E-ISSN:2456-3110

Review Article

Vibhitaki

Check for updates

Journal of Ayurveda and Integrated Medical Sciences

2025 Volume 10 Number 12 December

Publisher

Maharshi Charaka Ayurveda

www.maharshicharaka.in

Vibhitaki (Terminalia bellirica Roxb.) - A Confluence of Ayurvedic Wisdom and Modern Pharmacological Validation

Laha SD[1*], Gayen D[2]

DOI:10.21760/jaims.10.12.40

[1*] Sreyashi Das Laha, Assistant Professor, Department of Dravyaguna Vigyana, Amrapali Ayurvedic Medical College and Hospital, Behta Mujawar, Unnao, Uttar Pradesh, India.

[2] Debajyoti Gayen, Assistant Professor, Department of Kaya Chikitsa, SRS Ayurvedic Medical College and Hospital, Sikandarpur, Gwalior Road, Uttar Pradesh, India.

Vibhitaka (Terminalia bellirica Roxb.), a cornerstone of the ancient Ayurvedic formulation Triphala, represents a profound confluence of traditional wisdom and modern scientific validation. Revered in classical texts from the Rigveda to the Samhitas for its efficacy against Jvara (Fever), Kasa (Cough), and disorders of specific bodily tissues, its therapeutic potential is now attributed to a rich phytochemical property dominated by tannins, gallic acid, and ellagic acid. Contemporary pharmacological research robustly supports its traditional uses, demonstrating a wide spectrum of activities including antimicrobial, antioxidant, antidiabetic, hepatoprotective, antihypertensive, and anti-inflammatory effects. Its antispasmodic and bronchodilator properties, mediated through calcium channel blockage and anticholinergic mechanisms, provide a scientific basis for its historical role in treating respiratory and gastrointestinal ailments. While its potency underscores its value as a modern Phyto therapeutic agent, it also necessitates cautious use, particularly regarding its blood sugar-lowering effects and contraindications during pregnancy. This review highlights Vibhitaki's journey from an empirical botanical to a subject of intense scientific inquiry, positioning it as a critical bridge between traditional herbal knowledge and evidence-based medicine.

Keywords: Terminalia bellirica, Ayurvedic medicine, Phytopharmacology, Antioxidant, Synergistic therapeutic effects

Corresponding Author

Sreyashi Das Laha, Assistant Professor, Department of Dravyaguna Vigyana, Amrapali Ayurvedic Medical College and Hospital, Behta Mujawar, Unnao, Uttar Pradesh, India.

Email: sreyashioffice@gmail.com

How to Cite this Article

Laha SD, Gayen D, Vibhitaki (Terminalia bellirica Roxb.) - A Confluence of Ayurvedic Wisdom and Modern Pharmacological Validation. J Ayu Int Med Sci. 2025;10(12):266-274.

Available From

https://jaims.in/jaims/article/view/5242/

To Browse

Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2025-10-02	2025-10-27	2025-11-07	2025-11-17	2025-11-27

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
None	Nil	Not required	11.39	

© 2025 by Laha SD, Gayen D and Published by Maharshi Charaka Ayurveda Organization. This is an Open Access article licensed under a Creative Commons Attribution 4.0 International License https://creativecommons.org/licenses/by/4.0/ unported [CC BY 4.0].

Introduction

Vibhitaka is one among the ingredient of *Triphala*, which has been in use since ancient times. *Rigveda*, mentions the use of *Vibhitaka* for making dice, furniture and boat set.**[1]** The tree is abundantly found in the forests and plains of India. Classical texts, from *Caraka* to *Vagbhatta,* have highlighted it as *Jvarahara* (anti pyretic) & *Kasahara* (respiratory disorders), specifically targeting disorders of *Rasa, Rakta, Mamsa,* and *Meda.* This potency is unlocked by sophisticated phytochemical arsenal, dominated by tannins, gallic acid, ellagic acid, and chebulinic acid. It is mainly used as antioxidant, antimicrobial, antidiarrheal, anticancer, antidiabetic, antihypertensive & hepatoprotective agent. This introduction to *Terminalia bellirica* explores the remarkable journey of *Vibhitaki* from a revered ancient botanical to a subject of intense modern scientific inquiry. It is a story of convergence, where the empirical wisdom of the past is illuminated by the analytical rigor of the present, positioning this "Fruit of the Fearless" as a critical bridge between traditional herbal knowledge and evidence-based phytotherapy for the modern world.

