Original Article

A Drug Review Of Amalaki (Emblica Officinalis) : A Traditional Indian Drug With Contemporary Applications

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Abstract

Amalaki (Emblica officinalis) (EO), holds a prominent place as a multipurpose medicine in a traditional medical system of India – 'Ayurveda'. Amalaki, commonly known as Phyllanthus emblica or Indian gooseberry, is a member of the Euphorbiaceae family. Amalaki is thought to be the first tree ever made in the universe. Amalaki is a native of India, although it also grows in Pakistan, Uzbekistan, Sri Lanka, South East Asia, China, and Malaysia in tropical and subtropical climates. The fruits of Amalaki are frequently used in Ayurvedic preparations because they boost immunity to illnesses. It plays a positive function in the treatment of degenerative conditions like cancer, diabetes, liver disease, ulcers, anaemia, eye conditions, and heart problems. It is also a key ingredient in hepatoprotective and rejuvenating formulae.
Amalaki has been extensively used in Ayurveda, Unani, and Homoeopathic medicine and has become a cynosure of modern medicine. It is referred to as Amrit Phal and is prominently included in ancient Indian mythological literatures such as the Vedas, Shivpuran, Skandhapuran, Padmapuran, Ramayana, Kadambari, Charak Samhita, Sushrut Samhita, etc. because of its great medicinal and nutritional benefits (life giving fruit). Among anti-aging medications, "Amalaki" holds the top spot. It is the greatest herb for tissue regeneration.
The purpose of this paper is to compile the work of Indian medicine in association with modern research to understand the biological and pharmacological activities and the effects of this herb.

Keywords: Ayurveda, Pharmacology, Pain, Rheumatism, Rejuvenation, Immunity Booster.

INTRODUCTION:

Ayurveda, or Indian medicine, has its own pharmacology and has gathered a number of medications, of which 70% are raw medications found in modern-day pharmacopoeias.
In Ayurveda all food materials and drugs are classified according to their

1. Physical and Chemical properties– Guna
2. Taste - Ras
3. Healing and cooling Properties - Virya
4. Ultimate action after Digestion - Vipaak
5. Specific action - Prabhav

The test plays a significant role in the activity of food ingredients, whereas the particular or dynamic action of drugs determines their effect. Many of the medications employed in Ayurveda are still awaiting investigation and rediscovery, despite the fact that contemporary science has since proved the efficacy of some, such as Punarnava and Sarpagandha.
By critically examining a time-tested Ayurvedic concoction taken from a text book and from traditional usage, modern research on organo-therapy, vitamins, antibiotics, bacteriophages, and other topics may considerably benefit. (R. N. Chopra, S.L. Nayar, I.C. Chopra, 1956).
Among anti-aging medications, "Amalaki" holds the top spot. It is the greatest herb for tissue regeneration. It is a strong plant high in tannin, gallic acid, vitamin C, and antioxidants. Amalaki has important qualities including Rasayana, which is adaptogenic, Ajara, which fights ageing, Ayushprada, which prolongs cell life, and Sandhaniya, which enhances cell migration and binding (Sharma P. , 2009) . It encourages youth, safeguards it, and prolongs it, slowing down the ageing process. The Amalaki fruit contains unique characteristics that make it a nourishing plant that is known to have a lot of health advantages. Fruit is a crucial component of traditional Ayurvedic medicine preparations that support healthy ageing

and wellness (Kangotra Shakshi Et Al, 2017) . Amalaki is one of the most potent and nourishing drugs, as well as one of the best rejuvenating herb (Amalaki Vayasthapnanam Sreshtham) , according to Charaka Samhita.
There are so many researches has done by modern medical sciences still the use of Amalaki according to Ayurvedic text define a lot more area to develop on this herb.

Indian Mythological references:

Amalaki finds a prominent place in ancient Indian mythological literatures like Vedas, Shivpuran, Askandhpuran, Padmapuran, Ramayana, Kadambari, Charak Samhita, Sushrut Samhita, etc (Pravin M Bhat, 2019). It considered as Amrit Phal (life giving fruit). Amalaki possesses key properties like properties like Rasayana (Adaptogenic), Ajara (Anti-ageing), Ayushprada (prolonged cell life), Sandhaniya (Improves cell migration and cell binding) (Sharma P. , 2009).
It is believed that **Lord Vishnu and Goddess Lakshmi** reside in the Amla tree. Amla or Dhatri or Dhatrika means a nourishing mother. The tree is highly revered in India as it is associated with both Lord Vishnu and Lord Siva.
Brihad-dharma Purana mentions the sacredness of Amla. Goddess Parvati and Goddess Lakshmi wanted to worship Lord Shiva and Lord Vishnu in a new form. When both the goddesses cried, their tears fell on earth and thus the Amalaki plant germinated on the earth. Since then the leaves of the tree are considered sacred and are used in the worship of Lord Shiva and Lord Vishnu.
According to Skanda Purana, once when Lord Brahma was meditating, the earth got submerged in water. The Lord was moved to see the earth getting submerged, shed tears which fell on earth. The first drops of his tears germinated into Amla plant. Since Amla was the first plant to germinate on earth, it is known as Adiroha (pre- eminent tree) (Amla , 2014).

Name, Classification and Varieties:

Amalaki is gift of nature to mankind and is known as Amrit-phala in Sanskrit which means “Fruit of Heaven”.

