



ISSN: 0976-3376

Available Online at <http://www.journalajst.com>

ASIAN JOURNAL OF
SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol. 08, Issue, 05, pp.4776-4781, May, 2017

REVIEW ARTICLE

THERAPEUTIC AND MEDICINAL USES OF VIBHITAKA: A REVIEW

*¹Dr. Nidhi Garg and ²Dr. Akhil Jain

¹Department of Agad Tantra

²Department of Shalaky Tantra, Ch. Devi Lal College of Ayurveda and Hospital Jagadhari

ARTICLE INFO

Article History:

Received 19th February, 2017

Received in revised form

26th March, 2017

Accepted 13th April, 2017

Published online 30th May, 2017

Key words:

Phytoconstituents,
Phytopharmacology,
Terminalia bellerica.

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ABSTRACT

Terminalia bellerica Roxb (TB) is growing widely throughout the Indian subcontinent, Sri Lanka and SE Asia. In ayurveda medicinal uses have been described as it works in disease of every system. Glucoside, Tannins, Galliacid, Ellagicacid, Ethylgalate, Gallylglucose, Chebulanic acid are mainly believed to be responsible for its wide therapeutic actions. It is used as antioxidant, antimicrobial, antidiarrheal, anticancer, antidiabetic, antihypertensive and hepatoprotective agent. The present article attempts to provide comprehensive information on therapeutic and medicinal uses of Terminalia bellerica for further research.

INTRODUCTION

Vibhitaki, also known as Baheda in Hindi, is one among three fruits of Triphala. Its actual Sanskrit name is Vibheetaki. Bheeta means fear. Vibheeta means lack of fear and Vibhitaki means the fruit that takes away the fear of disease. But in Hindi, they usually pronounce 'va' as 'ba'. So the name Bibhitaki. Its botanical name is Terminalia bellerica / bellerica. The Ayurvedic properties of Bibhitaki are Kashaya (astringent), Rukshas and laghu (dry and light), Madhura (sweetness) and ushna (heat). These properties make Bibhitaki ideal for pacifying the Kapha dosha in the body. Bibhitaki primarily supports the formation of three bodily tissues - nutrients plasma (rasa dhatu), muscle (mamsa dhatu) and bone (asthi dhatu). It eliminates excess mucous in the body balancing the Kapha dosha and is a powerful medicine for a variety of lung conditions, including bronchitis and asthma. Plants produce wide array of bioactive principles and constitute a rich source of medicines (Badrul Alam, 2011). The herbal products can be isolated and identified as potential form medicines²Herbal medicines are prepared from a variety of plant materials as leaves, stems, roots, bark etc. Vibhitaki or Bibhitaki is an ayurvedic fruit. It is one of three important healthy fruits or *triphala*. Other two fruits are Amla (*Emblica Officinalis*) and Haritaki (*Terminalia Chebula*). This fruit has immense medicinal properties and is used in various diseases.

Vibhitaki tree grows to a height of 60 to 80 feet. It grows all over India. The leaves are large and about 15 cm long. The flowers are white in colour or pale yellow. According to principles of Ayurveda this fruit increases dryness of tissues and is lite to digest. It has *Kashaya Rasa* or astringent taste. It gets a sweet (*Madhura Rasa*) taste after digestion. It is hot in potency and boosts metabolism. This fruit normalises all three doshas and specially reduces kapha.

Synonyms

- Assam-Bhomora, Bhomra, Bhaira;
- Eng-Beleric Myrobalan;
- Guj-Bahedam, Beheda;
- Hindi-Bahera;
- Kan-Shanti, Shantikayi, Tare, Tarekayi;
- Mal-Tanni, Tannikai;
- Mar-Bhedam;
- Ori-Bhedam, Bhara;
- Sansk-Vibhita, Aksa, Aksaka, Bibhitaki;
- Tam-Thanakkai, Tanri, tanrikkai, Tani;
- Tel-Tannikkaya, Vibhitakami, Tani^{3,4}

Sanskrit Synonyms

Karshaphala – the fruit, which is the used part weights around 10–12grams

Aksha phala – the fruit weighs 10 – 12 grams, the fruit is used to play a kind of betting game

*Corresponding author: Dr. Nidhi Garg,
Department of Agad Tantra

Kalidruma – Because it is used in playing a betting game, it causes tensions (kalaha). So, the tree which causes Kalaha is Kaidruma. (Druma means tree).

