



# Cochrane Review of Bioactive Constituents of *Phyllanthus emblica* Linn. as an Strengthening Preparedness for Health Emergencies to Combat Infectious Pandemics

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## Abstract

Traditional System of Medicine or Unani System of Medicines is the nature's gift to human beings as they promote health and wellbeing in a best of the natural way. These are the System of Medicines that are affordable than conventional medicine, trouble-free to obtain than modern medicine and majority of them are pleasant to consume and these are the key benefits of these scientifically accepted System of Medicines. Unani System of Medicines is having a wealth of herbal medicine and among the divine treasure of herbs *Phyllanthus emblica* Linn. is a valuable herb. It belongs from the family Euphorbiaceae and this deciduous tree is of medium height, commonly known as Indian gooseberry, emblic myrobalans, and Amla. These species of plant is a native of India but also found in Sri Lanka, Uzbekistan, South East Asia, and China. *Phyllanthus emblica* is an important herbal drug used in Unani (Graceo - Arab) and other Alternative Systems of Medicine. It is highly nourishing and could be a significant dietary source of vitamin C, amino acids, and minerals. *Phyllanthus emblica* contains phenolic compounds, tannins, phyllembelin, rutin, phyllembelic acid, curcum-inoids, and emblicol. All parts of the plant are used for medicinal purposes, especially the fruit, which has been used in Unani as a potent ingredient and in traditional medicine for the treatment of several ailments. *Phyllanthus emblica* shows hepatoprotective, gastroprotective, antidiabetic, hypolipidemic, antibacterial, antiviral, antioxidant, and antiulcerogenic properties. The prime importance of this Cochrane Reviews of Bioactive Constituents of *Phyllanthus emblica* Linn. Is to access its efficacy as an Strengthening Preparedness for Health Emergencies to combat infectious pandemics on the basis of its potential as an antibacterial, antiviral and antioxidant properties.

**Keywords:** Amla; Emblica Officinalis; Unani Medicines; Antioxidant; Phenolic Compounds; Immunity

## Introduction

In the Indian traditional system of medicine *Emblica officinalis* (EO) is regarded as one of the most important herb and also known as the king of all medicinal plants. This phytochemical reservoir of immense medicinal value possesses enormous ethnomedical historical aspect. It is among the most widely consumed drugs of Unani (Greeco-Arab) system of medicine with astounding remedial characters. It is one of the richest sources of vitamin C as it contains about 30 times the amount of vitamin C found in oranges. It is also assumed as one of the oldest oriental

medicines mentioned in Ayurveda as superfluous remedy for a variety of ailments [1,2].

Embolic officinal is widely used in alternative system of medicines and believed to increase the combating power or immune power against different ailments. Several parts of the plant are used for the purpose of treatment, but the most imperative is the "fruit." As the fruit is rich in quercetin, gallic acid, tannins, flavonoids, pectin, phyllemblic compounds, and vitamin C and also contains various polyphenol compounds. A wide range of phytochemical components including terpenoids, alkaloids, flavonoids, carbohydrates, and tannins

have been shown to have helpful biological activities. It is found in many pharmacological studies that Embolic officinalis are having potential properties as an antioxidant, ant carcinogenic, antitumor, antigen toxic, anti-inflammatory activities, anticancer, anti HIV-reverse transcriptase, ant diabetic, inhibitory effects, antidepressant, antiulcer genic, hair growth tonic, wound healing activities, cardio protective, neurodegenerative diseases, and many more to be listed. It is found in extensive distribution in tropical and sub-tropical region and it also has a therapeutic potential against numerous disease. Thus, the word Amla truly shows its property as it is derived from the Sanskrit word Amalaki which means the "The Sustainer or Prosperity [3-5].

<b>Class:</b>	Dicotyledonae
<b>Division</b>	Angiospermae
<b>Family</b>	Euphorbiaceae
<b>Genus</b>	Embllica
<b>Kingdom</b>	Plantae
<b>Order</b>	Geraniales
<b>Species</b>	Oficinalis Geartn

**Table 1:** Scientific Classification.

## Morphology

*Phyllanthus emblica* Linn. (Syn: *Embllica officinalis*) is a deciduous tree of medium sized belonging to the family Euphorbiaceae. These species of plant is a native of India but also found in Sri Lanka, Uzbekistan, South East Asia, and China. *Phyllanthus emblica* is a small to medium sized tree with greenish gray or red bark, growing to a height of about 8-18 m. In March to May flowering occurs and September to November are the months of fruiting [6-8].

**Bark:** It is exfoliating in small thin irregular flakes, texture is thin and light gray in color.

**Leaves:** The leaves are feathery linear-oblong and rounded base. Apex is obtuse or acute, subsessile, closely set along branch lets and light green in color. It resembles with pinnate leaves.

**Flowers:** Flowers are borne in compact clusters in the axils of the lower leaves, small, inconspicuous and greenish yellow in color. Male flowers are unisexual and numerous on short, slender pedicels. Females few, sub sessile and ovary three celled.

**Fruit:** Pale yellow, depressed, fleshy, globose, about 2 cm in diameter with 6 obscure vertical furrows enclosing 6 rigorous seeds in 2 seeded 3 crustaceous cocci.

