ISSN : 2249-5746

International Journal of Ayurvedic and Herbal Medicine 7:2(2017) 2508–2517

Journal homepage: http://www.interscience.org.uk

Ayurvedic and Modern aspect of *Terminalia chebula* Retz. *Haritaki* An Overview

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Abstract:

Due to globalization the Ayurvedic science has been reached to every corner of the world. This science of life is well accepted today by many of countries and positive response to Ayurvedic is increasing day to day. The use of herbal drugs for prevention and treatment of various health ailments has been practice since time immemorial *Terminalia chebula* Retz. (Family-Combretaceae) is traditionally recommended by the Indian Ayurvedic medicine for treatment of several disorders. According to Ayurveda, due to its Rasayana (rejuvenating), and Vayasthapana (age-sustaining) actions it provides long healthy life and fights against variety of diseases. It is endowed with diverse pharmacological activities like antidiabetic, anti arthritic, Hepatoprotective, antioxidant, anti plasmodia activity etc. It contains many important Phytochemicals such as chebulic acid, Gallic acid, ellagic acid, tannic acid, amino acids, flavonoids like luteolin, rutins and quercetin etc. It also consists of nutrients such as vitamin C, protein, amino acids and minerals. The present review is an effort to highlight the various traditional uses as well as Phytochemical and pharmacological activities reported so far from *Haritaki* which will surely help researchers to explore it at molecular level and pharmaceutical industries to develop a new product.

Keyword-Terminalia chebula , Haritaki, Phytochemical, pharmacological

Introduction

The practices of traditional medicine are based on hundreds of years of belief and observations and analysis, which help in the development of modern medicine. Today, there is widespread interest in herbal drugs.[1]Plants have been used in a number of systems of medicines in our country as well as in other countries. India is well known as the 'Emporium of Medicinal Plants.[2]

Terminalia chebula Retz.(Family Combretaceae) commonly known as *Haritaki* and found all over the different parts of India, such as Assam, Gujarat, Mumbai, Konkan, Malbar, Chennai. The tree is greats significance to the Hindu and the dried twigs of tree are used in various vanjnas. T. chebula is commonly known as black myroblans in English and harad in Hindi. The Terminalia consists of 250 species and widely distributed in tropical areas of the world.[3]This is one of the major components of wonder Ayurveda medicine known as Triphala Powder. *Haritaki* is known as "The King of Medicines". In Ayurveda, it is described t as kind of mother because "At times even mother becomes angry but Haritaki never causes a harm to a person who takes it". T. chebula is a medium to large deciduous tree, attaining a height of up to 30 m with wide spreading branches and a broad disk-shaped crown.[4] The Sanskrit name 'Haritaki" is rich with meaning, referring to the yellowish dye (haritak) that it contains, as well as indicating that it grows in the abode of god siva (Hari, that is the Himalayas) and that it cures (harayet) all diseases. Its other commonly used Sanskrit name, Abhaya, refer to the „fearlessness" it provides in the face of the disease.[5]

Synonyms Name[6]

Haritaki, Abhaya, Pathya, Hemvathya, Vayastha, Chetaki, Rohini, Vijaya, Shiva, Shreyasi, Jivanti

Vernacular Name[6]

Eng.-Chebulik myrobalan. **Hindi**-Harara, Harad, **Beng**.-Haritaki. **Gu**j.-Hardo. **Kan**- Harra, Karakkayi, Aalekayi. **Mal**- Katukka. **Mar**-Hirda, Hirda-phala, Bala hirade. **Punj**. - Har, Halela, Hurh, Harrar. **Tam**-Katukkay. **Tel**-Karakkaya, Karitaki. **Urdu**-Haejarad.

