



## A COMPREHENSIVE REVIEW OF AYURVEDIC MEDICINAL PLANT HARITAKI (*TERMINALIA CHEBULA* RETZ.) AND ITS PHARMACOLOGICAL ACTIONS

Deborshi Ganguly<sup>1</sup>, Abdur Rahaman<sup>2</sup>, Sujeet Kishore Roy<sup>3</sup>

<sup>1</sup>Assistant Professor Department of Dravyaguna Vigyan, Aligarh Ayurvedic Medical College & ACN Hospital Aligarh Uttarpradesh.

<sup>2</sup>Assistant Professor Department of Dravyaguna Vigyan, Aligarh Ayurvedic Medical College & ACN Hospital Aligarh Uttarpradesh.

<sup>3</sup>Assistant Professor, Department of Dravyaguna Vigyan, Dayananda Ayurvedic Medical College and Hospital, Siwan, Bihar, India

Corresponding Author: [abdur.rahaman1991@gmail.com](mailto:abdur.rahaman1991@gmail.com)

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### ABSTRACT

The drug *Haritaki* (*Terminalia chebula* Retz.) belongs to the family Combretaceae is used since ancient times for therapeutic purposes in various ailments. It has been widely used in the traditional Indian medical system of *Ayurveda* for the treatment of a variety of ailments. *Ayurvedic* scholar *Acharya Bhavprakash* described the *Haritaki*<sup>1</sup> as the first drug in *Bhavprakash Nighantu*. It is called the King of Medicines in Tibet and is always listed first in the *Ayurvedic* Materia medica because of its extraordinary powers of healing with a wide spectrum of biological activity. *Haritaki* has five *Rasa* (taste) except *Lavana* (salt), its *Vipaka* (taste after digestion) *Madhura* (sweet) and *Veerya* (potency) is *Ushna* (hot). Due to these virtues, the plant performs various pharmacological actions such as *Rasayana* (rejuvenating), *Medhya* (brain tonic), *Deepana* (appetizer), *Amapacana* (digesting *Ama* or toxins), and *Srotas sodhana* (cleaning the channels by detoxifying the metabolic waste.) It helps to improve physical and mental health, prevents degeneration, extends youth, and delays aging or rather reverses the aging process. Nowadays different modern research has revealed its chemical components and pharmacological activities. The main phytochemical of *Haritaki* is chebulic acid, gallic acid, corilagin, chebulagic acid, ellagic acid, chebulinic acid, triterpe-

noids, and anthraquinones. It performs various therapeutical actions like antimicrobial, anti-inflammatory, antioxidant, anti-diabetic, hepatoprotective, anti-mutagenic, anti-proliferative, radio-protective, cardio-protective, etc.

**Keywords:** Haritaki, *Terminalia chebula*, phytoconstituents, pharmacological activities, Nighantu.

## INTRODUCTION

Ayurveda believed to be the ancient form of healthcare, gives a holistic approach to health, and healing main health care requirements. Ancient medical systems all over the world practice herbal preparations as an important resource for the finding of modern drugs. During screening numerous therapeutic plants, investigators exposed one of the best-valued therapeutic plants i.e., *Terminalia chebula* which possesses many therapeutic activities because of diverse ingredients.

*Terminalia chebula* (local name: haritaki, family Combretaceae) is a common medicinal plant used in folk medicines like Unani, Ayurveda, and homeopathy. *T. chebula* has many medicinal properties and has been conventionally employed for the management of sore throat, high cough, asthma, ulcers, gout, heart burn, vomiting, diarrhea, dysentery, bleeding piles, and bladder diseases. The main phyto-chemical of *Haritaki* is chebulic acid, gallic acid, corilagin, chebulagic acid, ellagic acid, chebulinic acid, triterpenoids, and anthraquinones. The plant has been proved to exhibit many medicinal and pharmacological activities, for instance antidiabetic, antimicrobial, antioxidant, anti-mutagenic, anti-proliferative, anti-inflammatory, cardioprotective, and wound healing.

**Botanical Name-** *Terminalia chebula* Retz.

### Taxonomical Classification:

- ❖ Kingdom- Plantae
- ❖ Division- Tracheophyta
- ❖ Subdivision- Spermatophytina
- ❖ Class- Magnoliopsida
- ❖ Superorder- Rosanae
- ❖ Order- Myrtales
- ❖ Family- Combretaceae
- ❖ Genus- *Terminalia*
- ❖ Species- *Terminalia chebula* (Gaertn.) Retz.

