iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** XII **Month of publication:** December 2024

DOI: https://doi.org/10.22214/ijraset.2024.66197

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue XII Dec 2024- Available at www.ijraset.com

Phyllanthus Emblica: The Phytochemistry, Pharmacological Activity and Therapeutic Application of Amla

Anshuman Bajpai[1], Jahnvi Shukla[2], Himanshu Singh[3], Anshu Kumar Dwivedi[4], Amit Shukla[5], Ashutosh Verma[6], Vaibhav Shukla[7], Vikas Dwivedi[8]
[1, 3, 4, 5, 6, 7, 8]*Babu Sunder Singh College of Pharmacy Nigohan Lucknow*
[2]*R.K. College of Pharmacy Naini Prayagraj*

Abstract: ***PhyllanthusEmblica, Indian Gooseberry and in Sanskrit we all known as "AMALAKI", is a small to medium sized deciduous tree. It belongs to the Family Phyllanthus. Amalaki is the one of the most beneficial components in Ayurveda, Unani, Siddha and Chinese Medicine System. Amalaki is a type of notable fruit due to it's high level of Vit-C. According to "CHARAK SAMHITA" amalaki is used to treat a lot of disease we also called it 'AMRIT PHALA' which mean 'Fruit Of Heaven'. Tridosha and Panchbhuta both are the principle of oldest medicine system in world AYURVEDA , and AMLA is well mentioned in Ayurveda for it's traditional uses and theurepeutic applications. So in this review Article we concern the phytochemistry, pharmacololgical activity and therapeutic application of Amla. The different chemical constituents found in Amalki are showing fallowing activities- Antioxidant, Antitussive, Anti-inflammatory, Antiviral, Antiulcer, Anticancer, Antimicrobial, Anti-diabetic,Cardioprotectivce, Hypolipidemicetc.***

Keywords: Phyllanthus Emblica, Phytochemistry, Pharmacological activity

I. INTRODUCTION

Fruits of Amla tree are used in Aayurvedic preparations. Amla fruit is praised as DHATRI (goddess of health) in ayurveda. This tree is a medium-sized deciduous plant that typically grows up to 8-18 meters in height. It has a spreading crown with thin branches and greenish-grey bark. The leaves are simple, oblong, and clustered in small groups. The flowers are greenish-yellow and inconspicuous, while the fruit is a round, light green berry-like structure with a smooth surface and a sour taste. The fruit of the Amla tree is the part that is commonly used for its nutritional and medicinal benefits. [1]

II. MORPHOLOGY OF AN AMLA TREE

1) Leaves: Amla trees have clusters of small, rectangular, light-green leaves along their branches. The leaves have a basic, smooth, and glossy appearance.
2) Flowers: Small, greenish-yellow blooms, either single or in clusters, are produced by the Amla tree. The flowers are not particularly showy and have five petals.
3) Fruits: The spherical, greenish-yellow fruit of the Amla tree, roughly the size of a tiny apple, is its most distinctive feature. The fruit tastes sour and has a silky texture.
4) Bark: The Amla tree's bark is hard and ranges in color from light brown to gray. It frequently peels and cracks.
5) Branches: The Amla tree has a spreading canopy and thin, drooping limbs.
6) Roots: The roots of the Amla tree are shallow and spreading, allowing the tree to absorb nutrients from a wide area.

Overall, the Amla tree is a medium-sized tree with a spreading canopy and small, sour fruits that are highly valued for their medicinal and culinary properties.

Emblica officinalis, commonly known as Indian gooseberry or Amla, is a small to medium-sized deciduous tree that belongs to the Phyllanthaceae family. It is native to the Indian subcontinent and is widely cultivated in various regions of Asia for its nutritional, medicinal, and culinary benefits.

The Amla tree typically reaches a height of 5-8 meters and has a spreading canopy with small, light green leaves. The tree produces small, greenish-yellow flowers that give way to round, greenish-yellow fruits that are about the size of a small apple.

©IJRASET: All Rights are Reserved

These fruits are known for their high vitamin C content and are used in various traditional remedies, Ayurvedic medicine, and culinary preparations.

