Pharmacognostical and Pharmaceutical Assay of Treesa Haritaki (Terminalia chebula Retz.)

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ABSTRACT

Context: Ayurveda has abundant collection of effective single and poly herbal formulations against diseases. In the era of increasing demand for traditional medicines, maintaining quality standards is must. Haritaki (Terminalia chebula Retz.) is one of vastly used drug in various ayurvedic formulations.

Aims: The present study was aimed at setting a standard pharmacognostical and pharmaceutical profile of Treesa Haritaki.

Materials and Methods: Treesa Haritaki (Terminalia chebula Retz.) was subjected to pharmacognostical, physicochemical, phytochemical and HPTLC analysis as per standard protocols.

Results: Pharmacognostical findings of the drug are yellowish brown tannin contain, starch grain, simple and lignified scleroids etc. Physico-chemical parameters are as per API standard protocol. HPTLC gave the fingerprint of the drug with thirteen and eight spots on short and long UV, respectively.

Conclusions: The quality of Haritaki Churna can be tested by series of pharmacognostical, physicochemical, phytochemical and HPTLC screening for its authenticity as per finding of the present study.

Key words: Treesa Haritaki (Terminalia chebula Retz.), HPTLC, pharmacognosy, physicochemical, phytochemical,

INTRODUCTION

Acharya Charaka described Haritaki primarily in first Chapter of Chikitsa Sthana. It is mentioned as Pathyanama and most useful in Vata-Kaphaja diseases. Tree of Haritaki is moderate sized, much-branched. Leaves are 2.5-6 by 1.5-3 cm in length, not clustered, alternate or subopposite, elliptic-oblong, acute, penninerved, clothed when young with silky hairs, glabrous or nearly so when mature, rounded or cordate at the base; petioles ½-1 in long, pubescent, usually with 2 glands near their summit. Flowers all hermaphrodite, in terminal (often panicked) spikes, bracteoles exceeding the flowers, linear, acute, hairy, conspicuous among the buds but soon deciduous. Drupe is pendulous, ¾-1.5 cm in. Long, ellipsoid or obovoid from a broad base, glabrous, more or less 5-ribbed when dry, yellowish-green; stone oblong, bony, very thick or obscurely angled. Haritaki(terminalia chebula Retz.) is one of vastly used drug in various ayurvedic formulations. Some of Amayika prayoga (Therapeutic usage) of Haritaki are mentioned. Haritaki almost alleviates disorders caused by oversaturation. Haritaki taken with salt, Ghee and Sunthi pacifies Vata, Pitta and Kapha respectively. However, with Guda(jaggary) it destroys all diseases. Haritaki taken with Guda(Jaggary) is useful in Gulma. Haritaki mixed with Guda(Jaggary) pacifies Pitta and...
Haritaki, kilogram, it may contain total 70 pieces of 466gm of weight, number of
Collection and Authentication of Raw Drugs
MATERIALS AND METHODS
of the drug.
and HPTLC evaluation in order to prepare profile physicochemical and phytochemical parameters)
(16) Haritaki (Terminalia chebula Retz.) was subjected to pharmacognostical (powder microscopy), pharmaceutical (evaluation of various physicochemical and phytochemical parameters) and HPTLC evaluation in order to prepare profile of the drug.

RESULTS
Pharmacognostical
Organoleptic Characters
The sample [powdered Treesa Haritaki] was a yellowish powder with predominant Kashaya (Astringent) taste and Pungent smell (Table 1).

Microscopic Characters
Powder microscopy of Treesa Haritaki showed epicarp cell, mesocarp cell, fibers, group of scleroids (Plate 2), simple and compound scleroids, yellowish brown tannin contain (Plate 3).

