IJMPR, 2026, 10(5), 41-46 ISSN: 2319-5878

INTERNATIONAL JOURNAL OF MODERN PHARMACEUTICAL RESEARCH

www.ijmpronline.com

Review Article

Impact Factor: 7.533

Coden USA: IJMPR3

TRIPHALA AND ITS THREE MYROBALANS (EMBLICA OFFICINALIS, TERMINALIA CHEBULA, TERMINALIA BELLIRICA): A COMPLETE REVIEW

Khushboo Vaghela[1*], Ansoya Chaudhari[2], Dhruvi Kavar[3], Parth Bhatt[4], Divyakant Patel[5]

[1]Professor, Department of Pharmacognosy, Sharda School of Pharmacy Affiliated to Gujarat Technological University, Pethapur, Gandhinagar, Gujarat, India.

[2,3,4]Student, Department of Pharmacognosy, Sharda School of Pharmacy Affiliated to Gujarat Technological University, Pethapur, Gandhinagar, Gujarat, India.

[5]Head of the Institute, Sharda School of Pharmacy, Affiliated to Gujarat Technological University, Pethapur, Gandhinagar, Gujarat, India.

Article Received on: 01/04/2026 **Article Revised on: 21/04/2026** **Article Published on: 01/05/2026**

***Corresponding Author**
Khushboo Vaghela
Professor, Department of Pharmacognosy, Sharda School of Pharmacy Affiliated to Gujarat Technological University, Pethapur, Gandhinagar, Gujarat, India.

https://doi.org/10.5281/zenodo.19883676

How to cite this: Khushboo Vaghela[1*], Ansoya Chaudhari[2], Dhruvi Kavar[3], Parth Bhatt[4], Divyakant Patel[5] (2026). Triphala And Its Three Myrobalans (Emblica Officinalis, Terminalia Chebula, Terminalia Bellirica): A Complete Review. International Journal of Modern Pharmaceutical Research, 10(5), 41–46.

ABSTRACT

Emblica officinalis Gaertn. (syn. *Phyllanthus emblica*), commonly known as Amla, is a highly valued medicinal plant belonging to the family Euphorbiaceous and is widely distributed in tropical and subtropical regions of India and other Asian countries. Traditionally known as Amalaki in Sanskrit, it has been extensively used in Ayurveda as a potent *rasayana* for rejuvenation and treatment of various disorders such as diarrhoea, jaundice, inflammation, and metabolic imbalances. Almost all parts of the plant including fruits, seeds, leaves, root bark, and flowers possess therapeutic importance, with the fruit being the most widely utilized. Phytochemical investigations reveal that Amla is rich in tannins, phenolic compounds, flavonoids, alkaloids, and hydrolysable tannins such as Emblicanin A and Emblicanin B, which yield gallic acid and ellagic acid on hydrolysis. The fruit also contains rutin, quercetin, corilagin, geraniin, and exhibits a very high concentration of vitamin C. Due to this diverse chemical composition, *E. officinalis* demonstrates broad pharmacological activities including antioxidant, anti-inflammatory, analgesic, cardioprotective, and free radical scavenging properties. Additionally, Amla forms an essential component of the classical Ayurvedic formulation Triphala, along with *Terminalia chebula* and *Terminalia bellirica*, which is widely used for detoxification, digestive health, and immune enhancement. Several studies also highlight the chemopreventive potential of Triphala and Amla in cancer models by improving antioxidant defense and reducing tumor incidence. Overall, *Emblica officinalis* remains an important medicinal plant with promising therapeutic applications and significant potential for modern drug development.

KEYWORDS: *Emblica officinalis.*

1. *Emblica officinalis*

Emblica officinalis or Amla is a fruit of deciduous tree which belongs to family Euphorbiaceae. This fruit is widely distributed in tropical and sub- tropical areas of India. It is known as Amalki in Sanskrit, Avala in Marathi, Nelli in Kannada and Nellikai in Tamil. It is a well- known Indian medicinal herb which provides numerous health benefits. The active constituents present in mla are gallic acid, ellagic acid and rutin. It possesses analgesic, anti- inflammatory, anti- oxidant and several other pharmacological properties. Almost all parts of this fruit possess medicinal properties, particularly fruit, which is used in Ayurveda as a powerful rasayana and in medicine in the treatment of diarrhea, jaundice, inflammation and several other ailments. Amla shows heart protective, antioxidant and free radical scavenging properties.[1]

Botanical classification[2]

Kingdom: Plantae
Subkingdom: Tracheobionta (Vascular plants)
Super division: Spermatophyta (Seed plants)
Division: Angiospermae
Class: Eudicots
Subclass: Archichlamydeae
Series: Unisexual
Order: Malpighiales
Family: Euphorbiaceae
Genus: *Emblica*
Species: *officinalis* Gaertn.

