



Review Article

AONLA (*Emblica officinalis* G.): NUTRITIONAL AND MEDICINAL ATTRIBUTES

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Abstract: Aonla is an important minor arid fruit crop which is indigenous to Indian sub-continent. It is a fruit endowed with ample of nutritional and medicinal properties. Though the fruit in raw form is not accepted in table purpose due to its high astringency but the value of its processed product has been increasing worldwide in a sky rocketing manner. The cultivation of aonla crop is gaining importance because the nutritional as well as therapeutic value is realized and supported by the general public. The main intent of this review is to accentuate the nutritional and medicinal properties of aonla fruit and further make a motion for the setting up of aonla processing plants which will stimulate our innovative farmers to come up with more area under aonla cultivation.

Keywords: Aonla, Ayurveda, Antioxidant, diabetics, vitamin C

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Introduction

Fruits are nature's gift to humankind. Importance of fruits in human diet is well recognized. Nutritionist advocate a normal human body requires 60- 85 gm. of fruits and 360 g vegetable per capita per day. Fruits are not only sweet to taste but also good source of vitamins and minerals without which human body cannot maintain proper health and develop resistance to disease. Fruits are rich in fibre which is essential for the smooth movement of our digestive system. These are the instant source of energy with unique capacity to combat against many deficiency diseases. Aonla (*Emblica officinalis* G.)- Wonder fruit for health

Regional Names	Botanical Classification
English	Indian Gooseberry
Bengali	Amlaki
Gujarati	Ambala, Amala
Hindi	Amla, Aonla
Malayalam	Nelhi
Marathi	Avala
Kannada	Amalaka, Nelhi
Tamil	Nelhi
Telugu	Usirikai, Usirika
Kingdom	Plantae
Division	Angiospermae
Class	Dicotyledonae
Order	Geraniales
Family	Euphorbiaceae
Genus	<i>Emblica</i>
Species	<i>officinalis</i> Geartn

Geographical distribution, climatic requirement, soil, plant morphology, variety and yield

Aonla (*Emblica officinalis* G.) commonly named as 'Indian gooseberry' belongs to family Euphorbiaceae. Aonla is an important minor arid fruit crop which is indigenous to Indian sub-continent. Aonla trees thrive well throughout the tropical and sub-tropical parts of India. Owing to its hardy nature and suitability o various kinds of waste lands it can be grown successfully in dry and neglected regions in the minimum management input.

The major aonla producing states in India are Rajasthan, Uttar Pradesh, Gujarat, Tamil Nadu, Maharashtra, Andhra Pradesh, Karnataka and Bihar [1]. However it is more commercially cultivated in Uttar Pradesh comprising Agra, Azamgarh, Pratapgarh, and Raibareilly. Jaunpur, Varanasi, Sultanpur. Kanpur. Mathura. A mature aonla can tolerate freezing as well as high temperature of 46°C but not heavy frost in winter [2]. Aonla can be grown in a variety of soil types, varying from acidic, saline, alkaline, sandy and clayed soil. The tree grows to a height of 60 ft (18 m). The leaves are very fine and small, only 1/8 in (3 mm) wide and 1/2 to 3/4 in (1.25-2 cm) long. The flowers are small, greenish-yellow and borne in compact clusters in the axils of the lower leaves. The fruits are round or oval, with smooth textured skin. There are ~6 to 8 pale visible lines, appearing as ridges. Unripe fruits are light green turning yellow to red at maturity. The stone is tightly set in the centre of the flesh and contains 6 small seeds [3]. After three years of planting a budded/grafted tree starts bearing, whereas a seedling tree takes 3-4 years more. The production of Aonla tree is 15-20 tonnes/ha. Commercially cultivated varieties are viz. Kanchan (NA 4), Krishna (NA 5), NA 6, NA 7 and NA 10 [4]. Physico-chemical characteristics of aonla fruit [5].

