

Essentials Perspectives for *Emblica officinalis*

Anil Kumar*, Anup Singh and Jyotsna Dora

Pharmacy College, Itaura, Chandeshwar, Azamgarh, Uttar Pradesh, India.

ABSTRACT

Emblica officinalis (Amla) are widely used in the Indian system of medicine and believed to increase defense against diseases. This article discusses and summarizes important medicinal values of *Emblica officinalis* (EO). In this communication, we reviewed the applications of EO in hepatoprotective, antioxidant, anti-inflammatory, dental problem, respiratory problem and various other diseases. These papers also review the studies on the Amla as important medicinal values.

Keywords: *Emblica officinalis*, traditional, pharmacological effects.

INTRODUCTION

Emblica officinalis is a small to medium sized deciduous tree belonging to family Euphorbiaceae and 8-18 meters height with thin light grey bark exfoliating in small thin irregular flakes, leaves are simple, subsessile, closely set along the branchlets, light green having the appearance of pinnate leaves; flowers are greenish yellow, in axillary fascicles, unisexual, males numerous on short slender pedicels, females few, subsessile, ovary 3-celled; fruits globose, fleshy, pale yellow with six obscure vertical furrows enclosing six trigonous seeds in 2-seeded 3 crustaceous cocci found throughout India, the sea-coast districts and on hill slopes up to 200 meters, also cultivated in plains.

The fruits are sour, astringent, bitter, acrid, sweet, cooling, anodyne, ophthalmic, carminative, digestive, stomachic, laxative, alterant, aphrodisiac, rejuvenative, diuretic, antipyretic and tonic. They are useful in vitiated conditions of tridosha, diabetes, cough, asthma, bronchitis, cephalalgia, ophthalmopathy, dyspepsia, colic, flatulence, hyperacidity, peptic ulcer, erysipelas, skin diseases, leprosy, haematogenesis, inflammations, anemia, emaciation, hepatopathy, jaundice, strangury, diarrhoea, dysentery, hemorrhages, leucorrhoea, menorrhagia,

cardiac disorders, intermittent fevers and greyness of hair.

Synonym: *Phyllanthus emblica* Linn.

Classification:

Kingdom: Plantae
Division: Angiospermae
Class: Dicotyledonae
Order: Geraniales
Family: Euphorbiaceae
Genus: *Emblica*
Species: *officinalis* Geartn.

Vernacular names:

English: Emblic myrobalan, Indian Goose berry
Sanskrit: Aamalaki
Hindi: Amla
Kannada: Nelli Kayi
Marathi: Amla
Gujarati: Ambla
Malayalam: Nelli Kayi
Tamil: Nelli
Telugu: Usirikaya
Kashmir: Aonla

PHARMACOLOGICAL PERSPECTIVES ANTITUMOR ACTIVITY

Aqueous extract of *emblica officinalis* was found to be cytotoxic to L 929 cells in culture in a dose Dependent manner. Concentration needed for 50% inhibition was found to be 16.5g/ml. *Emblica officinalis* and

chyavanaprash (a non toxic herbal preparation containing 50% E.O) extracts were found to reduce ascites and solid tumours in mice induced by DLA cells. Animals treated with 1.25 g/kg b.wt. Of emblica officinalis extract increased life span of tumour bearing animals (20%) while animals treated with 2.5 g/kg b.wt of Chyavanaprash produced 60.9% increased in the life span. Both emblica officinalis and chyavanaprash significantly reduced the solid tumours. Tumour volume of control animals on 30th day was 4.6 ml where as animals treated with 1.25 g/kg b.wt of emblica officinalis extract and 2.5 g/kg b.wt chyavanaprash showed tumour volume of 1.75 and 0.75 ml, respectively emblica officinalis extract was found to inhibit cell cycle regulating enzymes cdc 25 phosphates in a dose dependent manner. Concentration needed or 50% inhibition of cdc 25 phosphatase was found to be 5 g/ml and that needed for inhibition of cdc2 Chinese was found to be >100g/ml. The results suggest that antitumor activity of emblica officinalis extract may partially be due to its interaction with cell cycle regulation.