Botanical Name: *Terminalia bellirica* Roxb.**[2]**

Family: Combretaceae

Classical Names: *Bahera, Baheda, Vibhitaki, Aksha, Karshaphala, Kalidruma, Bhutavasa, Kaliyugalaya.***[3]**

Taxonomical Classification[4,5]

Kingdom - Plantae
Class - Dicotyledons
Subclass - Polypetalae
Series - Calyciflorae
Order - Myrtales
Family - Combretaceae
Genus - *Terminalia*
Species - *bellirica*

Vernacular Name[2]

Bengali - Baheda
Hindi - Bahed
English - Belleric myrobalam
Telugu - Tanikya, Tadi kaya, Tani
Tamil - Akkam, Todikai
Marathi - Behda, Beheda
Gujrati - Baheda, Beda
Oria - Bahada
Assamese - Bauri

Literature Review

In *Vedas*: In *Rigveda,* we come across the plant *Vibhittaka.* Its dried branches are used for *Yajna* but prohibited for the use as toothbrush. It is claimed to be *Madakara*. *Keshava Paddhati* and other ancient texts quoted it for the treatment of hair falling.**[2]**

In *Samhitas*: Acharya Caraka has mentioned it under *Jvarahara* and *Kasahara* group of drugs. It is indicated for *Rasa, Rakta*, *Mamsa* and *Meda vikaras*. *Susruta* mentioned it as *Madakara,* but *Vagbhatt*a mentioned as best herb for treating *Svasa, Kasa*.

Vibhitaki extensively used in ancient medicine and described by all *Nighantu* works. Folk considers its seeds as poisonous. In recent studies, an edible oil is obtained from *Vibhitaki* seeds justifying the synonym '*Taila Phala'*.

Table 1: Showing *Varga/Gana* according to different *Samhitas*

Samhitas/Nighantus	Gana/Varga
Caraka Samhita	Jvara hara, Virechanopaga
Susruta Samhita	Mustadi, Triphala
Vagbhatta	Mustadi
Bhavaprakash Nighantu	Haritakyadi varga
Kaiyadeva Nighantu	Ausadhi varga
Dhanvantari Nighantu	Guruchyadi varga
Raja Nighantu	Amradi varga
Shodala Nighantu	Guduchyadi varga
Nighantu Adarsha	Haritakyadi varga

Botanical description[6]



Figure 1: Vibhitaki inflorescence, fruit.

It is a large deciduous tree with the height of 50m and diameter of 30m with a rounded crown. It is branchless up to 20m. It is perennial and requires cold climate. **Bark:** The outer bark is bluish or ashy-grey whereas inner-bark is yellow in color. The bark contains number of longitudinal cracks**. Leaves:** Young leaves are copper red in color which turn into parrot green and later they become dark green. Leaves are large, alternate, glabrous, with the dimension of 4-24cm x 2-11cm, mostly clustered at the twig ends.

Leaf tip is narrowly pointed. Base of the leaf is rounded to cuneate, rufous-serious which turn to glabrescent, having 6-9 pairs of secondary veins. Secondary and tertiary venation are prominent on both the surfaces generally clustered towards the ends of branchlets.

Petiole is 2.5-9cm long, flat above, with pair of sessile glands just above the middle, sometimes indistinct. Lamina is broad elliptical or broad obovate with the dimension of 8-20 x 4-14 cm. Apex is rounded to abruptly short acuminate. Margin is entire.

Flowers: They are greenish white in color usually appear along with new leaves having an offensive odor or strong honey like smell. Flowers are simple, solitary and sessile. Inflorescence is axillary spikes generally 3-15cm long. Upper flowers of the spike are male. Lower flowers are bisexual. Calyx tube is sericeous or tomentulose.

Fruit: It is light yellow in color. It is drupe, globose or ovoid, densely velutinous or sericeous, 2-4 x 1.8-2.2 cm. It is slightly 5 ridged, 3cm across. It is one seeded and covered with minute pale pubescence.

Distribution:[7] It grows wild at an elevation of up to 2000m in wide variety of ecologies. It is native to Sri Lanka, India, Bangladesh, Bhutan, Thailand, China, Indonesia, Pakistan, Malaysia, Nepal, Cambodia and Vietnam. In India, it is commonly found in Madhya Pradesh, Uttar Pradesh, Punjab and Maharashtra.

Parts Used: Fruit rind, seed, seed kernel.