Plant Description

Emblica officinalis is widely distributed across India, Pakistan, Uzbekistan, Sri Lanka, Southeast Asia, China, and Malaysia. The parts of the plant used for various purposes include dried and fresh fruits, seeds, leaves, root bark, and flowers. The fruits of Amla ripen from November to February. They are nearly spherical or globular in shape, slightly wider than long, with small conical depressions at both apexes. The fruits measure about 18—25 mm in width and 15—20 mm in length. The surface is smooth with six obscure vertical pointed furrows. In the ripened condition, the mesocarp is yellow, and the endocarp turns yellowish brown. The mesocarp of the fresh fruit is acidulous, while in the dried fruit it is acidulous and astringent.[3]

Microscopic studies of *Emblica officinalis*[4]

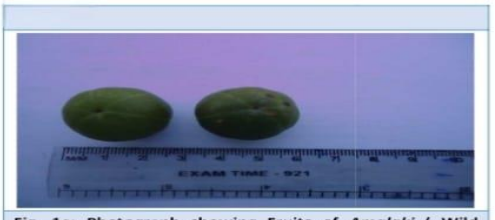


Fig. 1a: Photograph showing Fruits of *Amalaki* (Wild Variety)

Fig. 1b: Photograph showing Fruits of *Amalaki* (Cultivated Variety)

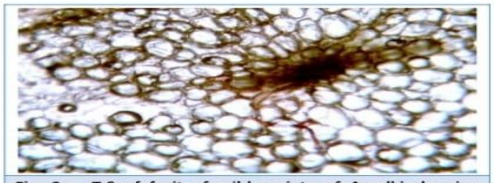


Fig. 2c: T.S of fruit of wild variety of Amalki showing sclereids. Sc - Sclerids

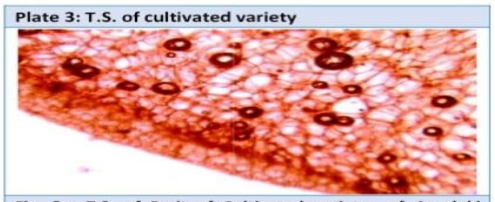


Plate 3: T.S. of cultivated variety

Fig. 3a: T.S. of Fruit of Cultivated variety of *Amalaki* showing Epicarp & Mesocarp.
Ep. – Epicarp, Mes.- Mesocarp, Epi. – Epidermis, Hy. – Hypodermis, Pa. – Parenchymatous cell

Chemical Constituents

Amla is one of the most extensively studied plants. Reports suggest that it contains tannins, alkaloids and phenols. Fruits have 28% of the total tannins distributed in the whole plant. The fruit contains two hydrolysable tannins Emblicanin A and B which have antioxidant properties: one on hydrolysis gives gallic acid, ellagic acid and glucose wherein the other gives ellagic acid and glucose respectively. The fruit also contains PhyIIembIin. Activity difected fractionation revealed the presence of several phytochemicals like gallic acid, corilagin, furosin and geraniin.23FIavonoids like quercetin, alkaloids like phyllostine and phyllantidine are found. Along with these, it primarily contains amino acids, carbohydrates and other compounds given in Table 1. Its fruit juice contains the highest concentration of vitamin-C (478.56mg/100mL). Vitamin C levels are more than those in oranges, tangerines and lemons.[5]

Applications of *Emblica officinalis*

Applications of *Emblica Officinalis* in Cancer

Triphala has been reported to exhibit chemo preventive potential. The presence of Triphala in diet had significantly lowered the benzopyrene induced fore stomach papilloma genesis in mice. It was more effective in reducing tumor incidences compared to its individual constituents. Triphala also significantly increased the antioxidant status of animals which might have contributed to the chemoprevention. The breast cancer is one of the most common cancers in women.[6]