HEPATOPROTECTIVE ACTIVITY

Hepatoprotective activity of emblica officinalis (EO) and chyavanaprash (CHY) extracts was studied using Carbon tetrachloride induced liver injury model in rats. EO and CHY extracts were found to inhibit the hepatotoxicity produced by acute and chronic administration as seen from the decreased levels of serum and liver lipid peroxides (LPO), glutamate-pyruvate transaminase (GPT), and alkaline phosphatase (ALP). Chronic CCl₄ (4) administration was also found to produce liver fibrosis as seen from the increased levels of collagen hydroxy proline and pathological analysis. EO and CHY extracts were found to reduce the elevated levels significantly, indicating that the extract could inhibit the induction of fibrosis in rats.

ANTIOXIDANT ACTIVITY

Pretreatment with the butanol extract of the water fraction of Phyllanthus emblica fruits

at the dose of 100 mg/kg body-weight, orally administered to rats for 10 consecutive days, was found to enhance secretion of gastric mucus and hexosamine ($P < 0.001$) in the Indomethacin induced ulceration of rats. The morphological observations also supported a protective effect of the stomach wall from lesion. The Indomethacin treatment of the premedicated animals with the drug hardly affected either the malondialdehyde (MDA) or superoxide dismutase (SOD) level in gastric tissue while the ulcerative agent itself significantly enhanced both the levels. An antioxidant property appears to be predominantly responsible for this cyto protective action of the drug. The antioxidant activity of tannoid active principles of *E. officinalis* consisting of emblicanin A (37%) emblicanin B (33%), punigluconin (12%) and pedunculagin (14%), was investigated on the basis of their effects on rat brain frontal cortical and striatal concentrations of the oxidative free radical scavenging enzymes, superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPX), and lipid peroxidation, in terms of thiobarbituric acid reactive products. The results were compared with effects induced by deprenyl, a selective monoamine oxidase (MAO) B inhibitor with well documented antioxidant activity. The active tannoids of *E. officinalis* (EOT), Administered in the doses of 5 and 10 mg/kg, i.p and deprenyl (2 mg/kg, i.p), induced an increase in both frontal cortical and striatal SOD, CAT and GPX activity, with concomitant decrease in lipid peroxidation in these areas when administered once daily for 7 days. Acute single administration of EOT and deprenyl had insignificant effects. The results also indicate that the antioxidant activity of *E. officinalis* may reside in the tannoids of the fruits of the plant, which have vitamin C-like properties rather than vitamin C itself.

ANTI-INFLAMMATORY ACTIVITY

Leaves and fruits of *Phyllanthus emblica* L. have been used for the anti-inflammatory

and antipyretic treatment of rural populations in its growing areas in subtropical and tropical parts of China, India, Indonesia, and the Malay Peninsula. In the present study, leaves of *Phyllanthus emblica* were extracted with ten different solvents (n-hexane, diethyl ether, methanol, tetrahydrofuran, acetic acid, dichloromethane, 1, 4-dioxane, toluene, chloroform and water). The inhibitory activity of the extracts against human polymorpho nuclear leukocyte (PMN) and platelet functions was studied. Methanol, tetrahydrofuran, and 1, 4-dioxane extracts (50 micrograms/ml) inhibited leukotriene B₄-induced migration of human PMNs by 90% and N-formyl-L-methionyl-L-phenylalanine (FMLP)-induced degranulation by 25-35%. The inhibitory activity on receptor-mediated migration and degranulation of human PMNs was associated with a high proportion of polar compound in the extracts as assessed by normal phase thin layer chromatography. Diethyl ether extract (50 micrograms/ml) inhibited calcium ionosphere A23187-induced leucotrienes Release form human PMNs by 40% thromboxane B₂ production in platelets during blood clotting by 40% and adrenaline-induced platelet aggregation by 36%. Ellagic acid, garlic acid and rutin all compounds isolated earlier from ph. *Emblica*, could not explain these inhibitory activity on PMNs and platelets, which confirm the anti-inflammatory and antipyretic properties of this plant as suggested by its use in traditional medicine. The data suggest that the plant leaves contain as yet unidentified polar compound(s) with potent inhibitory activity on PMNs and chemically different a polar molecule(s) which inhibit both prostanoid and leukotriene synthesis. Carrageenan-and dextran-induced rat hind paw oedema. Anti-inflammatory activity was found in the water fraction of methanol extract of the plant leaves. The effects of the same fraction were tested on the synthesis of mediators of inflammation such as leucotrienes B₄ (LTB₄), platelet-activating factor (PAF) and thromboxane B₂ (TXB₂), and on LTB₄- and N- leucocytes (PMNs) in-vitro. The water fraction of the methanol extract

inhibited migration of human PMNs in human platelets during clotting; suggesting that the mechanism of the anti-inflammatory action found in the rat paw model does not involve inhibition of the synthesis of the measured lipid mediators.