Chemical Constituents:

Major: Tannins, gallic acid, ellagic acid, ethyl gallate, chebulinic acid.**[8]**

Gallic acid, Tannic acid and glycosides, Beta-l, sitosterol, Ellagic acid, Ethyl gallate, Chebulagic acid., Quinic acid, Arabinose, Fructose, Sucrose, Sugar, Rhamnose and Amino acid.**[4,5]**

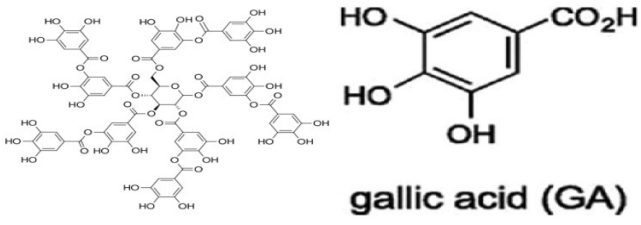


Figure 2: Structure of Tannin, Gallic Acid

Ayurvedic Properties

Table 2: Showing *Rasa, Guna, Virya and Vipaka* of *Vibhitaki* according to Various *Nighantus*

Rasapanchaka	D.N	S.N	M.P.N	R.N	K.N	B.P.N	S.G.N	P.N
RASA								
Kasaya	-	+	+	+	+	+	+	+
Madhura	-	+	-	-	-	-	-	-
Katu	-	-	-	+	-	-	+	-
Tikta	-	-	-	+	-	-	+	-
GUNA								
Laghu	+	+	-	+	+	+	+	-
Sara	+	-	-	-	-	-	-	-
Sita	-	+	-	-	-	-	-	-
Ruksha	-	-	+	-	+	+	-	-
VEERYA								
Ushna	-	-	+	+	+	+	+	+
Sheeta	-	+	-	-	-	-	-	-
VIPAKA								
Katu	+	-	-	-	-	-	-	-
Madhura	-	-	+	+	+	+	+	-

D.N- Dhanwantari Nighantu, S.N- Sodhala Nighantu, M.P.N- Madana Pala Nighantu, R.N- Raj Nighantu, K.N- Kaiyadev Nighantu, B.P.N- Bhav Prakash Nighantu, S.G.N- Saligram Nighantu, P.N- Priya Nighantu

Karma

Table 3: Showing *Karma* of *Vibhitaki* according to Various Nighantus

Karma	D.N	R.N	K.N	B.P.N	P.N
Bhedana	-	-	+	+	-
Kasa	+	+	+	+	+
Netra	+	+	+	+	-
Keshya	+	-	+	+	+
Palita	-	+	-	-	-
Krimi	+	-	+	+	-
Baisarya	+	-	+	+	+
Trit	-	-	-	+	-
Chardi	-	-	-	+	-
Kapha Vata Hara	-	+	-	+	-
Mada	-	-	+	+	-
Pitta Kapha Hara	-	-	+	-	+
Kapha Ashra Jit	+	-	-	-	-

D.N- Dhanwantari Nighantu, R.N- Raj Nighantu, K.N- Kaiyadev Nighantu, B.P.N- Bhav Prakash Nighantu, P.N- Priya Nighantu

It is evident from the above table that maximum numbers of authors have accepted *Raspanchak* as below-

Rasa - *Kasaya*
Guna - *Ruksha, Laghu*
Veerya - *Ushna*
Vipaka - *Madhura*
Doshaghnata - *Tridoshahara, Bhedana*
Rogaghnata - *Kasa, Chaksusya, Kesya, Krimi-nashan, Chardi, Trishna, Madakari (Phala Majja)*

Therapeutic Uses[2]

Svitra: *Aksa Taila* is applied externally

Asmari: Powder of *Vibhitaki* seeds are given with *Sura*

Kasa* and *Svasa: *Vibhitaki* powder is given with honey after meals

Atisara: *Vibhitaki* powder is burnt & given with salt.

***Sotha*:** *Lepana* of *Phala Majja* (pulp) of *Vibhitaki* may relieve burning sensation and pain in all kinds of *Sotha*.

***Netra Roga*:** *Anjana* of *Vibhitakasthi Majja* (seed kernel) will be beneficial.

***Granthi Visarpa*:** *Kalka* of *Vibhitaki Twak* (fruit rind) is applied warm

***Mutra Dosha*:** *Curna* of *Aksha Bija* (seed) mixed with *Sura* and taken orally may be beneficial

Doses: Powder 3-6 gm**[2]**

Formulations and Preparations[2]

Aksiri Sura, Lavangadi Vati, Triphala Curna, Aksa Taila, Talishadi Curna

Phytochemical study[4]

Foreign matter: Not more than 2 per cent.
Total Ash: Not more than 7 per cent.
Acid-insoluble ash: Not more than 1 per cent.
Alcohol-soluble extractive: Not less than 8 per cent.
Water-soluble extractive: Not less than 35 per cent.