Raspanchaka of Haritaki[7]

Rasa (Taste) -Pancharasatmaka except Lawan rasa
Guna (Quality)-Laghu, Ruksha.
Veerya (Potency) - Ushna
Vipaka – Madhur

Haritaki – effect on Tridosha

Because of sweet, bitter and astringent tastes, it balances Pitta. Because of its pungent, bitter and astringent tastes, it balances Kapha. and because of its sour taste, Terminalia chebula balances Vata.
It is traditionally used in Kushta (skin diseases), Gulma (Abdominal tumor), Udavarta (bloating of abdomen), Shotha (inflammation), Pandu (Anemia, intial stages of liver diseases), Mada (delirium), Arsha(haemorrhoids), Shiroroga(diseases pertaining to head, headache), Atisara(diarrhoea, dysentery), Arochaka(anorexia), Kasa(cough, cold), Kaphapraseka (increased salivation due to Kapha dosha), kaamala (jaundice), Krimi (worm infestation, infection), Chardi(vomiting), Srotovibandha (obstruction to body channels), Pralepa, Hrudayoraso (stiffness of chest, heaviness of chest).

Ritu Haritaki[6]

Aacharya Bhavprakash mention Ritu Haritaki
For the purpose of Rasayan (rejuvenation, antiaging),Haritaki is taken along with different ingredients in different seasons. This regimen is called as Ritu Haritaki. Ritu means seasons.
Varsha Ritu- Haritaki is given along with saindhava
Sharad Ritu- It is given along with Sharkara
Hemanta Ritu-It is given along with Shunti.
Shishir Ritu- It is given with Pippali
Vasant Ritu- It is given with Madhu
Greeshma Ritu- It is given along with Guda.

Varieties

Aacharya Bhawprakash describes seven different varieties of Haritaki. [8]
Vijaya - Shape of Vijaya is alabu which used in all diseases, commonly found Vindahya Mountains
Rohini - Round in shape commonly used in Vrana, habitat in Zansi.
Pootana - Size is small, mesocarp is less, seed is bigger, externally used, habitate Sind.
Amirtha - Mesocarp is more used for Shodhanakarma
Abhya - Fruit having five ribbed mostly used in eye diseases, habitate champaranya
Jeevantee - Fruit is golden yellow, used in all diseases, habitate Himalaya.
Chetaki - Fruit having three ribs, used as purgative.

According To The Size Of The Fruit [9]

1. **Survari harade** - Large, dense and heavy about 2 inches long, yellowish-brown: when cut it contains yellowish or darkish brown, pulp and stone.
2. **Rangari harade** - Smaller, less wrinkled and less furrowed than the above variety; in length about an inch; the epidermis is yellow; when cut it a yellow dried pulp and stone is present. The pulp is less astringent than that the survari harade.
3. **Bala harade** - Smaller than the above two varieties. The colour is dark brown or black; highly wrinkled. Epidermis is dark or brown in colour. Their pulp dark and homogenous; there is no stone.
4. **Java harade** - these are the smallest of all. Other characters are similar to those of Bala harade.

How to test Haritaki fruit?

Chewing the Haritaki fruits causes increases in digestion power. If it is made into a paste and eaten , it clears and cleanses bowels. If it is steamed or boiled, it becomes absorbent, useful in mala absorption. If Haritaki

is taken after food, it helps to eliminate all the toxic effecta due to food poisoning. If taken with sugar , it balances pitta and if taken with ghee it balances vata disprders.[6]

Qualities of different parts of Terminalia chebula fruit

Haritaki seed kernel is sweet, the fiber part is sour, fruit rind is bitter, skin is pungent and seed is astringent in nature. It improve digestion strength, good for eyes, improves vision power, anti- aging, rejuvenative, improves life expectancy, nourishing , improves the body weight, helps in normalising bowel movements useful in asthma COPD, breathing difficulty, relieves cold and cough, Useful in diabetes and urinary tract disorders, useful in piles.[6]

Use of Haritaki in Hemorrhoids –

Haritaki helps to ease bowel movement, one of the complications in hemorrhoids. It helps in reducing the pile mass and reducing / stopping the bleeding. A sitz bath with – 2 tablespoons of Haritaki or Triphala powder, in half a bucket of water, for 10 minutes, before bath, is useful in reducing the swelling and healing. Kushtahara useful in skin diseases. Shothahara relieves inflammation. Udarahara useful in Ascites. Krimihara useful in worm infestation[6]

Use of Haritaki in Sleenomegaly

For the treatment of splenomegaly (Plihodara), Haritaki, in a dose of 3 – 5 grams once or twice a day, is administered along with 2- 3 grams of jaggery (Guda).[10]

Harad for vomiting treatment:

Kapha and Pitta chardi (Because the Doshas are aggravated in excess)
Along with honey, the powder of Abhaya – Terminalia chebula is given in a linctus form for the purpose of purgation. **–** Virechana treatment[11].