Terminalia chebula

World Health Organization (WHO) stated that approximately 8O% of world's population in all developing countries believe in traditional system of medicine for their primary healthcare needs at major levels. Also. The traditional healing system has been using the herbal remedies globally, is an important base for the new modern drugs invention. *Terminalia chebula*, a moderate tree used in traditional medicines belongs to family Combretaceae. lt is commonly called as Black myrobalan, Ink tree (or) Chebulic Myrobalan. *Terminalia chebula* is a widely traditional medicine that ls not only used in India but also in other countries like Asia and Africa. Moreover, the plant has a history to be used commonly in Unani, Ayurveda and Homeopathic medicine due to its wide spectrum of pharmacological activities associated with the biologically active chemicals present in this plant. The fruit of the tree possesses diverse health benefits and has been used as traditional medicine for household remedy against various human ailments since antiquity. *T. chebula* has been extensively used in Ayurveda, Unani and Homoeopathic medicine and has become a base of modem medicine.[7,8]

Biological source: It consists of dried fruit, root, bark of plant knows as *Terminalia chebula* belonging to family Combretaceae.

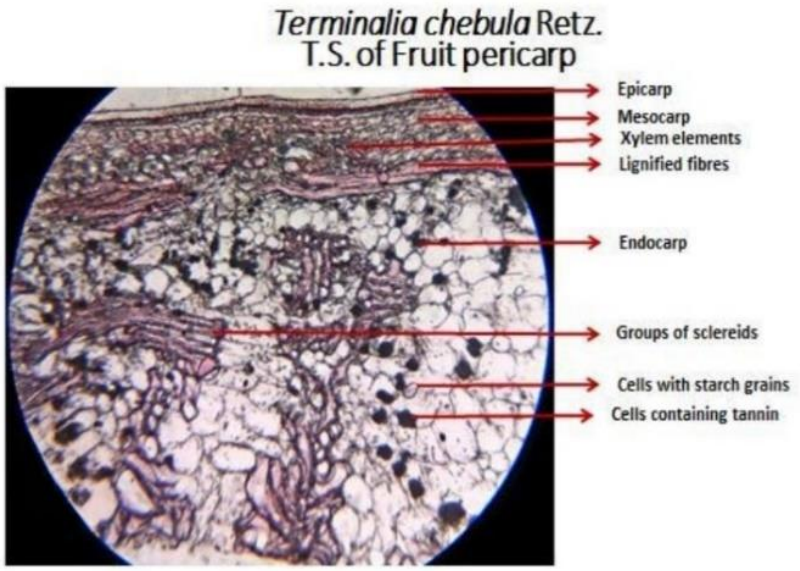
Botanical classification

Kingdom: Plantae
Sub kingdom: Tracheobionta
Division: Magnoliophyta

Subdivision: Spermatophyta
Class: Magnoliophta
Subclass: Rosidae
Order: Myrtals
Family: Combretaceae
Genus: *Terminalia*
Species: *Chebula*
Botanical name: *Terminalia Chebula* Retz[9]

Plant description

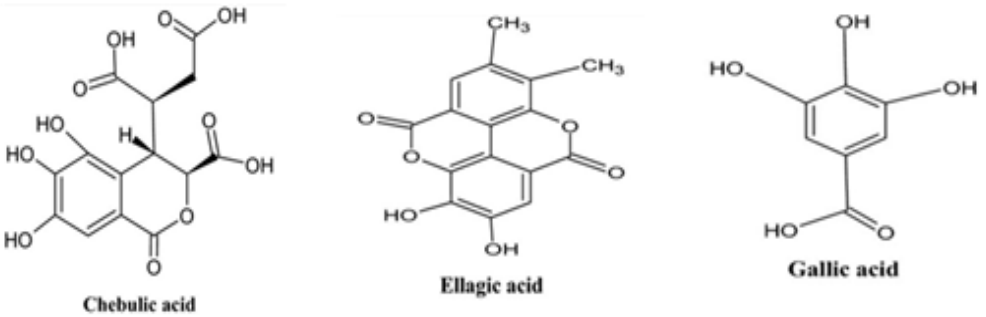
The tree of *T. chebula* is between 50 and 80 feet tall. Its top is rounded, and its limbs are widely spaced. The bark has a few longitudinal fissures and is a dark brown colour. The ovate, Elliptical leaves have two large glands close to the summit. The terminal spikes or short panicles of monoecious, dull White to yellow blooms are held in the center and have an Offensive, pungent odor. Flowers bloom in May through June, and fruit is visible from July through December. The Fruit, sometimes known as a drupe, is one to two inches in size there are five ribs or lines on the skin's surface. Green fruit is unripe, while yellowish-grey fruit is ripe. Fruit Formation started in November, and fruits were gathered Between January and April.[10]