Physical characteristics of aonla fruit

Physical characteristics of dond fruit		
Characters		Average Value
Fruit Weight (g)		33.59
Stone (%)		8.8
Pulp (%)		91.2
Fruit Size	Length (cm)	3.19
	Width (cm)	3.19
Fruit Shape		Spherical

Chemical characteristics of aonla fruit

Characters	Average value
TSS (%)	10
Acidity (%)	2.25
Ascorbic acid (mg/100g)	546.75
Reducing sugars (%)	2.6
Non-reducing sugar (%)	2.23
Total sugars (%)	4.83
Total phenols (mg/100g)	160.56

Ayurvedic Description of Aonla[6]

According to Ayurvedic literature aonla fruit possess following properties:

- Doshas (effect on humors): quietens all three doshas: vata, kapha, pitta, and is especially effective for pitta
- Guna (qualities): light, dry
- Rasa (taste): sour and astringent are the most dominant, but the fruit has five tastes, including sweet, bitter, and pungent
- Veerya (nature): cooling
- Vipaka (taste developed through digestion): sweet

Nutritional Benefits

Aonla is the store house of vital antioxidants and polyphenols. It contains high concentration of proteins and amino acids like aspartic acid, glutamic acid, proline, lysine, alanine, and cysteine [7]. Aonla is chiefly known for its high concentration of vitamin C. From a study it is reported that *E. officinalis* contains higher amount of vitamin C [8]. It stands next to Barbados cherry. A laboratory test showed that every 100 g of fresh fruit contains 470-680 mg of vitamin C. It has the same amount of vitamin C present in two oranges [9]. Uniquely, it has a natural balance of tastes (sweet, sour, pungent, bitter and astringent) except salt all in one fruit. It stimulates the brain to rebalance the three main components of all physiological functions, the water, fire, and air elements within the body [10]

The nutritional value of aonla per 100gm is as follows [11]:

Nutrients	Percentage (%)
Calories	60
Moisture	81.2%
Fibre	3.4%
Macronutrients	
Protein	0.4g
Fat	0.5g
Carbohydrate	14g
Micronutrients	
Vitamin B ₁ (Thiamine)	28mcg
Vitamin B ₂ (Niacin)	0.4mg
Vitamin C	720mg
Nicotinic acid	0.2mg
Calcium	15mg
Iron	1mg
Phosphorous	21mg

The demand for its processed products is gearing up day by day in domestic as well as in global market. About 50 processed products are prepared from aonla to exploit its nutritional and medicinal values. Some of the processed products of aonla are Jam, Jelly, Squash, Juice, Candy, Supari, Powder, Biscuit, Chutney, Chayavanprash, Instant Juice and Soup mixes, Ladoo, Mouth freshener, Nectars, Oil, Pickle, Preserve, Sauce, Shred, Sweet Aonla Flakes, Syrup, Toffee, Triphala etc. which have high domestic and global market values.

Therapeutic benefits

Recommended dosage of vitamin C[12]

Nowadays, aonla powder is extensively used for enhancing entire immune system. According to U.S. Recommended Dietary Allowance (RDA), daily ingestion of nutritional vitamin C is given as below:

Infants (age below 1 year):30 to 35mg

Children (age 1 to 14 years):40 to 50mg

Adolescent (age 15 to 18 years): 65 to 75mg

Men (age over 18 years): 90mg

Women (age over 18 years):75mg

Antioxidant

The antioxidant activity of aonla has been examined by a number of authors [13]. A study was carried out on the antioxidant activity of free and bounded phenolic of *E. officinalis*. The high level of antioxidant activity is due to the phenolic content (12.9% w/w) in them. The major antioxidant components identified in phenolic fractions of *E. officinalis* were gallic acid and tannic acid [14]. Aqueous extract of *E. officinalis* was found to be a potent inhibitor of lipid peroxide formation and

scavenger of hydroxyl and superoxide radicals in vitro [15].With an ORAC (Oxygen Radical Absorbance Capacity) value of 1770, Amalaki has almost twice the antioxidant power of acai and about 17 times that of pomegranate [3].

Antibacterial and antiviral

Alcoholic extracts of *E. officinalis* were found to show potential antibacterial activity against one or more test pathogen [16]. Medical studies conducted on Amla fruit suggest that it has antiviral properties [17].

Diabetes

Decoctions of the leaves and seeds are used in the treatment of diabetes mellitus [18]. Chromium, a mineral present in amla fruits responsible for the anti-diabetic effect [19].The blood sugar level may be increased by the action of an enzyme alanine transaminase which is present in liver. This enzyme can be normalized by taking one teaspoonful of this mixture (equal quantities of amla, jamun and bitter gourd powder) once or twice per day [12].

