




---



---

**PHYTO PHYSICO-CHEMICAL PROFILE OF TERMINALIA CHEBULA  
(COMBRETACEAE)**

**GURUBASAVARAJ YALAGACHIN<sup>1</sup>, TRIPATHY TB<sup>2</sup>, BARGALE SUSHANT  
SUKUMAR<sup>3</sup>**

**1:** Ph. D Scholar and Assistant Professor, **2:** Guide and Professor, **3:** Assistant. Professor  
Department of PG Studies in Swasthavritta, Sri Dharmasthala Manjunatheshwara college of  
Ayurveda and Hospital, Hassan-573201, Karnataka, India

\*Corresponding Author: Dr Gurubasavaraj Yalagachin: E Mail: [yogaayu.guru@gmail.com](mailto:yogaayu.guru@gmail.com)

Received 15<sup>th</sup> June 2021; Revised 10<sup>th</sup> July 2021; Accepted 24<sup>th</sup> Aug. 2021; Available online 25<sup>th</sup> Jan. 2022

<https://doi.org/10.31032/ijbpas/2022/11.1.2002>

**ABSTRACT**

**Introduction:** Terminalia Chebula (TC) widely known as Haritaki is most often used herb in Ayurveda due to its wide range of therapeutic properties. It is a prime component of Triphala (Three fruit pulp combination of *Terminalia Chebula*, *Terminalia Bellerica* and *Embllica Officinalis*). **Objective:** Evaluation of phytochemical, physical & chemical profile of Haritaki churna. **Materials & methods:** Dried fruit of TC was subjected to Physicochemical and phytochemical tests to study its components and properties scientifically. **Results & Conclusion:** Physical analysis revealed 0.01% of moisture, water soluble ash 0.02% and total ash 0.08%. Phytochemical tests revealed the presence of Alkaloids, Sterols, Glycosides, Saponins, Flavonoids, Tannins and absence of Carbohydrates & Proteins.

**Keywords:** Haritaki , Terminalia Chebula, Triphala

**INTRODUCTION**

Haritaki (*Terminalia chebula*) known as Myrobalan, Ink Nut, Abhaya and Pathya is called the "King of medicines" and is always listed first in the Ayurvedic materia medica because of its extraordinary powers of healing. In

Ayurveda it is considered to destroy all diseases and eliminate vitiated Doshas from the body. Hence most of the authentic texts of Ayurveda like Samhitas and Nighantu have emphasized on usage of Haritaki in various clinical conditions<sup>1</sup>. Haritaki along

with 9 other drugs are mentioned as Vayasthapana Dravyas<sup>2</sup> (Age sustaining drugs).

**OBJECTIVE:**

Evaluation of phytochemical, physical & chemical profile of Haritaki churna.

**MATERIALS & METHODS:**

Haritaki Churna was purchased from local vendor of Ayurveda drugs at Gadgil Vanoushadhi Belgaum and 100gms of this sample was sent to Biocyte Institute of Research & Development, Sangli, Maharashtra (Reg No: 1831300312031566). This sample was authenticated as Haritaki by comparing with sample specimen in the institute and was subjected to four physico chemical parameters and nine phytochemical parameter tests.

**Physico Chemical Parameter Tests:**

As per the guidelines of WHO, four physico chemical parameters like Total Ash, Water soluble extractive value, Alcohol soluble extractive value and loss on drying were assessed and values were recorded<sup>3,4,5</sup>.

**Total Ash Value Determination:** About two grams of air dried, Haritaki Churna was accurately weighed and taken in a tarred silica crucible and incinerated in a muffle furnace by gradually increasing the temperature to 4500 C to make it dull red hot and free from carbon. Cooled in a

desiccator, weighed and the percentage of total ash was calculated<sup>6</sup>.