Microscopy of *Terminalia chebula* fruit

Phytochemistry

T. Chebula contains several phytoconstituents like tannins, sterols. Amino acids, flavonoids like luteolin, rutins, quercetin etc.: resins. Fructose, fixed oil etc. However it is an important source of tannins. It contains high phenolic content, especially hydrolysable tannins. Presence of tannins content in *T. Chebula* depends on its geographical location. (E.g. The fruit collected from Chennai are very rich in tannins). Tannins of myrobalan are of pyrogallol type (hydrolysable tannin), which yield Chebulic acid and d-galloyl glucose on hydrolysis. Chebulagic, chebulinic : (astringent compound), ellagic and gallic acids, ellagitannin such as punicalagin, easurarinin, corilagin and tetrachebulin and other such as chebulanin, neochebulinic acid, chebulagic acid and chebulanin are the other content Of myrobalans. The presence of various carbohydrates in myrobalan is: glucose, sorbitol, fructose, sucrose.[11]



Pharmacological action

Antiarthritis and anti-inflammatory activity
The *T. Chebula* dried fruit extract inhibited nitric oxide synthesis and showed antiinflammatory activity when used in aqueous form. Chebulagic Acid (CA) obtained *T. Chebula* immature seeds checked development of collagen induced arthritis in mice .The polyherbal formulation (AIIer-7) *T. Chebula* showed a dose dependent anti-inflammatory effect on Freund's adjuvant induced arthritis in rats.[12]

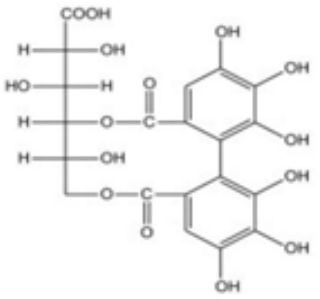
Terminalia bellirica
Herbal medicines are used as a health care tool io various countries. All the developing countries are fully dependent on herbal remedies. *Bibhitaki* also known as *Baheda* in Hindi, is one among three fruits of *Triphala*. *Triphala* is one of the Ayurvedic fomulations which may have antifungal, antibacterial, laxative, hypolipidemic, antidiabetic and immunomodulatory activities. *Triphala* or its constituents used against infectious microorganisms also. *Bibhitaki* means the fruit that takes away the fear of disease. lt's botanical name is *Terminalia bellerica* belongs family *Combratacrae.* A plant with active medicinal properties or constituents are used to treat disease in the traditional systems like Ayurveda, Siddha and Unani. Herbal medicines are prepared from different plant materials such as leaves, steams, roots, bark etc. They mainly contain biologically active ingredients and are used primarily for treating mild or chronic ailments.[13]

Biological source: The drug consists of the dried ripe fruits of *Terminalia bellirica* Roxb. Family Combretacea.

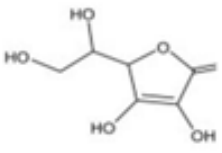
Taxonomy
Kingdom — Plantae
Sub kingdom — Tracheobionta
Super division — Spermatoplnyta
Division — Magitoliopliyta
Class — Magnoliopsida
Sub class — Rosidae
Order – Myrtales
Family — Coinbretaeeae
Genus - *Terminalia*
Species — *Bellerica*
Botanical name — *Terminalia bellerica* Roxb[14]

