

Extraction and Separation of Phytochemicals From Amla Powder Phyllanthus Emblica (Amla)

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Abstract: *Emblica officinalis* Gaertn. Or *Phyllanthus emblica* Linn, usually called Indian gooseberry or amla, is arguably the foremost necessary healthful plant within the Indian ancient system of medication, the piece of writing. Numerous elements of the plant are accustomed to treat a spread of diseases, however the foremost necessary is that the fruit. The fruit is employed either alone or together with different plants to treat several ailments like respiratory disease and fever; as a drug, laxative, liver tonic, refrigerant, stomachic, restorative, alterative, antipyretic, medication, hair tonic; to forestall ulceration and upset stomach, and as a biological process. Diagnosis studies have shown that amla possesses antipyretic, analgesic, medicament, antiatherogenic, adaptogenic, cardioprotective, gastroprotective, antianemia, anti hypercholesterolemia, wound healing, medication, antiatherosclerotic, hepatoprotective, nephroprotective, and neuroprotective properties. Additionally, experimental studies have shown that amla and a few of its phytochemicals like acid, ellagic acid, pyrogallol, some nor sesquiterpenoids, corilagin, geraniin, elaeocarpus, and prodelphinidins B1 and B2 additionally possess antineoplastic effects. Amla is additionally reportable to possess neuromodulatory, chemomodulatory, chemopreventive effects, atom scavenging, inhibitor, medication, antimutagenic and immunomodulatory activities..

Keywords: Antioxidant; Polyphenol; Flavonoid; Amla.

I. INTRODUCTION



Fig. 1 Amla powder

Alma fruit (*Phyllanthus emblica*) is a fruit that comes from India. Amla fruit is widely distributed in tropical and subtropical countries such as China, India, and Southeast Asia. It belongs to the family Euphorbiaceae. The amla fruit consists of a smooth, yellow-green outer skin and an inner skin and seeds of amla.

Many people only use the flesh of the amla fruit, while the seeds are thrown away as organic waste. Whereas amla seeds have high nutritional value as antioxidants that have free radical scavenging properties (damaged cells). The seeds have been tested for antimicrobial properties on human pathogens showing that they have strong antimicrobial compounds that can be used to kill pathogens and have antibacterial and antifungal properties.

The extraction of polymer compounds is also printed as a result of the separation of medicinally active portions from plant tissues pattern selective solvents through traditional extraction procedures. The foremost criteria of extraction technique is separating the soluble and insoluble components and jilting entirely insoluble Cellular mass. The extraction products of plants have relatively advanced mixtures covering sort of groups of plant metabolites either in liquid kind or semi-solid state (Imran et al. 2011; Ramamoorthy et al. 2007). The general techniques of extraction of healthful plants embrace maceration, infusion, percolation, digestion, decoction, hot continuous extraction (soxhlet), aqueous-alcoholic extraction by fermentation, counter current extraction, microwave assisted extraction, ultrasound extraction (sonication), essential fluid extraction (SFE), phytonic extraction (with hydro-fluoro-carbon solvents), etc. For the aromatic plants, three sorts of hydro-distillation techniques (water distillation, steam distillation, steam and water distillation), hydrolytic maceration followed by distillation technique.

Plant profile:

The tree is small to medium in size, reaching 1–8 metres (3+1/2–26 feet) in height. The bark is mottled. The branchlets are finely pubescent (not glabrous), 10–20 centimetres (4–8 inches) long, usually deciduous. The leaves are simple, subsessile and closely set along branchlets, light green, resembling pinnate leaves.

Chemical constituents :

The fruits contain high amounts of ascorbic acid (vitamin C), and have a bitter taste that may derive from a high density of ellagitannins, such as emblicanin A (37%), emblicanin B (33%), punigluconin (12%), and pedunculagin (14%). [9] Amla also contains punicafolin and phyllanemblinin A, phyllanemblin other polyphenols, such as flavonoids, kaempferol, ellagic acid, and gallic acid.

Benefits of Phyllanthus Emblica

1. Improves eye vision
2. Improve skin health
3. Prevents ageing
4. Increase immunity
5. Improves hair health
6. Protect and cure diabetes
7. Improves nervous system health
8. Improve cardiovascular health

Potential therapeutic applications:

Amla possesses a number of applications in various fields. Antioxidant Herbs and flavors are used as spice and flavoring agent and also considered to be antioxidant in nature . Amla fruit extract reveals the chemical nature and oxidation inhibiting nature. All phenolic constituents give positive responses as antioxidant and show maximum results for flavonoid and tannin . The study of Reddy et al. denoted the antioxidant nature of *E. officinalis* because of collective effects of phytophenols, flavonoid materials, and ascorbic acid . Similarly, Shivananjappa et al. explained that aqueous extract of Amla fruit increases the endogenous antioxidant activity by help of a hepatocyte cell line (HepG2) .

