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A Review on Amla (Emblica Officinalis): The Traditional Indian Superfood

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Abstract
For public health systems, the increasing incidence of lifestyle diseases is a serious obstacle. Although there are effective therapies available in modern medicine, there are still research gaps in areas like long-term management, and avoiding side effects. Herbal medicines and plant components are not toxic and have no side effects. They are notable therapeutic options for the treatment of various diseases. One of the most significant herbs in the Indian traditional medicinal system of Ayurveda is Amla (*Emblica officinalis*), or Indian gooseberry which is known as the "king of all medicinal plants". Amla is commonly used for managing conditions like diabetes, dyslipidemia, cardiovascular diseases, obesity, cancer due to the presence of phytochemicals like vitamin C, antioxidants (Phenols, flavonoids, anthocyanins, carotenoids, gallic acid, emblicin). These compounds have inherent properties like being anti-inflammatory, antioxidant, anticancer, and immunity boosting. Amla is used extensively, in the form of pickles, chutneys or juices when in season whereas it can be used as a supplement in forms like capsules, tablets, extracts and powders. Studies on Amla supplementation prove that it can help reduce fat mass in obese individuals, reduce blood sugar and cholesterol levels. Using Amla powder in recipes could be a novel method to derive the benefits of Amla. Various value-added products have been developed using Amla powder. Efforts need to be made to promote the consumption of Amla in different forms by its incorporation in various traditional regional recipes.

Keywords: Amla, Emblica officinalis, Functional foods

INTRODUCTION

Cardiometabolic risk factors such as obesity, hypertension and dyslipidemia are uniformly high across the country, particularly in urban areas. States like Kerala, Puducherry, Goa, Sikkim and Punjab report highest prevalence of NCDs. Approximately 351 million individuals suffer from abdominal obesity, hypertension (315 million), hypercholesterolemia (213 million) followed by 101 million cases of diabetes and 136 million cases of pre-diabetes (Anjana et al, 2023).

Herbal medicine, is one of the subgroups of complementary and alternative medicinal therapies, which many patients consider over conventional therapies because of dissatisfied outcomes from the conventional therapies, higher treatment costs and increased side effects of modern medicines (Choudhury

et al, 2018). According to the World Health Organization, a large percentage of population in developing countries (up to 90%) use plants and its products as traditional medicine for primary health care (World Health Organization, 1999).

Emblica officinalis Gaertn. is a deciduous tree that is a member of the Euphorbiaceae family. Commonly referred to as "Amla," "Aonla," "Phyllanthus Emblica," or "Indian gooseberry," it is also widely used in Ayurveda, the one of the oldest medical systems in India. It is considered to be the first tree to be produced in the universe. It is known as Amla in Hindi, Amalaki in Sanskrit and Indian Gooseberry in English. *Emblica officinalis* Gaertn. (Syn. *Phyllanthus emblica* Linn.) (family *Euphorbiaceae*) is an important medicinal plant in the Ayurveda and Unani systems of medicine and one of the key constituents used in various herbal formulations. *Vayasya, Amalaki, Vrushya, Jatiphalam, Shivam, Dhatriphalam, Shriphalam, Amrutaphalam* are all the Sanskrit synonyms of *Amala* (https://www.charak.com/wp-content/uploads/2020/11/amalaki-final.pdf). Tables 1 depicts the taxonomical classification of Amla.

Nutritional Composition of Amla and its Benefits on Health

Amla is found across the world in countries like India, Pakistan, Uzbekistan, Sri Lanka, Southeast Asia, China, and Malaysia (Talreja et al, 2019). The fruits ripen from November to February, nearly spherical or- globular in shape, wider than long and with a slight conic depression on both apexes. The fruits are 18-25 mm wide and 15-20 mm long. The mesocarp is acidulous in fresh fruit and acidulous astringent in dried fruit form (Khan et al, 2009).