Indian Classification:

Acharya Charaka has described it as ‘Sandhigata Anila’ in Vata-vyadhi.
In ancient Indian classification is based on Dravya or Gana

Name of Sage	Dravya (Gana)
Charak	Kushthagna varga, Kasahara varga, Virecanopaga varga, Jwarahara varga, Vyasthapana varga.
Sushrut	Parushakadi gana, Amalakyadi gana, Triphala
Bhavprakash Nighantu	Haritakyadi Varga (BPN: pp-38-41)

Table : 1 Dravya Classification

Taxonomical Classification:

Modern era the science of Herbs are detailed the ‘Amalaki’ with Biological Name with species and family which is as follows-

Kingdom	Plantae
Division	Angiospermae
Class	Dicotyledonae
Family	Euphorbeaceae
Order	Geraniales
Genus	Emblica
Species	officinalis Geartn
Botanical Name	Emblica officinalis Geartn
Authority	Geartn
Current Name	Emblica officinalis

Table: 2 Taxonomy (Anonymous)

Varieties:

According to Raja Nighantu -Amalaka, Ksudramalaka, Vanya, Gramya Krishna, Amrit, Neelam and Kanchan are cultivate varieties

अन्यच्चामलकं …….. गुणैः। (रा. नि. आमादिवर्ग 160-161)

Common Names : Calling names in various Languages :

Sanskrit	Amalaka, Amritphala, Dhatri
Oriya	Anala
Assamese	Amlaku
Nepali	Amlain
Marathi	Anvaḷa
Punjabi	Aula
English	Indian Goose Berry
Gujarati	Ambala, Bhosa
Hindi, Urdu & Bengali	Amla,
Telugu	Karkchettu
Kannada	Nellikayi
Tamil	Nellikai
Ayurvedic	Amalaki, Aamalaka, Dhaatri, Kaayasthaa, Amoghaa, Amritaphala, Amalaki, Aamalaa, Dhaatriphala, Vayasyaa, Vrshya, Shiva, Hattha.

Table: 3 Various Names (Anonymous)

History of Cultivation:

India, Pakistan, Uzbekistan, Sri Lanka, South East Asia, China, and Malaysia are among the countries with the greatest distribution of Emblica officinalis. The semi-arid areas and plains of northern India are excellent places to find it growing. Rajasthan, Uttar Pradesh, Madhya Pradesh, and Tamil Nadu (C K Kokate, 2005).

Fruits, leaves, and flowers of the Emblica officinalis are accessible from October through April. As a result, it is amassed and conserved in enormous quantities during this season so that it can be used during the remainder of the year.

Natural Habitat:

Amalaki is widely distributed in tropical and subtropical areas and has therapeutic potential against deleterious diseases.

Synonyms : Cicca emblica (L.) Kurz
Diasperus emblica (L.) Kuntze
Dichelactina nodicaulis Hance
Emblica arborea Raf.
Emblica officinalis Gaertn.
Phyllanthus glomeratus Roxb. ex Benth., nom. nud.
Phyllanthus mairei H.Lév.
Phyllanthus mimosifolius Salisb.
Phyllanthus taxifolius D.Don (Kavitha, 2012)

Fig.- 1. Amalaki Tree

Morphology:

Amalaki tree may be a small to medium sized deciduous tree with a mean height of 8-18 m, with thin light grey bark exfoliating in small thin irregular flakes. The common girth of the most stem is 70 cm. the most trunks is split into 2 to 7 scaffolds very with regards to the bottom. Leaves are 10 -13 mm long, 3 mm wide, closely set in pinnate fashion which makes the branches feathery in appearance. Flowers are unisexual, 4 to five mm in length4, pale green in color, borne in leaf axils in clusters of 6 to 10. Fruits are fleshy, almost depressed to globose shape, 2.1-2.4 cm in diameter, 5.3-5.7 g in weight, 4.5-5.0 mL in volume. it's commercially cultivated in state in India. It’s also grown in province, Rajasthan and Madhya Pradesh (Scartezzini P. , 2000)

Amalaki Fruit:

The fruit is fleshy, spherical, light yellow, quite smooth and hard on appearance, with 6 vertical stripes or furrows 4 each containing usually two seeds; seeds are 4-5 mm long and 2-3 mm wide, each weighing 572 to 590 mg4-5. Amalaki fruit size, shape and weight were found to vary among its different varieties. There are compositional differences in numerous styles of Amalaki. generally the typical composition of Amalaki fruits are: moisture 81.2%, protein 0.5%, fat 0.1%, carbohydrates 14.1%, mineral matter 0.7%, fiber 3.4%, Ca 0.05%, K 0.02%, Fe 1.2 mg/100g, vitamin B 0.2 mg/g, phyllemblin, phyllemblic acid, acid, emblicol, quercetin, hydroxymethyl furfural, ellagic acid, pectin, putranjivan A, two new hydrolysable tannins called emblicannin A and B, punigluconin and pendunculagin (S. Ghosal, 1996).

Seeds:

Amalaki seed contains fatty oil, phosphatides and a little quantity of volatile oil in varying amount. The oil yield (16%) has the subsequent physical and chemical properties: definite quantity 12.7, saponification value 185, acetyl value 2.03, iodine value 139.5, unsaponifiable matter 3.81%, sterol 2.70%, saturated fatty acids 7%, omega-6 fatty acid (8.78%), linolic acid (44.0%), monounsaturated fatty acid (28.40%), octadecanoic acid (2.15%), hexadecanoic acid (2.99%) and

tetradecanoic acid (0.95%)5. The seed oil is rich in unsaturated fatty acids like polyunsaturated fatty acid (18:2n-6) and monounsaturated fatty acid (A. Arora, 2011).

Leaves:

Amalaki leaves are sub sessile, closely set along the branchlets, distichous, narrowly linear, obtuse, having appearance of pinnate leaves. It contains acid, Ellagic acid, Chebulic acid, Chebulagic acid, Chebulinic acid, a Gallotannins called Amlic acid, Alkaloids, Phyllatidine and Phyllantine (P. Khanna, 1975)[10]. Amalaki bark contains Leucodelphinidin, Procyanidine, tannin, 3-0 gallated prodelphinidine, ellagesic acid. Amalaki root contains Lupeol, Oleanolic aldehyde, ellagesic acid, o-acety oleanolic acid. but that it also contains Carotene, B complex, Ribo flavine, D-glucose, D-Fructose, Myoinositol, etc.