Pharmacological Activities

The various reasons reported for the presence of the above mentioned phytoconstituents and their pharmacological activities are as follows:

Antispasmodic and bronchodilator activity

Research into the therapeutic application of *T. bellirica* fruit for treating hyperactive gastro-intestinal and respiratory conditions has revealed a dual mechanism of action, Combining anticholinergic effects and calcium channel blockade. Studies on rabbit jejunum demonstrated that the extract relaxes spontaneous contractions. It was also shown to suppress contractions induced by carbachol and potassium ions (K^+), and it caused a rightward shift in calcium concentration-response curves. In guinea pig ileum, the extract initially produced a parallel rightward shift of the acetylcholine dose-response curve, which progressed to a non-parallel shift with a suppressed maximum response at higher concentrations. rodent models, it provided protection against castor oil-induced diarrhea and carbachol-mediated bronchoconstriction. Further supporting its broncho dilatory effect, the extract relaxed carbachol-induced contractions in guinea pig trachea, shifted carbachol curves to the right, and inhibited K^+-induced contractions. The anticholinergic activity was attributed to the chloroform, ethyl acetate, and aqueous fractions, while the calcium channel blocking effect was specific to the aqueous fraction. **[9]**

Anti-fungal activity

The efficacy of an ethanolic extract of *T. bellirica* fruit was tested against five clinical and five environmental isolates of *Cryptococcus neoformans*. Using the disc diffusion method, the extract demonstrated anticryptococcal activity, with clinical isolates showing greater susceptibility than environmental ones. This suggests the extract's potential to inhibit drug-resistant fungal strains.**[10]**

Anti-salmonella activity

The anti-salmonella activity of various *T. bellirica* extracts (petroleum ether, chloroform, acetone, alcohol, and water) was evaluated. The alcoholic and aqueous extracts were found to be particularly effective. The aqueous extract displayed bactericidal activity at high concentrations and bacteriostatic activity at lower ones. The extract showed no in vitro cellular toxicity. Notably, mice pre-treated with the aqueous extract achieved a 100% survival rate after being challenged with lethal doses of *S. typhimurium.***[11]**

Anti-microbial activity

A methanol extract of *T. bellirica* was evaluated for its activity against respiratory pathogens, specifically *Staphylococcus aureus* and *Klebsiella pneumoniae*.

The extract inhibited the coagulase activity of *S. aureus* and induced biochemical alterations in both bacterial strains. In *Klebsiella pneumoniae*, significant changes in capsular morphology were observed after 24 and 48 hours of treatment. These results indicate that *T. bellirica* possesses antimicrobial propertie effe. against respiratory pathogens, supporting its use in treating related diseases.**[12]**

Anti-oxidant activity

The free radical scavenging and antioxidant potential of an acetone extract of *T. bellirica* fruit was assessed through in vitro assays. The crude acetone extract was further partitioned into ethyl acetate and water fractions. The ethyl acetate fraction outperformed the crude extract in several antioxidant tests, including DPPH radical scavenging, β-carotene bleaching inhibition, and reducing power assays. However, the crude acetone extract showed superior ferrous ion (Fe^{2+}) chelating ability. The study concluded that fractions rich in polyphenolic compounds were more effective antioxidants than the crude extract.**[13]**

Anti-biofilm activity

An ethanol extract of the *T. bellirica* plant was tested for its ability to inhibit biofilm formation by *Streptococcus mutans*, a primary bacterium in oral plaque. The results confirmed that the extract effectively counteracts biofilm formation, indicating its promise as an anti-biofilm agent.**[14]**

Anti-ulcer activity

Research on Wistar rats using pylorus ligation and ethanol-induced ulcer models demonstrated that an ethanolic extract of *T. bellirica* fruit possesses anti-ulcer properties. The extract significantly inhibited gastric lesions induced by both methods. It also reduced gastric free acidity and the overall ulcer index compared to the control group, confirming its potential therapeutic value for ulcer treatment.**[15]**

Anti-Alzheimer's activity

A comparative investigation evaluated the acetylcholinesterase (AChE) inhibitory properties of a methanol extract of *Triphala* and its individual fruit components: *Terminalia chebula*, *Terminalia bellirica*, and *Emblica officinalis*. All extracts inhibited AChE activity in a dose-dependent manner. Phytoconstituents such as gallic acid, ellagic acid, and phenolic acids present in these fruits were identified as contributing to this inhibition.