Plant Description
Terminalia bellirica is a large deciduous tree to 50 in tall and a diameter of 3 m with a rounded crown. The frequently buttressed be at the base is branch less up to 20 m. The bark is bluish or ashygrey covered with numerous fine longitudinal cracks, the inner bark yellowish. Leaves laige, glabrous, alternate, broadly elliptic to ovate- elliptical, base rounded to cuneate, rufous sericeous but soon glabrescent, with 6-9 pairs of secondary veins, secondary and tertiary venation prominent on both surfaces, clustered towards the ends of branchless. Petiole 2.5-9 cm long.[15]

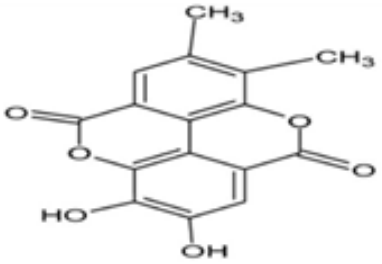
Chemical Constituents
Many of researchers have investigated *T.bellirica* for its many biologically active phytochemicals some of phytochemicals are sltown in below.
l) Plant body :- Tannins, gallic acid and ellagic acid, Galloylglucose, fiavones, fnlctose, Rhainnose, coloring matter, resins, Pheyllemblin etc.
2) Seed :- Cardenolide, cannogenol 3-O-D, Phospholipids 14 etc.
3) Fruit :- Tainternilignan, thannilignan, fiavones, Anolignan B-5, gallic acid, beta setosterol and tannins. Allxloids, saponin, steroid, Polysaccherides, bellerica acid, galactose, Chebulagic acid. Phenols, carbohydrates And proteins etc.
4) Stem bark :- Arjunogenin and it's glycosides, Belleric acid and bellericosides. Hydrolysable tannins, gallic acid, in water soluble extract.
5) Leaf:- Proteins, steroids and terpenoids.
Three hydrolysable tannins, gallic acid, ellagic acid and methyl gallate, leutolin, quercitin 3-O-a-L- rhamose pyranoside. Saponins, tannins, amino acids, alkloids, Carbohydrates, 4- liydroxy — benzoic acid. Pyridine-30 carboxamide, 4- dimethyl amino-N, 2,4- difluorophenyl beta-setosterol etc.



Punigluconin



Ascorbic acid



Ellagic acid

Pharmacological action

Immunomodulatory Activity
The effects of *Terminalia bellirica* methanolic extract (0.1, 1, 10, 100 and 500 ug/ml) on the mouse immune system was investigated in vitro. Phagocytic activity and lymphocytes proliferation were assayed. The results indicated the effect of the extract (500 ug/ml) on the stimulation of macrophage phagocytosis, through the production of superoxide anions and acid phosphate,

with a phagocpic index (PI) value of approximately 1.5 and 1.3 respectively. For the lymphocytes proliferation assay, the extractwith phpohemagglutinin exhibited maximal activation, with a stimulation index (SI) value of approximately 5.8 with concavalin A lipopolysaccharide and pockweed mitogen, similar activation (SI 4.5) of lymphocytes proliferation was observe. However, at low concentrations (0.1 ug/ml). *T.bellirica* extract with concanavalin A and pockweed mitogen caused suppresent activity.[16]

Triphala

Triphala is a drug widely used in many disorders due to its various pharmacological activities. Triphala (a is composed of the three myrobalans, *Terminalia chebula* Retz. (Haritaki), *Terminalia bellirica* Roxb. (Bibhitaki) and *Emblica Officianatis* Gaertn. (Amalaki) and is one of the most commonly used Ayurvedic preparations. The formulation generally consists of equal proportions of pericarps of this myrobalans.1 Triphala has been described in the ancient Ayurvedic text as a Tridoshic Rasayana, a therapeutic agent with balancing and rejuvenating effects on the three humours or constitutional elements in Ayurveda vata, pitta and kapha. *Terminalia chebula* Retz and *Terminalia bellirica* Roxb have a warm energy, while *Embelica officinatis* Gaertn. is cool in nature. Triphala, being a combination ot alt three, is therefore balanced, making it useful as an internal cleansing, detoxifying formula. lt is regarded as an important Rasayana and good purgative in Ayurvedic medicine. Recipe for this traditional herbal supplement is described in the traditional Indian texts, the Charaka and Susruta Samhita.[17]