Flowers:

It is Greenish-yellow, in axillary fascicles on the leaf bearing branchlets, often on the naked portion below the leaves.
Male flower: Numerous, on short slender pedicels, oblong, obtuse, 6 sepals, 3 anthers on a short central column.
Female flower: Few in numbers, 3 celled ovary, subsessile**.**

Fig.- 2. Amalaki Fruits

Fig.- 3: a)-Bark, b)-Flowers, c)-Fruits, d)-Seeds, e)-Leaves-of Emblica-Officinalis

Industry	Application
Beverage industry	Health drinks, fruit juice, syrup and mocktails.
Pharmaceutical Industry	Amla pulp or amla puree is used in the pharmaceutical industry to treat insomnia, anaemia, bronchitis and asthma disorders
Food industry	Candy, Pickle, sweets, amla powder, chutneys, and other culinary items.
Dietary supplements	Amla is used as a supplementary diet for
Cosmetic Industry	Amla puree is used in the cosmetic industry to produce skin and hair care products

Table : 4 Industrial Application of Amala palp
(AMLA, VARIETIES, PRODUCTION AND SEASON IN INDIA, 2022)

Chemical constituents:

Emblica officinalis primarily contains tannins, alkaloids, phenolic, amino acids and carbohydrates. Its fruit juice contains the highest amount of vitamin C (478.56 mg/100 mL). Compounds isolated fromEmblica officinalis were galic acid, ellagic acid, 1-O galloyl-beta-D-glucose, 3, 6-di-Ogalloyl- Dglucose, chebulinic acid, quercetin, chebulagic acid, corilagin, 1, 6- di-O -galloyl beta D glucose, 3 Ethylgallic acid (3 ethoxy 4, 5 dihydroxy benzoic acid) and isostrictiniin. (G V Satyavati, 1976).

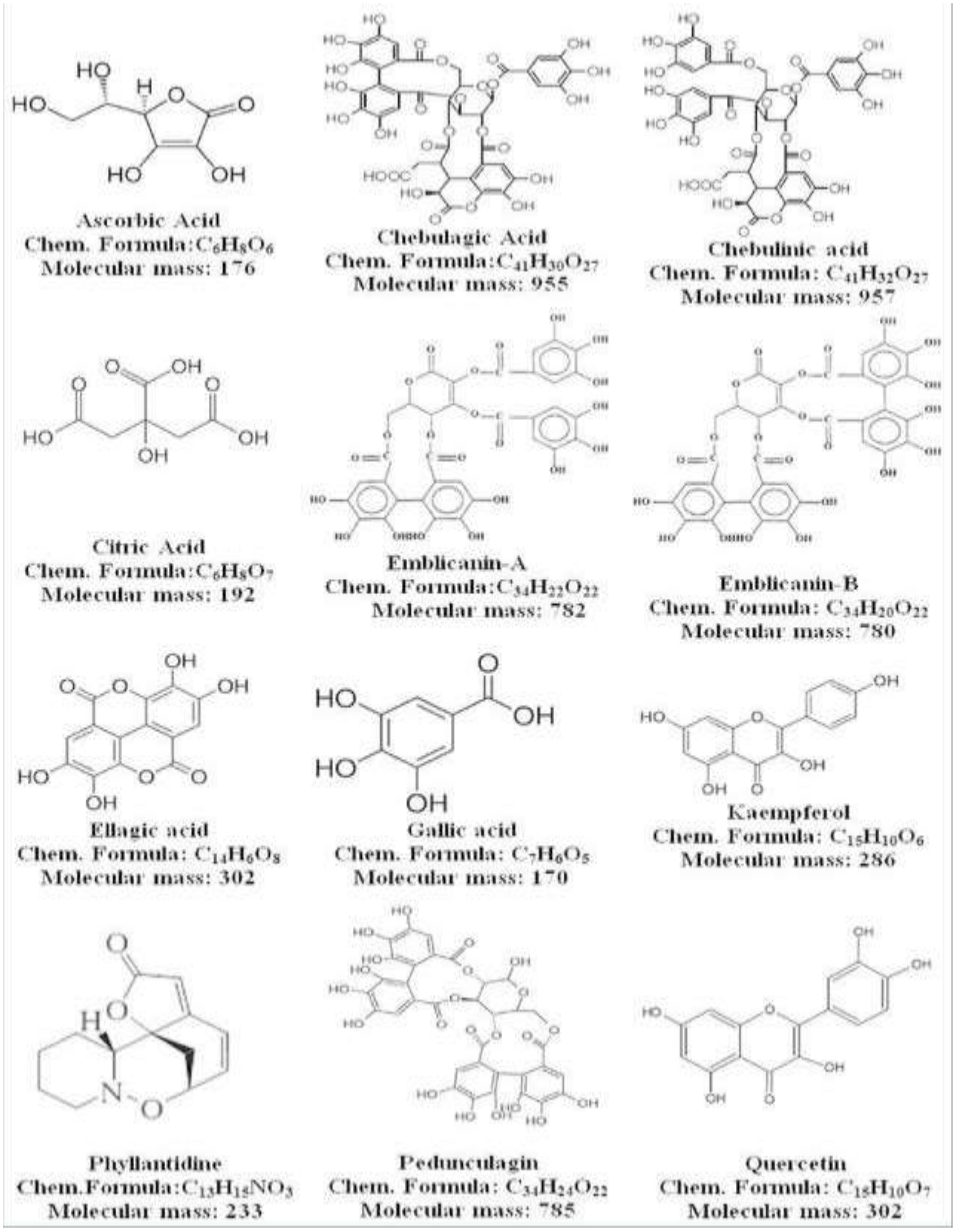

Fig.- 4: Active principles present in E. officinalis

Microscopy of fruit powder of Amalaki:

Coarse powder of Amalaki fruit is grayish white, dark brownish or black in colour. In microscopic powder study it shows lignified tissues of brown in colour. Aleurone grains of green to brown colour, and prismatic crystals of silica of brown colour are seen (Quality standards of Indian Medicinal Plants, 2010)

S. No.	Reagents	Observations	Characteristics
1.	Phloroglucinol + Conc. Hcl	Pink	Lignified Vessels
2.	Dil. Sulpuric Acid	White	Calcium oxalate crystals
3.	Alcoholic Picric Acid	Yellow	Starch grains
4.	Sudan Red III	Red	Oil globules and cuticles

