Review Article

Pleiotrophic Evaluation of Haritaki

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ABSTRACT

Plant based antimicrobial compounds have great therapeutic potential as they have lesser side effects as compared with synthetic drugs and also little chance of development of resistance. Drug resistance has been emerging as serious intimidation to human population due to an unsystematic utilization of antibiotics. Hence, the plant, called as "Mother of Medicine", *Terminalia chebula* has been extensively studied for its various ailments because of its extraordinary healing potency bring out by the existence of numerous phytoconstitutents. This present explorative study has been projected to elicit an immense aid for the researchers to understand about the pleiotrophic evaluation of Haritaki in a highly structured approach.

Keywords: Antimicrobial, Drug resistance, phytoconstituents, ailments.

INTRODUCTION

Medicinal plants are valuable treasure of human society to combat diseases from the down of civilization. *Terminalia chebula* Retz. is called" King of Medicine' in Tibet and is always listed at the top of the list of "Ayurvedic Meteria Medica" because of its extraordinary power of healing. The whole plant possesses high medicinal value and traditionally used for the treatment of various ailments for human beings. Some of the folklore people used this plant in the treatment of asthma, sore throat, vomiting, hiccough, diarrhoea, dysentery, bleeding piles, ulcers, gout, heart and bladder diseases. This plant has been demonstrated to possess multiple pharmacological and medicinal activities but not yet systematic updated information on the therapeutic effectiveness of *Terminalia chebula*, has been effectively reported. This review highlights updated information particularly on various pharmacological activities and medicinal properties of *Terminalia chebula*.

According to World Health Organization (WHO), about 80% of world's population in developing countries depends primarily on plant based traditional medicine for their primary healthcare needs[1]. Traditional healing system around the world that utilizes herbal remedies is an important resource for the discovery of modern drugs[2]. As the global scenario is now changing towards the use of non – toxic

plant products having traditional medicinal use, development of modern drugs from *Terminalia chebula* should be emphasized for the control of various diseases[3]. *Terminalia chebula* Retz. is a native plant in India and South – East Asia. It has been extensively used in Ayurveda, Unani and Homeopathic medicine and has become cynosure of modern medicine[4]. The antibacterial potential of these plants against UTI causing pathogens have been reported earlier but it needs extensive investigation to understand their antibacterial principles which may allow the scientific community to recommend their use as accessible alternative to synthetic antibiotics[5].

Ethanobotanical Classification of Haritaki

Terminalia chebula is a popular traditional medicine not only used in India but also in other countries of Asia and Africa. In India Haritaki tree is grows in deciduous forests and found in North India and South words to the Deccan table lands at 1000 to 3000 feet[6]. The tree (Fig - 1) is tall about 50-80 feet in height. It has round crown and spreading branches. The bark is dark brown with some longitudinal cracks. Leaves are ovate and elliptical, with two large glands at the top of the petiole. The flowers are monocots, dull white to yellow, with a strong unpleasant odour, borne in terminal spikes or short panicles. The flowers appear May-June, the fruits July-December. The fruit or drupe is about 1-2 inches in size. It has five lines or five ribs on the outer skin. Fruit is green when unripe and yellowish grey when ripe. Fruits were collected from January to April, fruit formation started from November to January[7].

Taxonomy of *T. chebula* Retz

Kingdom	:	Plantae - Plants;
Subkingdom	:	Tracheobionta- Vascular plants;
Superdivision	:	Spermatophyta - seed plants;
Division	:	Magnoliophyta – flowering plants;
Class	:	Magnoliopsida – dicotyledons;
Subclass	:	Rosidae
Order	:	Myrtales
Family	:	Combretaceae - Indian almond family;
Genus	:	Terminalia L - tropical almond;
Species	:	*T. chebula*

Types of Haritaki

There are seven types of Haritaki have been explored depending on its existence, which has enlisted as follows:

1. VIJAYA : Available in Vindhya Pradesh, used in all diseases.
2. ROHINI : Available I Pratish-tanaka, used for effective healing.
3. PUTANA : Available in Sindh area, smaller in size with big hard seeds, used for external plastering
4. AMRITA : Available in Champa, Bangaladesh area, used as Panchakarma (Detoxification, body purifier).
5. ABHAYA : Available in Champa, Bangladesh area, more effective for Ophthalmic use
6. JIVANTI : Available in Saurastra region of Gujarat, used for all cases.
7. CHETAKI : Available in Himachal Pradesh, More laxative than Others

Therapeutic Wonder of Haritaki

Terminalia chebula tree widely grows in the forests of Northern India, Utter Pradesh, and Bengal and is common in Tamil Nadu and in southern Maharastra. It has been traditionally and medicinally used in Indian system of medicine. The fruit (Fig - 2) of the tree, in powder form (Fig - 3) possesses diverse health benefits and has been used as traditional medicine for household remedy against various human ailments since antiquity[8-10] presented in table-1.

Haritaki is extensively used in the preparation of many Ayurvedic formulations for the treatment of various infectious diseases of human beings from head to toe, which are presented in table-2.