Properties

Rasa (Taste) – Kashaya (Astringent)

Long-Term: Sweet

Guna (qualities) – Rooksha (dry),

Laghu (light to digest)

Vipaka (taste conversion after digestion) – Madhura (sweet)

Veerya (potency) – Ushna (hot)

Effect on Tridosha – Balances Kapha and Pitta.

Attribute: Cold and oily

General Action: Digestive stimulant, purgative, promotes eyesight and hair growth, anti-viral

Specific Action: Rejuvenating

Therapeutic Action: Reduce kapha and pitta; increases vata

Part used: Fruit rind, seed, seed kernel.

Dose: 2 to 4 grams per day with meals

Plant Description

The fruit resembles Haritaki fruit but it does not contain the ridges. Its surface is quite plain. It is grown on large deciduous trees and has flowers which are greenish yellow with a pungent and unpleasant odour. Erect, long trunk. 3-8 inch long, alternate square and oval leaves. Either white or yellowish flowers. Fruits are less than one inch in diameter, nearly five angled after drying, grayish, which contain one seed. New leaves appear in February-March, flowers appear in May. Fruits are ripened during January-February. T. belerica also referred to as, Beleric Myrobalan in English, Bibhitaki in Sanskrit, Locally known as Bahera in India, has been used for centuries in the Ayurveda, a holistic system of medicine originating from India. The dried fruit used for medicinal purposes 6. It is found growing wild throughout the Indian subcontinent, Srilanka, and SE Asia, upto 1200 meters in elevation, in a wide variety of ecologies. It is a large deciduous tree with a buttressed trunk, a thick brownish gray bark with shallow longitudinal fissures, attaining a height of between 20 and 30 meters. The leaves are crowded around the ends of the branches, alternately arranged, margins entire, elliptic to elliptic-obovate, rounded tip or sub acute, midrib prominent, pubescent when young and becoming glabrous with maturity. The flowers are pale greenish yellow with an offensive odor, born in axillary spikes longer than the petioles but shorter than leaves. The fruits are ovoid grey drupes, obscurely 5-angled, narrowed into a very short stalk (Amrithpal Singh Saroya, 2011; Nadkarni, 2002)

Availability: The tree is found almost in all parts of India, in lower parts of hills.

Classical categorization

Charaka –

Jwarahara – group of herbs that are used in the treatment of fever.

Kasahara – group of herbs that are used in the treatment of cough and cold

Virechanopaga – group of herbs that are used in Virechana – Purgation therapy (Panchakarma).

Charaka has mentioned it as a plant source for oil.

Sushruta and Vagbhata – Mustadi group of herbs.

Important Ayurvedic medicine

All medicines with Triphala contain Bibhitaki. Eg: Triphala ghrita, Triphaladi Taila etc.

Oil of Vibhitaki –

आक्षं स्वादु हिमं केश्यं गुरु पित्तानिलापहम् । – Ashtanga Hrudaya Sutrasthana 5/60

Aksha Taila – oil obtained from seeds of Vibhitaka is sweet, cold in potency good for the hair, hard to digest, mitigates Pitta and Anila (Vata). Aksha Taila – oil obtained from seeds of Vibhitaka is sweet, cold in potency good for the hair, hard to digest, mitigates Pitta and Anila (Vata).

Phytoconstituents

Principal constituents are β - sitosterol, gallic acid, ellagic acid, ethyl gallate, galloyl glucose, chebulagic acid, glucose, galactose, fructose and raminose. Glucoside (bellericanin) (Amrithpal Singh, 2006), Gallo-tannic acid, Coloring matter, resins and a hydroxy 3'4' (methylene dioxy) flavone and anolignan B. Tannins, ellagic acid, ethyl gallate, galloyl glucose and chebulaginic acid, phenyllembin, β -sitosterol, mannitol, glucose, fructose and rhamnase (The Ayurvedic Pharmacopoeia of India, 2001)

Karma

Bhedanam – Eases motion, has laxative action. This is why Triphala is used as mild laxative.