Ingredients and composition of Triphala churna[18]

Sr .No	Name	Latin name	Family	Virya vipaka	Part uses	Ratio
1	Amalaki	*Emblica officinalis*	Euphorbiaceae	Sheeta madhura	Fruit	1
2	Haritaki	*Terminalia chebhula*	Combretaceae	Ushana madhura	Fruit	1
3	Bibhitaki	*Terminalia bellerica*	Combretaceae	Ushana madhura	Fruit	1

Therapeutic uses of Triphala[18]

Triphala is a well-known Ayurvedic polyherbal formulation consisting of *Emblica officinalis* (Amla), *Terminalia chebula* (Haritaki), and *Terminalia bellirica* (Bibhitaki). It is widely used as a rejuvenating tonic (*Rasayana*) and is mainly prescribed for maintaining digestive health. Triphala is commonly used as a mild laxative, digestive stimulant, and detoxifying agent, helping in constipation, indigestion, bloating, and improving bowel regularity. Its pharmacological activities are mainly attributed to the presence of tannins, flavonoids, gallic acid, and other polyphenolic compounds which support gastrointestinal motility and improve gut microbiota balance.[19]

Triphala has also demonstrated strong antioxidant and immunomodulatory properties, making it beneficial in reducing oxidative stress and improving immune function. Studies suggest that it helps in scavenging free radicals, protecting cellular integrity, and preventing inflammation-related disorders. Due to its anti-inflammatory and antimicrobial activity, Triphala has been traditionally used in the management of infections and chronic inflammatory conditions. Its use has been reported in improving metabolic health by regulating blood glucose and lipid levels, thereby supporting its role in managing diabetes and cardiovascular disorders.[20]

In oral healthcare, Triphala has gained attention due to its antibacterial and plaque-reducing effects. It has been used as a mouthwash for the prevention of dental caries, gingivitis, and periodontal infections. Research indicates that Triphala exhibits inhibitory effects against oral pathogens such as *Streptococcus mutans* and may serve as a natural alternative to chemical mouth rinses. Additionally, Triphala is reported to possess wound-healing properties and is also used in ophthalmic preparations in Ayurveda for improving vision and relieving eye irritation.[21]

Moreover, Triphala has shown potential anticancer and chemoprotective activity in experimental studies by inducing apoptosis and inhibiting tumor cell proliferation. It has also been explored for its hepatoprotective and nephroprotective effects, contributing to detoxification and organ protection. Triphala is considered safe for long-term use when consumed in recommended doses, although excessive intake may lead to diarrhea or abdominal discomfort. Overall, Triphala remains a highly valued herbal formulation with broad therapeutic applications in digestive, metabolic, immune, oral, and chronic disease management and its also used in bronchitis and respiratory related problems.[22-23] Some study also shows that Amla, Baheda and Harde are not cytotoxic. They are immune modulatory and shows very less cytotoxic effect on Vero cells.[24]

REFERENCES

1. Ayurvedic Pharmacopoeia Committee. (2001). The ayurvedic pharmacopoeia of India. *Government of India, Ministry of Health and Family Welfare. New Delhi, India: Department of AYUSH*, *1*(1): 144-145.
2. Vaidya, A. D., & Devasagayam, T. P. (2007). Current status of herbal drugs in India: an overview. *Journal of clinical biochemistry and nutrition*, *41*(1): 1-11.
3. Damodaran, M., & Srinivasan, M. (1935). Vitamin C content of some Indian plant materials.
4. Zhang, L. Z., Zhao, W. H., Guo, Y. J., Tu, G. Z., Lin, S., & Xin, L. G. (2003). Studies on chemical constituents in fruits of Tibetan medicine

