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RESEARCH ARTICLE

AMALAKI (*Emblica officinalis* Gaertn.): A REVIEW FROM TEXTS OF MODERN PERIOD.

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Abstract

The Amla berry is a traditional food and medicine having many known nutritional and medicinal benefits and uses. It is a natural, efficacious antioxidant with the richest natural source of Vitamin C. Numerous studies conducted on Amla fruit suggest that it has antibacterial, antiviral, anti-fungal, antioxidant, cardioprotective, Gastroprotective, anti-Helicobacter pylori and antistress activity. Regular use of Amla improves immunity, fight against chronic diseases like hypertension, Diabetes, influenza, high Cholesterol, Chronic cough and cold, chronic infections, chronic fatigue and chronic inflammatory conditions. In Ayurvedic classics it describes as one of the best herbs for Diabetes, bleeding disorders, strength and stamina promoter. Perusal of history reveals the earliest description regarding Amla is found in Vedic literature. In modern texts also related to Ayurveda or medicinal plants, detailed description regarding Amalaki can be seen.

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Introduction:-

Literary review” is the fundamental step of any research work. It is urgently needed to collect all possible data from the books and published articles regarding the subject before entering the practical part of the research work. Literary part of study provides a clear idea about the subject and helps in proper planning for further study. Since the beginning of human civilization, medicinal plants have been used by mankind for its therapeutic value. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. The materiamedica of Ayurveda contains a rich heritage of indigenous herbal practices that have helped to sustain the health of most rural people of India. The ancient texts “Veda” mention the use of Amalaki as medicine. Almost all the Ayurvedic classics also describe Amalaki as medicine. Amalaki is also illustrating in modern literature related to medicinal plants. Botanically it is *Emblica officinalis* Gaertn. belonging to family Euphorbiaceae. Some important texts related to plants described the Amalaki are discussing here.

Amalki In The Texts Of Modern Period:-

Indian Materia Medica:-

Author has described the Sanskrit name, vernacular name, habit, parts used (Dried fruit, nut or seed, leaves, root, bark and flowers), Action & uses in Ayurveda, Siddha and Unani, indications, preparations and uses of *Emblica officinalis*.¹

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Indian medicinal plants:-

Morphology of the plant has been described elaborately, along with its uses, therapeutic applications and Vernacular names.²

Compendium of Indian Medicinal Plants:-

All the volume have mentioned about *Emblicaofficinalis*. Bookcontains description about chemical constitution of fruit and seed along with biological activity.

Ayurvedic Pharmacopoeia of India:-

Thisbook described synonyms, vernacular names, macroscopic and microscopic description, identity, purity and strength, chemical constitution, properties and action, important formulation, therapeutic dose and uses of Amalaki fresh fruit and dried fruit.³

Wealth of India:-

This precious book describes about vernacular names, morphology, propagation, chemical constituents and action & uses of *Emblica officinalis*.⁴

Quality standards of Indian medicinal plants:-

This book describes botanical source, habit, habitat of Amalaki and macroscopy, microscopy, powder microscopy and TLC profile of *Emblicaofficinalis* frui⁵.

Database on Medicinal plants used in Ayurveda:-

This book depicts Botanical name, Natural order, classical names, Vernacular names, Botanical description, Distribution, Part used, Action & uses, Ayurvedic properties, Pharmacognosy of fresh & dried mature fruit, Chemical constituents, Pharmacological activity, Toxicology, Therapeutic evaluation, Formulations & preparations, Trade & commerce, Propagation & cultivation of *Emblica officinalis*.⁶

The Flora of British India:-

The detailed description about genus and species characters of this plant along with the information of habit and cultivation places has been described.⁷

