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Multiple health benefits of Amla in our day-to-day life

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Abstract

Emblica officinalis Gaertn, commonly known as Indian Gooseberry is a pivotal and most important medicinal plant in Indian traditional system. Medicinal plants are natural present to human life. Amla is a supercilious medicinal plant with indigenous traditional system including folklore Ayurveda, for medicinal and nutritional purposes that deals life threatening diseases to build up lost vitality and vigor. In modern era, unparalleled medicinal inventions have been achieved to resolve incalculable diseases, including cancer and AIDS. Yet most of the investigation conducted worldwide against newly discovered diseases. Thus we have forgotten our ancient medicines such as Siddha, Ayurveda, and Unani systems. Synthetic medicine like antibiotics, steroids, and advanced surgical practices results in uncured side effects and can be reason to death. The synthetic drug may be effective on one sickness and cause another trouble. Thus gradually man starts living against nature and lost his life. Ancient people had been live long when compared to nowadays because of their life style. *Emblica officinalis* Gaertn, or known as amla, is an important herbal drug used for human welfare. *Phyllanthus Emblica* linn, commonly known as Indian Gooseberry, or amla, is arguably the most important medicinal plant in the Indian traditional system and plays a pivotal role in the survival and development of human civilization. All parts of the plants are used to treat a range of diseases, but the most important is the fruit as it is found tremendous in pharmacological application. Amla used as both tonic and medicine and form an additional important dietary source that can build up lost vitality with supplements like Vitamin A, Vitamin C, and Amino Acid. Preclinical studies reveals about various beneficial uses of amla and its parts that have shown that possesses antipyretic, analgesic, antitussive, antiatherogenic, adaptogenic, cardioprotective, gastroprotective, antianemia, wound healing, hepatoprotective, neuroprotective, antidiarrheal, properties. Some experiments shown the Amla and phytochemical such as prodelfinidins B1 and B2 possess antineoplastic effects. Amla used for the treatment of diarrhea, jaundice, inflammation, cancer, cough, diabetes, and effect on skin. Amla reported to possess radiomodulatory, chemomodulatory, chemopreventive effects, antioxidant, anti-inflammatory, and immunomodulatory activities, properties that are efficacious in the treatment and prevention of cancer. The review focuses on biological components of amla in traditional and pharmaceutical process, also its relevance in future prospective.

Keywords: Medicinal plant, human civilization, *Emblica officinalis* gaertn, phytochemical, amla, ayurveda, preclinical studies

Introduction

Emblica officinalis Gaertn. Or *Phyllanthus Emblica* linn. also known as Indian Gooseberry or Amla in Hindi and amalika in Sanskrit, is a deciduous tree that commonly grown in the subtropical and tropical regions of southeast Asia including Southern India and China. Various parts of the amla plant, especially its fruit contains high amount of vitamin C and considerably higher concentrations of most minerals, protein and amino acids like glutamic acid, proline, aspartic acid, alanine, cysteine and lysine. Amla is a powerful Ayurvedic rasayana used as a traditional medicine to treat diarrhea, jaundice, inflammation and other conditions.

The amla plant is used both as a medicine and as a tonic to replenish lost vitality and energy. *P. emblica* is rich in nutrition and act as a best dietary supplement of vitamin C. Amla berries are unique super berries which belong to pantheon and have antioxidant abilities which are widely used in rasayana and in customary medicine in the treatment of diarrhea, jaundice, inflammation and other elements. Amla fruit is one of the oldest fruit in India also known as “wonder fruit for health” which is widely used in Indian system of medicine in alone or combination with other herbs for the treatment of infectious and non-infectious diseases. *E. officinalis* contains certain chemical constituents like tannins, alkaloids and phenols.

Almost all parts of Amla plant shows hypolipidemics, antibacterial, antioxidant, antiulcerogenic, hypolipidemic, antidiabetic, antibacterial, antioxidant, antiulcerogenic, hepatoprotective, gastroprotective, chemopreventive properties (Lanka, S., 2018) [16].

