

A Systematic Review of Triphala Churna: A Focus on Ingredient Synergism and its Implications for Human Health

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ABSTRACT

Triphala Churna, a revered Ayurvedic formulation, has gained global recognition for its multifaceted health benefits. This review delves into the traditional uses and modern scientific evidence supporting the therapeutic potential of Triphala Churna and its constituent fruits: Amalaki (*Embolia officinalis*), Bibhitaki (*Terminalia bellirica*), and Haritaki (*Terminalia chebula*).

Amalaki, rich in vitamin C and antioxidants, exhibits potent anti-inflammatory and immune-boosting properties. Bibhitaki possesses anti-inflammatory, antimicrobial, and hepatoprotective actions. Haritaki demonstrates laxative, anti-diabetic, and anti-inflammatory effects. These synergistic interactions among the ingredients contribute to the wide range of pharmacological activities observed with Triphala Churna, including improved digestion, enhanced immunity, antioxidant protection, and support for various chronic diseases.

The growing body of scientific research validates the traditional claims of Triphala Churna, solidifying its position as a valuable therapeutic agent in the realm of herbal medicine. As interest in natural and integrative approaches to healthcare continues to rise, Triphala Churna holds immense potential to contribute to global wellness by offering a safe and effective alternative or complementary therapy for various health conditions. This current review comprehensively summarizes the therapeutic potential of Triphala Churna and its ingredients, providing a valuable foundation for future research and clinical applications.

Keywords: Triphala churna, Review Article, Therapeutic potential and uses, Ingredients

I. INTRODUCTION

In the Indian context, complementary and alternative or traditional Systems of Medicine as Ayurveda, Siddha and Unani Systems play a critical role in the healthcare management strategies [1]. But, these traditional systems of medicine and associated medical practices were ignored by mainstream medicine for a long time as they were deemed to be primitive and unscientific. With the advent of chemical analysis in the early 19th Century, plant-based medicine came to the forefront as scientists began secondary metabolite extraction, purification and further utilization of the same as Active Principal Ingredients in Allopathic Medicine [2]. According to recent reports from United States Forest Service, close to 40% of all allopathic medicines available in the western world are derived from plant-based sources. These also include top 20 bestselling prescriptions in the US today [3]. On the global scale, more than 60% prescription medicines used for clinical purposes possess active principals which are either natural compounds of plant origin or their derivatives. These include more than 120 chemical moieties and products which are prepared using herbal sources and are used as lifesaving intervention drugs [4].

Modern medicinal research has proven time and again that, herbal and Ayurvedic medicines are equally efficacious as compared to conventional medicines. Moreover, Ayurvedic medicines are also repeatedly proven to be exceedingly safer than their allopathic counterparts [2]. One such well-known and commonly marketed traditional Ayurvedic Formulation is Triphala Churna (TC). It is a widely used formulation to treat a myriad of disorders and diseases due to its established pharmacological activities. The formulation is composed of an equal proportion mixture of the powders of three myrobalans, namely, *Emblica officinalis* Gaertn. (Amlaki), *Terminalia bellarica* Roxb. (Bibhitaki) and *Terminalia chebula* Retz. (Haritaki) [5]. All these plants are native to the Indian Subcontinent. TC has

been classified traditionally as a Tridoshic Rasayana (A medicinal drug) as it has been known to promote longevity and help rejuvenate patients of all physical constituents and age by providing a balance between the three humors or constitutional elements i.e., Vata, Pitta and Kapha as per Ayurveda [6] [7]. It has been further reported to be a vital drug and a good purgative as per Ayurvedic Scriptures [8]. The details on the composition, preparation, benefits and dosage of the formulation has been mentioned in traditional Ayurvedic formulations such as the Charak Samhita, Sushruta Samhita and has also been elaborated in the Ayurvedic Formulary of India [7] [5]. The current review article focusses on the compilation of the medicinal potency of TC as mentioned in the traditional systems of medicine and modern medical knowledge with special emphasis on its utilization as an anti-tumour, immunomodulator and anti-genotoxic medication.