Kasanashanam – relieves cough, cold

Netrahitam – good for eyes

Keshya – improves hair quality and promotes hair growth.

Kruminashanana – relieves worm infestation

Vaisvanyashana – relieves hoarseness of voice

Bibhitaki detoxifies blood, lymph, muscles and fatty tissue of the body.

The seed kernel of Vibhitaki is useful in

Trut – excessive thirst,

Chardi – vomiting

It balances Kapha and Vata. It is astringent in taste and causes slight drowsiness. Amla seed is quite similar in qualities Main Action: expectorant, laxative as part of Triphala, antiseptic

Other Uses: Improves overall bodily tone and is useful in cough, asthma, congestion, and migraine headaches It is Astringent, Tonic, Expectorant and Laxative. It has lithotriptic, rejuvenative and antibacterial properties. It is used in coughs and sore throat. While using herbal eye drops containing T. bellirica, encouraging results have been obtained in cases of myopia, corneal opacity, immature cataract, chronic and acute infective conditions. In Ayurveda the drug is classified as an expectorant. It is an integral part of Ayurvedic laxative

formulation, Triphala used in treatment of common cold, pharyngitis and constipation (The Ayurvedic Pharmacopoeia of India, 2001). The bark is mildly diuretic and is useful in anaemia and leucoderma. The Fruits are Astringent, acrid, Digestive, Anthelmintic, Aperient, Expectorant, Sweet, Anodyne, Stypic, Narcotic, Ophthalmic, Antipyretic, Antiemetic and Rejuvenating. Unripe fruit is a mild laxative and ripe fruit is an astringent. Seeds are used as aphrodisiac. Oil extract from the seed pulp is used in leucoderma and alopecia. Modern investigations have proved the laxative activity of the oil. (Vaidyaratnam, 2004)

PHARMACOLOGICAL ACTIVITIES

Bibhitaki was found to have anti-asthmatic, anti-spasmodic, expectorant and anti-tussive activities. It has also been shown to have hepatoprotective activity and in a reduction of lipids in hypercholesterolemic animals. It has been shown in *in vitro* studies to have antimalarial, antimutagenic, and antifungal activity. Acute and Sub acute Toxicities Thanabhorn *et al.*, (2009) were conducted acute and sub acute toxicity studies as per the OECD guideline. Single oral administration of the ethanolic extract of *T. belerica* at a dose of 5,000 mg/kg did not produce any toxicity. In sub acute toxicity, repeated administration of 1,000 mg/kg of *T. belerica* over 14 days did not cause changes in terms of general behaviors, mortality, weight gain, hematological or clinical blood chemistry parameters. The results of histological examinations showed normal appearance of the internal organs when compared to those of the control group (Thanabhorn *et al.*, 2009). Antioxidant, Antimicrobial and Toxicity Studies Badrul Alam *et al.* (2011) postulated that the crude methanolic extract of the fruits of *Terminalia belerica* Roxb along with its various organic fractions elicited both *in vitro* and *in vivo* antioxidant activity as well as antibacterial activity. Total antioxidant activity, scavenging free radical, authentic peroxy nitrite and reducing power assessment were performed. Finally they concluded that the EtOAc fraction elicited strong activity in all the model systems with moderate toxicity (Badrul Alam Antioxidant, 2011). *In vitro* glucoamylase activity *T. belerica* fruit rind powder was assessed for its antimicrobial activity by using Chloroform-Ethyl Acetate fractions. Maximum zone of inhibition was observed in both fractions. The fractionized compound Epigallo catechin gallate showed significant antimicrobial activity against *E. coli*, *B. subtilis* and *S. Aureus* (Meshram Gangadar *et al.*, 2011).