In Ayurveda, Amla is considered a powerful rejuvenating herb and is used in various formulations to promote overall health and well-being. The fruits are rich in antioxidants, vitamins, and minerals, making them beneficial for boosting immunity, improving digestion, promoting hair health, and supporting skin health.

Amla is also used in traditional Indian cuisine, where it is often consumed raw, pickled, or used in chutneys, jams, and preserves. It is also a common ingredient in herbal teas and health supplements.

Overall, Emblica officinalis is a versatile tree with a wide range of uses and benefits, making it an important plant in traditional medicine and culinary practices.[2,3,4,5,6]





III. MACROSCOPIC CHARECTERS

COLOUR - Fruits are green in color but changes into light yellow or brick red at maturing.
ODOUR - Odorless
TASTE - The taste of Alma fruits is sore and astringent.
SIZE - The average size of amla fruits is between 1.5-2.5 cm in diameter.
SHAPE - Fruita are depressed, globular
SEEDS - Four lobes with six trygonus seeds
WEIGHT - Weightof fruits bout 25-35gm.

IV. SYNONYMS OF AMLA

SANSKRIT - AMLA, AMALAKI, DHATRIPHALA,AMALKAN
HINDI - AMLA
ENGLISH - INDIAN GOOSBERRY
NEPAL - AMBA, AMALA
TELGU - USIRI KAAY
KANNAD - BETTADA NEILKKAYI
ARABIC - HALILAJ, IHLIIILAJ
CHINESE - ANMOLE
MARATHI - AVALA

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue XII Dec 2024- Available at www.ijraset.com

V. PHYTOCHEMISTRY OF AMLA

INDIAGOODSEBERRY is obtained from fruit containing Amla plant known as EMBLICA OFFICINALIS and tree is belonged to the family PHYLLANTHACEAE. Amla tree is a native to the INDIAN subcontinent and grows in tropical and subtropical regions. Due to medicinal and nutritional property, as EMBLICA OFFICINALIS is having very high values in Ayurveda, Chinese and Unani medicine systems.[7,8]

BOTANICAL OVERVIEW OF AMLA

KINGDOM	PLANTAE
SUB-KINGDOM	TRACHEOBIONTA
DIVISION	ANGIOSPERMAE
SUPER-DIVISION	SPERMATOPHYTA
CLASS	EUDICOTS
SUB-CLASS	ROSIDAE
ORDER	MALPIGHIALES
FAMILY	PHYLLANTHACEAE
SPECIES	PHYLLANTHUS EMBLICA
GENUS	PHYLLANTHUS

VI. CHEMICAL COMPOSITION OF AMLA

There are so many medicinal plants present in nature and we all know that all medicinal plant having different kind of chemical constituents in there composition,so AMALAKI also have large number of chemical constituents such as alkaloids, tannins, aminoacids,vitamins etc.

As well as it is highly benifitial plant gisted by nature and mentioned in different medicine system, it also containing different type of minirals such as potassium calcium iron magnis zink nickel copper phosphorous alluminium sodium etc.these minirals manage electrolyte balance in body and these all constituents increase therapeutic application in all over world And these all constituents are used to treat different kind of disease and disorders related to different organs of body such as liver,kidney eyes heart blood heart skin stc.

1) ALKALOIDS- Alkaloids are basic nitrogenous secondary metabolites synthesized by plants and show strong biological action on humans and animals etc.There are so many alkaloids found in Amla such as phyllantine, phyllantidine, phyllembein
2) FLAVONOIDS – Flavovoids are secondary metabolites and it is group of polyphenolic compound which are founf in plant's fruit,flower and seeds. There are so many flavonoids present in amla fruit such as quereetin, kaempferol
3) TANNINS- Tannins are complex, organic, non-nitrogenous, polyphenolic compound having high molecular weight.Tannins mainly show astringency, antioxidant, anti-inflammatory pharmacological actions. There are so many Tannins present in amla fruit such as Geranlin, Emblicanin A\B, Punigluconin, Pedunculagin, Chebulinicacid, Chebulagic acid, Corilagin.
4) AMINO ACIDS- Amino acids are building blocks of protein. They are contain carboxyl group (-COOH) and amine group (-NH2). There are so many Amino Acids present in amla fruit such as Glutamic acid, Proline, Aspartic acids, Alanine, Cystine, Lysine.
5) FATTY ACIDS- Fatty acids are naturally occurring carboxylic acids with an unbranche carbon chain and an eve number of carbon atoms.There are so many Fatty Acids present in amla fruit such as Oleic acid, linolenic acid, palmitic acid.
6) ORGANIC ACIDS There are so many Organic Acids present in amla fruit such as citric acid, oxalic acid acid, fumaric acid, mallic acid, tartaric acid.
7) PHENOLIC COMPOUNDS- Phenolic compounds are secondary metabolites produced by shikimic acid pathway. They also known as Polyphenols and they are naturally occurring molecule possessing an aromatic ring bearing one or more free hydroxyl substituents or functional derivatives such as ester, ethers, glycosides. There are so many Phenolic Compounds present in amla fruit such as Gallic acid, mthyl gallate, ellagic acid, trigallayl glucose.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