Table : 5 Microscopical Characteristics of Powdered Amalaki Fruit

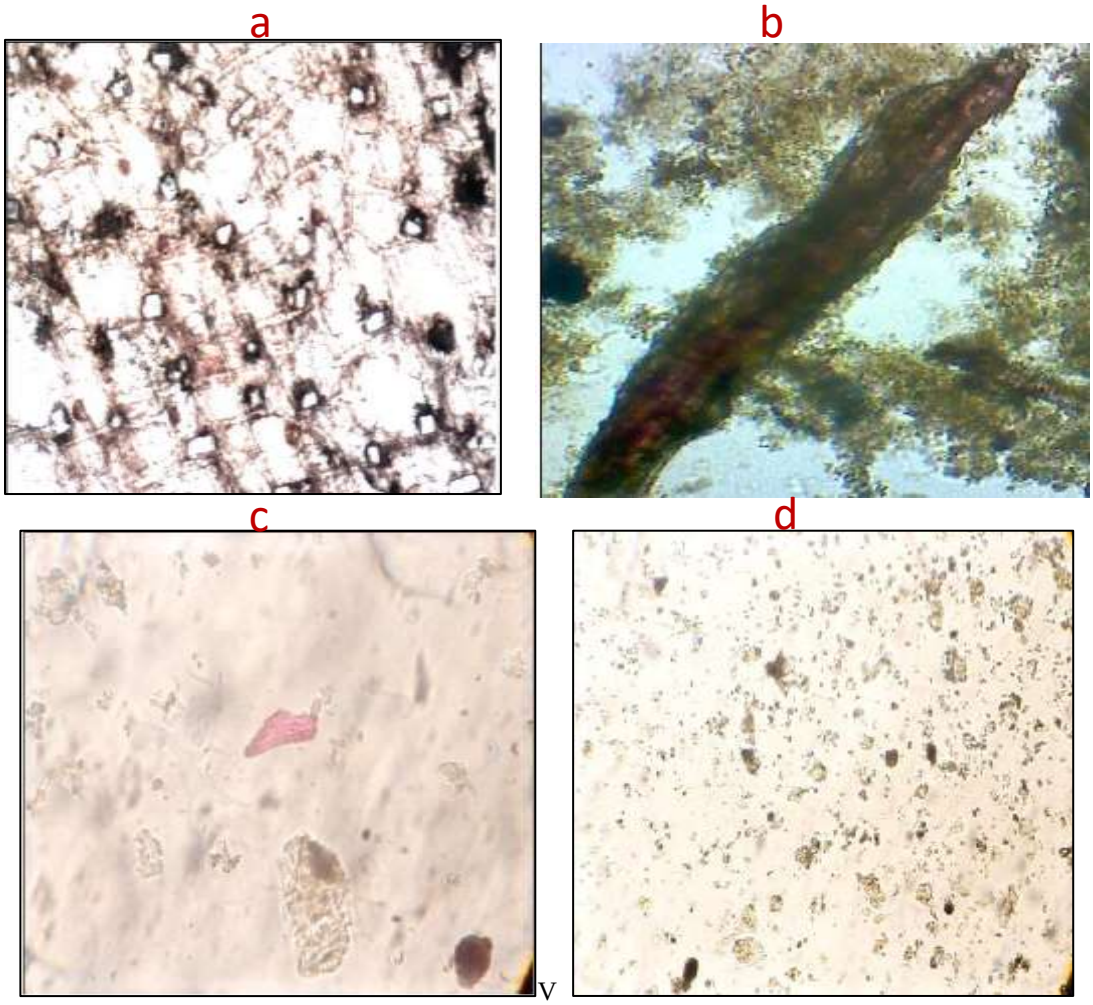

Fig.- 5: a) Lignified, b)Prismatic Crystal, c) Aleurone Grain, d) Cuticles E. officinalis

S. No	Components	Percentage
1.	Moisture	81.2%
2.	Protein	0.5%
3.	Fat	0.1%
4.	Mineral matter	0.7%
5.	Fibre	3.4%
6.	Carbohydrate	14.1%
7.	Calcium	0.05%
8.	Phosphorous	0.02%
9.	Iron	1,2mg/100gm
10.	Nicotinic acid	0.2mg/100gm
11.	Vitamin C	600 mg/100 gm

Table: 5 Average percentage composition of the fruit pulp of Emblica officinalis

Properties of Amalaki and Uses on the basis of Ayurvedic Text-

Rasa	Amlapradhan lavana varjita pancharasa
Guna	Ruksha, Laghu, Sara
Vipak	Madhura
Virya	Shita

Table: 6 Rasa Panchaka

Dosa-Karma (action on deferent abnormalities)- It is Tridoshahara (Vaat, Pitt, Kapha) Specially Pitta Shamak but having five properties Amla & Kasay Rasa, Shita Virya and Madhur Vipak with Ruksha Guna -
Amla Rasa – Vatahara
Madhur Vipak and Shita Virya – Pittahara
Ruksha Guna and Kasay Rasa – Kaphahara

Karma as per Ayurvedic Text (Action):- Rasayana, Pramehaghna, Jwarhara (fewer remover), Chardighna (cure of Vomiting), Kusthaghana, Caksusya, Dahahara, Medohara, Bhaghna, Shophaghna, Keshya, Sandhanakara, Dahaprashamana etc. (Sharma P. V., 1995) (Dr. Prakash L. Hegde, 2019)

Therapeutic indications : As given in ancient Text, as a Rasayana, Prameha, Jwara, Raktapitta, Panduroga, Kamala, Shukra dourbalya, Daha, Chardi, Bhagna, Shopha, Kesha vikara.

हरीतकी समं …… निर्दिशेत (भा.प्र. हरीतक्यादि वर्ग 39-41)

तद्वद् धात्री…….. वृष्यामामलकीफलम् (कै.नि. औषधिवर्ग 238-240)

Therapeutic Administration (Amayika Prayog)-

1. Prameha (Diabetes)- Fresh Amalaki juice will manage diabetes when taken every day with Harida (Curcuma longa).

……हरिद्रां पिबेद्रसेनामलकी फलानाम्। (च. चि. 6/26)

2. Jwara (Fever) – Amalaki fruit juice fried with Ghee is very effective in Jwara.

रसमामलकानां ……ज्वारापहम्। (च. चि. 3/230)

3. Panduroga (Anaemia)- Amalaki churna(Powder) is very effective in Panduroga when taken with Honey.

धात्रीफलं वा मधुना वलिहयात्। (सु. उ. 44/27)

4. Kamala (Jaundice) – Juice of Amalaki with Grapes may be used in Kamala.

कामला…… आमलकी रसः। (च चि. 16/114)

5. Raktapitta (Bleeding Disorder) - Virechaka (Purgative) is very useful in Raktapitta, which made by more quantity of Madhu (honey) and Sharkara (Sugar) mixed with Amalaki churna.