**Natural Order-** Combretaceae

**Classical Names-**

*Haritaki, Abhaya, Pathya, Kayastha, Putana, Haimavati, Avyatha, Chetaki, Shiva, Vayastha, Rohini.*

### Vernacular Names-

Sans. : *Abhaya, Kayastha, Siva*

Assam. : *Shilikha*

Beng. : *Haritaki*

Eng. : *Myrobalan*

Guj. : *Hirido, Himaja*

Hindi: *Harad*

Kan.: *Alalekai*

Kash. : *Halela*

Mal. : *Katukka*

Mar.: *Haritaki*

Ori. : *Harida*

Punj. : *Harar*

Urdu: *Halela*

### Literature Review- [A]

#### Samhita Kala:

#### Haritaki (*Terminalia chebula* Ritz.) in Brihatrayi

In *Charaka samhita*, *Haritaki* was mentioned with synonyms i.e., *Abhaya, Amrita, Pathya, Vijaya, Shiva*, And *Haritaki*. It is described among *Arshoghna, Kushthaghna, Virechanopaga, Hikkani-grahana, Kasahar, Jvarahar, Prajasthapana, Vayah-Sthapana Mahakashaya*. In this *Samhita*, *Haritaki* is indicated in *Jvara, Prameha, Kushtha, Unmada, Apasmara, Krimi Roga, Pandu, Grahani, Visha, Madatyaya*, and *Bhutatadha*, etc.

In *Sushruta samhita* *Vachadi, Mushkakai, Parushakadi, Mustadi, Haritkyadi, Triphaladi & Amalakyadi Gana*. *Haritaki* was mentioned with synonyms i.e., *Abhaya, Amrita, Pathya, Vijaya*, and *Haritaki*. It is indicated in *Kushtha, Kandu, Apasmara Unmad, Pandu, Bhagandara, Garavisha, Pliha Roga, Urus-tambha, Gandamala, Nadi Vrana, Netra Roga, Rak-tapitta, Prameha*, etc.

In *Ashtanga Samgraha*, *Vagbhatta* has mentioned it in *Parushakadi Gana, Vachadi Gana, Mustadi Gana*

etc..While in *Ashtanga Hridaya*, *Haritaki* was mentioned with synonyms i.e., *Abhaya*, *Pathya*, *Pranada*, *Vijaya*, *Shiva*, and *Haritaki*. it is indicated in *Garbhadosha*, *Raktagulma*, *Kshata*, *Shukra*, *Timira*, *Visha*, *Vrana*, *Ajirna*, *Kushtha*, *Tvakdosha*, *Shopha*, and *Udar Roga*, etc.

**Kashyap Samhita** (6<sup>th</sup> century) While describing the treatment of *Anaha roga*, the composition of *Haritaki* along with some other drugs taken with cow's milk or urine. (*Ci./Udawartha/4*)

*Haritaki* in granular form is one of the ingredients of the drug —*Mahaavayaristha*, described by Ach. Kaashyapa, when taken upto one-year cures *Kaphaj roga*. (*Ci./Rajayakshma/21*)

**Bhela Samhita** (7<sup>th</sup> century A.D.) While describing the intake of *Triphala*, *Haritaki* was described to take after food (*Su. 8/19*). *Haritaki* is one of the ingredients of the drug *Musthadi churna*, which is *Aamanasak*. (*Su. 10/18*). While describing the treatment of *Vishamjwara*, *Haritaki* is mentioned as one of the ingredients of the drug *Trayushanadi ghrita*, also useful in *Grahani*, *Arsha*, *Dipana*, *Vatagulma*. (*Ci. 2/23-26*).

**Chakradatta** (11<sup>th</sup> century A.D.): In the chapter on *Jwara chikitsa*, in *Aamalakyaaadi* decoction *Haritaki* is one of the ingredients for *Kapahajwara*. (*jwara/106*). In the chapter on *Atisaara*, *Haritaki* is one of the constituents used for the preparation of *Haridraadi pravriti churna* used in the cases of *Aamatisaara*. (*Atisaara/27*).

**Sarangadhar Samhita** (14<sup>th</sup> century) *Haritaki* is one of the *Anulomana* drugs described in *Dipanapachanadi* chapter. (*Pra. kha.4/3-4*) In the next part of the same chapter, while describing *Rasayana* drug, *Haritaki* is one of the drugs. (*Pra. kha.4/13-14*) In the third part of the same chapter, *Haritaki* is described as *Sukhrasosana dravya* (dries of semen). (*Pra.kha.4/17*).

