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Haritaki: Treasure of Ayurveda

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ABSTRACT:

Background- Traditional herb named *Haritaki* (*Terminalia Chebula*) commonly known as *Harada* is a very potential and useful drug that is having a very divine place in ayurveda. Its explanation in various *nighantus* texts in very beginning shows its immense importance. Its various properties, varieties and its different useful phytoconstituents makes it multipurpose and valuable drug. It is having anti aging, anti oxidant, anti fungal, anti bacterial, anti arthritic and also having potential for preventing skin aging.

Review methods: The studies done in previous years were found using Medline, Embase, Google scholar, pub med and by manual search. Studies conducted for determining the role of different phyto-constituents of *haritaki* specifically were included in this study.

Results- It has been tried to keenly understand the role of different phyto-constituents in particular and exploring some new concepts related to it in this review. Phytochemicals of *Terminalia chebula* are dealt in detail with its potential effects on various systems of human body and its potentiality as a therapy tool.

Conclusion: After reviewing several articles and ancient texts it has been concluded that *Haritaki* is an immense drug available in our ayurveda which is literally not less than a treasure.

Keywords: *Terminalia Chebula*, *Haritaki*, phytoconstituents

INTRODUCTION

Acharya Bhavprakash described the *Haritaki* as first drug in Bhavprakash Nighantu. It is called the "King of Medicines" in the Tibet. Acharya Bhavamishra a renounced scholar of Ayurveda in 16th century, described the *Haritaki* firstly in his Nighantu. He told the story about the arisen of *Haritaki* that once upon a time Indra was drinking Amrita (nectar) one drop of it fell on the earth and *Haritaki* grown from that divine drop.¹

Haritaki pathyanam is told by Acharya Charaka that denotes its importance itself.² *Haritaki* is *Pancharasatmaka* i.e. having *Madhura* (Sweet), *Amla* (Sour), *Katu* (Pungent), *Tikta* (Bitter) and *Kashaya* (Astringent).³ *Madhura rasa* is said to be *ksheenksata sandhankaro* by Acharya Charaka.⁴ Seven types of *Haritaki* are mentioned by Bhavaprakash in his textbook.⁵ *Jivanti* is one of them which provides *Rasayana*



(*Rejuvenative*) effect, if consumed for a long time and thus increases longevity.

*Mahakashaya Including Haritaki Are Arshoghna, Kushthaghna, Virechanopaga, Hikka Nigrahana, Kasahar, Jwarahar, Prajasthapana And Vayah - Sthapana Mahakashaya.*⁶ *Haritaki* is also an ingredient of *nili tail* which is used in *palitya roga* i.e. greying of hairs.⁷ *Haritaki* is also included in *Vayasthapna Mahakashaya* [rejuvenators].⁸

Aacharya Bhavprakash mentioned *Ritu Haritaki*⁹ for the purpose of *Rasayana* (rejuvenation, anti-aging and immunity promoter). *Haritaki* is taken along with different *Anupaan* in different *Ritu* (seasons). This regimen is called as *Ritu Haritaki*.

- *Varsha Ritu - Saindhava (rock salt).*
- *Sharad Ritu - Sharkara (sugar).*
- *Hemanta Ritu - Shunti (Zingiber officinale roxb).*
- *Shishir Ritu - Pippali (Piper longum linn).*
- *Vasant Ritu - Madhu (honey).*
- *Greeshma Ritu - Guda (jaggery)*

METHODOLOGY

The search was done online through Medline, PubMed, Embase and Google Scholar as well as manual search was also carried out through various ancient texts. The key words used were *Haritaki, Terminalia Chebula And Haritaki's* phytoconstituents. The words having similar meaning of the key words were also used for the search.

Inclusion criteria: The studies done specifically on *Haritaki* and its benefits over various bodily systems.

Relevant literature also collected from available textbooks and newspaper articles. After the in depth search and sorting out studies based on the inclusion criteria, the data extraction was done. Then the final set of manuscript was prepared by the authors and information was thematically extracted. The data extracted include the objective of the study, the methodology employed, salient findings and the conclusions of various researches.