आमलकानि वा। …… विशेषतः। (च चि. 4/57-58)

6. Hikka (Hiccough) – Juice of Kapitha and Amalaki mixed with Pippali powder and Honey controls Hikka

पिप्पलीमधुयुक्तो …… धात्रीकपित्थयोः। (च. चि. 17/135)

7. Vatarakta (Gouty- Arthritis) – Decoction (Kasaya) of Amalaki and Harida is very result oriented in Vatarakta.

आमलक…… पयायेत्। (सु.चि. 5/10)

8. Kasa (Cough) – Cough can be cure easily when Milk boiled Amalaki churna taken with Ghee.

चूर्णं …… हिताशी (अ.ह.चि. 3/78)

Systemic Administration – Different Application and Uses as per Ayurvedic Text -

External Uses- Apply Paste of Amalaki on externally affected parts in burning, urticaria, Headache and in diuresis . It's Juice is applied in Eye diseases. It is used to rinse Head and Hair in alopecia.

Nervous System - we can use it for Cerebral Palsy (मस्तिष्क दौर्बल्य). It can be given for sensory weakness specially for weakening of Eyesight (दृष्टि मांद्य).

Digestive system – It is used in indigestion (अग्निमांद्य), Acidity (अम्लपित्त), Colic (परिणाम शूल), constipation, abdominal disorder, Jaundice (कामला), Hemorrhoids (अर्श), disorder of Liver.

चर्विता वर्धयस्यग्निः पेषिता मलशोधनी।

स्विन्ना संग्रहिणी पथ्या मृष्टा प्रोक्ता त्रिदोशनुत्। (भा प्र ह. वर्ग… 30)

Circulatory system - It can be used in Blood biliary disease (रक्तपित्त), heart failure (हृदौर्बल्य) and blood disorders.

Respiratory System - It can be used in common Cough (कास), hiccup and breathing disorder (श्वास), Tuberculosis (यक्ष्मा) etc.

Reproductive System - It can be used for Spermatorrhea (शुक्रमेह), Blennenteria (श्वेतप्रदर), uterine hemorrhage or histeroma (गर्भाशयदौर्बल्य).

Urinary system - In diuresis (मूत्रकृच्छ्र), urinary incontinence (मूत्राघात), gonorrhea (प्रमेह) etc. fresh juice of Amalaki is very effective.

Skin Disorders – It is effective in leprosy (कुष्ठ), Erysipelas or Anthony's fire (विसर्प) and various skin disorders.

Assimilation – It is used for Infirmity (दौर्बल्य), Inflammation (शोथ) and exhaustion (क्षय).

Along with above it can also be used in typhoid fever (विषमज्वर), chronic fever (जीर्णज्वर), excessive thirst (तृष्णा) and Burning sensation (दाह).

Utilization and form – According to Ayurveda Amalaki has deferent action with deferent way of utilization on body as under

S.N.	Prayog (Utilization)	Phalbheda (Action)
1	Chewing	Increases Immunity
2	Powder	Malshodhak (Purifies Feces)
3	Swinn (Boiled)	Remove indigestion and constipation
4	Juice	Anti-aging and Blood Purification
5	Pashchat Bhojan	Improves digestion and prevents acidity
6	Special combination	Chyavanprash, Dhatrilauh, Dhatri-Rasayan, Bahyarasayan

Table: 7 Prayog : Phalbheda (Balakrishan, 2020)**,** (Sharma P. , 2009)

Formulation (योग):- deferent forms of 'Amalaki' can be used in deferent Problems

S.N.	Formulation	Indication
1	Amalaki Kasaya	Pitta gulama (gallstone)
2	Amalaki Rasayan	Varnya, Buddhivardhak (Increase Intelligence)
3	Amalakyavaleha	Pandu (Anemia), Kamala (Jaundice)
4	Amalakyadi Quath	Sarvajvara (Fever), Kapha Vikara
5	Bhringmalakadi Taila	Keshavikara (Hair disorder), Netra roga (Eye Disease)
6	Triphala Ghrata	Timira, Netraroga (Eye Disease)
7	Triphala Quath	Jwara (Fever), Kasa (Cough)
8	Dhatryarista	Pandu, Kamala, Hridroga (Heart diseases)

Table: 8 Formulations (Dr. Prakash L. Hegde, 2019)

Biological and Pharmacological activities of 'Amalaki' (Emblica officinalis) on the basis of Modern Researches:-

Antipyretic, Analgesic and Anti-inflammatory Activities:

Extracts from the leaves and fruits of Amalaki (Emblica officinalis) have powerful anti-pyretic, analgesic, and anti-inflammatory properties (R. Mythilypriya, 2007); (M. Gupta, 2013) (M.Z. Asmawi, 1993); (A. Ihantola-Vormisto, 199). Its aqueous extract significantly reduced the rats' brewer's yeast-induced hyperthermia. In the analgesic test, both of these extracts produced a noticeable inhibitory impact on the acetic acid-induced writhing response in mice (J.B. Perianayagam, 2004). It has also been reported for the antimicrobial activities (Srikumar, 2007). The plant have been reported to possess potent antibacterial activity against *Escherichia coli, K. ozaenae, Klebsiella pneumoniae, Proteus mirabilis, Pseudomonas aeruginosa, S. paratyphi* A, *S. paratyphi* B and *Serratiamarcescens* (S. Saeed, 2007). It has been demonstrated that substances with antipyretic effects include tannins, alkaloids, phenolic compounds, amino acids, and carbohydrates.

Immunomodulatory Activities

Amalaki (*Emblica officinalis*) has the ability to activate the immune system, which is a powerful and protective defence against newly emerging infectious diseases. The immune-modulatory actions of Triphala on Albino rats were evaluated in order to demonstrate this feature of Emblica officinalis. When taken orally, triphala appears to enhance neutrophil activity in vaccinated rats, and it considerably lessens the effects of stress-induced inhibition of neutrophil activity. (A. Bhattacharya, 2000). Amalaki has mild cytoprotective and immunostimulant properties. However, Amalaki churna must be triturated with Amalaki Swaras (M. Sai Ram, 2002). Another ayurvedic polyherbal formulation Immu-21, containing extracts of an *Emblica officinalis*, *Ocimum sanctum*, *Withania somnifera* and *Tinospora cordifolia* showed immunomodulatory response in mice. Pretreatment with Immu-21 selectively elevated the proliferation of splenic leukocyte to B cell mitogen, LPS and cytotoxic activity against K 562 cells in mice (Nemmani, 2002).