Hepatoprotective:

From ancient time, natural products are still used for curing the liver diseases . All the chemical constituents can be separated due to which it is highly efficient hepatoprotective isolated salt medicine like modern medicine . Inflammation in liver can cause liver infection. However, Amla fruit shows positive response in the treatment of liver injury because it contains excess of biochemical compounds such as Vitamin C, flavonoids, and tannins. The drugs of Amla fruit help in absorbing N-nitrosodiethylamine into the liver that acts as oxidation inhibitor, anti-inflammatory, apoptosis inhibitor, and autophagy inhibitor in nature.

Nephroprotective :

The study about Amla also describes its efficacy against kidney infection within the body of rats which promote with aging process .

Hypolipidemic :

Like other plants, the Amla fruit is also hypolipidemic, lipid deficient, and immune modulating in nature because of the presence of excess flavonoid or any other substances that lower the glucose . Using *E. officinalis*, the levels of lipids (i.e., cholesterol and triacylglyceride) in blood can be controlled .

Metabolic syndrome:

Ascorbic acid Quercetin and kaempferol Citric acid *E. officinalis* extract obtained by ethyl acetate extraction, contains the large amount of fructose-induced metabolic syndrome. This research elaborates that *E. officinalis* is rich in fraction of the polyphenol .

Cardioprotective :

Besides the other benefits, its major advantage is protection from CVD, atherosclerosis, and other heart diseases. The remedy from atherosclerosis is possible only when the oxidation of injury or low-density lipoprotein (LDL) is minimized. The juice of Amla fruit ensured that it is rich in polyphenol amount. Moreover, the surgical pathology recovery of cardiac muscles guaranteed the preventative activity of *E. officinalis*. All the research and discussion argued that *E. officinalis* shows heart protective, antioxidant, and free radical scavenging properties .Diabetes and related complications Daily routine foodstuffs participate in controlling the diabetes level. Like garlic, onion, and turmeric, Amla (*E. officinalis*) shows also positive effect in lowering the diabetes level. Approximately 2–3 g of *E. officinalis* powder efficiently helps in improving the high-density lipoprotein cholesterol level and controlling the LDL cholesterol level. Furthermore, Amla fruit is also being in use to get remedy from neuropathy development, for diabetic patient .

Immunostimulant :

As we are familiar with various plants, that are immune stimulant in nature. Similarly, Amla is the best source of ascorbic acid that enhances immunoactivity (i.e. make 2 times more effective) by stimulating immune cells and antibodies .

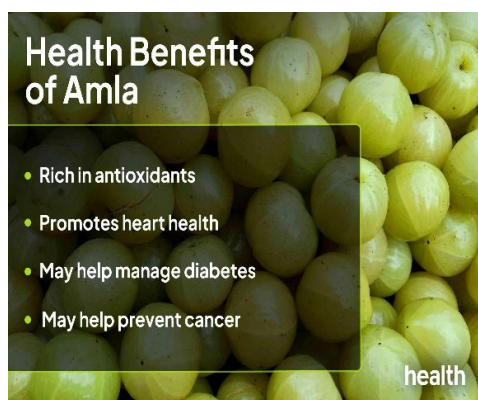


Fig.2 health benefits of amla

Antimicrobial :

Approximately 50% and 20% of deaths are caused by infectious diseases in tropic areas and America, respectively. Chemical constituent obtained from medicinal plants is being in used to cure antimicrobial infection since over 100 years .The organic solvent (such as $CHCl_3$ and $CH_3 OH$) extract of Amla (*E. officinalis*) shows efficient result against few Gram-positive and Gram-negative bacteria . On the other hand, Vijayalakshmi et al. discussed antimicrobial nature

of aqueous *E. officinalis* fruit pulp extract alongside Gram-positive bacteria and Gram-negative bacteria. However, in future, *E. officinalis* drugs will serve as low cost and safe medicines due to its antimicrobial activities.

Anticancer :

cholesterol Like other natural medicinal plant, *E. officinalis* is better for anticancer because of high concentration of polyphenol constituents in it. Polyphenols involve the mechanisms associated with anticarcinogenic effect, inflammation, and radiation retardant.

Osteoporosis :

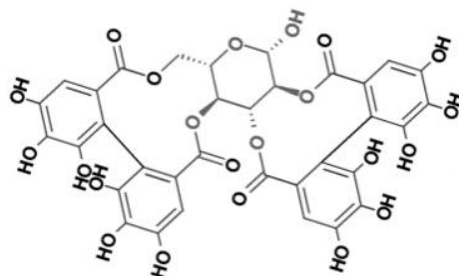
Amla (*E. officinalis*) fruit is very useful for strengthening the weak and fragile bones (i.e., osteoporosis). It often takes more time even several years to appear or required only diagnoses, *E. officinalis* extract is used to mature osteoclasts. Penolazzi et al. revealed the implement of the extracts of *E. officinalis*.