8) VITAMINS- Vitamins are organic components in food that are needed in very small amount for growth and health. Vitamins are also referred to asmicronutrients. There are so many Vitamins present in amla fruit such as Vitamin A, vitamin C, thiamine, alpha gama delta tocopherol
9) FIBER- Fiber or roughage is the portion of plant-derived food that can not be completely broken down by human digestive enzymes.It is a type of carbohydrate found in plants which cn not digest by human body. There are so many Fiber present in amla fruit such as pectin.
10) Minerals- There are so many menerals present in amla fruit such as Aluminium(Al), Calcium(Ca), Chromium(Cr), Copper(Cu), Iron(Fe), Lead(Pb), Lithium(Li), Magnisium(Mg), Magnese(Mn), Nickel(Ni), Phosphorus(P), Potassium(K), Sodium(Na), Zinc(Zn).[9,10,11,12]

VII. PHARMACOLOGICAL ACTION WITH MOA OF CHEMICALS PRESENT IN AMLA

Indian gooseberry, has several pharmacological actions due to its rich content of bioactive compounds such as vitamin, tannins, flavonoids, and polyphenols. Some of the pharmacological actions of Amla include-

1) Antioxidant: A chemical known as an antioxidant works to prevent or lessen the oxidative damage that free radicals and reactive oxygen species (ROS) cause to the body. Amla is a potent antioxidant that helps protect cells from oxidative stress and damage caused by free radicals. It scavenges free radicals and reduces oxidative stress in the body.
2) Anti-inflammatory: Amla has anti-inflammatory properties that help reduce inflammation in the body. It can help alleviate symptoms of inflammatory conditions such as arthritis and asthma.
3) Immunomodulatory: Amla has immunomodulatory effects, meaning it helps modulate the immune system to enhance its function. It can help boost the immune response and protect against infections.
4) Anti-diabetic: Amla has been shown to have anti-diabetic properties by helping regulate blood sugar levels and improve insulin sensitivity. It is rich in various bioactive compounds that contribute to its beneficial effects on diabetes. Amla contains Vit.C, kaempferol, quereetin increase insulin production and glucose metabolism.
5) Hepatoprotective: Amla has hepatoprotective effects, meaning it helps protect the liver from damage and supports liver function. Amla enhances the liver's detoxification capabilities, aiding in the removal of toxins and other harmful substances from body. Also help in regeneration of lever cells andrepaid tissue damage. There are so many chemical constituents are present in amla fruits whish are show hepatoprotective property such as phyllantin, phyllantidine, chebulinic acid, emblicaninA\B etc.
6) Cardiovascular benefits: Amla has cardio-protective effects by reducing cholesterol levels, improving blood circulation, and protecting against heart disease.
7) Anti-cancer: Some studies suggest that Amla may have anti-cancer properties due to its antioxidant and anti-inflammatory effects. It may help prevent cancer cell growth and proliferation.