RESULT

Phytoconstituents of *Terminalia chebula* and their importance or significance

Main phyto-chemicals of *Haritaki* are chebulic acid, gallic acid, corilagin, chebulagic acid, ellagic acid, chebulinic acid, triterpenoids and anthraquinones. The fruits of **T. chebula** is rich in tannins (about 32%-34%) and its content varies with geographical distribution.¹⁰ The

tannins of **T. chebula** are of pyrogallol (hydrolysable) type having 14 components (gallic acid, chebulagic acid, punicalagin, chebulanin, corilagin, neochebulinic acid, ellagic acid, casuarinin, chebulinic acid, 1,2,3,4,6-penta-O-galloyl-β-D-glucose, 1,6-di-o-galloyl-D-glucose, 3,4,6-tri-o-galloyl-D-glucose, terchebulin).¹¹ Other constituents include phenolics such as chebulinic acid, ellagic acid and anthraquinones. Some of the other minor constituents are polyphenols such as corilagin, galloyl glucose, punicalagin, terflavin A, maslinic acid¹². Besides, fructose, amino acids, succinic acid, betasitosterol, resin and purgative principle of anthraquinone are also present.^{13,14} Twelve fatty acids were isolated from **T. chebula** of which palmitic acid, linoleic acid and oleic acid were main constituents¹⁵. Triterpenoid glycosides such as chebulosides I and II, arjunin, arjunglucoside, 2α-hydroxyursolic acid and 2α-hydroxymicromiric acid also have been reported¹⁶. Punicalin, punicalagin, terflavins B, C, and D are certain polyphenols that are found in leaves of *Haritaki*. It also contains phloroglucimol and pyrogallol, along with phenolic acids. Oil extracted from kernels yielded palmitic, stearic, oleic, linoleic, behenic and arachidic acids.¹⁷

GA–AuNPs [Gallic acid coated gold nano particles] are valuable as an active ingredient in anti-aging, particularly for high glucose-induced skin aging.¹⁸ Punicalagin is promising as a natural antioxidant to protect human skin from aging.¹⁹

Immunomodulatory Activity and Anti-oxidant activity

In Ayurveda, *Hartaki* is considered the best *Pathya Dravya* (substances that clean the channels) and a good *Rasayan* (immunomodulator). In a study immunomodulatory potential of the alcohol extract of the dry ripe fruit of this plant at the cellular and molecular levels using Wistar male rats was assessed²⁰. These studies showed that there was distinct increase in the levels of glutathione, superoxide dismutase and catalase following treatment with *T. chebula*. Glutathione is the major endogenous antioxidant produced by cells and Catalase is an antioxidant enzyme while Superoxide dismutase induces the activation of endogenous system of antioxidant defenses. Therefore, the extract has both antioxidant as well and immunomodulatory activities, and is thus capable of protecting cells from oxidative damage. The antioxidant capacity of tri-ethylchebulate, an aglyconer from *Terminalia chebula* Retz fruit in vitro was also evaluated in a study.²¹ The leaves, bark and fruit of **T.**

chebula possessed high antioxidant activity and phenolics were also found to be responsible for this activity.²²

Free radical scavenging activity

Aqueous extract of **T. chebula** inhibited xanthine/xanthine oxidase activity and was also an excellent scavenger of DPPH radicals²³. **T. chebula** in a polyherbal formulation (Aller-7/ NR-A2) inhibited free radical induced hemolysis and also significantly inhibited nitric oxide release from lipopolysaccharide stimulated murine macrophages²⁴. Six extracts and four compounds of **T. chebula** fruit exhibited antioxidant activity at different magnitudes of potency²⁵. Potent antioxidant effect of aqueous extract of **T. chebula** was observed by studying the inhibition of radiation induced lipid peroxidation in rat liver microsomes at different doses²⁶, and methanolic extract was also found to inhibit lipid peroxide formation and to scavenge hydroxyl and superoxide radicals *in vitro*^{27,28}.

