Amalaki (Emblica officinalis Gaertn.): A review on its therapeutic properties

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ABSTRACT

Amalaki (Emblica officinalis) has a prime position in Ayurveda- an Indian indigenous system of medicine. Amalaki belongs to the family of Euphorbiaceae and is also known as Phyllanthus emblica or Indian gooseberry. Amalaki is one of the most important medicinal plants in Indian traditional systems of medicine (Ayurveda, Unani and Siddha). It is a well-known fact that all parts of Amalaki are useful in the treatment of various diseases. Among all, the most important part is fruit. The fruits of Amalaki are widely used in the Ayurvedic preparation and it increases defense against diseases. It has a beneficial role in degenerative diseases like cancer, diabetes, liver treatment, ulcer, anaemia, eye diseases, and heart trouble and also is an important constituent in hepatoprotective and rejuvenating formulas available. Phytochemical studies on Amalaki disclosed major chemical constituents including tannins, alkaloids, polyphenols, vitamins and minerals. Gallic acid, ellagic acid, emblicanin A & B, phyllembein, quercetin and ascorbic acid are found to be biologically effective. It is enormously used as a tonic to restore the lost body’s energy and vigor, mentioned under Triphala (~combination of three potent fruit) in Ayurveda. In this article, we will emphasize on its various therapeutic applications as per modern researches and our classical texts. We will also discuss about the nutritional value, biochemical constituents, medicinal value of Amalaki and its use as a household remedy.

Key words: Ayurveda, Amalaki, Emblica officinalis, Therapeutic, Traditional

INTRODUCTION

Ayurveda is one of the major and main traditional medicinal systems of India. The word “Ayurveda” means “science of life”. The basic concept of diagnosis and drug development in Ayurveda is based on Tridosha (three major components of disorders) theory, which includes Vayu, Pitta and Kapha. Amalaki or Indian gooseberry (Emblica officinalis Gaertn.) is known for its medicinal and therapeutic properties from the ancient time in India and considered as a wonder fruit for health conscious population.[1]

“Amalaki” is having prime position amongst the Antiageing drugs. It is the best tissue rejuvenating herb. It is a potent herb rich with Anti-oxidant, Vitamin-C, Tannin and Gallic acid. Amalaki possesses key properties like properties like Rasayana (Adaptogenic), Aitra (Anti-ageing), Ayushprada (prolonged cell life), Sandhaniya (Improves cell migration and cell binding).[2] It promotes, protects and extends youthful state and thus, curtailing Ageing process. Amalaki fruit has a special characteristic features which makes it a nurturing herb that is credited with a number of health benefits. In Ayurvedic tradition, the fruit forms an integral part of medicinal preparations that are used to support wellness and healthy Ageing.[3]

Charaka Samhita mentioned Amalaki is one of the most potent and nutritious drugs and also a best rejuvenating herb (Amalaki Vyayaahapnannam Sreshtham).[4] Amalaki has low molecular weight hydrolysable Tanins (Emblcacin A and B) thereby it is considered as one of the stronger antioxidant herb in Ayurveda.[5]
AIMS AND OBJECTIVES

1. To study the therapeutic applications of drug *Amalaki* as per our classical texts.
2. To study the biochemical constituents and medicinal value of *Amalaki* as per modern researches.

MATERIALS AND METHODS

The basic and conceptual materials were collected from the Ayurvedic classics i.e., Bruhtrayi, research paper and journals.

Taxonomical Classification

- Kingdom: Plantae
- Division: Angiospermae
- Class: Eudicots
- Subclass: Archichlamydeae
- Series: Unisexuals
- Order: Malpighiales
- Family: Euphorbiaceae
- Group: *Emblica*
- Species: *officinalis* Gaertn.
- Synonym- *Phyllanthus emblica* Linn.
- Family- Euphorbiaceae.[6]

Morphology

*Amalaki* tree is a small to medium sized deciduous tree with an average height of 8-18 m, with thin light grey bark exfoliating in small thin irregular flakes. The average girth of the main stem is 70 cm. The main trunk is divided into 2 to 7 scaffolds very near to the base. Leaves are 10 -13 mm long, 3 mm wide, closely set in pinnate fashion which makes the branches feathery in appearance. Flowers are unisexual, 4 to 5 mm in length, pale green in color, borne in leaf axils in clusters of 6 to 10. Fruits are fleshy, almost depressed to globose shape, 2.1-2.4 cm in diameter, 5.3-5.7 g in weight, 4.5-5.0 mL in volume. It is commercially cultivated in Uttar Pradesh in India. It is also grown in Tamil Nadu, Rajasthan and Madhya Pradesh.[7]