II. INGREDIENTS OF THE FORMULATION

1. *Emblica officinalis* Linn.





Fig. 1: *Emblica officinalis* Plant and Fruit

Distribution: It is found throughout tropical and sub-tropical India, chiefly in dry deciduous forests, ascending to 1400m on the Himalayas, Chota Nagpur, Bihar, west Bengal, Konkan, Matheran, Gujarat, Deccan, Western Ghats, and Mumbai.

Description: *Emblica officinalis* Linn. is small or medium sized deciduous tree. Leaves subsessile, closely set along the branchlets, distichous, narrowly linear, obtuse having appearance of pinnate leaves. Flowers unisexual (Sutaria, 1996), greenish-yellow, in axillary fascicles on the leaf bearing branchlets, often on the necked portion below the leaves. Fruits fleshy, globose, with obscure vertical furrow, pale yellow. Seed are 6 in number and trigonous [9]. The dried fruit powder appears buff colour.

Traditionally utilized parts part of the plant with therapeutic properties -: Root bark, stem bark, leaf, fruits, and seed.

Therapeutic properties of the Fruit of Amla: Amalaki is an all-round tonic and rejuvenator. The fruit rich source of vitamin C, triagalloylglucose, terchebin, corilangin, ellagic acid from fruit. Two growth inhibitors R1 and R2 also detected in the fruit. It alleviates all the three dosas [10].

Table 1: Summarizes the therapeutic potential of the fruits of *Emblica officinalis* Linn.

Therapeutic Property	Description	Reference
Antioxidant	Rich in vitamin C and polyphenols, it helps in scavenging free radicals.	[11]□
Anti-inflammatory	Reduces inflammation by inhibiting pro-inflammatory cytokines.	[12]□
Anti-diabetic	Helps in regulating blood glucose levels and improving insulin sensitivity.	[13]□
Hepatoprotective	Protects liver cells from damage and supports liver function.	[11]□
Cardioprotective	Reduces cholesterol levels and prevents atherosclerosis.	[14]□
Immunomodulatory	Enhances immune response and helps in fighting infections.	[12]□
Anti-cancer	Exhibits cytotoxic effects on cancer cells and prevents tumor growth.	[15]□
Anti-aging	Delays aging processes by reducing oxidative stress and improving skin health.	[11]□
Antimicrobial	Effective against a range of bacterial and fungal infections.	[10]□
Neuroprotective	Protects neurons from damage and supports cognitive function.	[10] [11]□

Emblica officinalis Gaertn. (Syn. *Emblica officinalis* L.; Family - Euphorbiaceae) commonly called Amla, is a common tree growing in tropical areas of India. The plant fruit is used in the formulation and has been reported to be rich in carbohydrate, fibres, irons and vitamins [16]. The fruit is also reported to be rich in tannins, flavonoids, phenolic compounds, saponins, terpenoids, ascorbic acids etc. [17] [6]. Traditionally, the juice of the fruits of Amla has been used for the treatment of a range of ailments [18] [19]. Almost every part of the plant *Emblica officinalis* has been reported to be pharmacologically important. The fruits of the plant, which are one of the ingredients of Triphala Churna has been reported to possess anti-oxidant, anti-inflammatory, Neuroprotective and adaptogenic properties [20] [21] [22]. It has also been reported to be potent in the management and treatment of diabetes, cancer, hyperlipidemia, osteoporosis and atherosclerosis [23]

2. *Terminalia bellerica* (Gaertn.) Roxb.



Fig. 2: *Terminalia bellerica* Plant and Fruit

Distribution: It is found in deciduous forests throughout the greater part of India, but not in the arid regions, in the area of Upper "Gangetic Plain Chota Nagpur, Bihar. Orissa, W. Bengal. Konkan, Deccan and most part of South India.

Description: A large tree, up to 40 m high, Leaves petiolate, broadly elliptic, clustered towards the end of branches. Flowers greenish yellow, in soliditary, simple, axillary spikes. Fruits nearly spherical to ovoid, 1.5-2.5 cm in diameter, obscurely 5-angled when dry. Fresh ripe fruits slightly with whitish shiny pubescent surface. Mature fruits grey or greyish brown with slightly wrinkled appearance. Rind of fruits shows variation in thickness from 3 to 5 mm. The dried fruit powder appears dark brown in colour.