Role of *haritaki* as an anti-aging herb

Ageing is a relentless, pleiotropic and unidirectional phenomenon of life, is a key trigger for several age-related disorders, such as cancer, cataract, osteoporosis, hypertension, cardiovascular (CV), metabolic and even neurodegenerative ailments.²⁹ While senescence is the progressive deterioration of bodily functions over time and normal human aging has been associated with a loss of complexity in a wide range of physiological processes and anatomic structures.³⁰

Aging theory

Rationally, theories of aging can be classified into more than 300 approximately³¹.

Aging can be attributed to in a broad way to:

1. Molecular Cross-Linking³²,

There Is A Growing Amount Of Direct Evidence And Much Indirect Evidence For Postulating The Relationship Between Crosslinking And Aging.

2. Free Radical-Induced Damages³³,

Chebulinic Acid and Boeravinone B (BB) minimized accumulation of oxidants, CFUs, nuclear damages, apoptosis, necrosis and maintained cell morphology. Independent supplementation of CA (5 µg/ml) and BB (3 µg/ml) significantly reduced the accumulation of intracellular H₂O₂ and associated hydroxyl,

hydroxymethyl or hydroperoxide radicals in *Saccharomyces cerevisiae*. CA and BB maintained the normal growth curve and proved as anti-aging by significantly decreasing oxidative stress, enhancing cell viability and ultimately protected *S. cerevisiae* cells from aging.³⁴

3. Changes in immunological functions.³⁵

T. chebula is a potent antioxidant and is found to help in enhancing immunity. The various organic and aqueous extract could be used as a bioactive component for enhancing the rate of wound healing by increasing cell proliferation and enhancing free-radical scavenging ability and also in the therapeutics industries in which ammonia accumulation results in a decreased production of the antibodies.³⁶

4. Telomere shortening³⁷

Telomere shortening has been pointed to as the main factor that speeds up cell ageing and promotes degeneration processes.³⁸ The ethanol extract of the fruits of *T. chebula* inhibited oxidative stress and the age-dependent shortening of the telomeric DNA length.³⁹

Triphala, a preparation of fruits of *Amalaki*, *Bibhitaki*, and *Haritaki* has been proved for having a great ability to prevent and reverse radiation-induced DNA damage in various *in vitro* and animal models.⁴⁰

Ayurveda counters the aging and its associated ill-effects with three main approaches *Vayasthapak* drugs (age stabilizers), rejuvenate the aged body by *Jeevneeya* drugs (*vitalisers*) and *Jarachikitsa* i.e. *Rasayana Chikitsa* (Rejuvenating process and formulations) which is a very well developed branch among eight branches of the management of Geriatrics disorders.

Antibacterial activity

1. Two antibacterial compounds, gallic acid and ethyl ester against methicillin-resistant *Staphylococcus*, have been isolated from ethyl alcohol extract of fruits of *T. chebula*⁴¹
2. *T. chebula* is well effective against *Helicobacter pylori*, a bacterium responsible for gastritis, ulcer and stomach cancers by inhibiting urease activity of *H. pylori*.⁴²
3. Several biologically active components were isolated from butanol fraction of fruit extract of *T. chebula* and tested against six intestinal bacteria. Ethanedioic acid

showed strong and moderate inhibitory activity against *Clostridium perfringens* and *Escherichia coli*, respectively, with no adverse effects on the growth of the four tested lactic acid-producing bacteria. Ellagic acid exerted a potent inhibitory effect against *C. perfringens* and *E. coli*.⁴³

4. The ethanolic extract of *T. chebula* fruit was found effective against several gram-positive and gram-negative bacteria.⁴⁴

Antifungal property

Aqueous, alcoholic and ethyl acetate extracts of leaves of *T. chebula* were also tested against five pathogenic fungi (*Aspergillus flavus*, *A. niger*, *Alternaria brassicicola*, *A. alternata* and *Helminthosporium tetramera*).⁴⁵

Anti-arthritic activity

The hydroalcoholic extract of *T. chebula* produced a significant inhibition of joint swelling. *T. chebula* could be used as a disease-modifying agent in treatment of rheumatoid arthritis.⁴⁶

Wound healing activity

Topical use of alcoholic extract of the leaves of *T. chebula* caused much faster healing of rat dermal wounds in vivo by improving rates of contraction and by decreasing period of epithelialization. The tensile strength of tissues in extract-treated incision wounds increased by about 40 %. These results strongly documented the beneficial effects of *T. chebula* in the acceleration of the healing process.⁴⁷