Herbal drugs industry: A practical approach to industrial pharmacognosy:-

In this book in chapter I, "pharmacological classification of medicinal herbs", Amalaki comes under Adaptogens, Anti-Arthritics and anti-inflammatory, Anti-diabetics, Anti peptic ulcer herbs, Hypertensives and Cardiotonics, Hypocholestremics, General tonics, Hyperacidity herbs, Laxatives, Liver disease herbs and Ophthalmic remedies. In chapter II, "herbal source of food supplements, taste enhancers, colours and cosmetics" Amalaki specified as source of Vitamin C and Iron. In chapter IV, "Suggested dosages of natural plant product" dose of dried extract of Amalaki is given as per Vitamin C needed i.e. 250-500 mg. In chapter V, "Key to identification of medicinal plants" books, Indian pharmaceutical codex, 1953 and Pharmacognosy of Ayurvedic drugs; 9 Volumes, Kerala University, Trivandrum are mentioned for identification of Amalaki. In chapter VIII, "Some hints on herbal formulations", Amalaki is mentioned for hair oil and Shampoo preparation.⁸

Medicinal plants and raw drugs of India:-

Here vernacular name, description, occurrence and distribution, chemical constituents, part used, medicinal uses and folklore are described.⁹

Illustrated manual of herbal drugs used in Ayurveda:-

This book include Sanskrit, English & regional names, description and uses of *Emblicaofficinalis* fruit.¹⁰

Indian Medicinal Plants (a compendium of 500 species):-

This book describes distribution, description, part used, properties and uses and references of different classics of Ayurveda.¹¹

Pharmacognosy of Ayurvedic drugs Kerala:-

This book contain synonyms, distribution & habitat, habit & general features, external morphology, description of fruit and histology along with description of Amalaki as per Acharyas of Ayurveda.¹²

Cultivation of Medicinal and aromatic plants:-

Book describes plant profile, origin & distribution, varieties, cultivation, planting, manures and fertilizers, irrigation, mulching, training & pruning, intercropping, pests & diseases and harvesting.¹³

Identification of Common Indian medicinal plants:-

This book describes key to identification of family (Euphorbiaceae) and species of medicinal plants.¹⁴

Agro-techniques of medicinal plants:-

This book describes vernacular names, botanical description, geographical distribution, medicinal uses, chemical constituents, soil and climate, improved varieties, land preparation, mode of propagation, nursery raising, transplanting, pruning, intercropping, fertilizers & manures, irrigation, pests and diseases of Amalaki.¹⁵

Medicinal properties of plants, Antifungal, antibacterial and antiviral activities:-

Here Amalaki is reported with antimicrobial activity against *Staphylococcus aureus*, *S. epidermidis* and *Salmonella typhimuricum*.¹⁶

The medicinal and poisonous plants of India:-

This book describes varieties, habitat, quality, therapeutic uses and Vernacular names of *Phyllanthus emblica*.¹⁷

Botany for degree students:-

Here description of family (Euphorbiaceae) of Amalaki is stated.¹⁸

Pharmacognosy:-

Here Synonyms, Biological sources, Geographical sources, Cultivation and collection, macroscopic characters, Extra features, Chemical constituents, Chemical tests and uses along with part used, Rasa, Guna, Virya, Vipaka and important uses are described.¹⁹

Indian herbal Pharmacopoeia:-

This book contain vernacular names, macroscopic and microscopic description of fruit, Chemical constituents, identity tests, Assay/Analytical methods, Limits for quality parameters, Pharmacology, therapeutic category and Dosage of *Emblica officinalis*.²⁰

Medicinal and aromatic plants of Himachal Pradesh:-

This book contains local names, distribution, description, flowering/fruiting, part used, current market rate, main ingredients, uses, preparations and cultivation notes of Amalaki.²¹

The medicinal plants of North-east India:-

Here common name, description, flowering, part used and medicinal uses of Amalaki is described.²²

Quality control of Herbal drugs: An approach to evaluation of Botanicals:-

This book describes Classification, part used, phytochemistry, marker constituents, Macroscopic characters, tests for extraneous materials, physic chemical analysis, extractive values, phytochemical analysis and identification of crude drug by TLC/HPTLC of *Emblica officinalis*.²³

Glossary of Vegetable drugs in Brihatrayi:-

This book describes the references of Dhatri in Brahatrayi.²⁴

Medicinal plants of SushrutaSamhita:-

This book mentioned references of Amalaki in SushrutaSamhita by different synonyms like Amalaki, dhatri, Vayastha etc.²⁵