Pharmaceutical
Treesa Haritaki was analysed using various standard physicochemical parameters at the pharmaceutical chemistry lab. The pharmaceutical parameters such as aqueous extractive, alcohol extractive, pH, total ash, acid-insoluble ash, and loss on drying were found within the permissible limits (Table 2). Phytochemical parameters such as Steroidal terpanoids, Glycosides, Flavanoid, Tannin- phenolic compound, Molisch test were

Microscopic studies, i.e., dissolving Haritaki Churna (Powder) in small quantity of distilled water, filtering through filter paper and the precipitate treated with and without stain to find out the lignified materials along with other cellular constituents. The micro photographs were taken under Carl Zeiss Binocular microscope attached with camera. [23-25]

Pharmaceutical Analysis
Haritaki was analysed with appropriate protocols for standard physicochemical parameters such as aqueous extractive, alcohol extractive, pH, total ash, acid insoluble ash, loss on drying as per Ayurvedic Pharmacopoeia of India at the Pharmaceutical Chemistry Lab, IPGT&RA. [26]
In the HPTLC study, Methanol extract of Treesa Haritaki was spotted on pre-coated silica gel GF 60254 aluminium plates by means of Camang Linomate V sample applicator fitted with a 100 µL Hamilton syringe. The mobile phase consisted of Chloroform:Methanol in ratio of 9:1 v/v. After development, densitometric scan was performed with a Camag T. L. C. scanner III in reflectance absorbance mode at 254 and 366 nm under control of Win CATS Software (V 1.2.1. Camag). Then, the plate was sprayed with Vanillin sulphuric acid followed by heating and then visualised in daylight. [27]

Selection of Haritaki is based on weight of drug in Ratala (1 Ratala= 466 gm). Name of Haritaki in market are Visa, Trisa, Chalisa Haritaki etc. Haritaki Visa means that in 466 gm of weight, number of Haritaki are 20. In Haritaki(Trisa), 466gm of weight, number of Haritaki are 30. In 1 kilogram, it may contain total 70 pieces of Haritaki approximately.

In the present study, Treesa Haritaki(Terminalia chebula Retz.) was subjected to pharmacognostical (powder microscopy), pharmaceutical (evaluation of various physicochemical and phytochemical parameters) and HPTLC evaluation in order to prepare profile of the drug.

In case of foul smell of breast milk the women should take Haritaki powder with Trikatu and honey. [16] Haritaki is an important ingredient in Vaishwanara Churna [17], Abhayarista [18], Haritaki Leha [19], Agatsya Haritaki [20], Pathya Grita [21].

Collection and Authentication of Raw Drugs
Treesa type of Haritaki (Terminalia chebula Retz.) was collected from raw drug market, Rajkot (Gujarat). Pharmacognostical authentication of drug was done based on the morphological features (Plate 1), organoleptic characters and powder microscopy of Haritaki. The API standards were used for authentication. [22]

Method of Preparation of Haritaki Churna(Powder)
The fruits of Haritaki were washed, shade dried, powdered, sieved through 80 mesh and preserved in an air-tight glass vessel.

Pharmacognostical Analysis
Pharmacognostical analysis of Treesa Haritaki based on organoleptic characters, i.e., colour, odour, taste and texture were recorded.

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found positive while Alkaloids, Saponine, Protein test were found negative (Table 3).

HPTLC
On performing HPTLC, the chromatogram showed thirteen peaks with \( R_f \) values 0.00, 0.03, 0.08, 0.13, 0.17, 0.25, 0.37, 0.45, 0.49, 0.65, 0.70, 0.75, and 0.94 at 254nm; while at 366 nm, the chromatogram showed eight spots with \( R_f \) values 0.01, 0.03, 0.08, 0.16, 0.25, 0.37, 0.45 and 0.64 (Table 4, Plate 4 & 5) 0.03, 0.08, 0.25, 0.37 and 0.45 were commonly seen \( R_f \) values at both 254 nm and 366 nm.