*Amalaki* Fruit: The fruit is fleshy, spherical, light greenish yellow, quite smooth and hard on appearance, with 6 vertical stripes or furrows 4 each containing usually two seeds; seeds are 4-5 mm long and 2-3 mm wide, each weighing 572 to 590 mg. *Amalaki* fruit size, shape and weight were found to vary among its different varieties. There are compositional differences in different varieties of *Amalaki*.[8]

Leaves: *Amalaki* leaves are Subsessile, closely set along the branchlets, distichous, narrowly linear, obtuse, having appearance of pinnate leaves.[9]

Flowers: 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. Ovary 3 celled; styles connate at the base, irregularly twice with acute lobes.[10]

The fruiting season of *Amalaki*

The fruiting season of *Amalaki* fruit is lengthy one. *Amalaki* is a deciduous tree and the new shoots emerges in the beginning of April. The fruit can be harvested in December which can be retained on the tree up to March without any significant loss in quality or yield. The picking of fruit is generally in January to March. *Amalaki* tree is a heavy bearer and the fruits also remain free from the attacks of birds and wild animals.[11]

Distribution

Throughout tropical and subtropical India, chiefly in dry deciduous forests, ascending to 1400 m on the Himalaya, Chhota Nagpur, Bihar, Orissa, West Bengal, North Circars, Deccan, Karnataka and in Western Ghats.[12]

Chemical constituents[13]

Table 1: Chemical Composition of *Amalaki*

| Fruits | Phylembolin, phyllemblic acid, gallic acid, emblicol, quercetin, hydroxymethyl furfural, ellagic acid, pectin, putranjivan A, two new hydrolysable tannins called emblicannin A and B, punigluconin and pendunculagin. |
Leaves
Gallic acid, Ellagic acid, Chebulic acid, Chebulagic acid, Chebulinic acid, a Gallottannins called Amlic acid, Alkaloids, Phyllatidine and Phyllantine. Amalaki bark contains Leucodelphinidin, Procyanidin, tannin, ellagasic acid.

Seeds
Saturated fatty acids (7%), linolenic acid (8.78%), linoleic acid (44.0%), oleic acid (28.40%), stearic acid (2.15 %), palmitic acid (2.99%), linoleic acid and oleic acid.

Barks
Leucodelphinidin, tannin and proanthocynidin

Roots
Lupeol, Oleanolic aldehyde, ellagasic acid, o-acetyloleanolic acid

Amalaki is 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-xyllosyl, 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 prodelphinidin and tannin (bark); ellagic acid, lupeol, oleanolic aldehyde and 0-acetyl oleanolic acid (root); tannins, polyphenolic compounds; 1,2,3,6-tigalloyl glucose, terchebin, corialgin, ellagic acid, alkaloids, phyllantidine and phyllantine (leaves & fruits).[14]

**Ayurvedic Review of Amalaki**

**Ayurvedic properties (Ras Panchak)**

<table>
<thead>
<tr>
<th>स्वाद</th>
<th>गुण</th>
<th>विर्य</th>
<th>पिक्षा</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amla, Madhura, Kashaya, Tikta, Katu</td>
<td>Guru, Ruksha, Sheeta</td>
<td>Sheeta</td>
<td>Madhura</td>
</tr>
</tbody>
</table>

**Dosha Grahana:** Tridosha-Shamaka, especially Pitta-Shamaka

Due to its Amla Rasa (Sour) it alleviates Vata
Due to Madhur Vipaka (Sweet) it alleviates Pitta
Due to Kashaya Rasa (Astringent) and Ruksha (Dry) Guna it alleviates Kapha
Useful parts: Root bark, stem bark, leaf, fruit and seed.

Dose:
- **Swaras:** 10-20 ml
- **Churna:** 3-6 gm

**Synonyms (Paryaya) of Amalaki**

Classical names: Amalaki, Vayasya, Vrishya, Dhatriphala, Amritaphala, Amalaka, Tishyaphala.