VIII. CONCLUSION

At this time all know that research on Indian traditional plants has gained a new recommence. Amla is a nutrient-dense fruit that has been used for centuries in traditional ayurvedic medicines. Amla has a different position in AYURVEDA due to its traditional and pharmacological properties which are scientifically proved such as antioxidant, anti-inflammatory, immune booster, antidiabetic, anticancer. Emblica officinalis has so many phytoconstituents which are provide health benefits and treat different type of disease. This medicinal plant also have few chemical constituents such as polyphenol which can used to treat cancer and on this point study is going on. Amla is a good source of vitamin C, the juice extract from amla fruit contains about 478.56mg/100ml vit.C. Whole plant mean leaves, fruits, seads can be used tp treat diabetes mellitus. One amla fruit is equal to 10-12 oranges in term of vit.-C , 2-3 apples in the terms of fiber and ½ cup of Spanich in terms of iron content. Overall, amla is a versatile and valuable fruit that warrants further research to fully explore its all therapeutic application. This gooseberry is considerd to be a safe herbal medicine without any adverse effects. [13,14,15]

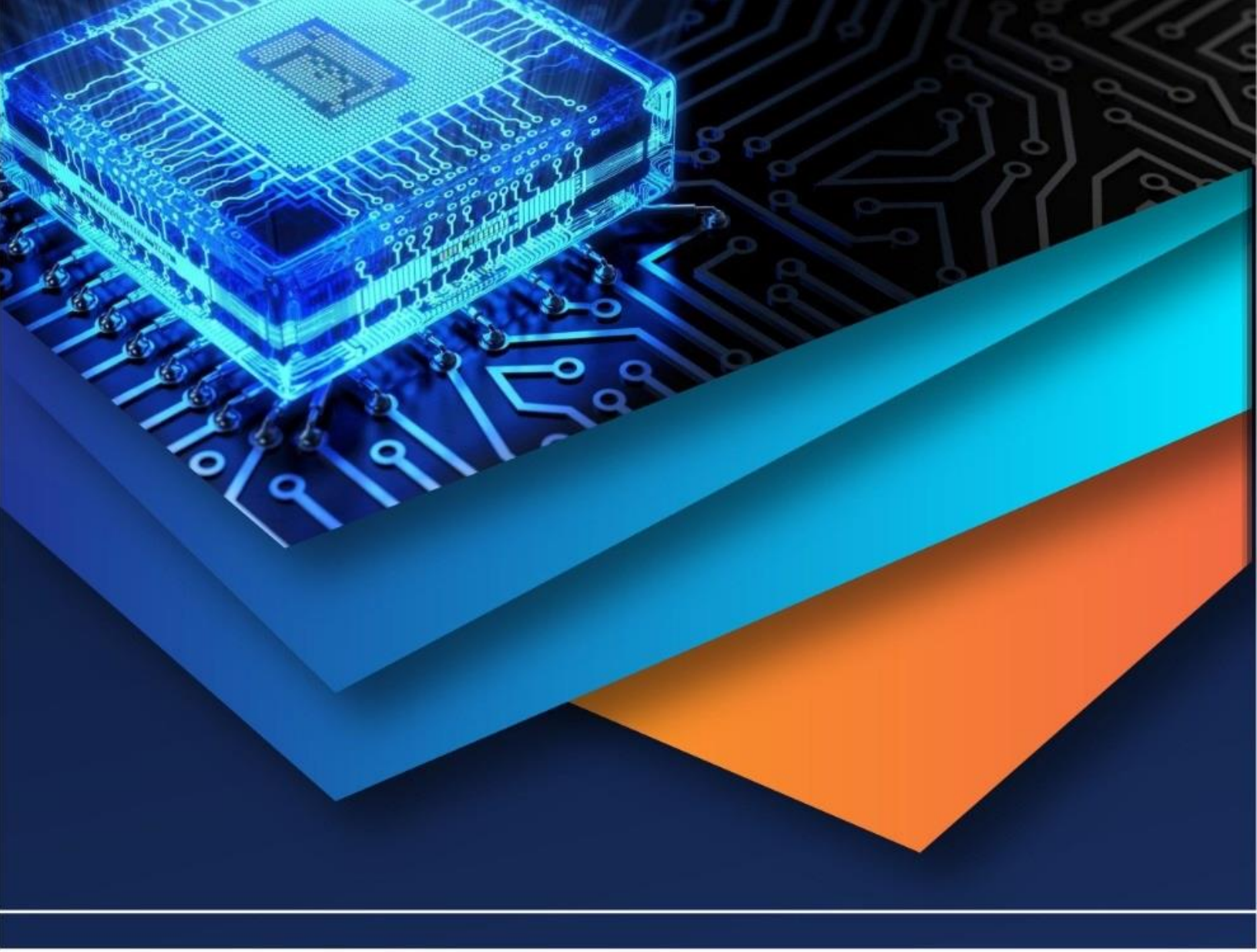
REFERENCES

[1] A. Lis and M. indica, "Effectiveness for dyslipidemia," J. Ethnopharmacol., vol. 79, no. 1, pp. 81–87, 2002.
[2] S. Arora, K. Kaur, and S. Kaur, "Indian medicinal plants as a reservoir of protective phytochemicals," Teratog. Carcinog. Mutagen., vol. suppl 1, pp. 295–300, 2003.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

[3] M. S. Akhtar, A. Ramzan, A. Ali, and M. Ahmad, "Effect of Amla fruit (Emblica officinalis Gaertn.) on blood glucose and lipid profile of normal subjects and type 2 diabetic patients," Int. J. Food Sci. Nutr., Apr. 18, 2011, [Online
[4] M. Bajpai, A. Pande, S. K. Tewari, and D. Prakash, "Phenolic contents and antioxidant activity of some food and medicinal plants," Int. J. Food Sci. Nutr., vol. 56, no. 4, pp. 287–291, 2005.
