in the form of a liquid [10].

Mobile phase : A mixture of 6 ml of Toluene, 6 ml of Ethyl acetate, 1.8 formic acid, 0.25 methanol.

Heat: Heat at 110 °C for 10 minutes and examines the plate under day light.



Solvent system [Toluene: Ethyl acetate: formic acid: methanol (6:6:1.8:0.25)]

For Spot 1

$$R_f \text{ Value} = \frac{2.1}{5.5} = 0.38$$

For Spot 2

$$R_f \text{ Value} = \frac{2.8}{5.5} = 0.509$$

For Spot 3

$$R_f \text{ Value} = \frac{3.5}{5.5} = 0.636$$

HPTLC of hydroalcoholic extract of Amalaki

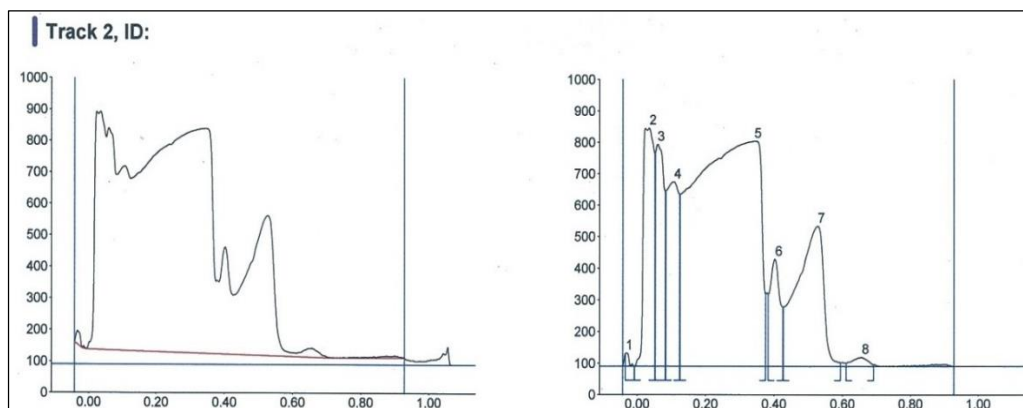
High performance thin-layer chromatography (HPTLC) is an enhanced form of TLC (thin layer chromatography).

Methodology

- 0.3g of extract was dissolved with 1 ml of water and 1ml of ethyle alcohol and 3, 6 and 9 μ l of the above extract was applied on a pre-coated silica gel F254 on aluminum plates to a band width of 7 mm using Linomat 5 TLC applicator.
- The plate was developed in Toluene: Ethyl-acetate: formic acid: methanol (6:6:1.8:0.25). The developed plates were visualized in UV 254 and 366 and scanned under UV 254 and 366 nm. R_f of the spots and densitometric scan were recorded.



HPTLC of Hydroalcoholic extract of Amalaki



HPTLC chromatogram of Hydroalcoholic extract of Amalaki

Track 2, ID

Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %
1	-0.03	38.9	-0.03	41.5	1.15	-0.01	0.0	372.1	0.18
2	-0.01	0.4	0.04	755.8	20.94	0.05	674.2	19765.2	9.66
3	0.05	676.4	0.06	703.7	19.50	0.08	555.8	14410.4	7.04
4	0.08	556.1	0.11	584.5	16.19	0.13	544.6	17063.5	8.34
5	0.13	544.8	0.34	713.8	19.78	0.38	229.6	114768.0	56.06
6	0.38	228.1	0.40	338.3	9.37	0.43	187.3	8439.0	4.12
7	0.43	187.8	0.53	443.2	12.28	0.60	11.9	28759.6	14.05
8	0.61	11.1	0.66	28.8	0.80	0.69	6.4	1136.4	0.56

Discussion & Conclusion

Plants have played a significant role in maintaining human health and improving the quality of life for thousands of years and have served human as well as valuable components of medicines, seasoning, beverages, cosmetics and drugs. The plants are used in medicine since antiquity. Rigveda, one of the oldest Veda had quoted the use of plants in medicine. Much of the medicinal plants are documented in the old medical sciences like Ayurveda. Nearly five hundred plants of vegetable origin are documented in Caraka Samhita and Sushruta has given the number of plants 573 in Sushruta Samhita. These plants are still used successfully to treat different ailments. The use of the plants depends on the basic theories brought up by ancient scholars. Number of pharmacological activities is attributed to these plants. Quotations of wonder and miracle plants are also found in literature. However, these plants require detailed taxonomical and pharmacological studies.

'Pharmacognosy' is meant by identification of drugs by its every aspect, habit, cultivation, procurement, micro and macroscopic characters, physical and chemical properties etc. [11].

In present study pharmacognostical standards have been established with regards to Fruit of *Emblca officinalis* Gaertn. In Powder microscopy of Fruit of *Emblca officinalis* Gaertn.

Showed the presence of lignified tissues, Aleurone grains and prismatic crystals of silica on physiochemical analysis, the moisture content was found in-Amalaki 6.8%. The Total ash was found 4.55%; Acid insoluble ash was 1.9%, and; water soluble ash was 1.6% in fruit of Amalaki. The phytochemical investigation shows the presence of Alkaloids, Glycoside, Flavonoids, tannins, Protein, Tannins and Phenolic Compounds in the fruit of *Emblca officinalis* Gaertn. The TLC and HPTLC was performed and the developed plates were visualized in UV 254nm, 366nm.

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