Traditionally utilized parts part of the plant with therapeutic properties - Fruits, bark, seed.

Therapeutic properties of the fruit of *Terminalia bellerica*: In Sanskrit "Bibhitak literally means the one that keeps you away from the diseases". The botanical name of Bibhitaka is *Terminalia bellerica*. The fruit pulp contains a non-nitrogenous crystalline substance. A new cardiac glycoside bellericannin-isolated which yielded glucose and galactose, B-sitosterol, gallic acid, ellagic acid, ethyl gallate, galloylglucose and chebulagic acid isolated from fruits. It possess a

special potency (prabhava) as a laxative, It alleviates all the three dosa especially kapha and pitta.

Table 2: Summarizes the therapeutic potential of the fruits of Terminalia bellerica.

Therapeutic Property/ Use	Description	Reference
Antioxidant	Exhibits strong antioxidant activity, helping to neutralize free radicals.	[24] [25] [26] [27]
Antibacterial	Effective against various bacterial strains, including <i>E. coli</i> and <i>S. aureus</i> .	[28]
Antifungal	Shows antifungal properties, useful in treating fungal infections.	
Anti-inflammatory	Reduces inflammation, beneficial in conditions like arthritis.	
Antidiabetic	Helps in lowering blood sugar levels, useful for managing diabetes.	
Hepatoprotective	Protects the liver from damage, supporting liver health.	
Anticancer	Exhibits potential anticancer properties, inhibiting the growth of cancer cells.	
Antiviral	Effective against certain viruses, aiding in viral infection management.	
Cardioprotective	Supports heart health	

Therapeutic Property/ Use	Description	Reference
	by improving cardiovascular function.	
Digestive Aid	Helps in digestion and alleviates digestive disorders like constipation.	

3. Terminaliachebula Retz.



Fig. 3: Terminalia chebula Plant and Fruit

Distribution: It is found throughout the greater parts of India, from Ravi eastwards to West Bengal and Assam, ascending to an altitude of 1500 m in the Himalayas, also in Bihar, Orissa, Madhya Pradesh, Deccan and South India (Sharma, 2001).

Description: A tree, 15-24 m high. Leaves ovate or elliptic with a pair of large glands at the top of the petiole. Flowers yellowish white. In terminal spikes. Drupes ellipsoidal, obovoid or ovoid, yellow to orange-brown, sometimes tinged with red or black and hard when ripe, 3-5 cm long, 5 ripped on frying, seeds hard, pale yellow (Sharma 2001). The dried Fruit powder appears bottle green colour.

Traditionally utilized parts part of the plant with therapeutic properties - Fruit

Therapeutic properties of the fruit of Terminalia bellerica

The botanical name of Haritaki is Terminalia chebulaa. Tannin, terchebin is isolated from fruits. Kernels palmitic, stearic, oleic, linoleic, arachidic and behenic acids are isolated. The fruits contain about 30% astringent substances chebulinic acid, tannic acid, gallic acid and chebulagic acid etc. Fruits of Terminalia chebula Retz. are useful in obesity, wounds, ulcers, inflammations, skin diseases, leprosy, stomatitis, hyperacidity and associated gastric disorders, diabetes, anorexia, flatulence, constipation, jaundice, cough, epilepsy, scrotal enlargement, neuropathy, narcosis, fainting, rheumatoid arthritis, general debility. In combination Emblica officinalis Linn., Terminalia bellerica (Gaertn.) Roxb. and Terminalia chebula Retz. have been extensively used as adjunct to other medicines in almost all diseases.

Haritaki is sweet, sour, pungent, bitter and astringent in taste. By the combination of sweet & sour tastes it alleviates vata-dosa, pungent and bitter taste it alleviates kaphadosa, and astringent and sweet alleviates the Pitta dosa. It has special potency (prabhav) to alleviate all the three dosas. In obesity, its decoction with honey, reduces the excessive body fats.