**Rasendrasār sangraha** (16<sup>th</sup> century) *Rukmiso rasa* contains *Haritaki* as one of the ingredients, indicated in constipation, abdominal disorders, fistula on ano, piles, etc. (*2/Vireka/8-12*) Powder of *Lodhra*, *Musta*, *Abhaya* taken in equal portions decocted in water added with honey useful in *Sarva meha* (all urinary disorders). (*2/Jwara/26*) *Haritaki* is one of the constituents

of the drug *Jwaramurari rasa*, indicated to relieve the fever instantly. (*2jwara/35*)

**Yogaratanākar** (17<sup>th</sup> century A.D.) In the next verse, the properties of *triphalā* are described as *Sotha*, *Prameha*, malarial fever, *Kaphapitta*, and *Kustha rasayana*, and when consumed with honey and ghee beneficial for the eye. (*Pur./pg.113*) A combination of *Haritaki*, *Sunthi*, and jaggery is known as *Trishama* or *Shamatrika*. (*Pur./pg.116*).

**Bhaishajaya Ratnawali** (18<sup>th</sup> century A.D.) Regular intake of *Haritaki* along with *Naagara* or jaggery or rock salt stimulates the power of digestion. Also, regular intake of *Pathya* along with jaggery cures *Aama* type of indigestion. (*10/9- 10*) In the next part of the same chapter use of *Haritaki* to cure four types of indigestion, dysentery, *Gulma*, *Agnimandhya*, etc is also mentioned (*Haritaki prayoga*). (*10/256-259*) *Amrita haritaki* is used in indigestion, anorexia, colic, piles, belching, *Vaata disease*, *Grahani*, and *Gulma*. (*10/260-263*)

#### [B] *Nighantu Kala*

**Saushruta nighantu** (6<sup>th</sup> Cent.) This *Nighantu* was written by *Acharya Saushruta* based on *Susruta samhita*. In this *Nighantu*, *Haritaki* has been described in *Mushkakadi gana*. *Abhaya*, *Pathya*, *vijaya*, *amrita*, *pranada*, and *nandini* are the synonym of it.

**Ashtanga nighantu** (8<sup>th</sup> Cent.) *Ashtanga nighantu* was written by *Vahatacharya*. In this *nighantu*, *Haritaki* has been described in *Parushakadi gana*. Its synonym described here are *Pranada*, *Putana*, *Amogha*, *Abhaya*, *Jaya*, *Pathya*, *Amrita*, *Haimavati*, *Pinditaka*, *Kayastha*, and *Rohini*.

**Dhanvantari nighantu** (10<sup>th</sup> Cent.) It was written by *Mahendra Bhaugik*. At the beginning of *Nighantu*, the author pays homage to lord *Dhanawantari* and again he mentions its name as *Dravyavali*. At the end of *Dravyavali* author desires to describe the drugs of *Dravyavali* with their synonyms and after that, he has described their properties and actions along with synonyms. *Haritaki* has been placed in *Guduchyadi Varga* And *Abhaya*, *Pathya*, *Prapathya*, *Putana*, *Amrita*, *Jaya*, *Avyatha*, *Haimavati*, *Vayastha*, *Chetaki*, *Shiva*, *Pranada*, *Nandini*, *Rohini*, and *Vijaya* have been given as its synonym. Regarding its properties, it has been

said as *Kashaya*, *Amla*, *Katu*, *Tikta*, and *Madhura* in *Rasa*. It is indicated in *Lekhana Karma*, *Medhya Karma*, *Chakshuroga*, *Meha*, *Kushtha*, *Vrana*, *Vamana*, *Shopha*, *Vatarakata*, *Mutrakrichchhra* and *Indriyaprasadana*.