As an AChE inhibitor, *T. bellirica* shows potential for symptomatic management of Alzheimer's disease. **[16]**

Antihypertensive activity

The mechanism behind the blood pressure-lowering effect of a crude *T. bellirica* extract was explored. In anesthetized rats, the extract induced a dose-dependent reduction in arterial blood pressure. In isolated guinea pig atria, it suppressed both the force and rate of atrial contractions. Furthermore, in rabbit thoracic aorta, it relaxed contractions induced by phenylephrine and potassium ions (K^+) and suppressed phenylephrine-induced peaks in a calcium-free medium. This vasodilator effect was endothelium-independent, occurring even in denuded tissues & is attributed to calcium channel antagonism, supporting its use for hypertension.**[17]**

Anti-atherogenic activity

The anti-atherogenic potential of a hot water extract of *T. bellirica* fruit was studied by examining its effects on low-density lipoprotein (LDL) oxidation & macrophage inflammation. Extract exhibited DPPH radical scavenging and 15-lipoxygenase inhibitory activities, significantly inhibiting free radical-induced LDL oxidation in vitro. In THP-1 macrophages, treatment with the extract led to a marked decrease in the mRNA expression of pro-inflammatory markers (TNF-α, IL-1β, LOX-1) and reduced secretion of matrix metalloproteinase (MMP)-9 and intracellular reactive oxygen species (ROS). These results indicate that the extract can inhibit both LDL oxidation & inflammatory responses in macrophages, suggesting it could hinder the progression of atherosclerotic plaques in vivo.**[18]**

Immunomodulatory effect

Methanolic extract of *T. bellirica* fruit showed stimulation of morphage phagocytosis through the production of superoxide and acid phosphatase. It also showed activation in lymphocyte proliferation assay with phytohemagglutinin, concanavalin A, lipopolysaccharide & pokeweed nitrogen. However, at lower concentrations, it showed suppressant activity with concanavalin A and pokeweed nitrogen. The results indicated that T-lymphocyte proliferation effect of extract occurred through the same mechanism exhibited by phytohemagglutinin, concanavalin A whereas B-lymphocyte proliferation effect occurred through T-cell independent and T-cell dependent mechanisms,

Similar as lipopolysaccharide & pokeweed mitogen. Hence, the mouse immune system, specifically in-vitro cellular and humoral immune response was affected by methanol extract of *T. bellirica* making it useful for treatment of human immune mediated diseases.**[19]**

Wound healing activity

The efficacy of an ethanol extract of *T. bellirica* fruit, formulated as an ointment, was evaluated using excision and incision wound models. The extract demonstrated a superior wound contraction ability compared to a standard treatment, indicating significant wound healing properties.**[20]**

Antifertility activity

Benzene and ethanol extracts of *T. bellirica* bark were orally administered to adult male rats for 50 days. Analysis showed a decrease in the weight of accessory reproductive ducts (epididymis and vas deferens) and a significant reduction in epididymal sperm count. An increase in total cholesterol content was also observed. These changes suggest a reduction in the bioavailability of androgens, indicating the extract's antifertility effects.**[21]**

Anti-diarrheal activity

The anti-diarrheal effects of aqueous and ethanolic extracts of *T. bellirica* fruit were assessed in castor oil-induced diarrhea, PGE2-induced enteropooling, and gastrointestinal motility tests. The extracts provided 73.37% and 63.58% protection against diarrhea, respectively. Both significantly reduced enteropooling and delayed gastrointestinal transit, with protection rates of 67.20% and 68.27%. The results suggest a prominent anti-secretory effect is primarily responsible for the anti-diarrheal activity, potentially due to the presence of tannins, flavonoids, and alkaloids that stimulate reabsorption or inhibit secretion in the intestinal lumen.**[22]**

Anti-cancer activity

An in vitro study compared anti-cancer & antioxidant effects, along with total phenolic content, of five leaf extracts (methanol, aqueous methanol, ethyl acetate, chloroform, & petroleum ether). Antioxidant activity & phenolic content increased with solvent polarity. Petroleum ether extract showed most potent anti-cancer activity against broad panel of cell lines (including ovarian, liver, breast, cervical, CNS, lung, colon, fibrosarcoma, leukemia, & melanoma), followed by chloroform extract. Other extracts were particularly effective against leukemia and melanoma. The high activity of the non-polar petroleum ether extract suggests it is a promising source for isolating novel anti-cancer compounds.**[23]**