Anti diarrhoeal activity

The Anti diarrhoeal activity was performed using Castor oil induced diarrhoea, PGE₂ induced entero pooling and gastrointestinal motility test (BimleshKumar *et al.*, 2010). Aqueous and ethanolic extract of fruit pulp of TB at the doses of 334 mg/kg, 200 mg/kg, 143 mg/kg were used. Comparison of percentage protection in these models revealed that the extracts have more prominent anti secretory effect than the reduction in gastrointestinal motility (Bimlesh Kumar *et al.*, 2010). Activities of Accessory reproductive ducts in male rats Sharangouda *et al.* (2010) was determined that Adult male rats were administered with 10mg and 25mg/100g body weight of benzene and ethanol extracts of *Terminalia bellirica* barks orally for 50 days. Epididymis, vas deferens was dissected out, weighed and processed for biochemical estimation. Repeated administration (10mg and 25mg/100g) of TB bark extract

resulted in decreased weight of accessory reproductive ducts in male rats. The total cholesterol content was increased while protein content and epididymal sperm count were significantly decreased. These changes may be due to non-availability of androgens in *T. belerica* barks extracts treated rats (Sharangouda J. Patil *et al.*, 2010).

Streptozotocin induced Antidiabetic activity

Latha *et al.* (2010) investigated that Hexane, Ethylacetate and Methanolic extracts of TB fruit at the doses of 200, 300 and 400 mg/kg, p.o for 60 days to Streptozotocin induced diabetic rats significantly ($p < 0.05$) increased the plasma insulin, C-peptide and glucose tolerance levels, body weight, serum total protein. The effect was more pronounced in methanol extract treated rats. In addition the plant extracts significantly decreased the serum levels of total cholesterol, triglycerides, low density lipoprotein cholesterol, urea, uric acid and creatinine in diabetic rats. (Latha and Daisy, 2010)

Analgesic activity

Arif Ullah Khan *et al.* (2010) describes the antisecretory and analgesic activities of the crude extract of *Terminalia bellerica*. *T. bellerica* extract at the dose range of 300 -1000 mg/kg inhibited the castor oil-induced intestinal fluid secretion in mice. The extract also dose dependently (50 -100 mg/kg) where it reduced the numbers of acetic acid mediated in mice. These results indicate that TB exhibit antisecretory and antnociceptive effects, hence justifying its medicinal use in diarrhea and pain (Arif Ullah Khan *et al.*, 2010).

Alloxan induced hyperglycemic and antioxidant activity

The continuous administration of TB fruits against alloxan induced hyperglycemia and antioxidant defense mechanism was studied in rats. Significant reduction of glucose level and Oxidative stress was observed. Increased levels of antioxidant enzymes such as Superoxide dismutase, glutathione reductase and catalase were observed in blood and liver (Sabu *et al.*, 2009).

Immune response *In vitro*

In vitro Phagocytic activity and lymphocyte proliferation assay were carried out in methanolic extract of on the mouse immune system (Aurasorn Saraphanchotiwitthaya *et al.*, 2008). In both assay, stimulation of macrophage phagocytosis and maximal activation of phytohemagglutinin were observed. Finally, the authors concluded that the methanolic extract of *T. belerica* affected the mouse immune system, specifically both the cellular and humoral immune response *in vitro* (Aurasorn Saraphanchotiwitthaya *et al.*, 2008).

Antihypertensive Effect

Arif Ullah Khan *et al.* (2008) was screened the effect of TB in hypertension. After administration of TB, they observed that fall in the arterial BP of rats under anaesthesia. In isolated guinea-pig atria, inhibition of force and rate of atrial contractions noted. In rabbit thoracic aorta, relaxation was observed after the induction of contractions which was induced by phenylephrine (Arif-Ullah Khan and Anwarl Hassan Gilani, 2008) Anti salmonella activity Madani *et al.*

(2008) were studied the effect of *T. belerica* against *Salmonella typhi* and *Salmonella typhimurium*.

Invitro cellular toxicity

In this study, Petroleum ether, chloroform, acetone, alcohol and aqueous extract of TB fruit taken for screening. When compared with other extracts both alcoholic and aqueous extracts of TB showed significant anti salmonella activity. There was no cytotoxicity was observed in invitro cellular toxicity study (Madani and Jain, 2008).