Gastroprotective :

Amla is not only anticarcinogenic but also its phytochemical components are best for prevention gastrointestinal infection. According to Mehmood et al., Amla (*E. officinalis*) extract is used in the treatment of diarrhea and showed spasmolytic activities.

Dermoprotective :

Besides the other medicinal plants, *E. officinalis* extract is very useful in skin care, antiaging, dermatological disorder since more than 20 years. Amla extract protects human skin against oxidative stress because of its antioxidant nature. *E. officinalis* defends the skin from free radical that causes skin damage.



Fog.3 Structure of Amla

Material and Method:

API/ chemicals:- Ethanol(100 ML) , dried powder(10 gm)

Instruments:-conical flask , beaker , mesuring cylinder.

Methods :

Preparation of Powder Extracts:

1. EXTRACTION:

Step 1: Fresh amla fruit is extracted with 95% ethanol, filtered, and concentrated in a rotary evaporator.

Step 2: Soaking the Plant Material Weigh the plant material: Use a ratio of 1:10 (w/v) for maceration. For instance, if you have 10 grams of plant powder, add 100 mL of acidic solvent. Soak the plant material: Place the ground *Phyllanthus Emblica* in a glass container or beaker and add enough of the acidic solvent to cover it. Stir the mixture well to ensure even contact between the plant material and the solvent.

Step 3: Filter the extract After the maceration period, filter the mixture through filter paper or a fine mesh cloth to separate the liquid extract (which contains the alkaloid salts) from the plant material residue.

Qualitative Analysis of Phytochemicals :

Tannins: Amla contains complex tannins and ellagitannins, including chebulagic acid, geraniin, corilagin, and elaeocarpusin.

Alkaloids: Amla contains alkaloids such as phyllantine and phyllantidine.

Flavonoids: Amla contains flavonoids such as quercetin and kaempferol.

Fatty acids: Amla contains linoleic, linolenic, oleic, stearic, palmitic, and myristic acids.

Minerals: Amla contains minerals such as calcium, magnesium, and selenium.

2. TLC PROCEDURE :

Step 1:- Plate Activation

Heat TLC plate at 120°C for 30 minutes & Allow the plate to cool.

Step 2:- Sample Application

Apply 5-10 µL of sample solution onto the TLC plate & Use a capillary for accurate application.

Step 3:- Development

Place the TLC plate in the mobile phase chamber & Develop the plate for 30-40 minutes or until the solvent front reaches 10-15 cm

Step 4:- Drying

Remove the plate from the chamber & Dry the plate with a hair dryer.

Step 5:- Detection

Visualize under UV 254 nm, 366 nm & Expose the plate to iodine vapor.

Stationery Phase:- Silica gel

Mobile Phase:- Chloroform: Methanol (9:1)

Evaluation Test :

1. Test for Flavonoids:

Alkaline reagent test Few drops of 10% NaOH solution were added to 2-3 mL of extract in a test tube. Formation of intense yellow colour that becomes colourless in addition to dilute HCl indicates presence of flavonoids .

2. Test for Alkaloids:

Few drops of dilute Iodine solution is added into 3 ml of test solution. Formation of blue colour which disappears on boiling and reappears on cooling indicates presence of alkaloids.

3. Test for Fatty acid:

Fats are soluble in organic solvents like alcohol and chloroform, but not in water. If a sample forms an oily layer on top of water, it contains fat.

4. Test for Tannins:

Gelatin test: Gelatin solution was prepared by dissolving gelatin powder in water by heating using a water bath. To this gelatin solution 2 ml. extract was added. Presence of tannins is indicated by formation of white precipitate.

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III. CONCLUSION

Approximately 80% of the population relies in large part on conventional plant-derived capsules for their primary health care. Furthermore, many of occurring drugs obtained immediately through herbs. Moreover, for purifying herbal pills, there may be sizable marketplace for natural drugs. The consumption of native therapeutic vegetation decreases growing countries' dependence on drug imports. Thus, each herbal medicines or unfinished natural drugs ought to take the equal cost-effective pharmaceutical difficulty, which has ended up vital for latest imitative prescribed drugs. Although the alternative structures of medication are powerful, they arrive by means of some unwanted results that

regularly cause critical hurdles. Herbal medicinal drug relieves a lot of the troubles, as Amla has a critical role for curing different diseases. Amla because of its greater antioxidant and biological nature saves you innumerable health issues as it includes important vitamins and particularly ascorbic acid.

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