## To Combat Infectious Pandemics

Ascorbic acid commonly known as Vitamin C, has

antioxidant properties. When sepsis occurs in the body it activates the cytokine surge and leads to the accumulation of neutrophils in the lungs which results in the destruction at alveolar level. It is found in early clinical studies that vitamin C can effectively prevent this. In addition as a result of activation and accumulation of neutrophils vitamin C can help to eliminate alveolar fluid and also reduces water channel damage of alveolar epithelial. Vitamin C also prevents the formation of neutrophil extracellular traps, which is a biological episode of vascular injury caused by neutrophil activation. It is also a proven fact that duration of the common cold effectively shorten by Vitamins C. It is commonly used in extreme conditions usually in athletes, skiers, and military exercises for the effective prevention of the common cold [9,10].

Few studies have also shown the increased risk and severity of influenza infections due to vitamin C deficiency. In non-randomized controlled trial 85% of the 252 students treated experienced a reduction in symptoms in the high-dose vitamin C group (1g / h at the beginning of symptoms for 6h, followed by 3 \* 1g / day) [11].

In another study it was concluded that Vitamin C in mega doses administered before or after the appearance of cold and flu symptoms relieved and prevented the symptoms in the test population compared with the control group is considered to be a potent rejuvenator and immunomodulator effective in stalling degenerative processes and senescence, and to promote longevity [12,13].

In a recent study the fruits extract of *E. officinalis* has been reported to have magnificent immunomodulatory properties. The immunomodulatory property of Amla was evaluated using chromium (VI) as an immunosuppressive agent. It also inhibited apoptosis and DNA fragmentation and relieved the immunosuppressive effects of Cr on lymphocyte proliferation and even restored the IL-2 and  $\gamma$ -IFN production considerably [14].

It is also well established that the strong antioxidant activity of the phenolics has the ability to protect cells against oxidative damage caused by free radicals. The hydroxyl group of many phenolic compounds has the potential to function as singlet oxygen due to the occurrence of conjugated ring structures and as antioxidants by forage superoxide anions and lipid peroxy radicals. Phenolics are the major chemical constituents of Amla and these substances have strong antioxidant property and might contribute to the health effects of Amla. Several active compounds like ellagic acid, gallic acid, 1-O-galloyl-D glucose, mucic acid 1,4-lactone 3-O-gallate, isocorilagin, chebulanin, chebulinic acid, quercetin, chebulagic acid, kaempferol, mallotusin, acylated apignin glucoside compounds etc. have been isolated from

the aqueous extract of Amla having tremendous health benefits [15,16].

An importance of oxidants in the suppression of viruses was ruled out as early as 1970 but the metabolic importance of oxidants in viral infection became obvious afterward. It had been reported that when the cells are treated with mitogenic lectins many viruses grow better in lymphocytes and that influenza viruses of the H2N2 subtype were mitogenic in lymphocytes. Looking for evidence of activation in other cell types, it was observed that Sendai virus and influenza virus were capable of activating a respiratory burst in phagocytic cells in the absence of antiviral antibody [17].

A pilot study of Jawarish Amla in addition to anti-tubercular treatment drugs for control of adverse reactions in DOTS regime in pulmonary tuberculosis was conducted in this study a significant improvements were observed in almost all subjective and objective parameters. In the said study Jawarish amla was established to be safe and successful adjuvant of DOTS in combating the adverse effects of anti-tubercular treatment drugs [18].

Phyllaemblicin B extracted from plant roots showed inhibitory potential for Coxsackie virus Pentagalloylglucose inhibits influenza A virus replication by prevention of adsorption of the virus and suppressing release of virus [19].

*Emblica officinalis* aqueous extract also having potent antifungal activity against different species of *Aspergillus* fungi that includes *Aspergillus candidus*, *A. columnaris*, *A. flavipes*, *A. flavus*, *A. fumigatus*, *A. niger*, *A. ochraceus*, and *A. tamar* [20].

*Phyllanthus emblica* is atop commercial botanicals having plentiful applications in the healthcare, nutraceuticals, pharmaceuticals, and cosmetics industries. It is a main component of the popular unani products as well of ayurvedic formulations such as Triphala churna and Chavanprash [21-23].

Murabba Amla	Dimagheen	Itrifal Mulayyin
Jawarish Amla Sada	Itrifal Fauladi	Itrifal Kashneezi
Jwarish Lulavi	Itrifal Ghudaddi	Itrifal Muqawwi
Anoshdaru	Itrifal Kabir	Itrifal Muqil
Itrifal Deedan	Itrifal Kishmish	Itrifal Saghir
Itrifal Sanai	Itrifal Shahtara	Itrifal Ustukhudus
Itrifal Zamani	Jawarish Shahi	Habb-e Pechis

**Table 2:** *Phyllanthus emblica* Compound Unani Formulations (Murakkab Advia).

## Conclusion

Cochrane Review of *Phyllanthus emblica* Linn and its Bioactive Constituents for the purpose to Strengthen Preparedness for Health Emergencies show profound efficacy and potentials of *Emblica officinalis* to combat infectious pandemics. Even though several researches for qualitative analysis of phytochemicals has been done, further quantitative analysis of *Emblica officinalis* extracts for potent phytochemicals is necessary to be targeted especially for assessment of their antiviral potential in particular. Although exploring the various mechanisms of action owing to antiviral potential of specific compounds / constituents present in the plant extracts, would pave way forward for more usages of such natural herbs for countering pathogens in an effective way by developing potent antiviral drugs and medicines as well as to alleviate the problem of emerging pandemic. Appropriate actions must be taken to continue studies for designing and development of natural products from Amla for safeguarding various health issues. Another paramount research importance should aim to identify the phytochemical constituents of *Emblica officinalis* extract rendering specific activities. This will enable us to synthetically produce the identified active ingredient at a large scale so that further studies can be conducted to develop new commercial drugs that are basically originated from the natural sources.

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