Namarupajnanam:-

This book describes interpretation of Sanskrit names of Amalaki.²⁶

DravyagunaSutram:-

Here Acharya P. V. Sharma mentioned Dhatri as “PranipalnadRasayani” in AushadhaPrakaran.²⁷

PrayogatmakaAbhinavDravyagunaVigyana:-

This book describes Nirukti, Swarupa, Doshabheden Karma Gyana, Therapeutic uses, Chemical composition, Formulations of Amalaki.²⁸

Taxonomic position²⁹:-

Kingdom	Plantae
Division	Spermatophyta
Subdivision	Angiospermae
Class	Dicotyledonae
Natural order	Geraniales
Family	Euphorbiaceae
Genus	<i>Emblica</i>
Species	<i>Emblicaofficinalis</i> Geartn.

Vernacular names³⁰:-

Arabic	-	Ambily, Amlaj
Assam	-	Amalaki, Amluki, Sohmyrlain
Bengal	-	Ambolati, Amla, Amalaki, Amlati, Amulati, Aunlah, Yeonlah
Bombay	-	Amla, Avala, Avalkati
Burma	-	Hziphyu, Shabju, Siphiyusi, Tasha, Zibyu, Ziphiyusi
Cambodia	-	Ngop
Canarese	-	Amalaka, Chattu, Dadi, Dhanya, Dhatri, Nelli, Sudhe
Central Provinces	-	Amla, Anla
Ceylon	-	Toppinelli
Chinese	-	An Mo Le
Cuttack	-	Alathanda
Deccan	-	Amla, Owla, Ownla
English	-	Emblicmyrobalan tree
Garo	-	Ambari
Gond	-	Aunri, Lalla, Milli, Nalli, Nilli, Usir
Gujerati	-	Amali, Ambala, Ambri, Amla, Bhoza, Bhozaamalli
Hindi	-	Amalaci, Amla, Amlika, Aonla, Anuli, Anvula, Anvurah, Anwerd, Aunra, Aungra, Daula
Khond	-	Durga
Kol	-	Miral
Kolami	-	Aura
Konkani	-	Anvallo, Dogranvalli, Dogranvallo
Kumaon	-	Aonla
Kurku	-	Aunre
Kwang Tung	-	YeouKanTse
Lambadi	-	Ambla
Lepcha	-	Amlokung, Suom
Malayalam	-	Amalakam, Nelli
Marathi	-	Anvala, Aonli, Avala, Arola, Bhuiawali
Nepal	-	Amla
North western Provinces	-	Amla, Aoula
Persian	-	Amelah, Amuleh
Portuguese	-	Mirabolano emblico
Punjab	-	Ambal, Ambli, Ambul, Amla, Aonla
Sanskrit	-	Adiphala, Akara, Amalaki, Amamalakam, Amlika, Amraphala, Amrita, Amritaphala, Bahuphali, Dhatri, Dhatrika, Dhatriphala, Jatiphala, Tishya, Tishyaphala
Santal	-	Meral
Saora	-	Peddavusirika
Sinhalese	-	Awusadanelli, Nelli, Nellik
Tamil	-	Amalagam, Andakoram, Indul, Kattunelli, Nelli, Perunelli, Sirottam, Tattiri

Telugu	-	Amalakamu, Amalaki, Nelli, Pullayusirika, Usirika, Usiriki
Tulu	-	Nelli
Urdu	-	Anwala
Uriya	-	Khondona, Onola

Description of amalaki³¹:-

A deciduous small or middle sized tree with crooked trunk and spreading branches; bark greenish grey, peeling off in conchoidal flakes; branchlets glabrous or finely pubescent, 10-20 cm. long, often deciduous. Leaves subsessile, 10-13 by 2.5-3 mm., closely set along the branchlets, distichous, light green, glabrous, narrowly linear, obtuse, imbricate when young, having the appearance of pinnate leaves; stipules ovate, finely acute. Flowers greenish yellow, in axillary fascicles on the leaf-bearing branchlets, often on the naked portion below the leaves, with fimbriate bracts at the base. Male flowers numerous, on short slender pedicles. Sepals 6, oblong, obtuse, 1.2 mm. long. Anthers 3 on a short central column. Female flowers few, subsessile. Sepals as in the male. Disk a lacerate cup. Ovary 3 celled; styles connate at the base, irregularly twice 2-fid with acute lobes. Fruit 1.3-1.6 cm. diam., fleshy globose with 6 obscure vertical furrows, pale yellow, of three 2 seeded crustaceous cocci. Seeds 6, 3 gonous.