Constipation

The constituents of "Triphala" include Aonla along with *Terminalia bellirica* and *T. chebula* which are used as a laxative [20]. In India the fresh ripe fruits are used extensively as a laxative, one or two fruits being sufficient for a dose. The fruit in dried form is said to be gently laxative [21].

Diarrhoea

Paste of amla leaves mixed with honey is an effective cure for diarrhoea [12]. For chronic diarrhoea, an infusion of the leaves with fenugreek seed is given [22].

Boils and Spots

The pericarp of the fruit is often used in decoctions along with other ingredients and also applied externally on boils with cow ghee to promote suppuration [22].

Gonorrhoea

The juice of the bark combined with honey and turmeric is a remedy for gonorrhoea [23].

Nausea and Headache

When a mixture of Amla powder, red sandalwood (*Pterocarpus santalinum*) and honey applied to forehead cures nausea and vomiting. [18].

Dental problem

The leaves of *Embolica officinalis* are squeezed and the juice extracted is used as a relief from toothache [6].

Fevers

A decoction of the emblic seed, chitrak root (*Plumbago zeylanica* or Leadwort), chebulic myrobalan and peepal (*Piper longum*) is given in fevers. There is also a compound powder composed of equal proportion of the emblic seed (*Embolica officinalis*), chitrak root, chebulic myrobalan, peepal and saindhava (rock salt) which may also be used [6].

Hair growth

Since years back aonla is being regarded as the prime ingredient of various shampoos and hair oils. Aonla stimulates the hair follicles and provides complete nourishment to the hair root. Daily consumption of green vegetables along with 2-3 aonla fruit reduces hair greying. The fruit, cut into pieces, is dried, preferably in shade and then boiled in coconut oil, the resulting oil is said to be excellent for preventing hair greying - in Ayurvedic terms, a classic sign of excess pitta dosha [3].

Respiratory Problems

The fresh juice of aonla mixed with honey given during hicccough and agonizing respiration. 10g leaves of *Embolica officinalis*, 5 fruits of *Terminalia chebula*, 9 seeds of *Piper nigrum*, one garlic and one clove are crushed properly and mixed with 25 ml ghee. During oligopnoea (shallow or infrequent breaths) this paste is given once daily for seven days to get relief.

Nose Bleed

The seed are fried in ghee and ground in conjee (the liquid from boiled rice). This paste is applied to the forehead to stop bleeding from the nose[3].

Urinary problem

The paste made by 20gms of pulp of dried amla in 160 gms of water till 40 gms are left. This was mixed with 20gms of Gur. Regular use of this portion may cure urinary problem [12].

Mouth Ulcers

Bark of the root mixed with honey is applied to aphthous inflammations of the mouth [21]. A decoction of the leaves is used as a chemical-free bactericidal mouthwash [18].

Indigestion

It is known that fresh green leaves of amla is crushed and mixed with curd taken before food can promote proper digestion. Fruit is carminative and stomachic [24].

Sore eyes

The exudate collected from incisions made on the fruit is applied externally on inflammation of the eye [22]. A decoction is prepared by immersing the dried fruit in a clean new earthen vessel which is used as a collyrium (medical lotion used as eyewash) in ophthalmia. It may be applied cold or warm [24].

Conclusion

In this era of modernisation, due to the emerging technologies, scientific discoveries, faster rate of knowledge or information dissemination through different means made people aware about the blind dependency on synthetic drugs. These days the term "Alternative Medicine" became very popular which focus on the idea of using the plants for medicinal purpose. Aonla being known for its nutritional and medicinal properties since ages, it holds an important position in indigenous medicinal system. This review, we tried to encapsulate the traditional and scientifically proven uses of aonla. Aonla fruit not only provide health benefits to the consumers but its wide acceptance opens the door for establishing commercial processing industries in the form of value-added products. This will reduce the risk of commodity loss due to high perishability which in turn will encourage our farmers to bring more area under aonla cultivation. Therefore, it is high time to scientifically explore the medicinal aspects of aonla at molecular level so that the fruit impregnated with medicinal properties could be used the fullest to live a disease free and healthy life.

Application of review: Aonla is a tree which can be grown in under-utilised land with less care and management. This article emphasizes on the medicinal properties of aonla which could be commercialised for future betterment.

Review Category: Ethnomedicine, Antioxidant Property of Aonla

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