Taxonomical Classification

Kingdom	Plantae
Division	Angiosperm
Class	Dicotyledonae
Order	Geraniales
Family	Euphorbiaceae
Genus	Embllica
Species	Officinalis Geartn



(<https://pixabay.com/photos/tree-gooseberry-berry-6950280/>)

Fig 1: Indian Gooseberries or amla fruit (*Embllica officinalis* Geartn)

Morphology

E. officinalis is a subtropical and tropical plant described in ancient Indian mythology as being the first tree in existence. Much earlier, Amla plant has been utilized for management of various disorders and a richest source of vitamin C. Small to medium-sized tree that grows up to 18 meters tall, with an asymmetrical branch structure and asymmetrical shape. The leaves are oval shape and very short in size up to 7-10cm long. The Indian Gooseberry, also known as Amla, is a bright greenish yellow colored fruit with a smooth and

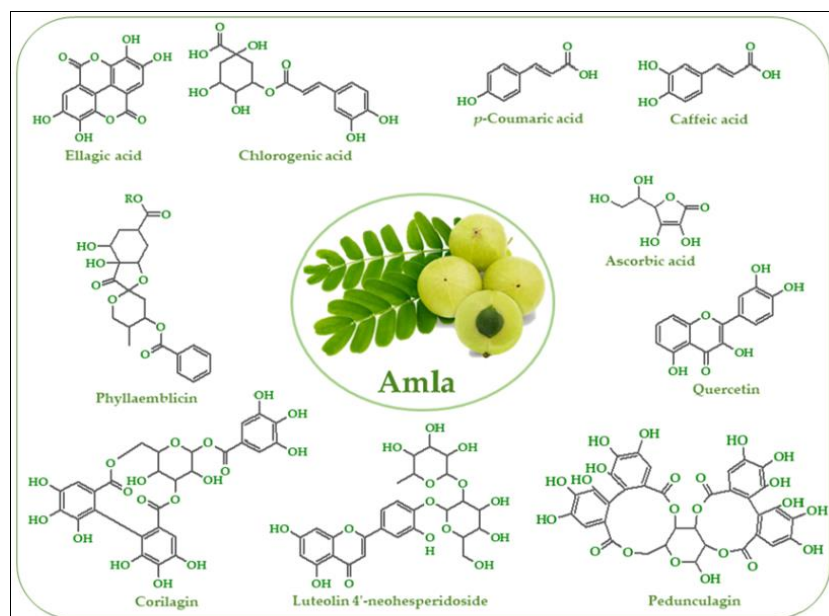
hard outer skin. It has six vertical stripes or furrows and is nearly spherical in shape. It ripens in the autumn months and is usually harvested by hand after climbing to the upper branches (Dora, J. 2012) [13]. The taste of the Indian Gooseberry is sour, bitter and astringent and is quite fibrous in texture. In India, it is common to eat Gooseberries either fresh or dried (Mirunalini, S., 2013) [3].

Growing season and type

1. Plant of Amla is found everywhere in India yup to the height of 5000 feet.
2. Fruits appear from October to April.
3. Wild variety of amla are smaller as compare to hybrid one.
4. Fresh fruits are light green and ripe fruits turn light brown in color.

Chemical Constituents

Amla has undergone extensive research, making it one of the most studied plants. The fruits are rich in ascorbic acid and in addition they contain phenols, including ellagic acid, gallic acid, quercetin, corilagin, geranin, gallotanins, kaempferol, emblicanins, furosin, flavonoids, glycosides, and proanthocyanidins. The root contains glycosides and tannins. Fruit has total 28% of the total tannis distributed in the whole plant. The fruit contains two hydrolysable tannins Emblicanin A and B, which have antioxidant properties; one on hydrolysis gives gallicacid, ellagicacid and glucose. The fruit also contains Phyllemblicin. Activity directed fractionation revealed the presence of several phytochemicals like galic acid, corilagin, furosin andgeranin. Flavonoids like quercetin, alkaloids like phyllantine and phyllantidine are discovered (Dasaroju., 2014) [5, 17]. Along with these, it primarily contains amino acids, carbohydrates and other compounds given in table 1. amla is the best rejuvenating herb and a great rasayana that helps to protect from disease, also by reducing the possibilities of premature ageing. Amla is considered one of the most powerful antioxidant herbs in Ayurveda due to its low molecular weight hydrolyzable tannins. (Variya, Bhavesh C., 2016) [30].