Distribution³²:-

Throughout tropical and subtropical India, chiefly in dry deciduous forests, ascending to 1400 m on the Himalaya, Chota Nagpur, Bihar, Orissa, west Bengal, north Circars, Deccan, Karnataka and in western Ghat.

Action and Uses³³:-

The root bark is astringent and is useful in ulcerative stomatitis and gastric ulcer. The bark is astringent and useful in gonorrhoea, jaundice, diarrhoea and myalgia. The flowers are cooling and aperients. The leaves are useful in conjunctivitis, inflammation, dyspepsia, diarrhoea and dysentery. The fruits are astringent, cooling, anodyne, carminative, digestive, stomachic, laxative, alterant, alexeteric, aphrodisiac, diuretic, antipyretic, tonic and trichogenous. They are useful in diabetes, cough, asthma, bronchitis, headache, ophthalmic disorders, dyspepsia, colic, flatulence, hyperacidity, peptic ulcer, erysipelas, skin diseases, leprosy, haematemesis, inflammations, anemia, emaciation, hepatic disorders, jaundice, strangury, diarrhoea, dysentery, intrinsic haemorrhages, leucorrhoea, menorrhagia, cardiac disorders, intermittent fevers and greyness of hair. Seeds are reported to be useful in asthma, bronchitis and biliousness.

Propagation And Cultivation³⁴:-

Phyllanthusemblica grows best on well drained fertile loamy soil. It thrives well on light as well as heavy soils. It is found even on moderately alkaline and acidic soils. Moderate warm climate favours for the initiation of floral buds. It is usually propagated by seeds directly in polythene bags. Two seeds are dibbled in each bag. The seeds are collected in the month of April or May. Freshly collected fruits stored in tins give 70 to 80% germination till three months. Adequate watering is necessary to keep the soil moist until the seedlings have put forth four or five leaves. The highest percentage of germination (92.5%) has been attained by presowing treatment of seeds with 500 ppm GA₃ for 24 hours. Planting is done without disturbance to the root system in the month of June or July. The soil is mixed with 5-10 kg farm yard manure. In order to protect the attack of termite 5% BHC powder is mixed in the FYM. Pruning of the bearing plants should be done after the end of fruit bearing season. The young plants require watering at fortnight interval, particularly till they are fully established. Watering of mature, bearing plants is also necessary from April to June at bi-weekly interval to secure higher fruit set and reduce fruit drop. Irrigation during October to December at 20 days intervals helps in better developments of fruits. The tree generally starts bearing fruits after 6 to 8 years. The plant is reported to be affected by blue mold (caused by *Penicilliumislandicum*) and fruit and leaf rust (caused by *Revenelliaemblicae*).

Effect of initial explant used (cotyledons, nodes, shoots, hypocotyls and root) on shoot morphogenesis in callus cultures was examined in *Emblicaofficinalis*. Regenerative callus was raised from different explants on MS medium supplemented with BAP (2.0 mg/l), Kn (2.0 mg/l), citric acid (25.0 mg/l), ascorbic acid (25.0 mg/l) and PVP (25.0 mg/l). The regenerated shoots elongated on hormone free medium and were subsequently rooted on ½ MS medium fortified with IBA (2.0 mg/l) and sucrose (1.5%). Callus raised from cotyledonary explants showed maximum intensity of shoot bud differentiation. Shoot proliferation was obtained from nodal stem explants of *Emblicaofficinalis* on modified MS-medium supplemented with BAP (3.0-5.0 mg/l) in combination with NAA (0.5 mg/l). These shoots elongated on hormone free MS-medium, were subsequently rooted on half strength MS medium containing IBA (2.0-3.0 mg/l).