Antioxidant

Vitamin C and low molecular weight hydrolysable tannins are abundant in amalaki fruit. Amalaki becomes a good source of antioxidants as a result of these contents. Punigluconin, pedunculagin, embelicanin-A, and emblicanin-b, together with other tannins, protect rat peripheral blood erythrocytes from oxygen radical-induced hematolysis(S. Ghosal V. T., 1996). The effectiveness of Amalaki (Emblica officinalis) in preventing cold stress-related changes in behavioral and biochemical abnormalities has been investigated. Triphala considerably reduced the behavioral and biochemical abnormalities brought on by cold stress in albino rats when given orally for 48 days at a dose of 1g/kg/animal body weight. Triphala supplementation can therefore be thought of as a stress-reduction medication (El-Desouky, 2008); (Scartezzini P. F., 2006). The research revealed that Amalaki preparations have significant concentrations of the enzyme superoxide dimutase (SOD), which is a free radical scavenger in the experimental subjects (Treadway, 1994). *Emblica officinalis* (Eo) reduced UV-induced erythema and showed free-radical quenching ability, chelating ability to iron and copper as well as MMP-1 and MMP-3 inhibitory activity (R.K. Chaudhuri, 2003).

Anticancer

Emblica officinalis is a wonder berry known for the treatment and prevention of cancer (Rajarama, 1964); (K.J. Jeena, 2001); (C. Wiart, 2013). Different forms of cancer, including those of the stomach, uterus, breast, pancreas, liver, and malignant ascites, are prevented from growing and spreading by Amalaki. Additionally, it lessens the negative effects brought on by radiotherapy and chemotherapy, which are typically used to treat cancer. Additionally, Amalaki has immune booster and anticancer properties (X. Liu, 2012). Swiss albino mice were used to test the plant's fruit extract for skin carcinogenesis. Swiss albino mice exposed to 7, 12-dimethylbenz (a) anthracene (DMBA) developed skin tumors, while fruit extract from Emblica officinalis showed chemo preventive ability (Drury, 1873). One of the most typical cancers in women is breast cancer. Lipoproteins, lipids, and lipid-metabolizing enzymes have all been linked to an increased risk of breast cancer. Kalpa-amruthaa (KA) is a modified Siddha preparation containing EO, Semecarpus anacardium (SA) and honey. The elevated levels of free cholesterol, total cholesterol, triglycerides, phospholipids and free fatty acids and decreased levels of ester cholesterol in plasma, kidney and liver found in cancer suffering animals were reverted back to near normal levels on treatment with KA and SA (K. Veena, 2006). Growth inhibitory activity of *Emblica officinalis* was primarily manifested through induction of apoptotic cell death and through inhibition of AP-1 further accompanied by suppression of viral transcription resulted in growth inhibition of cervical cancer cells (Mahata, 2013).

Anti-ageing

Amalaki is one of the strongest antioxidant herbs in Ayurveda because it contains low molecular weight hydrolysable tannins (Emblicanin A and B), which slow down the ageing process. enhanced with emmalicanin-A and -B fraction from the fruit's fresh juice. We naturally produce free radicals as byproducts of our own metabolism. Amalaki's high concentration of vitamin C and flavonoids prevents harmful free radicals that accelerate cell ageing in addition to enhancing nutrition. Superoxide dismutase, catalase, and other free radical-scavenging enzyme concentrations are increased in frontal cortical and striatal (rat brain) tissues, while lipid peroxidation is concurrently decreased (S. Ghosal, 1996).

Anti-diabetic

The high amount of vitamin C content in the fruit of Amalaki reduces the sugar level in blood. It stimulates the islets of Langerhans i.e. the isolated group of cells which secrete hormone insulin (Sampath, 2012). In trials using single and multiple dosages, Emblica officinalis reduced blood glucose levels in diabetic-inducing rat models. In rats fed Emblica, serum albumin rose and serum creatinine decreased within 20 days. Supplemental Emblica decreased neuropathic pain in rats with induced diabetes through an anti-oxidative mechanism, while in vitro investigations also point to alpha amylase and glucisidase inhibition as potential causes (D'Souza, 2014). Oral treatment of the extracts (100 mg/kg body weight) lowered the blood sugar level in normal and in alloxan (120 mg/kg) diabetic rats significantly within 4 hours. Rats that receive Emblica officinalis (EO) and a concentrated portion of its tannoids experience a delay in the onset of diabetic cataract (P. Suryanarayan, 2007). A cataract is one of the secondary consequences of diabetes that is influenced by Aldose Reductase (AR). It has been demonstrated that EO is a key AR inhibitor. Investigating the therapeutic potential of natural components that individuals can use on a daily basis could be a successful strategy for the management of diabetes problems (P. Suryanarayana, 2004). In a different study, rats that had been made diabetic by the drug alloxan were given an extract of the amla fruit in water. Due to a correction of the activity of the liver-specific enzyme alanine transaminase, blood sugar, triglyceride, and liver function levels were all reduced (Qureshi, 2009).

Hepato-protective

Amalaki has been proved in protection against a wide variety of hepatotoxic agents, such as heavy metals ethanol, paracetamol, carbon tetrachloride, ochratoxins, hexachlorocyclohexane and antitubercular drugs. Amalaki and its contents like phytochemicals, gallic acid, ellagic acid, quercetin and corillagin, possess hepatoprotective effects against various xenobiotic compounds (K Thilakchand, 2013). The possible mechanism of *Emblica officinalis* for hepato-protective activity is in decreasing glutathione depletion and preventing stimulation of cytochrome P450. Since quercetin alone was more effective than the *Emblica officinalis* extract, it is thought to be the active principle. Toxic effects induced by lead nitrate and aluminum sulphate were also counteracted by the administration of *Emblica officinalis* extract and ascorbic acid in albino rats. It is also reported that *Emblica officinalis* has strong hepatoprotective effect against carbon tetrachloride-induced hepatic damage (R.K. Gulati, 1995), (Lee CY, 2006).