Table 3: Summarizes the therapeutic potential of the fruits of Terminalia chebula.

Therapeutic Property/Use	Description	Reference
Antioxidant	Exhibits strong antioxidant activity, helping to neutralize free radicals.	[29] [30] [31] [26] [32]
Antibacterial	Effective against various bacterial strains, including <i>E. coli</i> and <i>S. aureus</i> .	
Antifungal	Shows antifungal properties, useful in treating fungal infections.	
Anti-inflammatory	Reduces inflammation, beneficial in conditions like arthritis.	
Antidiabetic	Helps in lowering blood sugar levels, useful for managing diabetes.	
Hepatoprotective	Protects the liver from damage, supporting liver health.	
Anticancer	Exhibits potential anticancer properties, inhibiting the growth of cancer cells.	
Antiviral	Effective against certain viruses, aiding in viral infection management.	
Cardioprotective	Supports heart health by improving cardiovascular function.	
Digestive Aid	Helps in digestion and alleviates digestive disorders like constipation.	

The Formulation – Triphala Churna

The above-mentioned ingredients are used together in equal proportions as powders to make the traditional formulation, Triphala Churna. Triphala Churna is a well-known Ayurvedic formulation which has been used as a health tonic commonly. The above mentioned ingredients i.e., *Emblica officinalis* (Amla), *Terminalia chebula* (Harda) and *Terminalia bellerica* (Behda) are readily available and there are numerous pharmaceutical and nutraceutical companies such as Baidyanath, Zandu, Divya, Patanjali, Dhootpapeshwar etc. which are manufacturing and selling Triphala Churna OTC all over India. The formulation is also locally prepared and prescribed by Vaidyas and other Ayurvedic Practitioners for a range of effects including improving immune system and as a immunomodulator.

Ayurvedic pharmacology, known as *Dravya guna*, outlines the characteristics of medicinal herbs. In the case of Triphala, a renowned Ayurvedic formulation, its taste (*rasa*) encompasses sweet, sour, pungent, bitter, and astringent, notably lacking the salty flavor. While its potency and action (*virya*) are considered neutral, its postdigestive effect (*vipaka*) is described as sweet. A unique feature of Triphala is its "prabhav," or special action, which harmonizes all three doshas (Vata, Pitta, and Kapha), making it suitable for various constitutions.

The formulation has been known to aid digestion, nutrient absorption and body metabolism [33]. Triphala Churna has been reported to possess a significant cytotoxic effect on cancer cell-lines and has been reported to be more effective in reducing tumour incidences as compared to its individual constituents [9]. Antioxidant studies conducted on the ingredients has revealed that all three constituents of Triphala Churna are active and they exhibit a range of activities under different conditions and the mixture, triphala, is thus reported to be more efficient due to the combined activity of the individual components [34] [9]. Triphala Churna has also been reported to possess potent and novel therapeutic

agents for scavenging of Nitrous Oxide (NO) and thereby inhibited the pathological conditions caused by excessive generation of NO and its oxidation product, per oxynitrite. But there is a paucity of information regarding anti-carcinogenicity and anti-mutagenicity of Triphala extract [34].

III.CONCLUSION

The current review paper comprehensively examines the traditional and modern scientific evidence supporting the therapeutic potential of Triphala Churna and its constituent fruits: Amalaki (*Emblica officinalis*), Bibhitaki (*Terminalia bellirica*), and Haritaki (*Terminalia chebula*). While Triphala Churna itself exhibits a wide range of pharmacological activities, individual ingredients contribute unique bioactive compounds. Amalaki is rich in vitamin C and antioxidants, Bibhitaki possesses anti-inflammatory properties, and Haritaki demonstrates laxative and anti-diabetic effects. These synergistic interactions among the ingredients likely contribute to the multifaceted health benefits observed with Triphala Churna. Further research is warranted to elucidate the precise mechanisms of action and optimize formulations for specific clinical applications.

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No conflict of Interest

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