**Table 3: Vernacular names of Amalaki**

<table>
<thead>
<tr>
<th>SN</th>
<th>Language</th>
<th>Vernacular Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>English</td>
<td>Emblic myrobalan, Indian gooseberry</td>
</tr>
<tr>
<td>2.</td>
<td>Gujarati</td>
<td>Amala, Ambala</td>
</tr>
<tr>
<td>3.</td>
<td>Hindi</td>
<td>Amalaki, Amalak, Amvala, Aonla, Amla</td>
</tr>
<tr>
<td>4.</td>
<td>Bengali</td>
<td>Amla, Amlaki, Ambolati, Amulati</td>
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<tr>
<td>5.</td>
<td>Assam</td>
<td>Amluki, Sohmyrlain</td>
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<td>6.</td>
<td>Oriya</td>
<td>Gondhona, Amlaki, Ohalu</td>
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<td>7.</td>
<td>Kannada</td>
<td>Nellika, Nelli, Nilika</td>
</tr>
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<td>8.</td>
<td>Malayalam</td>
<td>Nellimaram, Nellikko, Boa-malacca</td>
</tr>
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<td>9.</td>
<td>Marathi</td>
<td>Avola</td>
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<td>10.</td>
<td>Punjabi</td>
<td>Ambal, Ambli, Amla</td>
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<td>11.</td>
<td>Tamil</td>
<td>Nelli, Nelli-kai, Toppi</td>
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<tr>
<td>12.</td>
<td>Telugu</td>
<td>Usirikaya, Amalakamu, Userekoi, Wusheriko, Osirka, Usri, Usirika</td>
</tr>
<tr>
<td>13.</td>
<td>Arab</td>
<td>Amlaj</td>
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<tr>
<td>14.</td>
<td>N.W.P.</td>
<td>Amla, Aoula</td>
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<tr>
<td>15.</td>
<td>Pers.</td>
<td>Amuleh, Amelah</td>
</tr>
<tr>
<td>16.</td>
<td>Santhal</td>
<td>Meral</td>
</tr>
</tbody>
</table>

**Groups (Gana):** Kushthaghna, Virechanopaga, Kasahar, Jwarhara, Vayahsthapana (Charaka)

**Important formulations and preparations (medicinal uses)**

Chyawanprash, Brahmyarasyana, Dhatri Lauha, Dhatri Rasayana

**Sansthanik Karma (Organ system wise action)**

**Bahya (Local action):** Daha Prashamana, Chakshushya, Keshya

**Abhyantarata (Action on visceral organs)**
- **Nadi Sansthan (Nervous system):** Medhya, Balya, Indriyashakti Vardhaka
- **Pachana Sansthan (Digestive system):** Rochana, Deepana, Anuloman, Amlatanashaka, Yakrit Uttejaka
- **Raktavaha Sansthan (Blood vascular system):** Hridya and Shonitasansthapana
- **Shwasana Sansthan (Respiratory system):** Kaphaghna
- **Prajanana Sansthan (Reproductive system):** Vrishya and Garbhashthapana
- **Mutravaha Sansthan (Urinary system):** Mutrala and Pramehagha

**Twacha (Skin):** Kushthaghna

**Tapkrama:** Jwaraghna and Dahaprasrmana

**Soatmikarana:** Rasayana

**Doshaprayoga (Uses in Doshas):** Used specially in diseases caused by Pitta Dosha

**Sansthanik Prayoga (System wise uses)**

**Bahya:** Lepa used in Daha, Paittika Shirah Shoola and Mutraawrodha. Swaras is used inNetraroga. Washing head with Swaras in Khalitya and Palitya.

**Abhyantarata (Internal uses):**
- **Nadisansthan:** Used in Mastishka Daurbalya, Drishtimandya
- **Pachanasansthan:** Aruchi, Agnimandya, Vibandha, Yakritavikara, Amlapitta, Parinama Shoola, Udavarta, Udararoga and Arsha.
- **Raktavahasamsthana:** Hridaroga, Raktapitta, Raktavikara
- **Swashanasansthana:** Kasa, Shwasa, Yaksha
- **Prajananasansthana:** Shukrameha, Pradara and Garbashahya Daurbalya
**Mutravahasasthana:** Swaras of fresh fruit is used in Mutrakrichha and Paittika Prameh.