**Water soluble extractive:** Accurately weighed five gms of Haritaki Churna was taken in a conical flask and 100ml of distilled water is added and 5% solution was made & this flask was closed with cotton plug. This set up was kept for 24 hours with regular interval shaking of flask. This solution was filtered through a filter paper. 25ml of the filtrate is taken in evaporating dish and heated. The weight of the dish alone is subtracted from weight of dish containing damp mass is calculated and water soluble extractive value was calculated using formula as below

Percentage of water Soluble extractive =  $\frac{\text{Weight of the extract} \times 100 \times 100}{25 \times \text{weight of the sample}}$ <sup>7</sup>.

**Alcohol soluble extractive:** The same procedure was repeated for Alcohol soluble extractive calculation as done to calculate water soluble extractive percentage by using 95% of alcohol instead of water<sup>8</sup>.

**Loss on drying/ moisture content:** 10gms of Haritaki Churna was weighed properly and placed in evaporating dish. It was dried for 5 hours at the temperature of 105<sup>0</sup> C and weighed again. The drying continued till the difference between two successive weights was not more than 0.01gm after cooling. Moisture percentage was calculated

**Phytochemical parameter tests:**

The phytochemical analysis of the Haritaki churna was carried out by conducting tests for 09 parameters namely Alkaloids, Sterols, Glycosides, Anthraquinone Glycosides, Saponins, Carbohydrates,

Flavonoids, Tannins & Proteins. To establish a better conformity, multiple standard tests are conducted for each of the 09 phytochemical testing. The name of the tests conducted, changes observed is tabulated in the **Table 1** below.

**Table 1: Tests to Assess Physicochemical Properties of Haritaki (*Terminalia Chebula*)**

| Sr. No. | Chemical Constituents     | Name of Test                                | Observed Changes  |
|---------|---------------------------|---|---|
| 1.      | Alkaloids                 | Mayer's Reagent                             | White coloured turbidity  |
|         |                           | Wagner's Reagent                            | Reddish Brown Precipitate   |
|         |                           | Hager's Reagent                             | Yellow Precipitate floating   |
|         |                           | Ehrlich's Reagent                           | Two separate yellow and brown coloured layers   |
| 2       | Sterols and Triterpenoids | Salkowaski test                             | Lower layer turns red   |
|         |                           | Sulphur test                                | Sinks in it   |
| 3       | Glycosides                | Baljet's test                               | Yellow to orange colour.  |
|         |                           | Keller killani test                         | Separation between two layers, lower layer shows reddish brown and upper layer turns bluish green in colour |
|         |                           | Legal's test                                | No Pink to red colour   |
| 4       | Anthraquinone glycosides  | Borntrager's test                           | Ammonical layer turns pink or red.  |
|         |                           | Modified Borntrager's test for C-glycosides | Ammonical layer Turns pinkish red colour  |
| 5       | Saponins                  | Foam test                                   | Formation of Foam   |
| 6       | Carbohydrates             | Molisch's test:                             | No Changes Seen   |
|         |                           | Barfoed's test                              | No Changes Seen   |
|         |                           | Benedict's test                             | Reddish brown precipitate   |
| 7       | Flavonoids                | Ferric chloride test                        | Intense green colour  |
|         |                           | Shinoda test                                | Pink to magenta red colour  |
|         |                           | Alkaline reagent test                       | Yellow colour which becomes colourless on addition of few drops of dilute acid                              |
|         |                           | Lead acetate solution test                  | Yellow precipitate  |
| 8       | Tannins                   | Ferric-chloride test                        | Dark colour   |
| 9       | Proteins                  | Millon's test                               | No Changes Seen   |
|         |                           | Xanthoproteic test                          | No Yellow precipitate   |
|         |                           | Biuret test                                 | No Blue colour  |
|         |                           | Ninhydrin test                              | No Blue colour  |

**RESULTS:****Table 2: Physicochemical studies result of Haritaki (*Terminalia Chebula*)**

| S. No | Test Done                  | Obtained Value | API Standard value <sup>9</sup> |
|-------|----------------------------|----------------|---------------------------------|
| 1     | Total Ash                  | 0.08 gms       | Not more than 05%               |
| 2     | Water Soluble Extractive   | 3.36 %         | Not less than 06%               |
| 3     | Alcohol Soluble Extractive | 21.5%          | Not less than 40%               |
| 4     | Loss on Drying             | 0.01 gms       | Not Mentioned                   |