Effect of Haritaki on Sex[11]

It has Rasayana – anti ageing property. Almost all herbs with Rasayana property also possess aphrodisiac nature. So, Haritaki, in a small dose of 1 – 2 grams per day, for a period of 1 month increases sexual energy.
Haritaki, has astringent properties. This is useful in treating excess night-fall, wherein person loses some quantity of semen every day (night)
But on long term usage, because of its hot and astringent properties, Haritaki may cause decrease in sexual strength. That is why it is contra indicated in those who are emaciated due to increased sexual activity and alcohol.

Other uses of Haritaki

Haritaki is a natural laxative and contains dietary fibers which are digestive agents fights with constipation. Haritaki is a natural remedy for Constipation Patients. Haritaki is very useful in fighting with skin allergies. It treats skin allergies in the ears and nose caused by earrings and nose ring. Ornaments made of Gold and Silver don't cause any skin allergy but artificial jewelry made of metal cause allergies and skin rashes. Haritaki has antibacterial properties which make it very effective for treating acne and ulcers. Take haritaki powder and boiled water, make a paste and apply it on acne and ulcer spotted skin. Haritaki acts as an immunity booster and increases longevity if it's powder is taken regularly fried in ghee. Haritaki helps in regulating blood sugar levels and decreases insulin sensitivity in the body, so it is a very useful remedy Diabetes patients. One more thing as many diabetic medicines has side effects along with regulating blood sugar levels, but haritaki do not have any side effects at all.Haritaki is a natural blood purifier. It helps in remove toxins from the body and keeps digestive system on track as it contains dietary fibers which help in digestion of food.Taking Haritaki in the form of powder daily regulate hunger and combined with balanced diet and regular exercise will aid in weight loss naturally.[12]

Contra indications of Haritaki

Though Chebulic myrobalan has immense health benefits, due to its astringent and hot nature, it is contra indicated in a few cases. Haritaki is best avoided in People who have walked for very long and who are tired, Who have depleted immunity and strength, Who are feeling dry and are emaciated, having lean body who have fasted for long, In people with increased Pitta (burning sensation), in pregnant woman[6], After blood letting treatment, during and soon after menstruation, Kshut, Trishna, Ushnarta – who are having severe thirst, hunger and have got exposed o Sun for long, in patients suffering from indigestion[8], in people having dry mouth, in early stages of fever, in people with dry throat, in people with neck stiffness[13]

Important Formulations -

Triphala choorna, Triphaladi Taila, Abhayarishta, Agastya Haritaki Rasayana, Citraka Haritaki, Danti Haritaki, Dashmul Haritaki, Bramha Rasayana, Abhaya Lavan, Pathyadi Lepa[7]

Traditional Values Of Haritaki

Haritaki is termed as the mother of human being. As mother never does badly for her progeny similarly Haritaki never does badly for health of a fellow. Haritaki improve the working of digestive system, rejuvenates each and every part of the body; and remove the waste product from the body. It acts as a nerve tonic and improves eye sight. It is useful in loss of appetite, pain in abdomen, Constipation, Ascites, Haemorrhoids, Hepatomegaly, parasites. Haritaki used for skin disorder, it prevent accumulation of pus in skin disease and act as rasayana. Haritaki and oil is extremely helpful in healing of wound. Its local application is anti-inflammatory. In conjunctivitis Haritaki can be used for application on the eyelids. Haritaki also used for gargling in disease of mouth and throat. In certain part of India Haritaki oil used on the hair to prevent lice infection and dandruff. The unripe fruit is astringent and aperients, commonly used for dysentery and diarrhoea. The ripe fruit enriches the blood; good in ophthalmic, diseases of the spleen, piles, cold in the head; strengthens the brain, the eye, the gums; used in paralysis. Bala Haritaki is used for reducing the levels of total lipids, serum TG, serum cholesterol, LDL, and VLDL significantly. On the other hand level of HDL is increased, significantly. [14]

Dosage of Haritaki

1 – 6 grams of fruit powder along with required co-drink or ingredient, based on disease, once or twice a day.[7]