**Twacha:** Kushtha, Visarpa

**Tapkrama:** Jeerna Jwara, Trishna, Daha

**Satmikarana:** Daurbalya, Kshaya, Shotha\(^{[18]}\)

### Therapeutic applications of *Emblica officinalis*\(^{[19]}\)

**Anti-ageing:** *Amalaki* is one of the strongest antioxidant herbs in *Ayurveda* because it contains low molecular weight hydrolysable Tanins (Emblicanin A and B), enhanced with emmalicanin-A and -B from fruit juice that has just been squeezed. We naturally produce free radicals as byproducts of our own metabolism. *Amalaki*’s high concentration of vitamin C and flavonoids prevents harmful free radicals that accelerate cell aging in addition to enhancing nutrition.

**Cardio protective:** Fresh *E. officinalis* fruit juice, which is high in Embalicanin-A and -B, is useful in reducing the oxidative stress brought on by ischemia-reperfusion in rat cardiac tissue. Fruits are cardioprotective in nature. In addition to reducing oxidative stress, *Emblica officinalis* also stops the onset and progression of hypertension. It alters levels of serum NO, active eNOS, endogenous antioxidants, and electrolytes.

**Hepato protective:** A wide range of hepatotoxic substances, including heavy metals, ethanol, paracetamol, carbon tetrachloride, ochratoxins, hexachlorocyclohexane, and antitubercular medications, have been proven to be resistant to *Amalaki*. The herb *Amalaki* and its phytochemicals gallic acid, ellagic acid, quercetin, and corillagin have hepatoprotective properties against a variety of xenobiotic substances.

**Against carcinogenesis:** Phenolic compounds from *Phyllanthus emblica* extract identified by HPLC having anticancer properties like Ellagic acid (tannin) in Colon, prostate cell lines, and breast and prostate xenografts, Corilagín (tannin) in Ovarian cancer cells, liver cancer cells, and hepatocarcinoma xenografts, Pyrogallol (tannin) in lung cancer cells, gastric cancer cells, and lung adenocarcinoma xenografts, Chebulagic acid (tannin) in retinoblastoma colon cancer, breast cancer, prostate cancer, and leukemia cancer cell lines, Gallic acid (tannin) in breast and lung cancer cell lines, some activity against lung cancer xenograft, Quercetin (flavonoid) in numerous cancer cell lines from multiple tissue types, transgenic murine model of breast cancer, leukemia xenograft, and phase I clinical trial.

**Immunomodulator:** It has been proven that *E. officinalis* fruit extracts have a substantial immunomodulatory effect. *Amalaki* has mild cytoprotective and immunostimulant properties. But one must triturate *Amalaki Churna* and *Amalaki Swaras* in order to obtain the desired pharmacological effect.

**Cytoprotective:** *Amalaki* fruit extracts exhibit cytoprotective qualities against oxidative damage brought on by chromium (VI). It is because they can prevent the generation of free radicals and keep cell antioxidant levels high even when under oxidative stress.

**Eye diseases:** According to *Ayurveda*, *Amalaki* is referred to as *Chakshyushya*. Conjunctivitis, glaucoma, Retinopathy, and other diabetic eye problems can all be effectively treated with it. Because of its purgative effects, it lowers intraocular pressure. Patients suffering from a variety of ophthalmic conditions, such as rubor (inflammatory conditions), mucosa xerosis (dry eye), chronic conditions (pterygium or pinguecula), surgical cataract patients, age-related degeneration such as ARMD, other retinal degenerative diseases, etc., can benefit from *Amalaki*.

**In gastric ulcer:** The effectiveness of the *E. officinalis* methanolic extract was dose dependent; it greatly decreased the offensive factors (acid, pepsin) and raised the defensive elements (musin secretion, cellular mucous).

**Intestinal disorders:** The primary constituent of *E. officinalis* fruit is tannins, which have a significant potential for treating intestinal diseases including diarrhea and dysentery. Tannins are also astringent in nature.

**Anti-inflammatory and antipyretic:** It has been demonstrated that substances with antipyretic effects...
include tannins, alkaloids, phenolic compounds, amino acids, and carbohydrates. Fruit extracts from *Emblica officinalis* have strong antipyretic and analgesic properties.

**Hypolipidemic agent:** Fruit juice made from *E. officinalis* works well to lower cholesterol. It reduces aortic plaques. It reduces cholesterol levels and low-density lipoprotein oxidation, reducing atherosclerotic changes.

**Antidiabetic:** Blood sugar levels are lowered by the fruit of *Amalaki*’s high vitamin C content. It activates the Langerhans islets, a small collection of cells that release the hormone insulin.