(<https://www.mdpi.com/2076-3921/11/5/816#>)

Fig 2: Chemical Constituents of Amla

Types and chemical constituents of Amla

Type	Chemical Constituents
Hydrolysable Tannins	Emblicanin A and B, Punigluconin, Pedunculagin, Chebulinic acid, Chebulagic Acid, Corilagin, Geraniin, Ellagotannin
Alkaloids	Phyllantine, Phyllembein, Phyllantidine
Phenolic compounds	Gallic acid, Methyl gallate, Ellagic acid, Alanine, Cystine, Lysine
Carbohydrates	Pectin
Vitamins	Ascorbic acid
Flavonoids	Quercetin, Kaempferol
Organic acid	Citric acid
Amino acid	Glutamic acid, Proline, Aspartic acid, Alanine, Cystine, Lysine

Ethnobotanical Importance of Emblica

In ancient Indian Mythology it is believed that it is the first tree to be created in the universe. The plant is considered as rasayana and used in delaying the degenerative and senescence related processes.

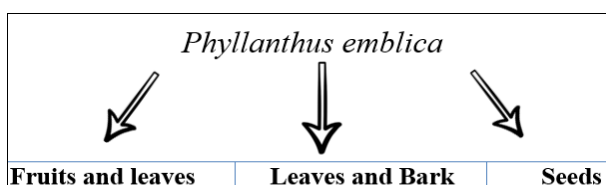
In folk medicine, the fruit which are sour, astringent, bitter, sweet and anodyne. Its various beneficial effects include eye cooling, carminative, digestive, stomach, laxative, indigestion, aphrodisiac, rejuvenating, diuretic, antipyretic and tonic effects (Baliga, M. S. 2014) [7]. Fresh and dry fruits are extensively used as laxatives. *E. officinalis* is also said to have hepatoprotective, cardioprotective, diuretic, cooling, gastric tonic, mood-altering, antipyretic, and anti-inflammatory properties. It has high concentration of vitamin C, thus amount is more than that of a tomato and orange. In ayurvedic texts, it is described as potent antacid. Due to its cooling effect, amla is a popular ingredient for treating burning sensations anywhere on the body and various types of inflammation and fever. These are manifestations of pitta. Amla also prevent peptic ulcer dyspepsia, and is a digestive medicine. Amla is considered to be the best rejuvenating agent in Ayurveda (Lanka, S. 2018) [16].

The fruit has these properties using the ayurvedic classification

- **Rasa (taste):** The main tastes are sour and astringent, but the fruit has five tastes such as sweet, bitter and pungent.
- **Veerya (nature):** cooling
- **Vipaka:** (Taste developed through digestion): sweet
- **Guna:** (Qualities): light, dry
- **Doshas:** (Effect on humors): quietens all three doshas: vata, kapha, pitta and is especially effective for pitta.

Unique in having a natural balance of fruit flavors (sweet, sour, pungent, bitter and astringent), it stimulates the brain to activate the three main components of all physiology in the body: water, fire and Recognize the element of air regain balance (Singh, Ekta, *et al.*, 2012) [6].

Amla - A Novel Ayurvedic Herb



Amla as an energy revival

One teaspoon of amla powder over with honey after taking milk in the morning helps to improve freshness and strength to the body.

Amla fight with acidity

Irregular eating habits and abnormal consumption of sweet, sour, spicy, and oily foods can cause hyperacidity, and tea, coffee, and smoking can also cause this problem. The problem is overcome by use of one gram of amla powder and a little amount of sugar mixed with milk or water twice a day.

Enhance fertility

As a vrishya herb, it enhances all the seven tissues including the reproductive tissue. The herb nourishes ovaries and sperm, and with a property called garbhasthapan, which means it enhances fertility. It is especially nurtures womanhood by strengthening the uterus and supporting reproductive health.

Relieves leucorrhoea

Major problem in female is the white mucous material discharge indicates infection in vagina. The problem is overcome by uptake of 3 grams of powder amla with 6 grams of honey every day for one month can cure it.

Urinary trouble

Fresh amla juice has a diuretic effect and normalizes acidic urine. It is helpful in burning urinary infection. It also helps in elimination of waste from the body but does not over-stimulate the urinary system.

Amla as a febrifuge

Fruit leaves and seeds help recover from heat. The leaf extracts are widely used for the treatment of fever in malays homeomedicines. Emblic seeds are boiled with chitrak root and chebulic myrobalan and boiled contents are good for curing fever.