Cytoprotective and antiaging activities

Gallic acid and chebulagic acid, isolated from fruit extract of *T. chebula*, blocked cytotoxic T lymphocyte (CTL)-mediated cytotoxicity. Granule exocytosis in response to anti-CD3 stimulation was also blocked by the above phytochemicals at the equivalent concentrations.⁴⁸ The cold water extract of *T. chebula* indicated the highest stimulation index (SI) on normal human fibroblast proliferation and also demonstrated MMP-2 inhibition on fibroblasts confirming the traditional use of *T. chebula* in many Thai medicinal plant recipes for longevity.⁴⁹

Radio-protective activity :-Radio - protective activity was estimated on the aqueous extract of the fruit of *Terminalia chebula*(50µg) which was able to neutralize 1,

1-diphenyl-2-picrylhydrazyl, a stable free radical by 92.9% and protected the plasmid DNA pBR322 from undergoing the radiation-induced strand breaks. *T. chebula* extract also protected the human lymphocytes from undergoing the gamma radiation-induced damage to DNA exposed in vitro to gamma-radiation.⁵⁰

Cardio-protective activity

Cardio-protective effect of ethanolic extract of *T. chebula* fruits (500 mg/kg body weight) was investigated in isoproterenol induced myocardial damage in rats. It was reported that the pre treatment with *T. chebula* extract had cardioprotective effect due to the lysosomal membrane stabilization preventing myocardial necrosis and inhibition of alterations in the heart mitochondrial ultrastructure and function in the experimental rats.⁵¹

Hepatoprotective activity

The 95% ethanolic extract of *T. chebula* fruit showed hepatoprotective activity against anti-tuberculosis (anti-TB) drug-induced toxicity which could be attributed to its prominent anti-oxidative and membrane stabilizing activities.⁵²

Chemoprotective activity

In a study, treatment with *T. chebula* extract prevented nickel chloride induced renal oxidative stress, toxicity and also cell proliferation effect in male Wistar rats. It was suggested that *T. chebula* extract could also be utilised as therapeutic agent for cancer prevention as it blocked or suppressed the events associated with chemical carcinogenesis.⁵³

Hypolipidemic and hypocholesterolemic activities

T. chebula extract administration showed hypolipidaemic activity against experimentally induced atherosclerosis and hypocholesterolemic activity against cholesterol-induced hypercholesterolemia and atherosclerosis.⁵⁴

DISCUSSION

Haritaki is a very useful and multipurpose drug. Abundant information is given in our ancient texts about *haritaki* regarding its properties *Like Rasa Guna Virya Vipaka And*

Prabhava. But in today's modern era, population only believe in scientific proven things. *Haritaki* consists of number of phytoconstituents which are having their specific properties and potential against various ailments. So it has now become very essential to know the chemical constituents of the herbs and their beneficial effects for the human welfare. An attempt has been done here to collect all relevant information about *haritaki* regarding its phyto-constituents as well as their properties in detail. It is said as *Pathyanam* by acharya charak, used in various disorders for curing them due to its variety of phyto-constituents in it. As it is having a number of constituents, it works on different systemic channels of body and works as purifying agent and also responsible for detoxifying the body working on all systems of the body. Consumption in different ways according to vitiation of different doshas is also explained signifying its versatility.

CONCLUSION

By reviewing the various studies done on *T. Chebula* and knowing about its various phytochemicals, constituents and properties it can be concluded that *Haritaki* is dug which is a multipurpose and very much valuable drug from the ancient times till now. Various in vivo and in vitro studies have been done showing the significance of its various phytoconstituents which proves that *t. chebula* is an antiaging rejuvenator, anti arthritic, antioxidant properties and acting on different systems of human body by mechanism of its different constituents. More studies should be done on the unexplored concepts and properties of *Terminalia chebula*. Hence it can be concluded in a nut shell that *Haritaki* is a immense and beneficial traditional herb. It is also been said that *yasya gruhe na asti mata, tasya mata haritaki*.

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