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**Review Article**

# A Brief Review on *Phyllanthus emblica* Linn Seeds

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## ABSTRACT

The survival and future of human civilization depend heavily on plants as they serve as the foundation of nutrition, medicine and ecological balance. A significant proportion of modern medicines are derived directly or indirectly from plants and traditional systems of medicine such as Ayurveda, Siddha, and Unani rely almost exclusively on botanical resources. Among these Phyllanthus emblica Linn., commonly known as Amla or Indian gooseberry holds a prominent place due to its wide range of therapeutic applications and high medicinal value. Taxonomically it belongs to the family Euphorbiaceae and is also referred to by its synonym Emblica officinalis. Phyllanthus emblica is renowned for its rich phytochemical composition. The seeds and other plant parts are known to contain diverse bioactive compounds such as flavonoids, tannins, alkaloids, phenolic compounds and fixed oils which contribute to its pharmacological significance. The fixed oils present in the seeds are composed primarily of unsaturated fatty acids which are known for their health promoting benefits. Experimental studies highlight multiple pharmacological properties including antioxidant, anti-inflammatory, antimicrobial, antidiabetic and aphrodisiac activities. These properties contribute to its effectiveness in managing oxidative stress, infections, metabolic disorders and improving vitality.

## INTRODUCTION

Medicinal plants are an invaluable gift from nature and have played a crucial role in healthcare systems since ancient times. They form the backbone of traditional medicine and continue to serve as a potent source of therapeutic agents for the prevention and treatment of a wide spectrum of diseases across the globe. Unlike many synthetic drugs, herbal medicines are often regarded as safer alternatives due to their natural origin and reduced incidence of adverse side effects. Their accessibility, affordability and cultural acceptance have further contributed to their widespread use in both developing and developed nations. Among the various traditional systems of medicine,

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Ayurveda is considered the world's oldest and most holistic approach to healthcare. It extensively recommends the use of medicinal plants not only for curing ailments but also for maintaining general health and promoting longevity. *Phyllanthus emblica* occupies a prominent place in Ayurvedic system of medicine, it is described as a rejuvenator that supports vitality, strengthens immunity and delays the aging process [1, 2].

**Fruits:** It is the most crucial component of all. Vitamin C is most abundant in amla fruit. Water makes up more than 80% of the amla fruit's chemical makeup [2]. Along with minerals like calcium, phosphorus, iron, niacin, carotene, thiamine and riboflavin. It also contains protein, carbs, fiber and amino acids. Tannins, Gallic acid, Ellagic acid, Emblicol, Phyllembin, Lupeol, Essential oil, Fixed oil and other chemical components are all found in the plant [2]. Amla fruit either by itself or in combination with other plants is used extensively as a Diuretic, Laxative, Liver tonic, Antipyretic, Hair tonic, Ulcer preventative and for Fever and Common cold. The Analgesic, Anti-tussive, Cardioprotective, Cytoprotective, Immunomodulatory, Chemopreventive, Antioxidant, Memory-enhancing, Anticancer and Antidiabetic qualities of amla are revealed by research reports [2, 3].

**Leaves:** Antidiabetics, Antioxidant, Antimicrobial and amelioration of pulmonary fibrosis [4, 5, 6, 7].

**Bark:** Antioxidants and Hepatoprotective [8].

**Seeds:** An ointment made from the burnt seeds mixed with oil is applied to skin afflictions [9]. The seeds are used in treating asthma, bronchitis, biliousness, diabetes and fevers [10, 11]. Phytochemical studies indicate the presence of proteolytic and lipolytic enzymes, phosphatide and small amount of essential oil. Approximately 16% of the seeds are a brownish-yellow fixed oil [12].