Table 1: Taxonomical Classification

Kingdom	Plantae
Division	Angiosperm
Class	Dicotyledonae
Order	Geraniales
Family	Euphorbiaceae
Genus	Emblica
Species	Officinalis Gaertn

(Talreja et al, 2019)

The leaves are 8-10 mm in length and 2-3 m in width, with a hairless exterior and the lower part is pale green or pubescent. Compounds like gallic acid, ellagic acid, chebulic acid, chebulinic acid, chebulagic acid, a gallantonic (amlic acid), and the alkaloids phyllantidine and phyllantine are present in it. The seeds are smooth, dark brown, four-six in number. Phosphatides, a little amount of essential oil, and a fixed oil are present in them. The fixed oil (yield 16%) exhibits the following physical and chemical properties: acid value (12.7%), saponification value (185), iodine value (139.5), acetyl value (2.03), unsaponifiable matter (3.81%), sterol (2.70%), and saturated fatty acid (7%). They also contain linolenic acid (8.78%) and linoleic acid (44%), oleic acid (28.40%), stearic acid (2.15%), palmitic acid (2.99%), and myristic acid (0.95%). The barks are thick upto 12 mm with lustrous greyish brown or greyish green colour and consist of compounds like leukodelphinidin, tannin and proanthocyanidin (Khan et al, 2009). The roots of Amla possess ellagic acid and lupeol all of which show the rich phytochemical profile of Amla (Variya et al, 2016).

Amla has a rich nutrient profile with high levels of vitamin C (600mg/100g), moisture (81.2%), carbohydrates (14.1%), fiber (3.4%), protein (0.5%), fat (0.1%), calcium (0.05%), phosphorus (0.02%), iron (1.2mg/100g), nicotinic acid (0.2mg/100g) and mineral matter (0.7%). Amla has a higher vitamin C concentration as compared to oranges or tangerines. Some trace elements of importance in Amla are manganese, cobalt and chromium (Jain et al, 2016). According to Gul et al (2022), Amla consists of a variety of phytochemicals like ellagic acid, chlorogenic acid, p-Coumaric acid, caffeic acid, phyllaemblicin, corilagin, luteolin 4'-neohesperidoside, pedunculagin.

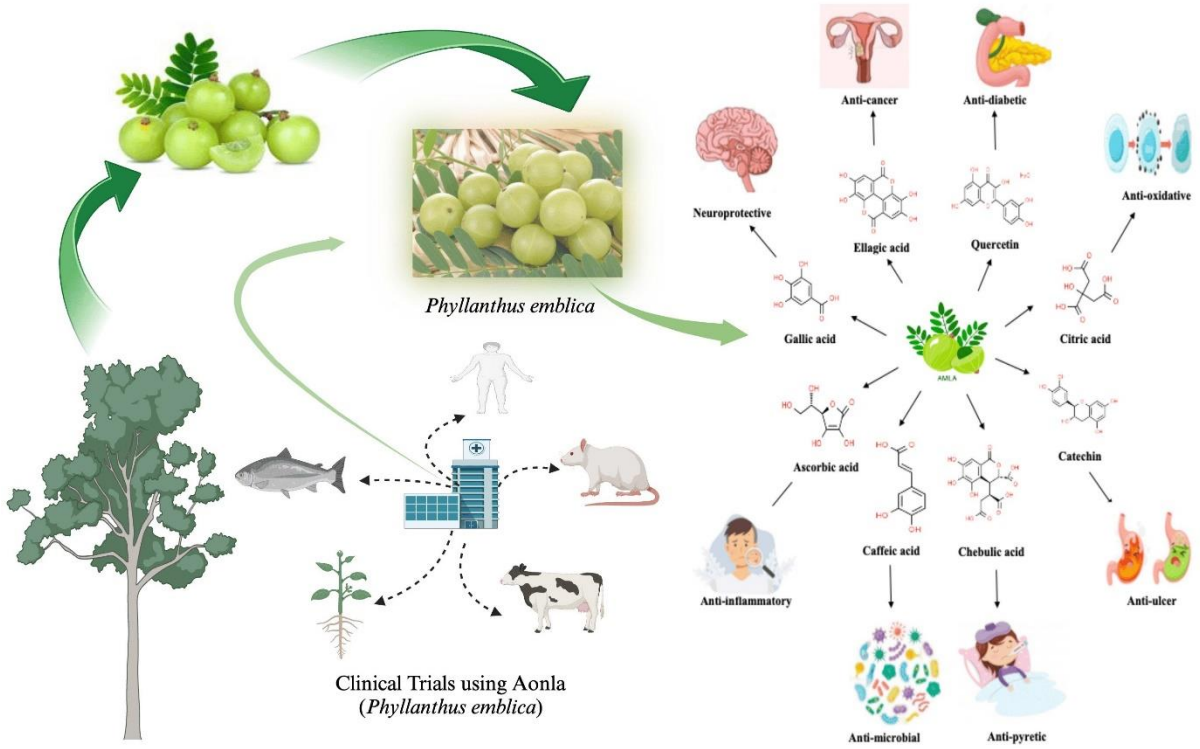
Nutrient Composition of Amla	
Moisture (%)	81.2
Carbohydrates (%)	14.1
Fiber (%)	3.4
Protein (%)	0.5
Fat (%)	0.1
Calcium (%)	0.05
Phosphorus (%)	0.02
Iron (mg/100g)	1.2
Vitamin C (mg/100g)	600
Nicotinic acid (mg/100g)	0.2
Mineral matter (%)	0.7%