Cytoprotective, Antitussive, Gastroprotective Activities:

Amalaki (*Emblica officinalis*) *has been mentioned by Acharya Charaka* as *Kasaghana*. (Pt. Kashinatha Shastri, 2011) Its antitussive activity *has been seen* in conscious cats by mechanical stimulation of the laryngo-pharyngeal and trachea-bronchial mucous areas of airways. Its Antitussive activity was more effective than the non-narcotic antitussive agent dropropizine but less effective than shown by the classical narcotic antitussive drug codeine. The dry extract of *Emblica officinalis* exhibits the antitussive activity not only due to Anti-phlogistic, Ant-spasmolytic and Anti-oxidant efficacy effects, but also to its effect on mucus secretion in the airways (S. Kaur, 2002). *Emblica officinalis*has been reported for its Cytoprotective and Immune modulating properties against chromium (VI) induced oxidative damage. It inhibited chromium induced Immuno suppression and restored gamma-IFN production by macrophages and phagocytosis (R.M. Sai, 2003). *Emblica officinalis*has has been reported for its cytoprotective and immune modulating properties against chromium (VI) induced oxidative damage. It inhibited chromium induced immune suppression and restored gamma-IFN production by macrophages and phagocytosis (R.M. Sai, 2003) [16]. The therapeutic efficacy of amla in case of dyspepsia was evaluated with promising results in human subjects (Y.K. Chawla, 1982), (Singh, 1971). Only cases of hyperchloridia with burning sensation in abdominal and cardiac regions and epigastric pain were benefited (Singh, 1971)(Singh and Sharma, 1971). The fresh juice of Amla is given as tonic, diuretic and anti-bilious remedy. It is also helpful in burning sensation, over thirst, dyspepsia and other complaints of digestive system.

Anti-Ulcer and Wound Healing

Amalaki (*Emblica officinalis*) has significant ulcer protective property and ulcer healing effect due to its offensive and defensive mucosal factors A study has been done by its methanolic extract against ulcer (Scartezzini P. , 2000). Amalaki (*Emblica officinalis*) (ethanolic extract) was investigated for its Anti-secretory and antiulcer activities using various experimental models in rats, including pylorus ligation Shay rats, Indomethacin, Hypothermic restraint stress induced gastric ulcer and necrotizing agents. It was then reported that *Emblica officinalis* extract exhibit Antisecretory, Cytoprotective and Antiulcer properties (R.M. Sai, 2003). Methanolic extract of E. officinalis, showed dose dependant ulcer protection; it significantly reduced the offense factor (acid, pepsin) and increased the defensive factors (mucin secretion, cellular mucous) (S K Bandyopadhyay, 2000). A herbomineral formulation of the Ayurveda medicine named

Pepticare, composed of *Emblica officinalis*, *Glycyrrhiza glabra* and *Tinospora cordifolia* was tested for its anti-ulcer and anti-oxidant activity in rats. Reports were made that Pepticare exhibit anti-ulcer activity, which can be attributed to its anti-oxidant property (P.A. Bafna, 2005). *E. officinalis* fruit extract promoted NO production, endothelial wound closure, endothelial sprouting, and VEGF mRNA expression. Therefore, it also proves useful in endothelial function and restoring wound healing competency (L. Chularojmontri, 2013).

Cardio-protective, Cholesterol and Dyslipidemia

The fresh juice of Amalaki (*Emblica officinalis*) fruit which is rich in Embalicanin-A and –B is helpful to prevent the ischemia-reperfusion-induced oxidative stress in rat heart. The fruits are having cardioprotective effect. *Emblica officinalis* reduces oxidative stress and prevents development and progression of hypertension. It modulate levels of serum NO, activated eNOS, endogenous antioxidants, and electrolytes. Studies by Yokozawa et al. indicate that Amalaki may attenuate oxidative stress and may prevent hyperlipidemia associated with ageing (T. Yokozawa, 2007). Cu2+induced LDL oxidation and cholesterol fed rats were used to investigate the effects of *Emblica officinalis* on low-density lipoprotein (LDL) oxidation and cholesterol levels in vitro *and* in vivo. It was concluded that *Emblica officinalis* may be effective for hyper-cholesterolemia and prevention of Atherosclerosis (Jeevangisantoshkumar, 2012). The *E. officinalis* showed cardioprotective effect against isoproterenol (ISP)- induced cardiotoxicity in rats, in this study the pretreatment with Amalaki (*Emblica officinalis*) exhibited restoration of hemodynamic and left ventricular function along with significant preservation of antioxidants, myocytes-injury-specific marker enzymes and significant inhibition of lipid peroxidation the protection was attributed to its potent antioxidant and free radical scavenging activity which was evidenced by favorable improvement in hemodynamic, contractile function and tissue antioxidant status (S. Ojha, 2012). The effects of chronic oral administration of fresh fruit homogenate of Amalaki on myocardial antioxidant system and oxidative stress induced by ischemic-reperfusion injury (IRI) were investigated on heart in rats. Chronic *Emblica officinalis* administration produces myocardial adaptation by augmenting endogenous antioxidants and protects rat hearts from oxidative stress associated with IRI (Sancheti, 2005).

Eye diseases:

Amalaki is called as Chakshyushya according to Ayurveda. It is effective in the treatment of conjunctivitis, glaucoma, diabetic eye diseases like Retinopathy,etc. It reduces intraocular pressure by virtue of its purgative action. Amalaki is beneficial in patients laid low with numerous ophthalmic disorders specifically, rubor (inflammatory conditions), mucosa xerosis (dry eye), chronic conditions (pterygium or pinguecula) and surgical cataract patients, Age connected devolution like ARMD, other retinal degenerative diseases, etc (Head, 2001). It exhibits a beneficial role in a number of inflammatory, infective and degenerative ophthalmic (N.R. Biswas, 2001).