Relieves headache

Applying mixture of amla with buttermilk make temperature reduction and give chillness and its paste reduce headache.

Well digestive agent

Fresh green leaves of amla is crushed and mixed with curd taken before can improves good digestion (Mirunalini, Sankaran, Velusamy Vaithyanathan, and M. A. N. I., 2013) [3].

Traditional Uses of Amla

Amla Powder

Treat cardiac diseases

Hypertension, diabetes and cholesterol are major factors of heart diseases. Blood vessel involves the collection of unused cholesterol that leads to high pressure, which increases the possibility of heart attacks. By using the mixture of powdered dry amla powder with sugar candy can overcome these impediments. One teaspoon of this mixture is mixed with the glass of water and taken in empty stomach may neutralize the blood cholesterol level.

Action on diabetes: Amla fruit powder helps control high blood pressure. Triphala consists of three herbs he named

Amla, Harada and Vihara. 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 taken one teaspoonful of this mixture once a day. Chromium a mineral present in amla fruits responsible for the anti-diabetic effect.

Physical and mental health

With the consumption of amla, which is sparkling and brilliant and maintains a healthy digestive process, physical and mental illness is overcome.

Impedes constipation

One teaspoon of amla powder with milk or water every morning can control the irregular and infrequent evacuation of the bowels i.e. constipation. On the other hand tea spoon of fresh amla juice and 3 teaspoon of honey mixed with water may deal this infection. Intake of 20 grams fresh amla juice everyday can cure any parasitic worms that are causing constipation.

Jaundice

Fresh amla fruits are soaking with 4 munnakkas and after 1 hour both are ground together with amla juice. This part relieves jaundice (Kumar, Anil, Anup Singh, and Jyotsna Dora., 2012) [13].



(<https://www.indiamart.com/proddetail/natural-amla-indian-gooseberry-powder-bulk-packing-16961140448.html>)

Fig 3: Amla Powder



(<https://www.quora.com/Does-drinking-amlaj-juice-on-an-empty-stomach-cure-acidity>)

Fig 4: Amla juice

Amla Juice

Amla juice with honey every morning and evening expose number of medicinal benefits; include cures weakness of the generative system, blood purification, act on diabetes, act on cold and cough.

Gout

Gout is an inflammation of the big toe caused by uric acid metabolism resulting in acid deposit and its salts in blood and joints. It is cured by intake of amla juice withhold ghee makes softening of joints and helps in curing gout and also removing the spots caused by measles, chicken pox, small pox.

Piles

Drinking fresh amla juice with half teaspoon of ghee and 1 teaspoon of honey and 100 grams of milk after cures chronic piles problem (Gul, Aadil, 2022) [24, 32].

Amla Paste

Respiratory disorder

Amla has been witnessed that it can retrieve the normal respiration while the system gets affected. The paste made by 10gram leaves of *Phyllanthus Emblica*, 5 fruits of *Terminalia chebula*, 9 seeds of *Piper nigrum*, one garlic are crushed over and mixed with 25 ml ghee made from cow's milk and a clove. The fresh juice of amla mixed with honey can get back best from asthma, cough, and other respiratory disorders.

Urinary problem

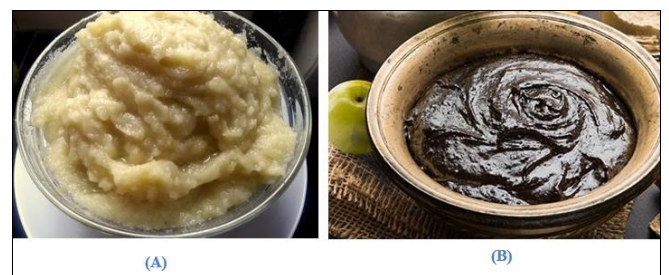
Amla excellently cleans the bladder and strengthens the bladder muscles. Consumption of dried amla pulp with hot water mixed with gur can cure urinary problem. One tablespoon of amla powder and one tablespoon of turmeric with hot water can reduce urine infection.

Migraine

Severe vascular headaches associated with migraines, which are more common in women than men, are treated by applying a paste of dry amla powder containing kumkum, neelkamal, and rosewater.