Therapeutic Potential of Amla

All parts of Amla including its fruits (dried and fresh), seeds, leaves, root, bark and flowers have a positive impact on various organs of the body. It possesses different beneficial properties like antioxidant, antimicrobial, immunomodulatory, antipyretic, analgesic, cardioprotective, antitussive, hepatoprotective, cholesterol lowering and gastroprotective properties which in turn plays a vital role in various conditions like diabetes, cancer, liver disorders, heart problems, anemia, memory enhancement, ophthalmic disorders and so on (Khan et al, 2009).

Amla is rich in beneficial medicinal properties which has a positive rejuvenating impact on our health. Over the years extensive research has been done on Amla. Various studies have proven that Amla works as an excellent anti-inflammatory, anti-diabetic, antioxidant, anticancer and immunity boosting agent (figure 1). Since ancient times, Amla has been used to treat diabetes, renal, lung, liver, eye, digestion related disorders. It is used as an immunomodulatory, anti-cancer, laxative, anti-inflammatory, anti-microbial, anti-emetic, wound healing agent (Variya et al, 2016).

Figure 1 Impact of Amla on Health



Source: Avinash et al (2024)

A Comparative analysis of functional and nutritive values of Amla fruit, seed and seed coat powder found that among the three, fruit powder showed strongest free radical (DPPH) activity followed by seed coat whereas, seed had only 30% of DPPH scavenging activity. The Total Phenolic Content (TPC) of seed coat and seed powder was lower than fruit powder (Mishra et al, 2014).

Akhtar and colleagues (2011) conducted a clinical trial on normal and diabetic subjects. A significant reduction in fasting and post-prandial blood glucose (PP2BS) levels, total cholesterol, triglycerides (TG) and low-density lipoprotein cholesterol (LDL-C) levels in both normal and diabetic subjects who received 1, 2 or 3 g Amla powder per day was observed. A significant improvement in the high-density lipoprotein-cholesterol (HDL-C) levels was observed in both normal and diabetic volunteers receiving 2 or 3 g.

A study conducted on impact of Amla supplementation showed that incorporation of Amla powder at the 2 g level brought about a reduction in the glycemic index (GI) of methi thepla, vegetable cutlet, muthiya and handva. Maximum per cent reduction was for observed in handvo, which shifted to medium GI category from high GI (Venugopal et al, 2021).