Chemical Composition Of Amalaki:-

The fruit pulp contains: moisture, 81.2; protein, 0.5; fat, 0.1; mineral matter, 0.7; fibre, 3.4; carbohydrate, 14.1; Ca, 0.05; and P, 0.02; Fe, 1.2 mg/100 g.; nicotinic acid, 0.2 mg./100 g.; and vitamin C, 600 mg/100 g. Vitamin C content up to 720 mg/100g. of fresh pulp and 921 mg./100 cc of press juice has been recorded. The fruit is a rich source of pectin (*Hlth Bull.*, No. 23, 1951, 38; Srinivasan, *Nature*, 1944, 153, 684; Krishnamurti&Giri, *Proc. Indian Acad. Sci.*, 1949, 29 B, 155). Amla fruit is probably the richest source of Vitamin C. The fruit juice contains nearly 20 times as much Vitamin C as orange juice and a single fruit is equal in antiscorbutic value to one or two oranges. A tannin containing gallic acid, ellagic acid and glucose in its molecule and naturally present in the fruit, prevents or retards the fruit a valuable antiscorbutic in the fresh as well as in the dry condition. The dried fruit loses only 20% of its vitamins 375 days when kept in a refrigerator, but loses 67% in the same period when stored at room temperature.

Seeds of Amalaki contain a fixed oil, phosphatides and a small quantity of essential oil with a characteristic odour. The fixed oil which is brownish yellow in colour, has the following physical and chemical characteristics. The component fatty acid of the oil is: linolenic, 8.78; linoleic, 44.0; oleic, 28.40; stearic, 2.15; palmitic, 2.99; and myristic acid, 0.95%. proteolytic and lipolytic enzymes are present in the seeds (Dharet *al.*, *J. sci. industry. Res.* 1951, 10B, 88; *Annu.Progr. Rep.*, *CDRI, Lucknow*, 1951-52)

The fruit bark and leaves are rich in tannin. The distribution of tannin in the plant is as follows: fruit, 28; twig bark, 21; stem bark, 8-9; and leaves, 22%. The fruit contains two tannins, one giving hydrolysis gallic acid, ellagic acid and glucose, and the other giving ellagic acid and glucose.³⁵

A good source of Vitamin C; carotene, nicotinic acid, riboflavin, D-glucose, D-fructose, myoinositol and a pectin with D-galacturonic acid, D-arabinosyl, D-xylosyl, L-rhamnosyl, D-glucosyl, D-mannosyl and D-galactosyl residues, embicol, mucic, indole acetic acid and four other auxins- a1, a3, a4 and a5. Two growth inhibitors- R1 & R2; phyllembic acid and phyllembin (fruits) and fatty acids (seed oil); leucodelphinidin, procyanidin, 3-O-gallated prodelfphinidin and tannin (bark); ellagic acid, lupeol, oleanolic aldehyde and O-acetyl oleanolic acid (root); tannins, polyphenolic compounds; 1,2,3,6 - trigalloyl glucose, terchebin, corialgin, ellagic acid, alkaloids, phyllantidine and phyllantine (leaves & fruits).³⁶

Toxicology³⁷:-

Active crude alcoholic extract of the plant was assayed for cellular toxicity to fresh sheep erythrocytes and found to have no cellular toxicity.

Discussion and Conclusion:-

Amalaki is well known plant since ancient period. In modern period, different authors identified Amalaki botanically as *Emblicaofficinalis*, family Euphorbiaceae. Almost all authors reported its properties as mentioned in classical Ayurvedic texts related to Dravyaguna. Further they have reported the habitat, synonyms, vernacular names, chemical constituents, doses and formulations of Amalaki. The fruits are astringent, cooling, carminative, digestive, laxative, aphrodisiac, diuretic, and tonic. They are valuable in diabetes, ophthalmic disorders, dyspepsia, colic, flatulence, hyperacidity, peptic ulcer, erysipelas, skin diseases, leprosy, hepatic disorders, jaundice, leucorrhoea, menorrhagia, cardiac disorders, intermittent fevers and greyness of hair.

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