Anti-diabetic activity

Bioassay-guided fractionation of *T. bellirica* fruit rind led to the isolation of gallic acid as an active anti-diabetic compound. Both isolated and synthetic gallic acid were administered to streptozotocin (STZ)-induced diabetic rats for 28 days. Treatment resulted in a significant, dose-dependent reduction in plasma glucose levels and regeneration of pancreatic β-islet cells. Gallic acid also decreased serum cholesterol, triglycerides, LDL-cholesterol, urea, uric acid, and creatinine, while increasing plasma insulin, C-peptide, and glucose tolerance. It additionally restored total protein, albumin, and body weight, confirming its potential as an anti-diabetic agent.**[24]**

Hepatoprotective activity

An ethyl acetate extract of *T. bellirica* aerial parts was administered to mice prior to carbon tetrachloride (CCl_4) intoxication. The treatment significantly reduced hepatic necrosis and decreased the expression of oxidative stress biomarkers (4-HNE and 3-NT), while restoring normal CYP2E1 expression. It also suppressed the overexpression of inflammatory mediators (NF-κB, COX-2, TNF-α) and markers of fibrosis (TGF-β1 and α-SMA) in injured livers, demonstrating strong hepatoprotective and anti-fibrotic effects.**[25]**

Anti-helminthic activity

The anti-helminthic potential of ethanolic and aqueous extracts of *T. bellirica* fruit pulp was tested on *Pheretima posthuma* worms. Parameters such as time to paralysis and time to death were measured. Both extracts caused significant paralysis and death of worms at higher concentrations, outperforming the reference standard, Levamisole. This confirms the plant's anti-helminthic activity and warrants further research to isolate active compounds.**[26]**

Analgesic and antipyretic activity

The analgesic and antipyretic effects of ethanolic and aqueous extracts of *T. bellirica* fruits were evaluated in mice and rats using acetic acid-induced writhing, the Eddy's hot plate method, and a yeast-induced fever model.

Both extracts significantly reduced the number of writhes and increased the reaction time to heat stimuli. They also effectively inhibited the elevation in body temperature, confirming significant analgesic and antipyretic activities.**[27]**

Contraindications[28]

It should be avoided during pregnancy as it is unsafe during pregnancy and breast feeding.

It has blood sugar lowering activity hence, diabetes medications need to be adjusted for diabetic patient.

Due to its blood sugar lowering activity, it may interfere with blood sugar control surgery, hence it should not be taken at least 2 weeks before surgery.

Discussion

Presented data on *Vibhitaki* (*Terminalia bellirica*) offers a fascinating review in the convergence of traditional wisdom and modern scientific validation. It has always been a staple of natural medicine of famed *Triphala* formulation, its classical applications as a *Jvarahara* (antipyretic), *Kasahara* (antitussive), & *Virechanopaga* (purgative adjunct) are profoundly supported by its rich phytochemical profile, dominated by tannins, gallic acid, and ellagic acid. This discussion posits that *Vibhitaki* is not a mere herbal simpleton but a sophisticated poly-pharmacological agent whose efficacy stems from a symphony of synergistic actions. Its celebrated use in *Kasa, Svasa* (respiratory) and *Atisara* (gastrointestinal disorders) is mechanistically explained by its demonstrated antispasmodic, bronchodilator, and anti-diarrheal activities, which operate through a dual anticholinergic and calcium channel blocking mechanism. Furthermore, the ancient caution regarding its *Madakara* (intoxicating) property and the folk belief of seed toxicity find a counterpoint in modern research, which isolates potent bioactive compounds like gallic acid for therapeutic anti-diabetic and hepatoprotective effects, while also validating its anti-microbial, anti-oxidant, and anti-inflammatory capacities. This robust scientific evidence, covering activities from anti-ulcer and wound healing to immunomodulation and even anti-cancer potential, transforms historical descriptions into credible pharmacological dossier. However, this powerful biological activity also mandates the traditional cautions; its blood sugar-lowering effect necessitate careful co-administration with diabetes medication, And its contraindication during pregnancy & surgery underscores the principle that potent medicines demand respectful and informed use. Thus, *Terminalia bellirica* stands as a paradigm of how deep phytochemical investigation can illuminate the mechanisms behind ancient empirical knowledge, bridging the gap between the classical *Vibhitaki* described in the Vedas and a modern evidence-based botanical therapeutic.