Anti Spasmodic and Bronchodialatory Properties

Anwarul Hassan Gilani *et al.* (2008) were postulated that the crude extract of TB fruits elicited relaxation of spontaneous contractions in both isolated rabbit jejunum and guinea-pig ileum. Protective effect of TB against castor oil-induced diarrhea and carbachol-mediated bronchoconstriction also observed in rodents. In guinea pig trachea, TB relaxed the CCh induced contractions (Anwarul Hassan Gilani *et al.*, 2008).

Hepatoprotective activity

Sangeetha Shukla *et al.* (2006) were evaluated the protective effect of TB fruit extract and its active principle, Gallic acid against CCl₄ intoxication. Treatment with extract (200, 400 and 800mg/kg, p.o.) and gallic acid (50, 100 and 200 mg/kg, p.o.) showed dose dependent recovery in biochemical parameters such as SGOT, SGPT and lipid peroxidase, glutathione but the effect was more pronounced with gallic acid.²³

Anti microbial activity

Elizabeth *et al.* (2005) were conducted the antimicrobial activity of TB against 9 human microbial pathogens. The Aqueous extract of dry fruit at 4 mg concentration showed highest zone of inhibition against *S. aureus*. These pathogens were highly sensitive to the methanol extract also except *E. coli* (enteropathogen) and *P. aeruginosa*. Finally they concluded that TB dry fruit possesses potential broad spectrum antimicrobial activity²⁴

THERAPEUTIC USES

Vibhitaki is used primarily to lower kapha-related diseases and respiratory disorders, such as coughs and bronchitis. Diseases are said to fear it because of its strong purgative action throughout the body. It can expel stones or other kapha-type accumulations in the digestive, urinary, and respiratory tracts. It is also a strong rejuvenator of the body, especially for the voice, vision, and hair. One third of the classic formulation Triphala, and renowned as cleanser and nourisher of kapha dosha, it is used in all types of kapha imbalances and is especially helpful in supporting the organs and tissues where kapha tends to accumulate. These include the lungs, liver and urinary tract as well as the sinuses, ears, eyes and throat. In Western terms its pharmacological actions includes being an astringent, lung tonic, urinary systemic tonic, rejuvenative, expectorant, laxative, anthelmintic, antiseptic, lithotriptic; purgative (in some individuals in high doses); anti-inflammatory, antiviral; anticholesterol and immunomodulator. It is extremely astringent (and to a lesser degree, sweet) in

taste and has the qualities of being dry and light, all of which help to balance the inherent damp and heavy qualities of kapha. Bibhitaki also helps maintain balanced body fluid levels while toning and cleansing the colon. Oddly enough, its virya is hot and its vipaka is sweet, and equally oddly, it is both a laxative and an astringent, and in lower doses is used to treat diarrhea (laxative properties are apparent in higher doses). Though energetically 'hot,' it does not aggravate pitta. It is useful in treating disorders relating to the manipura chakra (solar plexus) relating to function of abdominal nervous system. Bibhitaki enters into rasa, mamsa and ashti dhatus and into the anavaha, pranavaha, ambhuvaha, majjavaha, mutravaha and purishavaha srotas, and exhibits tropism for the head and throat area, as well as the brain.

Indications include renal or bladder calculi, respiratory disorders, pharyngitis and laryngitis, bronchitis, catarrh, chronic diarrhea and dysentery, Crohn's Disease, parasitic infestation, arthritis and rheumatism, eye disorders, mental disorders and vata-mediated insomnia. It is contraindicated for use in very high vata cases. Recent research shows that bibhitaki reduces levels of lipids (important dietary constituents that are insoluble in water; they contain vitamins and essential fatty-acids; in excess they cause fat buildup in the tissues) throughout the body and specifically lower the lipid levels in the liver and heart. This shows a strong action in preventing heart and liver fat congestion, which can lower the disease risk associated with those organs. Other studies indicate that bibhitaki has retroviral actions in inhibiting the viral growth in leukemia patients, and yet another study indicates the strong inhibiting effect bibhitaki has on the HIV virus.