**Flowers:** Cooling and Aperient[10]

## BOTANICAL DESCRIPTION:

Amla is a small to medium sized fruit tree that grows upto a height of 8 to 18 meters. The light grey bark exfoliates in tiny, uneven flakes, and simple. Sub sessile leaves are light green and pinnately arranged along its branchlets. The flowers are unisexual and greenish yellow. The fruit has six vertical stripes or furrows and is almost globose, smooth, meaty and hard to touch. In the autumn the fruits ripen. It has a fibrous texture and tastes sour, bitter and astringent [10, 13, 14, 15].

Inside the fruit are small hexagonal stones that carry six tiny seeds each, dimensions 3.9-4.5 mm and Reddish in color [16].

In order to extract the seeds, the collected fruits ar e often sun-dried and pulled the seeds gently. Usually, one quintal of local fruits produces one k ilogram of seeds. Fresh *Phyllanthus emblica* seeds have a standard test weight of 20 to 33 g (1000 seeds) [17].

The seeds have aphrodisiac and antipyretic qualities and they can be used to treat biliousness, vomiting, leukorrhoea and vata (In Indian medicine vata is linked to cold; cooling increases vata)[10].

They yield about 16% of brownish yellow oil containing 44% linoleic acid, 28.4% oleic acid, 4.8% linolenic acid, 2.2% stearic acid, 3.0% palmitic acid and 1.0% myristic acid [4, 10, 18, 19].

**Figure 1: *Phyllanthus emblica* Linn., fruit**

**Figure 2: Phyllanthus emblica Linn., seeds**

## GEOGRAPHICAL DISTRIBUTION [2]:

It is native to India found throughout the country and Sri Lanka [10, 14].

It is very common in tropical and subtropical nations [13] including China, Indonesia, Burma and the Malay Peninsula are habitat to *Phyllanthus emblica*. Particularly in central and southern India, Nepal, Pakistan, Bangladesh, Bhutan and the Mascarene Islands. It is indigenous to tropical South East Asia. It is widespread in Madhya Pradesh deciduous forest areas.

It also grows in a few other countries throughout the world including Pakistan, Uzbekistan and Malaysia. Amla is grown in the plains as well as on hill slopes up to 200 meters and in coastal locations. It is a promising crop that thrives in marginal soils and a variety of degraded areas including saline, dry and semi-arid areas as well as soils impacted by salt. Approximately 200 trees can be grown per acre when cultivating an orchard [2, 15, 17].

**Figure 3: Phyllanthus emblica tree**

## TAXONOMY [2]

| | |
|---|---|
| **Kingdom:** | Plantae |
| **Subkingdom:** | Tracheobionta |
| **Division:** | Magnoliophyta |
| **Super division:** | Spermatophyta |
| **Class:** | Magnoliopsida |
| **Subclass:** | Rosidae |

| | |
|---|---|
| **Order:** | Euphorbiales |
| **Family:** | Euphorbiaceae |
| **Genus:** | *Phyllanthus* L. |
| **Species:** | *emblica* |

## SYNONYMS [16]

- *Cicca emblica (*L.) Kurz
- *Dichelactina nodicaulis* Hance
- *Emblica arborea* Raf.
- *Emblica officinalis* Gaertn.
- *Phyllanthus mairei* H.Lév.
- *Phyllanthus pomifer* Hook.f.
- *Phyllanthus taxifolius* D.Don

## VERNACULAR NAMES [13, 20]

| | |
|---|---|
| **Assamese:** | Amlaku, Amlakhi, Amlakhu |
| **Bengali:** | Amla, Dhatri |
| **English:** | Emblic myrobalan, India Gooseberry |
| **Gujarati:** | Amala, Ambala |
| **Hindi:** | Amla, Aonla,Amvala, Amlaki, Amalak |
| **Kannada:** | Bela nelli, Nellikayi, Pottadenollikayi |
| **Kashmiri:** | Embali, Amli |
| **Malayalam:** | Nellikka |
| **Marathi:** | Avala, Avalkathi |
| **Oriya:** | Anala, Ainla |
| **Punjabi:** | Aula, Amla |
| **Tamil:** | Nelli, Nellikkai |
| **Telugu:** | Usirika |
| **Urdu:** | Amla, Amlaj |