Taxonomical Classification

Botanical name: *Terminalia chebula* Retz
Kingdome-Plantae
Subkingdom- Angiosperms
Class-Monocotyledons
Subclass-Epigynae
Division: Magnoliopsida
Order: Myrtales
Family: Combretaceae
Genus: Terminalia
Species: Chebula

Habit And Habitat

Haritaki is found in the sub-Himalayan tracts to West Bengal and Assam, at the altitude of 1,500 m. in the Himalayas. In high-level rocky and dry places in the outer Himalayas and in the hills of Deccan and South

India it is a small tree[15] . In Maharashtra, it is common on the Deccan trap, and Mahabaleshwar hilly reason at an altitude of 1,370 m., it is one of the principal constituents of the low elfin-wood forest. [16]

Propagation And Cultivation

It grows on variety of soils but thrives best in clay and sandy soils the fruit ripen from November to March depending upon the locality. The fruit mostly collected in first half of January, and drying the seeds can stored for one year. The Germination is obtained because of chipped quality of seeds; hard cover seed requires presowing treatment. Germination starts after 15 days and continues for 3-4 weeks. Young plant required large amount of water during first hot season. The plant growth is slow. [17]

Morphology

A big tree, 25 to 30 metres in height. Its wood is hard and bulky. Leaves are 10-30 cm in length and are pointed. The vasculature of the leaves has 6 to 8 pairs of veins. The inferior aspect of the leaves show two small nodules near its attachment with the stalk. The flowers have short stalks, white or yellow in colour and have a strong smell. Fruits are 3 to 6 cms in length. Initially these are green but on ripening, they become yellowish brown. Each fruit contains one seed. Seeds are oval and hard. On breaking the shell of the seed, an oval shaped pulp is obtained. [18]

Description

Macroscopic

Fruit is yellowish-brown, ovoid, generally 20-35 mm long, 13-25 mm wide, wrinkled and ribbed longitudinally. Pericarp is fibrous, 3-4 mm thick, non-adherent to the seed; taste, astringent. [19] Externally it is shining and is adorned with longitudinal ridges. Internally the fruit is light yellow. [20]

Microscopic

Transverse section of pericarp consisting of one layer of epidermal cells, inner tangential and upper portions of radial wall thick. Mesocarp consists of 2-3 layers of collenchymas, containing a broad zone of parenchyma in which fibres and sclereids are in group and vascular bundles scattered; fibres with peg like out growth and simple pitted walls; sclereids of various shapes and sizes is elongated. Tannins and raphides in parenchyma; endocarp made up of thick- walled sclereids of various shapes and sizes, longer epidermal surface view reveal polygonal cells, uniformly thick-walled, divided into two by a thin septa; starch grains simple rounded or oval in shape, measuring 2-7 m diameter , found in plenty in almost all cells of mesocarp.[19]

Identity, Purity And Strength Of Haritaki From API

Foreign matter	Not more than	1 per cent,	Appendix 2.2.2.
Total Ash	Not more than	5 per cent,	Appendix 2.2.3.
Acid-insoluble ash	Not more than	5 per cent,	Appendix 2.2.4.
Alcohol-soluble extractive	Not less than	40 per cent,	Appendix 2.2.6.
Water-soluble extractive	Not less than	60 per cent,	Appendix 2.2.7.

CONSTITUENTS - Tannins, anthraquinones and polyphenolic compounds.

Phytochemical Properties

Haritaki consisted of several phytoconstituents like tannin, flavonoids, sterols, amino acid, fructose, resin, fixed oil etc [21]. It contains 33% of hydrolysable tannin which is responsible for pharmacological action. The chief components of tannin are chebulic acid, chebulinic acid, chebulagic acid, Gallic acid, corilagin and ellagic acid. Tannins of Haritaki are of pyrogallol (hydrolysable) type.Phytochemicals like anthraquinones, ethaedioic acid, sennoside, 4,2,4 chebulyl-d- glucopyranose, terpinenes and terpinenols have also been reported to be present.[22,23] Triterpenoids and their glycoside have been isolated from the stem bark of Haritaki.[24]