[5] S. K. Bhattacharya, A. Bhattacharya, K. Sairam, and S. Ghosal, "Effect of bioactive tannoid principles of Emblica officinalis on ischemia-reperfusion-induced oxidative stress in rat heart," Phytomedicine, vol. 9, no. 2, pp. 171–174, 2002.
[6] S. K. Bandyopadhyay, S. C. Pakrashi, and A. Pakrashi, "The role of antioxidant activity of Phyllanthus emblica fruits on prevention from indomethacin-induced gastric ulcer," J. Ethnopharmacol., vol. 70, no. 2, pp. 171–176, 2000.
[7] V. Brun and T. Schumacher, Traditional Herbal Medicine in Northern Thailand, Berkeley, CA, USA: Univ. of California Press, 1987, p. 349.
[8] S. M. Banu, K. Selvendiran, J. P. Singh, and D. Sakthisekaran, "Protective effect of Emblica officinalis ethanolic extract against 7,12-dimethylbenz(a) anthracene (DMBA)-induced genotoxicity in Swiss albino mice," Hum. Exp. Toxicol., vol. 23, pp. 527–531, 2004.
[9] M. B. Bajracharya, Ayurvedic Medicinal Plants, Kathmandu, Nepal: Piyusavarsi Ausadhalaya, 1979.
[10] N. N. Bharthakur and N. P. Arnold, "Chemical analysis of the emblic (Phyllanthus emblica L.) and its potential as a good source," Scientia Horticult., vol. 47, pp. 99–105, 1991.
[11] P. S. Babu and P. Stanely Mainzen Prince, "Antihyperglycaemic and antioxidant effect of hyponidd, an ayurvedic herbomineral formulation in streptozotocin-induced diabetic rats," J. Pharm. Pharmacol., vol. 56, no. 11, pp. 1435–1442, 2004.
[12] N. R. Biswas, S. K. Gupta, G. K. Das, et al., "Evaluation of Ophthacare eye drops — a herbal formulation in the management of various ophthalmic disorders," Phytother. Res., vol. 15, no. 7, pp. 618–620, 2001.
[13] A. Bhattacharya, A. Chatterjee, S. Ghosal, and S. K. Bhattacharya, "Antioxidant activity of active tannoid principles of Emblica officinalis (amla)," Indian J. Exp. Biol., vol. 37, no. 7, pp. 676–680, Jul. 1999.
[14] N. Bunyapraphatsara, "Personal communication: uses of Phyllanthus species in traditional Thai medicine," Medicinal Plant Information Center, Mahidol Univ., Bangkok, Thailand, 1987.
[15] I. H. Burkill, A Dictionary of the Economic Products of the Malay Peninsula, vol. 1, Kuala Lumpur, Malaysia: Ministry of Agriculture and Co-operatives, 1966.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)