The hypolipidemic potential of Amla powder and nutrition counselling in 60 hyperlipidemic subjects aged 39-49 years was evaluated in a study. The experimental group was given 5g Amla powder whereas the control group was given only nutrition counselling for 3 months. There was a significant reduction in serum total cholesterol (12.31%), LDL-C (11.69%), triglycerides (16.17%) and VLDL-C (16.17%) in the experimental group. An 8.19% increase in HDL- C in the subjects of the experimental group was observed (Srivastava et al, 2019).

A prospective randomized open label study done on hyperlipidemic patients found that Amla powder (500 mg daily for 16 weeks), when compared with the standard hypolipidemic drug Atorvastatin showed better effects on TG and HDL (Sinha et al, 2014).

Research reveals little or no information regarding adverse reactions with the use of Amla. No reported adverse reactions have been observed in animal experiments (https://www.drugs.com/npp/emblica.html).

Traditional Uses and Benefits of Amla

Various value-added food products can be prepared and promoted to increase its shelf life and acceptability among consumers to gain the benefits of Amla.

- Amla sauce or chutney prepared with amla, tomato pulp, sugar, salt, onion, garlic, ginger, red chillies and spices has a long shelf life and can be consumed easily while Amla pills can also be prepared by mixing Amla pulp, ground cumin, ginger, and salt which are highly appetizing and a rich source of vitamin C.
- It was observed that Amla preserves are helpful to reduce cholesterol levels, improves vision and acts as a blood purifier (Kore et al, 2013).
- *Chyawanprash* is a classic Ayurvedic preparation in which Amla is used as a chief ingredient which helps to improve cognitive function and memory.
- Amla *ladoos* when prepared using a mixture of the roots of *satavari* and Amla is highly nutritious and has a longer shelf life (Bishnoi et al, 2018).
- Amla as a mouth cleanser and very helpful to maintain dental health (strengthen teeth). Its decoction can be used to prevent acidity and digestive issues and it can be taken with honey as an anthelmintic agent.
- Amla also helps to improve the liver function, haemoglobin levels (RBC count). It is useful for treating cough, bronchitis and asthma.
- Amla powder (1 tsp) with honey after taking milk in the morning provides energy to the body.
- Amla powder (1g) when mixed with milk or water along with little sugar twice a day can help in preventing acidity.
- Amla powder (3g) with honey (6g) every day for one month can help to provide relief to women suffering from leucorrhea (white mucous discharge caused due to infection in vagina).
- Fresh Amla juice eliminates excess waste from the body acting as a diuretic agent.
- Amla mixture along with buttermilk when applied on forehead, acts as a cooling agent and provides relief from headache.
- Fresh Amla leaves and curd mixture, can improve digestion and Amla seed with red sandalwood with honey, can help to provide relief from nausea and vomiting.
- Amla powder (1tsp) with milk or water every morning can help prevent constipation.
- A mixture of Amla seed powder, *Chitrak* root, chebulic myrobalan, *pipli* and palelone given with warm water twice daily, morning or at bed time can help to treat diarrhea (Mishra et al, 2023; Dasaroju, 2014).

Conclusion

Amla's extensive phytochemical composition makes it a possible source of compounds with health advantages. Although Amla is very well known for its beneficial effects on health, due to its astringent taste, highly perishable nature and unavailability all-round the year it is not as popular as other fruits. As a result, its processing is required to increase the shelf-life. Amla powder is available for use any time of the year. To avoid rejection owing to monotony in the consumption pattern, novel ways of consuming

Amla could be promoted. Amla powder could be incorporated in different food preparations. Incorporation of freeze-dried Amla powder in Indian recipes can bring about a reduction in the postprandial glycemic and lipemic responses. It may be utilized in the biopharmaceutical and nutraceutical industries and as a potential food additive. Numerous studies have found that different Amla extracts and herbal formulations have potential therapeutic effects against a range of illnesses, with outcomes comparable to those of conventional medications. As consumers become more health conscious, there is a growing demand for healthy food products. Efforts need to be made to promote the consumption of Amla in different forms using strategies like its incorporation in various food products.

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