Pharmacological Properties

Anti-carcinogenic activity

The effect of 70% methanolic fruits extract of Haritaki was studied on growth of several malignant cell lines including a human (MCF-7) and mouse (S115) cell line of breast cancer, cell line of human osteosarcoma (HOS-1), cell line of a human prostate cancer (PC-3) and a non- tumorigenic, immortalized human prostate cell line (PNT1A) using assays for proliferation, cell viability (i.e.ATP determination) and cell death (flow cytometry and Hoechst DNA staining).). In all cell lines studied, because of the extract there is decreasing the cell viability, inhibiting cell proliferation, and induced cell death in a dose dependent manner [25]. Acetone extract of T. chebula has been reported to contain Phytochemicals with promising antimutagenic and ant carcinogenic properties [26]. One of the fractionated compounds from ethanolic fruit extract of T. chebula, chebulagic acid, showed potent dual inhibition against COX and 5-LOX. It also showed anti-proliferative activity against HCT-15, COLO-205, MDA-MB-231, DU-145 and K562 cell line. [27]

Antifungal activity

Aqueous extract of T. chebula show antifungal activity against a number of dermatophytes (e.g. Epidermophyton, Floccosum, Microsporum gypseum and Tricophyton rubrum) and yeasts (e.g. Candida albicans) [28,29,30]. Aqueous, alcoholic and ethyl acetate extracts of leaves of Haritaki was also tested against five pathogenic fungi (Aspergillus flavus, A. niger, Alternaria brassicicola, A. alternate and Helminthosporium tetramera) with the help of paper disc method.[31]

Antibacterial activity

Antibacterial activity of T. chebula exhibited against various Gram positive and negative bacteria such as Salmonella typhi, Staphylococcus epidermidis, Staphylococcus aureus, iBacillus subtilis and Pseudomonas aeruginosa suggesting its broad spectrum antimicrobial activity.[32,33,34,35,36,37,38]. Another study revealed that gram positive organisms inhibited on larger extent as compare to gram negative organisms. [39] The gallic acid and ethyl ester showed effective in methicillin- resistant Staphylococcus. [40] T. chebula is well effective on Helicobacter pylori, a bacterium responsible for gastritis, ulcer and stomach cancers. [41] T. chebula fruit extract had strong antibacterial activity against intestinal bacteria, Clostridium perfingens and Escherichia coli [42]. Study of in vitro antibacterial activity of extracts from Haritaki was carried out with the help of disk diffusion technique. All showed such activity against human pathogenic Gram positive and Gram negative bacteria. The widest spectrum of antibacterial activity was shown by Terminalia chebula. It was also most potent.

Antioxidant activity

T. chebula used for anti-lipid per oxidation, anti- superoxide radical formation and free radical scavenging activities.[43,44,45,46,47]Haritaki shows *In vitro* evaluation of tri-ethyl chebula is a strong antioxidant and free-radical scavenger, which is help for anti-oxidative ability.[46] The aqueous extract of T. chebula seems to be able to protect cell organelles from radiotherapy induced damages.[48] . Protective effects of an aqueous extract of Terminalia chebula fruit on the tart-butyl hydro peroxide (t-BHP)-in- duced oxidative injury observed in cultured rat pri- mary hepatocytes and rat liver has also been documented. [49]

Antiplasmodial activity

Antiplasmodial activity of water extract of Haritaki shows in vitro by its ability to inhibiting the [3H] Hypoxanthine into the Plasmodium falciparum K1 multi drug-resistant strain and in vivo. [50] Actone seed extract of Haritaki was also found to have good antiplasmodial activity in a study. [51]

Hepatoprotective activity

Haritaki extract was found to prevent the hepatotoxicity against anti-tuberculosis drug induced toxicity which could be attributed to its prominent ant oxidative and membrane stabilizing activites. [52]

Cardio protective activity

Various extracts prepared from the fruit rind of Terminalia chebula have shown cardio tonic activity when tested on normal as well as hypo dynamic isolated frog hearts. The extracts increased the cardiac output and contraction of force without altering the heart rat. [53]

Wound healing activity

An alcoholic extract of Terminalia chebula leaves administrating on the healing of rat dermal wounds showed that Terminalia chebula treated wounds healed faster as indicated by improved rate of contraction and decreased period of epithelialisation. Hexosamine and uronic acid levels increase up to day 8 post wounding. This result found that extract of Haritaki beneficial effect on healing process. [54]