Conclusion

In conclusion, *Terminalia bellirica (Vibhitaki)* emerges from this analysis not merely as a historical botanical relic, but as a dynamic and profoundly relevant therapeutic agent for the modern world. Its journey from the sacred verses of the Rigveda to the cutting-edge laboratories of pharmacological research exemplifies a perfect synergy between ancient empiricism and contemporary scientific rigor. The plant's extensive repertoire of validated activities - spanning antimicrobial, antioxidant, anti-inflammatory, antispasmodic, and antihypertensive effects - provides a robust mechanistic foundation for its millennia-old uses in treating respiratory, digestive, and metabolic disorders. This confluence of evidence firmly establishes *Vibhitaki* as a powerful poly-pharmacological entity, whose value is encapsulated in its complex chemistry and multi-faceted actions. However, its potency also demands prudence, as evidenced by its contraindications during pregnancy and surgery, and its interactions with diabetic medications. Ultimately, *Terminalia bellirica* stands as a powerful testament to the enduring wisdom of Ayurveda, offering a compelling promise that within nature's pharmacy lie sophisticated solutions to contemporary health challenges, waiting to be fully understood and responsibly integrated into a holistic framework of healing.

References

1. Singh MP, Gupta A, Sisodia SS. Ethno and modern pharmacological profile of Baheda (Terminalia bellirica): a review. Pharm Chem J. 2018;5(1):153-62. *[Crossref][PubMed][Google Scholar]*

2. Sastri JLN. Illustrated Dravyaguna Vijnan. Vol II. 3rd ed. *Varanasi: Chaukhamba Orientalia; 2009. p.216-8 [Crossref][PubMed][Google Scholar]*

3. Kadian R, Parle M, Yadav M. Therapeutic potential and phytopharmacology of Terminalia bellirica. World J Pharm Pharm Sci. 2014;3(10):804-19. *[Crossref][PubMed][Google Scholar]*

4. Hegde PL, Harini A. Textbook of Dravyaguna Vijnana. Reprint ed. New Delhi: Chaukhamba Publications; 2024. *p.702-9 [Crossref][PubMed] [Google Scholar]*

5. Ministry of Health and Family Welfare. The Ayurvedic Pharmacopoeia of India. Vol 1, Part 1. 1st ed. *New Delhi: Govt. of India, Dept. of AYUSH; 2007. p.33-4 [Crossref][PubMed][Google Scholar]*

6. Easy Ayurveda. Bibhitaki (Terminalia bellirica) uses in Ayurveda [Internet]. 2013 Jan 13 [cited 2025 Dec 29]. Available from: https://www. *easyayurveda.com/2013/01/13/bibhitaki-baheda-terminalia-bellerica-uses-ayurveda-details [Crossref][PubMed][Google Scholar]*

7. Planet Ayurveda. Bibhitaki (Terminalia bellirica) [Internet]. [cited 2025 Dec 29]. Available from: https://www. *planetayurveda.com/library/bibhitaki-terminalia-bellerica [Crossref][PubMed][Google Scholar]*

8. Sharma PC, Yelne MB, Dennis TJ. Database on Medicinal Plants Used in Ayurveda. Vol 1. New Delhi: CCRAS; 2005. *p.199-204 [Crossref][PubMed] [Google Scholar]*

9. Gilani AH, Khan AU, Ali T, Ajmal S. Mechanisms underlying the antispasmodic and bronchodilatory properties of Terminalia bellirica fruit. J Ethnopharmacol. 2008;116(3):528-38. *[Crossref] [PubMed][Google Scholar]*

10. Valli S, Shankar GS. Terminalia bellirica—a promising challenge to cryptococcosis. Int J Pharm Res Biosci. 2013;2(5):154-69. *[Crossref][PubMed] [Google Scholar]*

11. Madani A, Jain SK. Anti-Salmonella activity of Terminalia bellirica: in vitro and in vivo studies. Indian J Exp Biol. 2008;46(12):817-21. *[Crossref] [PubMed][Google Scholar]*

12. Sabnis S. Antimicrobial efficacy of Terminalia bellirica against virulence factors of respiratory pathogens. Int J Curr Microbiol Appl Sci. 2014;3(5):215-21. *[Crossref][PubMed][Google Scholar]*

13. Guleria S, Tiku AK, Rana S. Antioxidant activity of acetone extract/fractions of Terminalia bellirica Roxb. fruit. Indian J Biochem Biophys. *2010;47(2):110-6 [Crossref][PubMed][Google Scholar]*