Phyllanthus emblica. *Zhongguo Zhong yao za zhi= Zhongguo zhongyao zazhi= China journal of Chinese materia medica*, *28*(10): 940943.
5. Shibnath Ghosal, S. G., Tripathi, V. K., & Satish Chauhan, S. C. (1996). Active constituents of Emblica officinalis: Part 1-The chemistry and antioxidative effects of two new hydrolysable tannins, emblicanin A and B.
6. Nandi, P., Talukder, G., & Sharma, A. (1997). Dietary chemoprevention of clastogenic effects of 3, 4-benzo (a) pyrene by Emblica officinalis Gaertn. fruit extract. *British journal of cancer*, *76*(10): 1279-1283.
7. Khan, M. U., Khalilullah, H., Akhtar, J., & Elhasan, G. O. (2015). Terminalia chebula: an ephemeral glance. *Int J Pharm Pharm Sci*, *7*(2): 40-43.
8. Bag, A., Bhattacharyya, S. K., & Chattopadhyay, R. R. (2013). The development of Terminalia chebula Retz.(Combretaceae) in clinical research. *Asian Pacific journal of tropical biomedicine*, *3*(3): 244-252.
9. Singh, P., & Malhotra, H. (2017). Terminalia chebula: a review pharmacognistic and phytochemical studies. *Intern J Recent Sci Res*, *8*(11): 21496-21507.
10. Gupta, A., & Pandey, S. (2022). A review on pharmacological activity of Terminalia chebula. *Indian Journal of Microbiology Research*, *9*(3): 153-159.
11. Pannu, A. R. Z. O. O., Parveen, A. S. M. A., & Goswami, S. H. I. K. H. A. (2021). Terminalia chebula: A Review. *Innovat International Journal of Medical & Pharmaceutical Sciences*, *6*(5).
12. Kumar, N., & Paul, K. S. (2018). Phytochemistry and medicinal value of Harad (Terminalia chebula Retz.) the 'king of medicinal plants. *Pharma Chem*, *10:* 186-195.
13. Sharma, P., Verma, K. K., Raj, H., & Thakur, N. (2021). A review on ethnobotany, phytochemistry and pharmacology on Terminalia belerica (Bibhitaki). *Journal of Drug Delivery and Therapeutics*, *11*(1-s): 173-181.
14. Urooj, A., Hashir, M., Akram, M., & Zaidi, S. S. (2023). EFFICACY OF TERMINALIA BELLIRICA (Balela): A REVIEW. *Indian Journal of Unani Medicine*, *16*(2): 138.
15. Deb, A., Barua, S., & Das, B. (2016). Pharmacological activities of Baheda (Terminalia bellerica): a review. *Journal of pharmacognosy and phytochemistry*, *5*(1): 194.
16. Renu Kadian, R. K., Milind Parle, M. P., & Monu Yadav, M. Y. (2014). Therapeutic potential and phytopharmacology of Terminalia bellerica.
17. Bali Chouhan, B. C., Kumawat, R. C., Mita Kotecha, M. K., Ramamurthy, A., & Sumit Nathani, S. N. (2013). Triphala: a comprehensive Ayurvedic review.
18. Bairwa, V. K., Kashyap, A. K., Meena, P., & Jain, B. P. (2025). Triphala's characteristics and potential therapeutic uses in modern health. International Journal of Physiology, Pathophysiology and Pharmacology, 17(2): 19.
19. Peterson CT, Denniston K, Chopra D. Therapeutic uses of Triphala in Ayurvedic medicine. J Altern Complement Med, 2017; 23(8): 607-614.
20. Baliga MS. Triphala, Ayurvedic formulation for treating and preventing cancer: a review. J Altern Complement Med, 2010; 16(12): 1301-1308.
21. Sabu MC, Kuttan R. Antidiabetic activity of medicinal plants and its relationship with their antioxidant property. J Ethnopharmacol, 2002; 81(2): 155-160.
22. Naik GH, Priyadarsini KI, Bhagirathi RG, Mishra B, Mishra KP, Banavalikar MM, et al. In vitro antioxidant studies and free radical reactions of Triphala, an Ayurvedic formulation and its constituents. Phytother Res, 2005; 19(7): 582-586.
23. Jethva K, Bhatt D, Zaveri M. Phytopharmacognostical study of some selected antituberculosis plants and study of its cytotoxicity screening using vero cell line. Int. J. Pharm. Sci. Res, 2021; 12(3): 1685-98.
24. Khushboo J, Dhara B, Maitreyi Z. In-vitro cytotoxicity activity of some selected ethnomedicinal plants against Vero cell line. Int. J Pharm Sci Rev Res, 2016 Mar; 37(2): 130-3.