Laxative property

The laxative property of Terminalia chebula is studied in one of the clinical studies. Symptoms other then frequency, evacuation and consistency is improved with Terminalia chebula fruit powder (6gm) given with luck worm water after meals for seven days. Total response of the drug was excellent in 20% cases and good in 80% cases of simple constipation. No side effects reported. [55]

Hypolipidemic activity

Ethyl acetate soluble fraction of the alcoholic extract of Terminalia chebula stem show Hypolipidemic action in normal and Trition-treated rats is reported. [56]

Anti-amoebic & anti-protozoal activity

T. chebula showed anti-amoebic activity against Entamoeba histolytica in experimental caecal amoebiasis in vivo. The acetone extract of T. chebula seeds showed anti plasmodial activity against Plasmodium falciparum. [57]. Terminalialia chebula and four other botanicals (Boerhavia diffusa, Berberis aristata, Tinospora cordifolia, and Zingiber officinale) shows maximum cure rate of 73% in experimental amoebic liver abscess in hamsters [58] and 89% in experimental caecal amoebiasis in rats showing its antiamoebic activity against Entamoeba histolytica.[59]

Nephroprotective effect

The fruit extract of T. chebula is useful to reduce the cadmium induced nephrotoxicity in rats. [60] The Vara Asanadi Kwath (decoction) showed significant reduction in hyper-lipidemia in high fat diet induced hyperlipidemic rats. [61]

Anti-arthritic activity

The hydro alcoholic extract of *T. chebula* produced a significantly reduction of joint swelling as compared to control in both formaldehyde- induced and CFA-induced arthritis. *T. chebula* could be used as a disease-modifying agent in treatment of rheumatoid arthritis.[62] Study shows that acetone extract of T. chebula fruits have better effect on controlling CFA induced arthritis showing the definite effect in reducing the inflammatory components.[63] Aqueous extract of dried fruit of T. chebula showed anti-inflammatory by inhibiting inducible nitric oxide synthesis.[64] Extracted from tender fruit of T. chebula, chebulagic acid significantly suppressed the onset and progression of collagen induced arthritis in mice. T. chebula in a polyhedral formulation (Aller-7) exhibited anti- inflammatory effect against arthritis in rats. [65]

Antidiabetic activity

Methanolic extract & chloroform extract of T. chebula decrease the blood sugar level in normal and alloxan diabetic rats significantly.[66,67] T. chebula fruit and seeds also exhibited dose dependent reduction in blood glucose of streptozotocin induced diabetic rats both in short term and long term study.[68,69]

Cytoprotective and antiaging activites

Gallic acid (GA) and chebulic acid (CA) were isolated from the extract of the herbal medicine Kashi (myrobalan, the fruit of Terminalia chebula) it is an active principal which blocked the cytotoxic T-lyphocyte (CTL) mediated cytotoxicity. Granule exocytosis in response to anti-CD3 stimulation was also blocked by GA and CA at the equivalent concentrations [70]

Conclusion

As Haritaki is Tridoshahar i.e. it alleviates all three Doshas, it is widely used in day to day practise by Ayurvedic physicians to combat various disorders. In order to evaluate the overall implication of *Terminalia chebula* Retz. Terminalia chebula is widely used because a number of Phytochemical constituents have been

found in plant extract that include mainly the different types of chebulic acid, Gallic acid, ellagic acid, tannic acid, amino acids, flavonoids like luteolin, rutins and quercetin etc. These compounds are responsible for many of pharmacological activities. Such as anticarcinogenic, antifungal, antibacterial, antioxidant, Antiplasmodial, hepatoprotective, cardio protective, wound healing, laxative,anti amoebic, nephroprotective,hypolipidimic, anti arthritic, antidiabetic, cytoprotective antiaging activities. From the times immemorial, plants have been widely used as curative agents for variety of ailments. Concentrated leaves, fruits, seed extracts can be found in various herbal preparations are available in market today. It is believed that detailed information as presented in this review on its Phytochemistry, various Pharnacognostic and pharmacological properties of the plant and the constituents might provide incentive for proper evaluation of the use of this plant in medicine.

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