As a daily rejuvenating and preventative supplement bibhitaki is superb, especially for kapha body types. Bibhitaki reduces excess body water, fat, and slowly regenerates the body on a tissue level. For people prone to viral infections, or a history of leukemia in the family, bibhitaki is a recommended daily supplement, alone or on the triphala formula. Kapha disorders: As we have already mentioned in our earlier posts, Kapha types are generally overweight and are prone to cough and cold due to the excessive mucous in the body. Bibhitaki helps in removing mucous from the digestive tract which leads to better absorption of nutrients by the body.

Digestion: Known to be as one of the best tonics for the digestive system, Bibhitaki Juice keeps the system clean and resolves the digestive functions. It helps in improving conditions such as anorexia and diseases such as piles and worms in the digestive system.

Respiratory System: Respiratory problems such as asthma, bronchitis and phlegm can be prevented by the Vibhitaki
Conjunctivitis: Applying Bibhitaki paste on the eye can be the best and quickest cure to any eye infections.

Cuts and Wounds: Applying Vibhitaki paste on cuts and wounds can prevent excessive bleeding.

Apart from these benefits, applying Bibhitaki paste on the hair and skin can prevent premature ageing. Sleeping disorders can also be cured with the consumption of Bibhitaki in any form
For painful Joints and muscles: This fruit has anti-inflammatory properties. The powder of vibhitaki has to be

mixed in warm oil. This oil is applied on aching muscle and joints to get a relief.

For dry and inflamed eyes: Ayurvedic physicians recommend the ghee processed with vibhitaki, amla and haritaki in treating dry and inflamed eyes.

For Cough, Cold and Bad throat: The small bits of pulp of dry vibhitaki fruit has to be fried in pure ghee. These bits have to be chewed slowly to get relief from cough, cold and sore throat.

Weight Loss: Since this fruit reduces kapha and Medhadhatu (body fat), it is used in weight reducing ayurvedic preparations. The weight reduction Kit contains herbal preparations which have this fruit as main ingredient.

Diabetes: Vibhitaki can be effectively used in diabetes. Since it normalises kapha and medhas (body fat), which are main causes for diabetes, it reduces fluctuating blood sugar level.

Erectile Dysfunction: Seeds of this plant are known to have aphrodisiac properties. Hence this fruit is used as an ayurvedic remedy for erectile dysfunction. Due to its weight loss aiding properties it can be efficiently used in erectile dysfunction due to obesity. Its blood sugar controlling properties help to use this herb in erectile dysfunction related to diabetes.

Irritable bowel Syndrome (IBS): The dry fruit powder of this fruit helps to reduce increased motility of intestines in IBS. It also helps to reduce the inflammation of walls of intestines.

Precaution: This herb should not be used in excess and pregnant women have to avoid consuming vibhitaki.

Conclusion

The extensive survey of literature revealed that Terminalia bellerica, is an important medicinal plant with diverse pharmacological spectrum. Terminalia bellerica is widely used in Ayurveda. The vast study done on the plant proved that the plant has many important phytoconstituents like Gallo-tannic acid, bellericanin, ellagic acid, gallic acid, termilignan, thanni lignan, flavone and anolignan B, Tannins, ellagic acid, ethyl gallate, galloyl glucose and chebulaginic acid, phenyllembin, β -sitosterol, mannitol, glucose, fructose and rhamnose. These compounds were found to be responsible for many of the pharmacological activities such as antimicrobial, antioxidant, antidiarrhoeal, antidiabetic, analgesic, immunomodulatory, antihypertensive, antisolmonella, hepatoprotective, antispasmodic and bronchodilatory activities. Further the plant is used in the treatment of gastric ulcer, constipation, general debility, piles. Hence, this plant provides a significant role in the prevention and treatment of a disease. Further evaluation needs to be carried out in order to explore the concealed areas and their practical clinical applications, which can be used for the welfare of the mankind.

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