**Madanapala nighantu** (14th Cent.) This *Nighantu* was written by *Madanpal*. In this *Nighantu*, *Haritaki* has been found in *Abhayadi varga*. Following is the synonym of *Haritaki* are *Shiva*, *Pathya*, *Chetaki*, *Vijaya*, *Jaya*, *Putana*, *Prapathya*, *Prathama*, *Amogha*, *Kayastha*, *Pranada*, *Amrita*, *Jivaniya*, *Hemavati*, *Vritana*, *Abhaya*, *Vayahastha*, *Nandini*, *Shreyasi* and *Rohini*. Regarding its properties, it has been said as *Kashaya*, *Katu*, *Tikta*, *Amla*, *Madhura Rasa*, *Ruksha Guna*, and *Ushna virya*. It is indicated in *Dipana*, *Medhya*, *Vrishya*, *Chakshushya*, *Brimhana*, *Shvasa*, *Kasa*, *Jvara*, *Prameha*, *Gulma*, *Arsha*, *Kushtha*, *Shopha*, *Udararoga*, *Krimi*, *Grahani*, *Vibandha*, *Vishama Jvara*, *Gulma*, *Adhmana*, *Vrana*, *Hikka*, and *Kandu*.

**Raj nighantu** (14th Cent.) This book is written by *Narhari Pandit*, who added the first *Dravyaguna* in *Astanga Ayurveda* and also gives it first place in *Astanga Ayurveda*. This book is particularly based on the *Dhanwantari nighantu*. The subject matter has been divided into 23 chapters. *Haritaki* is included in *Amradi varga* in this *Nighantu*. *Haimavati*, *Jaya*, *Abhaya*, *Shiva*, *Avyatha*, *Chetanika*, *Rohini* *Pathya*, *Prapashtya*, *Putana*, *Amrita*, *Jivapriya*, *Jivanika*, *Jivanti*, *Pranada*, *Jivya*, *Kayastha*, *Shreyasi*, *Devi*, *Divya*, and *Vijaya* have been given as its synonyms. Its *Rasa* has been mentioned as *Kashaya*, *Katu*, *Tikta*, *Amla*, *Madhura*.

**Bhava prakasha nighantu** (16th Cent.) This *Nighantu* was written by *Acharya Bhavmishra*, *Haritaki* has been described in *Haritakyadi varga* and the following synonyms are found in this *Nighantu*- *Abhaya*,

*Pathya*, *Kayastha*, *Putana*, *Amrita*, *Haimavati*, *Avyatha*, *Chetaki*, *Shreyasi*, *Shiva*, *Vayastha*, *Vijaya*, *Jivanti*, and *Rohini*. Its *Rasa* has been mentioned as *Kashaya*, *Katu*, *Amla*, *Madhura* and *Tikta Rasa*, *Laghu* and *Ruksha Guna*, *Ushna Virya* and *Vipaka Madhura*. It is indicated in *Dipana*, *Medhya*, *Rasayana*, *Chakshushya*, *Anulomana*, *Shvasa*, *Kasa*, *Prameha*, *Arsha*, *Kushtha*, *Shotha*, *Udararoga*, *Krimi*, *Grahani*, *Vibandha*, *Vishamajvara*, *Gulma*, *Adhaya mana*, *Chhardi*, *Hikka*, *Kamla*, *Shula*, *Anaha*, *Pliha Roga*, *Ashmari*, *Mutrakrichchhra* and *Mutraghata*.

**Shaligrama nighantu** (19th Cent.) In this *Nighantu*, *Haritaki* has been placed in *Haritakyadivarga* and *Abhaya*, *Pathya*, *Kayastha*, *Putana*, *Amrita*, *Haimavati*, *Avyatha*, *Chetaki*, *Shreyasi*, *Shiva*, *Vayastha*, *Vijaya*, *Jivanti* and *Rohini* are said as its synonyms. Its *rasa* has been mentioned as *Kashaya*, *Amla*, *Madhura* *Tikta* and *Katu* in *Rasa*; *Laghu* and *Ruksha guna*, *Ushna virya* and *Vipaka madhura*. It is indicated in *Dipana*, *Medhya*, *Rasayana*, *Chakshushya*, *Anulomana*, *Shvasa*, *Kasa*, *Prameha*, *Arsha*, *Kushtha*, *Shotha*, *Udararoga*, *Krimi*, *Grahani*, *Vibandha*, *Vishamajvara*, *Gulma*, *Adhayamana*, *Chhardi*, *Hikka*, *Kamla*, *Shula*, *Anaha*, *Pliha*, *Ashmari*, *Mutrakrichchhra* and *Mutraghata*.