Diarrhoea

Paste of amla leaves with honey is an effective cure for diarrhoea (Singh, Sharma, S. (2012) [6].



(<https://www.netmeds.com/health-library/post/amazing-benefits-of-chyawanprash-for-bolstering-immunity-and-vitality>)

Fig 5: (A) Amla pulp. (B) Amla powder paste

Pharmacological Implication of Amla

Anti-Microbial Activity

Amla inhibits antimicrobial properties and usefulness for the designing effectual medicines. Its phytochemical

constituents contain a wide range of secondary metabolites and function as reducing substance for biogenic production. It is determined from total phenolic, tannin, and flavonoid contents of *E. officinalis* fruit extract. Essential oil obtained from emblica by hydro-distillation and supercritical fluid extraction showed good anti-microbial activity in an *in vitro* study which effects are mediated through Amla extract (Anbuselvi, S., & Jha, M. 2015) [14]. Components such as tannins that make amla an excellent cancer preventive agent and the conversion of polyphenols to high atomic weight tannins. Amla represses the development of different malignancies like bosom, uterus, pancreas, stomach and liver diseases. Activity of emblica exerts protective effect against human microbial pathogens. Studies involve the *in vitro* antimicrobial activity of plant extracts against gram positive and gram-negative microorganisms and to ascertain chemical components that may be present in amla extract. Anti-microbial effect by inhibiting adhesion of *candida albicans* to buccal epithelial cells and denatures acrylic surfaces *in vitro* (Khurana, S. K., 2019) [31]. Gradual increase in zone of inhibition against staphylococcus with amoxicillin by agar diffusion and disk diffusion methods. Amla extract shows significant result in the mean colony count reduction of *Escherichia coli*, staphylococcus aureus, and *pasteurellamultocida* by tube dilution method.

Anti-Diabetic Activity

Amla is considered as a natural therapy to treat or control diabetes. Primary cause of diabetes are obesity, stress-related disorders or else inactive lifestyle. Amla is abundant in vitamin C. It is a powerful antioxidant that helps combat the effects of free radical production and oxidative stress. A mixture prepared from dried fruits of three plant species *Emblica officinalis*, *Terminalia bellerica*, *terminalia chebula* contributes to decrease blood glucose level. Research reveals that by intake of amla extracts there is gradual reduction in neuropathic pain via antioxidative mechanism (D'souza, Jason Jerome, *et al.*, 2014) [7]. Methanolic extract of amla examined for anti-diabetic activity against streptozotocin-induced diabetic patient. The quercetin constituent present in the methanolic section showed significant antidiabetic activity when administered daily for 28 days. The extract reduces the blood glucose and urine sugar levels with a substantial increase in chloride in dosage.

Anti-Cancer, Anti-Immunogenic Activity

Cancer is a global epidemic with 40 million new cases each year lead to annual death toll around 8 million. The immeasurable societal burden results in social and economic impact with quality of life consequences. In spontaneous developing world, the usage of medicinal plant seems more effective than synthetic drugs. Research reveals that the person consuming herbal or Ayurvedic medicine has more sustainability than taking synthetic or psychoactive substance (Baliga, M. S., & Dsouza, J. J. 2011) [2]. *Phyllanthus Emblica* tree produce *Emblica officinalis* or Indian gooseberry whose extracts utilized as anticancer agent, immune-stimulator and antitumor activities. Amla consists of 18 compounds that inhibit the growth of tumor cells such as gastric and uterine cancer cells. Amla fruit extract activates natural killer cells reduce ascites and solid tumors (Gul, Maryam, *et al.*, 2022) [24, 32]. The aqueous extract of amla exhibited potent ant carcinogenic activity

against 20-methylcholanthrene. Amla harbors potent antitumor activity, also prevent reactive oxygen species induced DNA damage and oncogenesis. Amla detoriates potential treatment for breast cancer with low toxicity against nontransformed cells (Madhuri, S., 2011) [34].