**Table 3: Phytochemical studies result of Haritaki (*Terminalia Chebula*)**

| S. No | Paramater                 | Present/ Absent |
|-------|---------------------------|-----------------|
| 1.    | Alkaloids                 | Present         |
| 2.    | Sterols and Triterpenoids | Present         |
| 3.    | Glycosides                | Present         |
| 4.    | Anthraquinone glycosides  | Present         |
| 5.    | Saponins                  | Present         |
| 6.    | Carbohydrates             | Absent          |
| 7.    | Flavonoids                | Present         |
| 8.    | Tannins                   | Present         |
| 9.    | Proteins                  | Absent          |

**CONCLUSION:**

The current study was aimed to assess and confirm physicochemical & phytochemical composition of the sample drug Haritaki (*Terminalia Chebula*). The four physicochemical properties of the drug came out to be within normal range in comparison with the standard norms. Due to these properties, the drug is said to be quite effective in different Ayurveda formulations as Churna (Powder), Kashaya (Decoction), Vati (Tablet) and Arishta (Fermented Liquid). The phytochemical tests confirmed the presence of alkaloids, sterols, glycosides, saponins, flavonoids and tannins which re-establishes that constituents are responsible for the antioxidant, antibacterial, cytoprotective and antiaging properties of the drug (Haritaki) *Terminalia Chebula*<sup>10</sup>.

**LIST OF REFERENCES:**

- [1] D.Sai Gowtam, P.P.Rao, M.Gowtam, K, K, Priya. Haritaki A Wonderdrug. Ayuush Darpan Journal, 10(2), 28-39(2019).
- [2] Agnivesha: Charaka Samhita, with Ayurveda Chandrika commentary By Chakrapanidatta, edited by Vaidya Brahmanand Tripathy, Varanasi: Chaukhambha Subharati Prakashan, Sutra Sthana, Adhyaya 04, PP-87.
- [3] Anonymous. The Ayurvedic Pharmacopoeia Of India, New Delhi Department Of Ayush, Ministry Of Health And Family Welfare, Government Of India, 2009,70 – 72.
- [4] Anonymous. Pharmacopoeia of India. Vol.2, Edition 4: 1996 Government of India, Ministry of Health, Controller of publication, New Delhi, 1996, A-53–55
- [5] Lohar DR, Ravindra Singh. Quality Control Manual for Ayurvedic, Siddha and Unani Medicine. Ghaziabad: Department of Ayush, Ministry of Health and Family Welfare, Pharmacopoeial Laboratory for Indian Medicine, 2008, 21-24.
- [6] Joseph L, George M, Agrawal S, Kumar V. Pharmacognostical and Phytochemical studies on *Jasminum*

- 
- grandiflorum* leaves. Int J Pharm Frontier Res 2011; 1, 80-92.
- [7] Joseph L, George M, Agrawal S, Kumar V. Pharmacognostical and Phytochemical studies on *Jasminum grandiflorum* leaves. Int J Pharm Frontier Res 2011; 1, 80-92.
- [8] Avinash Kondalkar, Sapna Avinash Kondalkar. Effect of proportion composition variation on physicochemical parameters of Triphala. International journal of Pharmaceutical Sciences & Research. 2018, Volume-09(10): 4280-4285.
- [9] Gajarmal Amit Ashok, Sharma Gaurav, Rath Sudip. Pharmaceutical Evaluation of Chaturthamalaka Rasayana-An Ayurveda Compound. International Journal of Ayurveda & Pharma research.2019; 7(2): 31-39.
- [10] Pansare T. A., Sole A. P. The Vayasthapan Karma (Age Sustaining Action) Of Haritaki (*Terminalia Chebula* Retz.)- A Review. International journal of Ayurvedic and Herbal Medicine. [www.interscience.org.uk](http://www.interscience.org.uk), 7: 2(2017) 2484–2500.