14. Singh S, Yadav S, Sharma P, Thapliyal A. Antibiofilm formation activity of Terminalia bellirica plant extract against clinical isolates of Streptococcus mutans and Streptococcus sobrinus: implication in oral hygiene. Int J Pharm Biol Arch. 2012;3(4):816-21. *[Crossref][PubMed][Google Scholar]*

15. Choudhary GP. Anti-ulcer activity of the ethanolic extract of Terminalia bellirica Roxb. Int J Pharm Chem. 2012;1(4):1293-7. *[Crossref] [PubMed][Google Scholar]*

16. Nag G, De B. Acetylcholinesterase inhibitory activity of Terminalia chebula, Terminalia bellirica and Emblica officinalis and some phenolic compounds. Int J Pharm Pharm Sci. 2011;3(3):121-4. *[Crossref][PubMed][Google Scholar]*

17. Khan AU, Gilani AH. Pharmacodynamic evaluation of Terminalia bellirica for its antihypertensive effect. J Food Drug Anal. 2008;16(3):6-14. *[Crossref][PubMed][Google Scholar]*

18. Tanaka M, Kishimoto Y, Saita E, Suzuki-Sugihara N, Kamiya T, Taguchi C, Iida K, Kondo K. Terminalia bellirica extract inhibits low-density lipoprotein oxidation and macrophage inflammatory response in vitro. Antioxidants (Basel). 2016;5(2):20. *[Crossref] [PubMed][Google Scholar]*

19. Das PR, Islam MT, Mahmud ASM, Kabir MH, Hasan ME, et al. An ethnomedicinal survey conducted among the folk medicinal practitioners of three villages in Kurigram district, Bangladesh. Am Eurasian J Sustain. 2012;6(2):85-96. *[Crossref] [PubMed][Google Scholar]*

20. Choudhary GP. Wound healing activity of the ethanol extract of Terminalia bellirica Roxb. fruits. Nat Prod Radiance. *2008;7(1):19-21 [Crossref] [PubMed][Google Scholar]*

21. Sharangouda JP, Satishagouda S, Vishwanatha T, Saraswati B. Effect of Terminalia bellirica bark extracts on activities of accessory reproductive ducts in male rats. Int J Pharm Sci Rev Res. 2010;1(2):75-9. *[Crossref][PubMed][Google Scholar]*

22. Kumar B, Divakar K, Tiwari P, Salhan M, Goli D. Evaluation of anti-diarrhoeal effect of aqueous and ethanolic extracts of fruit pulp of Terminalia bellirica in rats. Int J Drug Dev Res. 2010;2(4):769-79. *[Crossref][PubMed][Google Scholar]*

23. Awad H, Ayoob F, Abdalla MM. Evaluation of total phenol, anticancer and antioxidant properties by different extracts of Terminalia bellirica Roxb. leaves: an in vitro analysis. Res J Pharm Biol Chem Sci. *2015;6(3):360-7 [Crossref][PubMed][Google Scholar]*

24. Latha RC, Daisy P. Insulin-secretagogue, antihyperlipidemic and other protective effects of gallic acid isolated from Terminalia bellirica Roxb. in streptozotocin-induced diabetic rats. Chem Biol Interact. *2011;189(1-2):112-8 [Crossref][PubMed] [Google Scholar]*

25. Rashed K, Potočnjak I, Giacometti J, Škoda M, Domitrović R. Terminalia bellirica aerial parts ethyl acetate extract exhibits antioxidant, anti-inflammatory and antifibrotic activity in carbon tetrachloride-intoxicated mice. J Funct Foods. 2014;8:319-30. *[Crossref][PubMed][Google Scholar]*

26. Kumar B, Kalyani D, Hawal LM, Singh S. In vitro anthelmintic activity of ethanolic and aqueous fruit extract of Terminalia bellirica. J Pharm Res. 2010;3(5):1061-2. *[Crossref][PubMed][Google Scholar]*

27. Sharma US, Sharma UK, Singh A, Sutar N, Singh PJ. Screening of Terminalia bellirica fruit extracts for analgesic and antipyretic activities. Jordan J Biol Sci. 2010;3(3):121-4. *[Crossref] [PubMed][Google Scholar]*

28. WebMD. Terminalia bellirica: overview, uses, side effects, precautions, interactions, dosing and reviews [Internet]. [cited 2025 Dec 29]. Available from: https://www. *webmd.com/vitamins/ai/ingredientmono-137/terminalia-bellirica [Crossref][PubMed][Google Scholar]*

Disclaimer / Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of Journals and/or the editor(s). Journals and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.