EFFECT ON SERUM CHOLESTEROL LEVELS

The effect on total serum cholesterol and its lipoprotein fractions of supplementation of the diet with Amla was studied in normal and hypercholesterolaemic men aged 35-55 years. The supplement was given for a period of 28 day in the raw form. Both normal and hypercholesterolaemic subjects showed a decrease in cholesterol levels. Two weeks after withdrawing the supplement, the total serum cholesterol levels of the hypercholesterolaemic subjects rose significantly almost to initial levels. *Emblica officinalis* reduces serum, aortic and hepatic cholesterol in rabbits. *Emblica officinalis* reduced serum cholesterol (p less than 0.001), aortic cholesterol (p less than 0.001) and hepatic cholesterol (p less than 0.001) significantly in rabbits. *Emblica officinalis* did not influence euglobulin clot lysis time, platelet adhesiveness or serum triglyceride levels.

CHELATING AGENT

Photo aging of the skin is a complex biological process affecting various layers of the skin with major changes seen in the connective tissue within the dermis. *Emblica* was shown to reduce UV-induced erythema and had excellent free-radical quenching ability, chelating ability to iron and copper as well as MMP-1 and MMP-3 inhibitory activity.

CONSTIPATION

The fruit is occasionally pickled or preserved in sugar. When dry it is said to be gently laxative, according to some sources the fresh fruit is also laxative. The fresh ripe fruits are used extensively in India as a laxative, one or two fruits being sufficient for

a dose. They have been exported to Europe, preserved in sugar, and are valued as a pleasant laxative for children and made into a confection consisting of the pulp of the de-seeded fruit. Fruits along with those of *Terminalia bellirica* and *T. chebula* are the constituents of "Triphala" which are used as a laxative.

DENTAL PROBLEMS

The roots of *Emblica officinalis* (10 g) are ground and taken twice daily for one day only after taking food. Alternatively, the leaves of *Emblica officinalis* are squeezed and the juice extracted. This juice is put in the ear (a few drops) to find relief from toothache. A final alternative is to grind the node of an *Emblica officinalis* and mix it with water. After vigorous stirring it is filtered through a cloth. This water is put drop by drop in the right ear if the teeth on the left hand side are in pain and *vice versa*. The remedy is continuing for three days.

DIABETES

The fruits are used in the treatment of diabetes and in other references an infusion of the seeds are also used. Decoctions of the leaves and seeds are used in the treatment of diabetes mellitus.

DIARRHOEA

It is used medicinally for the treatment of diarrhoea. As a fruit decoction it is mixed with sour milk and given by the natives in cases of dysentery. The bark partakes of the astringency of the fruit. A decoction and evaporation of the root solution produces an astringent extract equal to catechu. An infusion of the leaves with fenugreek seed is given for chronic diarrhoea.

DIURETIC

The fresh fruit is diuretic. A paste of the fruit alone or in combination with *Nelumbium speciosum* (the Egyptian Lotus), Saffron [author's note: more likely to be *Curcuma longa* (Indian saffron) than *Crocus sativus* (saffron)] and rose water is a useful applica-

tion over the pubic region in irritability of the bladder, in retention of urine. A sherbet prepared from the fresh fruit with (or without) raisins and honey is a favoured cooling drink which has a diuretic effect. A decoction of the fruit with stems of *Tinospora cordifolia* is a well-known remedy for various urinary diseases.

FEVERS

Malays use a decoction of its leaves to treat fever [Burkill 1966]. The fresh fruit is refrigerant [Nadkarni & Nadkarni]. The seeds are given internally as a cooling remedy in bilious affections and nausea, and in infusion make a good drink in fevers [Drury; Nadkarni & Nadkarni]. The flowers are employed by the Hindu doctors for their supposed refrigerant and aperient qualities. Often after a fever there is a loss of taste and a decoction of the emblic seed, dried grapes and sugar is used for gargling. A decoction of the *Emblica* seed, chitrak root (*Plumbago zeylanica* or Leadwort), chebulic myrobalan and pipli (*Piper longum*) is given in fevers and there is also a compound powder composed of equal parts of the emblic seed (*Emblica officinalis*), chitrak root, chebulic myrobalan, pipli and saindhava (rock salt) which may also be used.