**Priya nighantu** (20th Cent.) This book was written by *Acharya Priyavrata Sharma*, in this *nighantu*, *Haritaki* was mentioned in *Haritkyadi varga*, and *Haritaki*, *Abhaya*, *Kayastha* has been included as its synonym. Regarding its properties, it has been said to as *Pancarasa* and *Alavana* in *Rasa*. It is *Tridosahara* and indicated in *Dosha Anulomana*, *Dipana*, *Pachana*, *Arsha*, *Gulma*, *Udavarta*, *Anaha*, *Udararoga*, *Shotha*, *Pandu*, *Svarabheda* and *Kasa*.

**Table 1: Showing Different Ayurvedic texts have been mentioned Haritaki with its various synonyms<sup>2</sup> as-**

Syn	C.S <sup>3</sup>	S.S <sup>4</sup>	A.H <sup>5</sup>	BP.N <sup>6</sup>	A.K <sup>7</sup>	S.N <sup>8</sup>	K.N <sup>9</sup>	M.N <sup>10</sup>
<i>Abhaya</i>	+	+	+	+	+	+	+	+
<i>Amogha</i>	-	-	-	-	-	-	+	+
<i>Amrita</i>	+	+	+	-	+	-	+	+

Avayatha	+	-	-	-	+	-	+	-
Chetaki	-	-	-	-	+	-	+	+
Haimavati	-	-	-	-	+	-	+	+
Haritaki	+	+	+	+	+	+	+	+
Jivaniya	-	-	-	-	-	-	+	+
Jivanti	-	-	-	-	-	-	-	-
Jayaa	-	-	-	-	-	-	-	+
Nandini	-	-	-	-	-	+	-	+
Kayastha	+	-	+	-	+	-	+	+
Pathya	+	+	+	+	+	+	-	-
Pramathya	-	-	-	-	-	-	+	-
pramatha	-	-	-	-	-	-	+	+
Pranada	-	-	-	-	-	+	+	+
Putana	-	-	-	-	+	-	-	+
Shivaa	+	-	+	-	+	-	-	-
Shreyashi	-	-	-	-	+	-	-	+
Rohini	-	-	-	-	-	-	-	+
Vayastha	+	+	-	-	-	-	+	-
Vijaya	+	+	+	-	-	+	+	+

**Note-**C.S-Carak Samhita,S.S-Susrut Samhita,A.H.-Astanga Hridaya,BP.N.-Bhavprakash Nighantu,A.K.- Amar kosh, S.N.-Soushrut Nighantu,K.N.-Kaidev Nighantu, M.N.-Madanpal Nighantu. ‘+’ denotes present, ‘-’ denotes absent.

**Table 2 Showing Properties of Haritaki According to Different Nighantu:**

Sl.No	Properties	DN	RN	KN	BPN	SN	MN	PN
1.	Rasa							
	Madhur	+	+	+	+	+	+	+
	Amla	+	+	+	+	+	+	+
	Katu	+	+	+	+	+	+	+

		<i>Tikta</i>	+	+	+	+	+	+	+
		<i>Kasaya</i>	+	+	+	+	+	+	+
2.	<i>Guna</i>	<i>Ruksha</i>	+	+	+	+	+	+	-
		<i>Laghu</i>	+	-	+	+	-	-	+
3.	<i>Virya</i>	<i>Ushna</i>	-	+	+	+	+	+	+
4.	<i>Vipak</i>	<i>Madhur</i>	-	-	+	+	-	+	-

**Note-**DN-Dhanantari Nighantu, RN- Raj Nighantu, KN- Kaiyadev Nighantu, BP.N- Bhavprakash Nighantu, SN- Shaligram Nighantu, MN-Madanpal Nighantu, PN- Priya Nighantu ‘+’ denotes present, ‘-’ denotes absent

**Table 3 Showing The action of Haritaki according to different Nighantu:**

Sl.No	Action	DN	RN	KN	BPN	SN	MN	PN
1.	<i>Balya</i>	+	-	-	+	-	-	-
2.	<i>Medhya</i>	+	-	-	-	+	+	-
3.	<i>Netra</i>	+	+	+	+	+	+	+
4.	<i>Brimhan</i>	-	-	+	+	-	+	-
5.	<i>Dipan</i>	-	-	+	+	+	+	+
6.	<i>Pachan</i>	-	-	+	+	+	+	+
7.	<i>Virechan</i>	-	+	-	+	+	-	-
8.	<i>Rasayan</i>	-	+	+	+	+	+	
9.	<i>Anuloman</i>	+	+	+	+	+	+	+
10.	Action on <i>Dosha- Tridosha saman</i>	+	+	+	+	+	+	+

**Note-** DN- Dhanantari Nighantu, RN- Raj Nighantu, KN- Kaiyadev Nighantu, BP.N- Bhavprakash Nighantu, SN- Shaligram Nighantu, MN- Madanpal Nighantu, PN- Priya Nighantu ‘+’ denotes present, ‘-’ denotes absent.