Antioxidant Activity

Amla is rich in antioxidant such as gallic acid, ascorbic acid and phenolic compounds and thus helps the body's immune systems and digestion. It contains a number of biologically active compounds having an antioxidant activity like tannins, flavonoids, anthocyanin, flavonoids and phenolic acids. Amla fruit extract found to improve mitochondrial dysfunction in skeletal muscles. It was also found to have cyto-protective effects and lowered the reactive oxygen species level induced by oxidative stress (Gul, Maryam, *et al.*, 2022) [24, 32]. A dose-dependent protective effect on plasma proteins and red blood cells are demonstrated from fruit extract and also restored the membrane integrity at higher levels, mainly due to the presence of gallic acid, quinic acid and quercetin. Amla fruit extract also caused the healing of damaged mucosa and inhibition of *H. pylori* after 14 days of the therapy (Baliga, M. S., & Dsouza, J. J. (2011) [2]. Gastroprotective effects of fruit extract also found in clinical studies.

Anti-Aging Activity

Amla is an antioxidant rasayana that protects the skin from free radical damage and prevents aging. The drug promotes longevity, prevent illness and ameliorate symptoms of old age. A dark brown powder extracted from branch of amla consisted of variety of phenolic acids, mainly sinapic and ferulic acids. The extract exhibited the potent antioxidant and tyrosinase inhibitory activities *in vitro* assays and melanin suppression (Fazil, M., & Nikhat, S. 2019) [8]. Amla branch is rich in bioactive compounds and can be a potential ingredient for utilization in anti-skin aging products. Experimentally studies show amla formulation by traditional Ayurvedic method, given in dose of 45gm/day to healthy volunteers. Drastic increases in telomerase activity and telomere length as compared to age-matched placebo control after 45 days of treatment. Activity of telomerase increases which delay the onset of ageing process by making critical upper limit of telomerase length. In animal studies, Amla showed protective effect against collagen degradation benefitted collagen synthesis. Tropical application of cream containing Amla constituents effect against ultraviolet radiation induced aging process, attributed to the presence of phenolic acids and flavonoids (Bhadra, P. 2020) [28].

Cardio-Protective Activity

In animal studies, the *Emblica* fruit as fruit extract showed an antimicrobial, antifungal and antiviral protective effect against ischemia-reperfusion injury which occurred due to oxidative stress. The remedy from atherosclerosis is possible only when the oxidation of injury is minimized. The juice of the amla ensured that it is rich in polyphenol amount. Indian gooseberries were demonstrated to prevent oxidative stress. Amla supports the heart, blood and circulation. It protects the cardio vascular system and act as a cardiac stimulant. Amla helps to reduce cholesterol level and protect heart from diseases (Baliga, M. S., & Dsouza, J.

J. 2011) [2]. Oral intake of a *P. emblica* fruit extract enriched with emblicanin A and B which instantly reversed the effects of immune reconstitution inflammatory syndrome. Amla juice reduces low-density lipoprotein, or bad cholesterol, in our body. It rapidly reduces total cholesterol levels, including fatty acids or triglycerides.

Amla as Anti-Anemic Agent, enhance Fertility and remedy for Menstrual Disorders

Anemia occurs when there are not enough red blood cells to carry oxygen to different organs. As a result, it causes lack of blood, iron and vitamin B12. Main function of the RBC is to transport oxygen into the tissues and anemia caused due to decrease in oxygen carrying capacity. Anemia leads to reduction in oxygen level inhibits various factors such as inadequate absorption of iron, reduced intake of vitamin B 12, destruction of red bone marrow. Amla act as good absorbing agent of iron which is composed of high amount of Vitamin C or ascorbic acid that helps to reduce iron deficiency. Combination Amla and neem leaves have a synergistic effect which can be very effective to patients suffering from iron deficiency anemia (Irinmwinuwa, E. O., *et al.* 2023) [22].

Amla fruits keep menstrual cycle regular and healthy. Amla juice is packed with vitamin B1 and B2 which is beneficial during heavy blood flow. It helps in flushing out toxins from the body during the menstrual cycles. It is also rich in vitamin C and iron which can fulfill the demands in body. Amla fruit juice helps to regularize periods (Singh, Ekta, *et al.* 2012) [6]. It supports the reproductive system of both men and women and can help overcome difficulty in conceiving. It enhances fertility by nurturing sperm and ovaries and possibilities of conception. Mostly supportive for women, strengthens the uterus and protects the reproductive system. White discharge can also be reducing by taking dried amla seeds powder mixed with honey. Mixture of fruit juice and sugar used for the relief of burning sensation in vagina. Amla essentially supports urinary system and helps to eliminate waste from body.