GONORRHOEA

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

HAIR GROWTH

A fixed oil is obtained from the berries that are used to strengthen and promote the growth of hair. The dried fruits have a good effect on hair hygiene and have long been respected as an ingredient of shampoo and hair oil. Indian gooseberry is an accepted hair tonic in traditional recipes for enriching hair growth and also pigmentation. A fixed oil obtained from the berries strengthens and promotes the growth of hair. 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

graying in Ayurvedic terms, a classic sign of excess *pitta dosha*. The water in which dried Amla pieces are soaked overnight is also said to be nourishing to the hair.

HEADACHE

A paste of the fruit is a useful application to the forehead in cases of cephalalgia (headache). The name "Itrifal" of Unani medicine is the same as "Triphala" in the Ayurvedic system and represents a group of preparations used for the care of all manner of cranial conditions. The expressed juice of the fruit along with other ingredients is used to cure fits and insanity [Jayaweera]. In Indonesia, the pulp of the fruit is smeared on the head to dispel headache and dizziness caused by excessive heat (Perry, 1980). Amla is mixed with buttermilk for anointing and "cooling" the head [Treadway].

INDIGESTION

Fruit is carminative and stomachic. The tender shoots given in butter-milk cure indigestion and it are known that green fresh leaves combined with curds have similar effect.

MOUTH ULCERS

A decoction of the leaves is used as a chemical-free bactericidal mouthwash. Bark of the root mixed with honey is applied to inflammations of the mouth and a decoction of the leaves is also useful as a mouth wash in the treatment of aphthae. Another remedy suggests root bark rubbed with honey is used in aphthous stomatitis (an inflammation of the mouth).

NAUSEA

Amla powder is mixed with red sandalwood (*Pterocarpus santalinum*) and prepared in honey to relieve nausea and vomiting. One tola (a unit of weight used in India, equal to the weight of one silver rupee 11.7 grams or 180 troy grains) of the seeds soaked in a tinned vessel during the night, and ground next morning, with cow's milk and taken in 7 tolas or 1/4 seer of milk (one seer in India was 0.9331 kg) is a good remedy for bil-

iousness. Another remedy for this condition is to take the fruit which is often dried and used as a medicine and can also be used cooked, preserved and used in pickles, or made into confection.

RESPIRATORY PROBLEMS

The fresh fruit is used in Turkeystan in inflammations of the lungs. The juice or extract of the fruit is mixed with honey and pip-it added is given to stop hiccough and also in painful respiration. The expressed juice of the fruit along with other ingredients is used to cure cough, hiccough, asthma and other diseases [Jayaweera]. Dyspnoea (breathing difficulty): The following materials are all ground into a paste - *Emblica officinalis* (10g leaves), *Terminalia chebula* (5 fruits), *Piper nigrum* (9 seeds), one garlic, 25 ml ghee (made from cow's milk) and a clove. Take the paste orally once daily for seven days to get relief. It is also used for oligopnoea (shallow or infrequent breaths).

SKIN SORES AND WOUNDS

The milky juice of the leaves is a good application to sores. Grind the bark of *Emblica officinalis* (10g) into a paste and apply to the cut or wound area once daily for 2 to 3 days. Alternatively, squeeze *Emblica officinalis* leaves and extract the juice to the cut once daily for 3 to 4 days. Healing occurs when the dynamic harmony of the doshas is restored.

SKIN WHITENING

Skin lightening agents have been widely used to either lighten or depigment the skin in the Asia, Far East and Middle East countries, whereas in the European market products tend to be employed for age spots and freckles. The effectiveness of a standardized antioxidant fraction of *Phyllanthus emblica* fruits as a skin lightener and also as an antioxidant was proven [Chaudhuri, 2004]

SORE EYES

Infusion of the leaves is applied to sore eyes [Drury]. The dried fruit immersed in water in a new earthen vessel a whole night yields a decoction which is used as a collyrium (a medical lotion applied to the eye as eyewash) in ophthalmic. It may be applied cold or warm [Nadkarni & Nadkarni]. In another treatment an infusion of the seeds is also used as a collyrium and applied with

benefit to recent inflammations of the conjunctive and other eye complaints. The exudates collected from incisions made on the fruit are applied externally on inflammation of the eye [Jayaweera]. In Ayurvedic terms it lowers pitta without disrupting the other two doshas and so Amla is frequently used in cataract medicine.



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