Pleiotrophic Assessment of Haritaki

Traditional healing systems around the world that utilize from herbal remedies are an important resource for the discovery of new antimicrobials[11]. Plants are known to produce different secondary metabolites which are naturally toxic to bacteria[12]. In 2009, Shokeen[13] has reported that, plants produce a wide variety of secondary metabolites which are used either directly as precursors or as lead compounds in the pharmaceutical industry and it is expected that plant extracts showing target sites other than those used by antibiotics will be active against drug resistant microbial pathogens. Table–3 shows the various pleiotrophic activities if Haritaki in a systematic way.

How ever, very little information is available on various activities of medicinal plants and out of the 4,00,000 plant species on earth, only a small number has been systematically investigated for their antimicrobial activities[14]. Additionally, there is a rich local Ethano botanical knowledge and bibliography describing the species most frequently used by human population to cure various diseases. Since phytochemicals are structurally different from antibiotics and often have different modes of action, they provide novel means of studying the mechanisms of bacterial control at molecular level[14]. There is a widespread interest in drugs derived from plants, which leads to the screening of several medicinal plants for their potential antimicrobial activity[15]. Haritaki is widely used to prevent aging and impart longevity, immunity[16] and body resistance against diseases. It has beneficial effect on all the tissues. When it is taken with meals it sharpens the intellect, increase strength, stimulates the sense, and expels the urine, stool and waste materials from the body. It reduces the ill effects of fat rich, creamy and oil food. It is used for curing swellings, skin and eye diseases. It can be used as home remedy against fever, cough, asthma and urinary disease. This herb has the ability to stop bleeding and prevent a medical condition called hemorrhage. Its powder used as toothpaste, it will make our teeth stronger and healthy. The paste of dried fruit is used for chronic ulcers, wounds and scalds[6].

Phytochemical Constituents of *T. chebula* Retz

The plant is found to contain phloroglucinol and pyrogallol, along with phenolic acids such as ferulic, p- coumaric, caffeic and vanillic acids. Some of the other minor constituents were polyphenols such as corilagin, galloyl glucose, punicalagin, terflavin A, maslinic acid[17]. Besides, fructose, amino acids, succinic acid, beta sitosterol, resin and purgative principle of anthraquinone are also present[18,19]. Flavonol, glycosides, triterpenoids, coumarin conjugated with gallic acids called chebulin as well as other phenolic compounds were also isolated[20,17,21,22]. Twelve fatty acids were isolated from *T.chebula* of which palmitic acid, linoleic acid and oleic acid were main constituents[23]. Triterpenoid glycosides such as chebulosides I and II, arjunin, arjunglucoside, 2α-hydroxyursolic acid and 2α-

hydroxymicromiric acid also have were reported[24]. Oil extracted from kernels yielded palmitic, stearic, oleic, linoleic, behenic and arachidic acids[25].

The fruits of *T. chebula* are rich in tannins (about 32%-34%) and its content varies with geographical distribution[26, 27]. The tannins of *T. chebula* are of pyrogallol (hydrolysable) type. A group of researchers found 14 components of hydrolysable tannins (gallic acid, chebulagic acid, punicalagin, chebulanin, corilagin, neochebulinic acid,ellagic acid, chebulinic acid, 1,2,3,4,6-penta-O-galloyl- β-D-glucose, 1,6-di-o-galloyl-D-glucose, casuarinin,3,4,6-tri-o-glloyl-D-glucose, terchebulin) from *T. chebula* fruits[27]. Other constituents include phenolics such as chebulinic acid, ellagic acid and anthraquinones. The leaves were found to contain polyphenols such as punicalin, punicalagin, terflavins B, C and D[28-30].

Role of haritaki in human habitual life

Haritaki is a traditional holistic medicine even though it has originated in India; people eat the fruit in a pickled or candied form. It has all the merits, namely six flavours, eight properties, three processing tastes and seventeen efficiencies together used as folklore medicine. In the present scenario, bark and fruit have been made in to tea, oil supplement for hair, skin care lotion, weight loss tonic etc.,

CONCLUSION

The present review attempts to highlight updated information on the therapeutic effectiveness of *Terminalia chebula* even though more number of researches has been carried out in this plant, this is the first structurally ordered information's from the basic concepts about the understanding of Haritaki in a fruitful way and also it forms a footstep for the researchers and scientific community for invention of various bioactive principles from *Terminalia chebula*, for the valuable treatment of various terrible diseases, without any side effects.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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Table 1. Therapeutic potential of Haritaki