Ambient uses and needs

Amla in Biotin Gummies

Biotin or vitamin B7 is a water soluble vitamin that plays a vital role for human body. It helps to increase nutrition value and converts it into metabolize fats, energy, and amino acids, plays a crucial part in development of hair, skins and nails. Biotins are prepared from organic meat, fish, eggs, meat, seeds, nuts and certain vegetables. Biotin gummies are supplements that uptake in gummy form instead of pill or capsule. Biotin gummies contains collagen, keratin, Zinc and multivitamins such as Vitamin A, Vitamin B, Vitamin C, and Vitamin E (Perez-Sanchez, Ariadna C., 2020) [20]. Though, Amla is the 2nd richest source of Vitamin C and it plays a crucial role in biotin gummies. Vitamin C as an anti-oxidant provides protection to cells from oxidative stress. It increases blood circulation throughout the body including to the scalp also which helps to increase hair growth. Vitamin C supports a healthy and moisture skin. It promotes collagen production in skin as reduction in collagen levels leads to fine line and wrinkle. Vitamin C is a major building block proteins found in connective tissue and skin (Khetpal, N., 2020) [12]. It also helps to manage blood pressure, reduce risk of chronic diseases, prevent iron deficiency, lower risk

of heart disease and prevent iron deficiency. Biotin gummies are safe to take in doses up to 300mg daily for 6 months. Not recommended for sensitive skin, sensitive to Vitamin B, pregnant or breastfeeding woman. It helps to improve hydration, smoothness and glow in our skin. It also strengthens fingernails and hair growth.

Amla Wine

Amla wine is one of the most acidic alcoholic beverages identified as a beneficial health promoting alcoholic beverages made from fruit juice that has a mouth puckering flavor. It is prepared by using fermenting agent, temperature, duration, juice, concentration, variation or by addition of jiggery. Wine is recognized to be potentially beneficial in various aspects like anti-aging, anti-oxidants effect, reduction effect, decrease cancer risk in women, improve lung functions, anti-depressants, antispasmodic and make the bone stronger. The herbal "amla wine" consists of alcoholic extract of herb with percent of ethanol present in wine is about 7-16%, thus moderate consumption of amla wine lower the risk of diabetes, artery damage, heart attack, and decrease in the level of cholesterol (Soni, S. K., 2009) [35].

Study comprises of fermentation process using two types of fermenter, i.e., yeast *Saccharomyces cerevisiae* and flowers of plant *Woodfordia fruticosa* without any source of nutrition. Medicinal benefits from amla due to presence of phytoconstituent like Gallic acid (GA) and Ascorbic acid (AA). It has neuroprotective and antioxidant properties. AA is the water soluble antioxidant, and it fight off virus, infections and can be used in prevention and treatment of diabetes, cataract, heart disease, cancer, help to make bone stronger. GA is water insoluble phenolic compound is one of the major constituent of amla that improves immune system naturally. Quantitative analysis of amla extract done by thin layer chromatography is used to analyze following phenolic compound in quantitative way. Development carried out using ethyl acetate and amla wine formulated using yeast *S. cerevisiae* as a fermenter for 3 months fermentation at 30-35 degree Celsius (Argade, V. P., 2015) [1]. Further, storage in the oak wood barrel for months improve the quality and reduce the undesirable components such as n-propanol, n-butanol, isoamyl alcohols and an increase in desirable components including ethyl acetate, phenolic, etc.

Amla in Cosmetic World

Amla is the most important medicinal plant of Indian traditional system of mythology and it is as ancient as human civilization so as our cosmetic world. In prehistoric sculpture, it is mentioned about benefits of amla on face and hair treatment. Amla tree, fruit and leaves found abundantly all over India, and other south Asian countries. The fruit is highly prized both for its high Vitamin C content and precious oil, extracted from seeds and pulp used as treatment for hair and scalp problem. Raw amla juice removes acne marks and blemish in natural way and can be used as face scrub to detoxify, exfoliate the skin well (Kolekar, Yogesh S., 2021) [36]. Amla powder with turmeric powder mixture can applied on face as mask to exfoliate skin and helps in brightening skin and lightening the complexion. An essential oil is distilled from leaves used for preparation of perfume. Oil extracted from amla fruit is rich

in Vitamin E, enhances hair texture, make it shine and soft by well conditioning hair roots (Shah, R. R., Mohite, S. A., & Patel, N. R. 2018) [37]. Amla and yoghurt hair mask also act as a great conditioner, along with amla extract in shampoo cleanses and help in growth with shine. But now in accelerated life style no time to self-care, so multinational branded cosmetic companies are bring to us amla products in packing form for ready to use. Cosmetics brands like Ayur, Nihar Amla, Dabur, Mamaearth, Patanjali, Khadi Naturals, VICCO, and many more.