**Table 1: Phytoconstituents of different parts of *Phyllanthus emblica*** [2, 13, 17, 21, 22, 23]

| Plant part | Phytoconstituents |
|---|---|
| **Fruits** | Ascorbic acid, Gallic acid, Ellagic acid,[18] Chebulagic acid, Chibulinic acid, Chebulaginic acid, Chebulic acid, Corilagic acid, Corilagin, Emblicanin-A and B, Emblicol, Ethyl gallate (syn. Phyllemblin), , Gallic acid ethyl ester, Myristic acid, Niacin, Phyllemblic acid, Phyllemblinic acid, Quercetin, Tannin, Rutin, Phyllantidine, Phyllantine. |
| **Leaves** | Kaempferol, Kaempferol-3-O-glucoside, Ellagic acid, Gallo-tannin, Phyllantidine, Rutin, Tannin, Phyllantine. |
| **Shoot** | Ellagic acid, β-sitosterol, Chebulagic acid, Chibulinic acid, Gallic acid, Glucogallin, Lupeol. |
| **Bark** | β-sitosterol, Leucodelphinidin, Lupeol, Tannin. |
| **Root** | Ellagic acid, Lupeol |
| **Seeds** | Flavonoid, β-sitosterol, Linoleic acid, Myristic acid, Linolenic acid, Oleic acid, Stearic acid, Palmitic acid, Tannin[24]. |

## ETHNOBOTANICAL IMPORTANCE [25]

It is thought to be the universe's first tree according to ancient Indian mythology [2]. The herb referred to as rasyana in the Charaka Samhita which is known to prolong life and prevent aging. Its five flavors are sour, astringent, sweet, bitter, and pungent which are naturally balanced. Ayurvedic texts describe it as a powerful antacid that helps reduce all three body humors (vata, pitta, and kapha). It is the richest natural source of vitamin C with an amount greater than that of oranges and tomatoes. It is an ingredient in triphala and many herbal formulations. Both fresh and dried fruits are widely used as laxatives. It is having rejuvenating properties and is one of the ingredients of renowned herbal formulations chyavanprash[14]. It is well known that the fruits have antiviral, antifungal and antibacterial qualities. Fruits are used to treat inflammation, nausea, scurvy, fever, skin sores, wounds and diarrhea. Along with other components the fruit's pericarp is employed in the decoction to treat spots and boils.

The fruits are powerful scavengers of free radicals and great antioxidants. Fruits are also believed to strengthen, dandruff-free strands and preventing premature graying of hair. Regular use strengthens immunity, safeguards the heart, brain and other body organs.

The root-bark is effective in aphthous stomatitis. A fermented preparation from root is used to cure jaundice, dyspepsia and cough. [14]

Tender shoots of the plant are used as remedy in indigestion and diarrhoea. [14]

The leaf infusion is used as a bitter tonic and a remedy for chronic dysentery. Leaf decoction is useful as mouthwash in apthae and eye wash for sore eyes. Young leaves are dried in shed, powdered, sieved, and mixed with sugar and milk to cure spermatorrhoea. Juice of the fresh bark with honey and turmeric is used to cure gonorrhoea. [14]

Seed decoction is used as garglefor loss of taste after fever and an ointment of burnt part of the body. Seeds are useful for itching. [14] Asthma and obstructive bronchitis are treated with a decoction (10–15 ml) of seeds twice a day [26].

## PHARMACOLOGICAL ACTIVITES:

## INVITRO SCREENING

### ANTIMICROBIAL ACTIVITY [27, 28]

The crude extracts of Indian gooseberry (*Phyllanthus emblica*) seeds exhibited notable antibacterial and antifungal activities. In the disc diffusion assay extracts prepared in different solvents showed inhibition against *Klebsiella pneumoniae, Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa,* with gentamycin (10 µg) serving as the positive control and DMSO as the negative control. Clear zones of inhibition were observed after 24 h of incubation at 30 °C, confirming antibacterial efficacy. Similarly, antifungal activity was confirmed against *Candida tropicalis, Aspergillus niger, and Aspergillus fumigatus,* where zones of inhibition were recorded after 48 h of incubation at 37 °C. The antimicrobial effects are attributed to the presence of phytochemicals such as flavonoids, terpenes, tannins and saponins in the seed extracts.