Therapeutic Potential of *Terminalia chebula*
❖ Haritaki fruits are beneficial for the five senses as they improve their receiving powers. ❖ It has laxative, rejuvenate, purgative, astringent and dry properties ❖ The paste gives relief to the eyelids, in case of conjunctivitis ❖ It is used as eyewash, for relief from various eye-infections ❖ It serves as a good astringent for loose gums, bleeding and ulceration in gums ❖ The herb is used in preparing 'Triphala' that is used for hair wash, brush teeth in pyorrhoea. ❖ It is a good nervine and helps in nervous weakness and nervous irritability and promotes the receiving power of the five senses. ❖ Its fruit pulp increases the oxygen levels of the blood, thereby promoting longevity of tissues. ❖ The paste of its fruit is effective in reducing swelling, hastening the healing process and cleansing the wounds and ulcers. ❖ Gargling with haritaki decoction helps in stomatitis, oral ulcers and sore throat. ❖ It responds well to gastrointestinal ailments, tumours, ascites, piles, enlargement of liver-spleen, worms and colitis. ❖ Haritaki helps in improving appetite and helps in digestion. ❖ Since it is anti-inflammatory and astringent, it is helpful in urethral discharges like spermatorrhea and vaginal discharges like leucorrhoea ❖ Regular consumption of haritaki powder, fried in ghee, promotes longevity and boosts energy. ❖ Powdered haritaki, mixed with jaggery, works well in gout. ❖ Its powder, when mixed with honey and ghee, is an effective remedy for anaemia. ❖ Its decoction, when taken along with honey, is of great help in hepatitis and obesity. ❖ The herb improves memory and is salutary in dysuria and urinary stones. ❖ A half teaspoon of fruit pulp powder when ingested every night followed by a little warm water is used for healing ulcers (of both mouth and stomach) and wounds. ❖ Gargling with a decoction made from the fruits is very good for fighting oral ulcers, stomatitis and sore throat. ❖ Haritaki fruit, mixed with dry ginger powder and hot water, is used for treating asthma and hiccups. ❖ These fruits are used for fighting many digestive disorders such as flatulence, distension and parasitic infections. ❖ A decoction of this fruit is used to fight against hepatitis and obesity. ❖ It is useful in skin disorders with discharges, like allergies. ❖ It is used to treat chronic fever. ❖ On long term use, it is helpful in gaining weight in the emaciated persons and in losing weight in obese persons. ❖ When taken with meals it sharpens the intellect, increases strength, stimulates the senses, and expels the urine, stool and other waste materials from the body. It saves the person from the vitiating effects of bodily humours. ❖ Haritaki reduces the ill effects of fat rich, creamy and oily food. Haritaki is the definite aid for persons who habitually overeat. ❖ It reduces lipid deposits in the blood and liver. When consumed with honey, it helps reduce cholesterol.

Table 2. Therapeutic potential of Haritaki

Haritaki seed kernel is sweet, the fibre part is sour, fruit rind is bitter, skin is pungent and seed is astringent in nature.	
❖ Anulomani –	Helps in normalising bowel movements
❖ Arshahara –	Useful in piles
❖ Ayushya –	Improves life expectancy
❖ Bruhmani –	Nourishing, improves body weight
❖ Chakshushya–	Good for eyes, improves vision power
❖ Deepana –	Improves digestion strength
❖ Doshaghna –	Natural detoxifying
❖ Kasahara –	Relieves cold and cough
❖ Krimihara –	Useful in worm infestation
❖ Kushtahara –	USEFUL in skin diseases
❖ Kushtanut –	Useful in skin diseases
❖ Medhya –	Improves intelligence.
❖ Pramehahara–	Useful in diabetes and urinary tract disorders
❖ Rasayana –	Anti aging, rejuvenate
❖ Sara –	Promotes bowel movement
❖ Shothahara –	Relieves inflammation
❖ Shothanut –	Relieves inflammation
❖ Shwasahara –	Useful in Asthma, COPD< wheezing, breathing difficulty
❖ Udarahara –	Useful in ascites
❖ Ushna –	Hot in nature
❖ Vranya –	It helps to improve skin complexion
The fruits of Haritaki are one of the main ingredients in many Ayurvedic formulations. Example: Triphala'. They are highly nutritious for human health as they contain various vitamins, minerals and proteins. They are an excellent source of vitamin C. They are also rich in several minerals including selenium, potassium, manganese, iron and copper.	

Table 3. Pharmacological Evaluation of Haritaki

S.No	Pharmacological Activities	References
1	Anti oxidant	31,32 & 33
2.	Antibacterial	3, 34, 35 & 36
3.	Antifungal	37 & 38
4.	Antiviral	39, 40 & 41
5.	Antiprotozoal	42
6.	Anticancer	43
7.	Antimutagenic	44
8.	Radioprotective	44
9.	Chemopreventive	45
10.	Hepatoprotective	46
11.	Cytoprotective	32 & 47
12.	Cytotoxic	48
13.	Anti diabetic	49
14.	Renoprotective	50
15.	Anti-inflammatory	51
16.	Anti arthritic	52
18.	Adaptogenic & Anti anaphylactic	53
19.	Hypolipidemic & hypocholesterdemic	54 & 55
20.	Anti ulcerogenic	56 & 57
21.	Anti caries	3 & 58
22.	Wound healing	59 ,60 & 61
23.	Purgative property	62
24.	Immunomodulatory	16 & 63
25.	Anti allergic	64
26.	Anti convulsant	65

Figure 1. *Terminalia chebula* tree

Figure 2. Dried fruit of *T.chebula*

Figure 3. Dried fruit powder of *T.chebula*