Amla in Food Technology

Indian gooseberries composed of antioxidants and vitamins that offer several health benefits. Amla has crucial role in food technology from ancient time till date in many forms. Amla pickles concentrated with Vitamin C which boosts immunity and protects from viral infection. Also cure stomach infection and provide resistance to our body. Amla juice is a great dietary source of vitamin C and a water soluble substance that act like antioxidant. It helps to prevent fructose induced fatty liver disease and enhances liver health. It also promotes heart health and increases hair growth. Amla candy is full of antioxidant and anti-inflammatory properties which prevent us from harmful bacteria, oxidative stress and diseases. It also help in treating any digestive issues like constipation, bloating, etc. Having amla candy every morning in empty stomach will have maximum benefits (Gupta, Vidhi, *et al.*, 2021) [19]. Amla murabba intake is very beneficial for women as it reduces menstrual cramps, if taken for three months regularly. It prevents and compensates iron loss also during menstrual bleeding.

Effect of amla on COVID-19 Pandemic

Corona virus is an infectious and contagious virus caused by SARS-COV-2 Virus. Covid-19 caused diverse impact on our immune system which arose to pandemic. A large spread of covid-19 with high mortality rate due to SARS-COV-2 led the world health organization to declare a world-wide pandemic on 12th March 2020. Due to unavailability of health facility and proper medicines and vaccines, thousands of death cases increased day by day. Many peoples were not able to get a bed in hospital, government started home isolation in which people started adopting our traditional methods to get cure and enhance immunity to fight against. Amla played a significant role to improve physical health and act as a natural immunity booster. It is no secret that amla is enrich in Vitamin C which is a strong antioxidant and as recommended by nutritionist, replacing Artificial Vitamin C capsules with Amla fruit/juice which can be a natural nutritional support to immune system and led as a primary line of protection in opposition to viral infection. Amla enhances flavors of mouth in covid-19 patient as they receive no sensitivity of taste and smell of any odor (Murugesan, S., 2021) [21]. Vitamin C from Amla helps build defence for the body by combining with Zinc help the body to fight the infection. Zinc potentiates the immune boosting function of Vitamin C and hence the supplement of Amla with Zinc can immensely help to maintain normal functioning of immune system and keep diseases like COVID-19 at bay. Activation of innate immune system is an early step of adoptive immune system.



(<https://pixabay.com/photos/indian-gooseberry-aml-337446/>)

Fig 6: Indian Gooseberry

Factors which will enhance the chance of amla side-effects

Consumption of excessive dosage of Amla can trigger these side effects

- Amla is not for hypotension patient.
- Amla not for low blood sugar level patients
- Hyper-acidity patient
- Blood-related disorder patient
- Who have undergo surgery in the near future
- If you are pregnant or breastfeeding
- If you have dry skin and scalp
- Amla makes stole hard
- Heart patient should be careful

Conclusion

World 80% population wholesomely depended on plant-derived drugs for their primary health care. Amla has an imperative position in Ayurveda- an Indian Indigenous system of medicine and sustainer of human life. A cocktail of Vitamin C, minerals, antioxidants properties prevent innumerable health disorders. Amla is a medicinal, herbal and has a spiritual effect on India. Amla tree is believed to be a sacred and worshipped as mother Earth. Medicinal plant constitutes the base of health care systems in many societies. Herbal and medicinal formulations of amla showed potential therapeutic benefits against various diseases and have exceptional results in diabetes and during COVID-19 Pandemic. Several research and imperative scientific studies revealed the various extracts and herbal formulations of amla has most worthy effective results on human welfare at molecular level with help of latest technologies. However, further studies need to be on Indian gooseberry plants to evaluate unexplored phytochemical constituent which can lead to the development of new drugs for human welfare.

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