**Table 3 Showing the Therapeutic uses of Haritaki according to different Nighantus:**

Sl.No.	Therapeutic uses	DN	RN	KN	BPN	SN	MN	PN
1.	<i>Meha</i>	+	-	+	+	-	-	-
2.	<i>Kustha</i>	+	-	+	+	+	+	-
3.	<i>Vrana</i>	+	-	+	+	+	+	-

4.	Vamana	+	-	+	+	+	+	-
5.	Sotha	+	-	+	+	+	+	+
6.	Mutra kriccha	+	-	-	-	-	+	-
7.	Hridroga	+	-	+	+	+	-	-
8.	Anaha	-	-	+	+	+	+	+
9.	Kamala	-	-	+	+	+	+	-
10.	Grahani	-	-	+	+	+	+	+
11.	Arsha	-	-	+	+	+	+	+
12.	Adhman	-	-	+	+	+	+	+
13.	Kasa	-	-	+	+	+	+	+
14.	Swas	-	-	+	+	+	+	+
15.	Gulma	-	-	+	+	+	+	+
16.	Udarroga	-	-	+	+	+	+	+
17.	Udavarta	-	-	-	+	+	+	+
18.	Visama Jvar	-	-	+	-	-	-	-
19.	Shool	-	-	+	+	+	+	-
20.	Indriya Prasadani	+	-	-	-	-	-	+

**Note-** DN- Dhanantari Nighantu, RN- Raj Nighantu, KN- Kaiyadev Nighantu, BP.N- Bhavprakash Nighantu, SN- Shaligram Nighantu, MN- Madanpal Nighantu, PN- Priya Nighantu.

### Botanical Description-

*Terminalia chebula* is a medium to large-sized deciduous tree growing up to the height of 25-30 mt and a diameter of the trunk of this tree is 1 mt. This plant matures with numerous branches and a rounded crown. The bark of this medicinal plant is dark brown with longitudinal cracks. Leaves are oval or elliptic, 7-8 cm long, alternate or sub-opposite in direction with a petiole of 1-3cm. These are oblique and unequal at the

base and have 5-8 pairs of veins. The fruit of this plant is ovoid drupe, broad, blackish, and has five longitudinal ridges. Flowers have dulled white to yellow color with a strong and unpleasant odor. Its flowers are hermaphrodite and its fruits are yellow to orange, brown in color. The flowering of this Indian medicinal plant appears between April and August and the plant bears fruits from November to January.



Fig 1- Haritaki fruits with leaves Fig 2- Haritaki whole plant



Fig 3- Haritaki dry fruit Fig 4- Haritaki leaves

## DISCUSSION

It is found throughout the greater parts of India, from Ravi eastwards to West Bengal and Assam, Orissa, Madhya Pradesh, Maharashtra, Deccan, and South India.

### Parts Used-Fruits

### Action and Uses-

Fruits are astringent, sweet, acrid, bitter, sour, thermogenic, anodyne, anti-inflammatory, vulnerary, stomachic, laxative, purgative, carminative, digestive, anthelmintic, cardiogenic, aphrodisiac, antiseptic, diuretic and tonic. They are useful in wounds, ulcers, inflammations, skin diseases, leprosy, stomatitis, hyperacidity and associated gastric disorders, anorexia, indigestion, flatulence, constipation, haemorrhoids, jaundice, hepato-splenomegaly, other abdominal diseases, helminthiasis, anaemia, delirium, pharyngitis, hiccup, dyspnea, cough, asthma, urinary disorder, vesical and renal calculi, soft chancre, seminal defects, narcosis, fainting, epilepsy, ophthalmic diseases, car-

diac disorder, filerina, obesity, neuropathy, rheumatoid arthritis, general debility.