Memory Enhancing activity:

Emblica officinalis churn has proved to be a useful remedy for memory improvement of young and aged and in the management of Alzheimer's disease and reversed the amnesia induced by scopolamine and diazepam due to its multifarious beneficial effects such as memory improvement and reversal of memory deficits (Nosál'ová, 2003). Amla churna produced a dose-dependent improvement in memory of young and aged rats. It reversed the amnesia induced by scopolamine and diazepam. Amlachurna may prove to be a useful remedy for the management of Alzheimer's disease due to its multifarious beneficial effects such as memory improvement and reversal of memory deficits (D.M.A. Jayaweera, 1980).

Anti-Snake Venom Activity:

Amalaki (*Emblica officinalis*) and Nirgundi (*Vitex negundo)* were explored for the first time for anti-snake venom activity. Najakaouthia and Viperarussellii venom was antagonized by the plant extracts significantly both in vivo and in vitro studies. V. russellii venom-induced coagulant, hemorrhage defibrinogenating and inflammatory activities were significantly neutralized by both plant extracts. No precipitating bands were formed between the snake venom and plant extract which confirmed that the plant extracts possess potent snake venom neutralizing capacity and need further investigation (M.I. Alam, 2003).

Anti-Arthritis Action-

Osteoarthritis (OA) is a serious, degenerative disease. *Emblica officinalis* fruits have been reported as chondro-protective agent in osteoarthritis therapy (Sumantran, 2008). The ayurvedic formulations (extracts of *Tinospora cordifolia, Zingiber officinale, Emblica officinalis*) were equivalent to glucosamine and celecoxib (Chopra, 2013)(Chopra *et al.,* 2013). There is preliminary evidence *in vitro* that its extracts induce apoptosis and modify gene expression in osteoclasts involved in rheumatoid arthritis and osteoporosis (Penolazzi, 2008)(Penolazzi *et al.,* 2008).

Neuro-protective Activity:

Amalaki causes reduction of iNOS and COX-2 expression levels by inhibiting NF-κB activation thus reduction of elevated expression level of Bax occurs which is a proapoptotic protein (M. Sankaran, 2013). Pretreatment with hydro- alcoholic extract of Amalaki (*Emblica officinalis*) fruit (500 and 700 mg/kg) significantly ($P<0.001$) increased the latency of seizures as compared with the vehicle-treated group. It also significantly prevented the increase in thio-barbituric acid-reactive substances levels and ameliorated the fall in glutathione. Furthermore, *Amalaki* dose dependently attenuated the Kainic

acid-induced increase in the TNF-α level in the brain and significantly improved the cognitive deficit, as evidenced by increased latency in passive avoidance task (M Golechha, 2011).

Respiratory Diseases

Amalaki (*Emblica officinalis*) is especially valuable in tuberculosis of the lungs asthma and bronchitis. Pulmonary antioxidant defenses are widely distributed in lungs and include both enzymatic and non-enzymatic systems. The primary non enzymatic antioxidants are membrane bound vitamin C and Vitamin E. Amalaki is the richest source of flavonoids and vitamin C. As an antioxidant, it is very effective in inhibiting lipid peroxidation by scavenging reactive species and free radicals, thus preventing tissue damage. Dietary supplement with amla protects against *K. pneumoniae* mediated respiratory tract infection by keeping a check on the induction of proinflammatory cytokine like TNF-a (A. Saini, 2008). It has also shown hypotensive effect and also a synergistic cholinergic and synergistic histaminergic effect on MABP, HR and RR of anaesthetized male dogs (Geer, 2005). In Turkey, the fresh fruit is used for inflammations of the lungs. The juice or extract of the fruit is mixed with honey and pipit 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 (D.M.A. Jayaweera, 1980).

CONCLUSION -

Amalaki (Emblica officinalis) is highly regarded Ayurvedic medicine. It is one of the most versatile plants having a wide spectrum of medicinal activities. Amalaki is one of the oldest known medicinal plants given in Indian philosophical context. This versatile medicinal plant is the unique source of various types of compounds having diverse chemical structure. There is some medicinal uses given in the Ancient Text of Indian Medicine but very little work has been done on the commendable medicinal applications of these compounds and hence extensive investigation is needed to exploit their therapeutic utility to combat diseases. The use of Amalaki for its functional and pharmacological qualities has been the main subject of this essay. Amalaki is described as an Ayurvedic Rasayana medication with a regenerative effect on body tissues. One of the three fruits used to make Triphala is Amalaki, which is also the principal component of the Rasayan remedy Chyavanprash. The highest source of vitamin C is found in Amalaki. Amalaki enhances normal digestion, metabolism, and excretion. It has anti-inflammatory qualities and nourishes the tissues and organs of the body. Amalaki fruit is restorative and immune-boosting for the respiratory and cardiovascular systems. Amalaki is a natural antioxidant that supports the growth of skin, hair, nails, and nails as well as healthy eyes. It Evens Out Jatharagni (digestive fire). Amalaki increases Ojas (physical vigor, energy, strength, and capacity) to support a strong immunological response. Vata, Pitta, and Kapha are all calmed by Amalaki (*Emblica officinalis*), but Pitta is the one it specifically calms. Amalaki (*Emblica officinalis*) also promotes the growth of Ojas, the essence of youth and immunity, which rejuvenates all of the body's tissues. Generally speaking, Amalaki (*Emblica officinalis*) is a potent herb with therapeutic benefits for numerous bodily systems. It is well known to support bodily wellness, vitality, and reproductive health. More explanation is required for some properties, such as Chakshyushya property, in terms of eye diseases. Many ancient Acharyas referred to Amalaki as Chakshyushya (good for the eyes). A drug development program should be undertaken to develop Ayurvedic Drugs as well modern drugs with the compounds isolated from Amalaki (*Emblica officinalis*). Although various Ayurvedic Medicine on the formula given in ancient text have been using by Ayurvedic Practitioner as well as crude extracts from fruit part of Amalaki (*Emblica officinalis*) have medicinal applications from time immemorial, modern drugs can be developed after extensive investigation of its bioactivity, mechanism of action, pharmaco-therapeutics, toxicity and after proper standardization and clinical trials. As the global scenario is now changing towards the use of nontoxic plant products having traditional medicinal use, development of various Ayurvedic drugs and development of modern drugs from Amalaki (Emblica officinalis) should be emphasized for the control of various diseases.

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