### ANTIOXIDANT ACTIVITY [28]

The antioxidant activity of *Emblica officinalis* seed extracts was determined by using the DPPH radical scavenging assay. Extracts prepared in hexane, diethyl ether and methanol showed concentration dependent scavenging activity with methanol extract exhibiting the highest activity. The IC50 values indicated the effectiveness of the extracts in neutralizing free radicals with ascorbic acid (1–10 µg) serving as the standard. These findings confirm that the seed extracts possess significant antioxidant activity due to their phytochemical constituents.

### ANTI-INFLAMMATORY ACTIVITY [28]

Soybean 15-lipoxygenase was inhibited by the methanolic seed extract of *Emblica officinalis* in a concentration dependent manner. A progressive reduction in enzyme activity was observed with increasing extract concentration. The $IC_{50}$ value of the extract was determined to be 58 µg indicating effective inhibition when compared with ascorbic acid used as a reference standard. These findings suggest that the seed extract possesses notable anti-inflammatory potential through lipoxygenase inhibition.

## INVIVO SCREENING

### ANTI-DIABETIC ACTIVITY [29]

The aqueous seed extract of *Emblica officinalis* demonstrated significant anti diabetic activity in streptozotocin induced models. Oral administration (100–400 mg/kg) produced dose dependent effects with 300 mg/kg showing the highest activity. In normal rats fasting blood glucose decreased by 27.3% at 6 h and by 25.3% in the glucose tolerance test (GTT). In sub and

mildly diabetic rats the same cure reduced glucose situations by 34.1% and 41.6% independently at 3 h post glucose administration. These findings confirm both hypoglycemic and anti-diabetic potential of the seed extract.

## APHRODISIAC EFFECTS [30]

The 95% methanolic seed extract of *Emblica officinalis* (500 and 1000 mg/kg, 30 days) produced a dose dependent aphrodisiac effect in male rats. Treated groups showed reduced mount latency (ML) and intromission latency (IL) along with increased mounting frequency (MF), intromission frequency (IF), sniffing, and licking compared to controls. Histological examination, sperm concentration, body weight, and reproductive organ weight further confirmed the anabolic and restorative effects. Notably the extract improved sexual behaviour even under immobilization induced stress, indicating significant aphrodisiac potential.

## CONCLUSION:

Medicinal plants have served humanity since prehistoric times and continue to remain an integral part of healthcare for nearly 80% of the world's population. Among these *Phyllanthus emblica* (Indian gooseberry) occupies a distinctive position due to its wide array of therapeutic potentials and nutritional benefits. With its antioxidant, antimicrobial, anti-inflammatory, and rejuvenating properties, it exemplifies the rich heritage of Ayurveda and other traditional medical systems.

In the modern era, rapid advancements in pharmaceutical sciences have often led to the preference for synthetic drugs that provide quick relief. However, this shift has inadvertently overshadowed the centuries old wisdom embedded in traditional medicine. The over reliance on synthetic compounds also raises concerns related to side effects, drug resistance and long term safety. In this context, it becomes Imperative to revive, preserve and promote ethnobotanical knowledge ensuring that these natural resources are utilized both wisely and sustainably.

*Phyllanthus emblica* seeds represent a botanically distinct and phytochemically rich medicinal plant with wide geographical distribution and ethnopharmacological relevance. Evidence from modern pharmacological evaluations confirms its potent antioxidant, antimicrobial, anti-inflammatory, antidiabetic, and aphrodisiac activities validating its traditional uses. The convergence of its botanical uniqueness, diverse bioactive constituents and multifaceted therapeutic properties underscores its importance as a promising source for natural drug development and integrative medicine.

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