### Ayurvedic Properties<sup>11</sup>

*Rasa- Kasaya, Katu, Tikta, Amla, Madhura*

*Guna- Laghu, Ruksa*

*Virya- Usna*

*Vipaka- Madhura*

*Prabhava- Tridoshashamaka*

**Doshagnata-** Tridoshashamaka, especially vatashamaka.

**Rogagnata-** Vatavyadhi, Shotha- vedanayuktavikara, Vrana, Mukharoga, Kantharoga, Nadidaurbalya, Mastishkadaurbalya, Netraabhishyanda, Drishtimandya, Indriyadaurbalya, Agnimandya, Shoola. Anaha, Gulma, Vibandhya, Udararoga, Arsha, Kamala, Yakritpleehavidhi, Krimiroga, Hriddaurbalya, Vatarakta, Raktavikara, Shotha, Pratishyaya, Kasa, Swarabheda, Hikka, Shwasa, Prameha, Shukrameha, Shwetapradara, Mootrakrichchhra, Mootraghata, Ashmari, Prameha, Kushtha, Visarpa, Twagdoshha, Jeerna jwara.



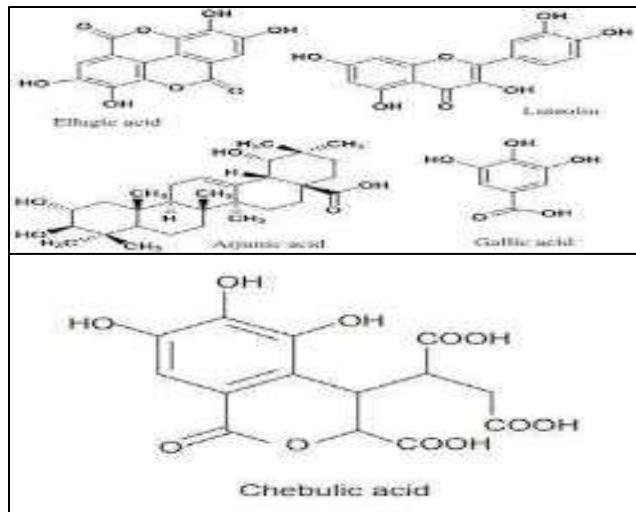
**Karma-** Shothahara, Vedanasthapana, Vranasodhana, Vranaropana, Nadibalya, Medhya, Chakshushya, Deepana, Pachana, Anulomana, Mridurechana, Krimighna, Grahi, Kaphaghna, Srotah-shodhana, Vrishya, Prajasthapana, Mootrala, Kushthaghna, Rasayana.

#### Pharmacognosy-

Intact fruit yellowish-brown, ovoid, generally 20-35 mm long, 13-25 mm wide, wrinkled, and ribbed longitudinally. The pericarp is fibrous, 3-4 mm thick, non-adherent to the seed. Taste astringent. The transverse section of the pericarp shows an epicarp consisting of one layer of epidermal cells, an inner tangential, and the upper portion of the radial wall thick. Mesocarp consists of 2-3 layers of collenchyma, followed by a broad zone of parenchyma in which fibres and sclereids in group and vascular bundles are scattered. Fibres have peg-like outgrowth and simple pitted walls. Sclereids are of various shapes and sizes but are mostly elongated. Tannins and raphides are present in the parenchyma. Endocarp consists of thick-walled sclereids of various shapes and sizes, mostly elongated. The epidermal surface view reveals polygonal cells, uniformly thick-walled, several of them divided into two by a thin septum. Starch grains are simple, rounded, or oval in shape measuring 2-7 $\mu$  in diameter, and found in plenty in all cells of the mesocarp.

#### Chemical Constituents-

Anthraquinone glycoside, chebulinic acid, chebulagic acid, tannin acid, terchebin, vitamin C (fruits); arachidic, behenic, linoleic, oleic, chebulin (flowers); 2- $\alpha$ -hydroxymicromeric acid, maslinic acid, and 2- $\alpha$ -hydroxyl ursolic acid (leaves).



#### Pharmacological activities-

##### Antibacterial activity-

*Terminalia chebula* exhibited antibacterial activity against a number of bacterial species<sup>12</sup>. One group of researchers found that it is effective in inhibiting the activity of *Helicobacter pylori*, a ubiquitous bacterium implicated in the development of gastritis, ulcers, and stomach cancers<sup>13</sup>. Antibacterial activity of *Terminalia chebula* against both Gram-positive and Gram-negative human pathogenic bacteria has also been reported. Gallic acid and its ethyl ester isolated from the ethanolic extract of *Terminalia chebula* showed antimicrobial activity against methicillin-resistant *Staphylococcus aureus*<sup>14</sup>. Diffusate of *Terminalia chebula* showed an inhibitory effect against strain XC-100 of the bacterium *Xanthomonas Campestris* pv. Citri indicates its usefulness for the management of citrus canker disease. It has also growth inhibitory action against *Salmonella typhi* and intestinal bacteria.