**Antibacterial activity:** *Amalaki* has antibacterial properties as well. Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Pseudomonas aeruginosa, K. ozaenae, S. paratyphi A, S. paratyphi B, and Serratia marcescens have all been reported to be sensitive to the plant’s powerful antibacterial properties.

**Anti hyperthyroid:** Fruit ethanolic extract has been demonstrated to have antihyperthyroid effect in animal (mice) tests.

**Anticancer:** Cancers of the stomach, liver, uterus, breast, pancreatic, malignant ascites, and other organs are among those that *Amalaki* inhibits from growing and spreading. It also reduces the negative effects caused by radiotherapy and chemotherapy, which are typically used to treat cancer. Additionally, *Amalaki* has anticancer and immunological stimulant properties.

**Antioxidant:** Vitamin C and low molecular weight hydrolysable tannins are abundant in *Amalaki*. *Amalaki* is the best rejuvenative herb, and specifically observed that *Amalaki* is a great *Rasayana* that helps to protect from disease and reduce the possibilities of premature ageing. *Acharya Charak* and *Vaghbatta* have admired *Amalaki* as the drug of choice for *Vayasthapana Karma* (mentioned as Agryadravya). *Charak* has also mentioned it as *Ayushya*, *Deepaniya* an appetizer and *Pachaniya*, a digestant. It is also well known for its *Kesha* and *Chakshushya* properties. *Bhavaprakash* and *Dhanwantri Nighantu* mentioned the *Rasayana* properties of *Amalaki*. *Rasayana* drugs act as antioxidants. Oxidative damage to cells is important phenomenon in ageing process. *Amalaki* has low molecular weight hydrolysable tannins (Emblicanin A and Emblicanin B, punigluconin) thereby it is considered as one of the more strong antioxidant herb in *Ayurveda*. Antioxidants are the substances that reduce oxidative damage such as that caused by free radicals. Well known antioxidants include a number of enzyme and other substances such as Vit C, Vit E, and Beta carotene are capable of counteracting the damaging effect of oxidant. Main constituent of *Amalaki* are Vit C, Carotene and Riboflavin. They also play a role in collagen fibrin formation, helps in production of fibrin, and iron absorption. *Amalaki*, the *Rasayana* is designed beautifully by nature and discovered by our *Acharyas* as it can be used in almost every disease which are found on the earth.[20]

**DISCUSSION**

Present article has been a focused on the utilization of *Amalaki* fruit for their therapeutic properties based on both *Ayurvedic* and modern texts. *Amalaki* is stated as a *Rasayana* drug in *Ayurveda* which is having a rejuvenating effect on body tissues. *Amalaki* is one of the three fruits that are the ingredient in *Triphala* and it is the main ingredient in the *Rasayana* formulation *Chyavanprash*. *Amalaki* is having highest source of vitamin C. It is a highly nutritious fruit and is one of the richest sources of vitamin-C, amino acids and minerals. It contains several chemical constituents like tannins, alkaloids and phenols. *Amalaki* improves healthy metabolism, digestion and elimination. It possesses

*Amalaki the Rasayana*

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anti-inflammatory properties, nourishes body tissue and organs. *Amalaki* fruit is rejuvenative and protective for the heart and respiratory system. *Amalaki* is a natural antioxidant which promotes healthy eyes, growth of hairs, nails, and skin. It balances *Jatharagni* (digestive fire). *Amalaki* builds *Ojas* (bodily strength, vigour, energy, ability) to support a healthy immune response.

**CONCLUSION**

*Emblica officinalis* (Amalaki) has an important position in Ayurveda- an Indian indigenous system of medicine. In general, *Amalaki* is a powerful herb which is having medicinal properties for many systems of the body. It is known to promote energy, reproductive health, and healthy state of the body. *Amalaki* is termed as *Chakshyushya* (beneficial for eyes) by many ancient *Acharyas* and this property needs more elaboration in context of eye diseases. Also, *Amalaki* due to its strong antioxidant and biological properties prevent innumerable health disorders as it contains essential nutrients and highest amount of vitamin C. In this review, we have tried to make a summary of the traditional and scientifically proven uses of *Amalaki*. It has various *Sansthanik Karmas* (organs system wise actions). Even though, *Amalaki* has various medicinal properties since ages, there is a colossal necessity to scientifically explore and evident its medicinal values at molecular level with help of various latest biotechnological tools and techniques.

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