Table 1: Organoleptic characters of *Treesa Haritaki*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Yellowish (Pittabha)</td>
</tr>
<tr>
<td>Odour</td>
<td>Pungent</td>
</tr>
<tr>
<td>Taste</td>
<td>Astringent (Kashaya)</td>
</tr>
<tr>
<td>Consistency</td>
<td>Fine</td>
</tr>
</tbody>
</table>

Table 2: Phytochemical parameters of *Treesa Haritaki*

<table>
<thead>
<tr>
<th>S. No</th>
<th>Investigation</th>
<th>Treesa Haritaki</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss of drying</td>
<td>7.34 %</td>
</tr>
<tr>
<td>2</td>
<td>Ash value</td>
<td>2.201%</td>
</tr>
<tr>
<td>3</td>
<td>Acid insoluble ash value</td>
<td>0.45% w/w</td>
</tr>
<tr>
<td>4</td>
<td>pH</td>
<td>3.0</td>
</tr>
<tr>
<td>5</td>
<td>Water soluble extract</td>
<td>55.6%</td>
</tr>
<tr>
<td>6</td>
<td>Alcohol soluble extract</td>
<td>66.5%</td>
</tr>
</tbody>
</table>

Table 3: Physicochemical parameters of *Treesa haritaki*

<table>
<thead>
<tr>
<th>S. No</th>
<th>Investigation</th>
<th>Treesa Haritaki</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steroidal terpanoids</td>
<td>Positive</td>
</tr>
<tr>
<td>2</td>
<td>Glycosides</td>
<td>Positive</td>
</tr>
<tr>
<td>3</td>
<td>Flavanoid</td>
<td>Positive</td>
</tr>
<tr>
<td>4</td>
<td>Tannin- Phenolic compound</td>
<td>Positive</td>
</tr>
<tr>
<td>5</td>
<td>Alkaloids</td>
<td>Negative</td>
</tr>
<tr>
<td>6</td>
<td>Saponins</td>
<td>Negative</td>
</tr>
<tr>
<td>7</td>
<td>Protein test</td>
<td>Negative</td>
</tr>
<tr>
<td>8</td>
<td>Molisch test</td>
<td>Positive</td>
</tr>
</tbody>
</table>

Table 4: RF values of *Treesa haritaki*

<table>
<thead>
<tr>
<th>HPTLC</th>
<th>RF Values at 254 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.00, 0.03, 0.08, 0.13, 0.17, 0.25, 0.37, 0.45, 0.49, 0.65, 0.70, 0.75 and 0.94</td>
</tr>
<tr>
<td></td>
<td>0.01, 0.03, 0.08, 0.16, 0.25, 0.37, 0.45 and 0.64</td>
</tr>
</tbody>
</table>

HPTLC = High performance thin-layer chromatogram phy; \( hR_f = (R_f \text{ value}) \times (100) \)

Plate 1
Morphological characters of *Terminalia chebula Retz.*

b. Powder of fruit of *Haritaki*

Plate 2
Powder microscopy of fruit of *Terminalia chebula Retz.*

a. Epicarp cell
b. Fibers
c. Mesocarp cell
d. Scleroids in group

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DISCUSSION AND CONCLUSION
Taste of the Haritaki was Kashaya (astringent). In present study, Powder microscopy of Treesa Haritaki showed epicarp cell, mesocarp cell, fibers, group of scleroids, simple and compound scleroids, yellowish brown tannin contain. All the pharmaceutical parameters analysed showed values within permissible limit. As per API [26], total ash and acid insoluble ash should not more than 5, in present study it was 2.201 % and 0.45% w/w respectively. As per standard, Alcohol and water soluble extract was not less than 40% and 60% respectively. In present study alcohol soluble extract was 66.5% which is within limit but water soluble extract was 55.6%. HPTLC study of the drug has yielded a standard fingerprint of the formulation consisting of thirteen and eight peaks on short and long UV, respectively. The result of the present study can be considered as the reference values for Treesa Haritaki in similar research works in future.

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