##### Antifungal activity:

An aqueous extract of *Terminalia chebula* exhibits antifungal activity against a number of dermatophytes and yeasts<sup>15,16</sup>. It is effective against the pathogenic yeast *Candida albicans* and dermatophytes *Epidermophyton*, *Microsporum gypseum*, and *Trichophyton rubrum*. Its inhibitory effect on three dermatophytes (*Trichophyton* spp.) and three yeasts (*Candida* spp.) has also been documented.

##### Antidiabetic activity-

*Terminalia chebula* fruit exhibited a dose-dependent reduction in blood glucose of streptozotocin-induced diabetic rats both in short-term and long-term study<sup>17</sup>.

##### Antispasmodic activity-

One of the numerous studies of *Terminalia chebula* demonstrated its anti-vata or anti-spasmodic properties by the reduction of abnormal blood pressure as well as intestinal spasms. This confirms its traditional usefulness for spastic colon and other intestinal disorders<sup>18</sup>.

##### Wound healing activity-

Topical administration of an alcoholic extract of *Terminalia chebula* leaves on the healing of rat dermal wounds showed that *Terminalia chebula* treated wounds healed faster as indicated by improved rates of contraction and decreased period of epithelialization<sup>19</sup>.

##### Purgative property-

Purgative action of an oil fraction from *Terminalia chebula* has been documented<sup>20</sup>.

Hypolipidemic/ Hypocholesterolemic activity-

The hypolipidemic activity of *Terminalia chebula* extract against experimentally induced atherosclerosis has been documented<sup>21</sup>. It also possessed hypocholesterolemic activity against cholesterol-induced hypercholesterolemia and atherosclerosis in rabbits<sup>22</sup>.

#### **Toxicology-**

LD<sub>50</sub> of chebulin is reported to be 550 mg/kg in mice.

#### **Substitutes and Adulterants-**

*Terminalia citrina* Roxb. ex Flem, found in the foothills of the Himalayas from Nepal eastwards to Assam is called Haritaki in the Bengali language and its fruits have medicinal properties similar to that of *Terminalia chebula*. Hence, they are used medicinally as those of *T. chebula*.

**Dose** – 3-6 gm

#### **Formulations and Preparation-**

*Abhayamodaka, Abhayarishta, Pathyadi vati, Pathyadi kvatha, Vyaghriharitaki, Haritaki leha, Agastiharitaki, Dantiharitaki, Haritaki khanda, Pathyadi curna, Abhayadi guggulu, Amritaharitaki, Abhayadi kalka.*

#### **Propagation and Cultivation-**

It grows on a variety of soils but thrives best in clay and sandy soil from November to March depending upon the locality. Mostly fallen fruits are collected in the first half of January, they are dried, and the seeds are low because of hard cover and the seed requires presiding treatment. Best germination is obtained when the seeds are chipped at their broad end without damaging the embryo and then soaked in water for 36 hours before they are sown in nursery beds. Germination starts after 15 days and continues for 3 to 4 weeks. The tree can be successfully raised by direct sowing the seed or by transplanting the seedlings or by stem cuttings. It is observed that transplanting of 1-year seedlings grows better than cutting or direct seed-sown plants. The young plants require watering during 1<sup>st</sup> hot weather. The shelter is desirable in the early stages of the nursery and also after transplanting. The general growth of the plant is slow.

## **CONCLUSION**

*Terminalia chebula* is highly regarded as a universal panacea in *Ayurvedic* medicine. It is one of the most versatile plants having a wide spectrum of medicinal activities. The versatile medicinal plant is a unique source of various types of compounds having diverse chemical structures. Very little work has been done on the plausible medicinal applications of these compounds and hence extensive investigation is needed to exploit their therapeutic utility to combat diseases. A drug development programme should be undertaken to develop modern drugs with compounds isolated from *Terminalia chebula*. Although crude extracts from the fruit part of *Terminalia chebula* have had medicinal applications from time immemorial, modern drugs can be developed after extensive investigation of their bioactivity, mechanism of action, pharmacotherapeutics, toxicity, and after proper standardization and clinical trials. As the global scenario is now changing towards the use of nontoxic plant products having traditional medicinal use, the development of modern drugs from *Terminalia chebula* should be emphasized for the control of various diseases.

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