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Pharmacognostical and Physico-chemical Evaluation of Drakshadi Gutika - An Ayurvedic Formulation

Diksha Gupta*, Mahesh Vyas1, Harisha C.R2, V. J. Shukla3, Kashyap Chauhan4

*PG Scholar, 1Professor and Head, Department of Basic Principles, 2Head, Pharmacognosy Laboratory, 3Head, Pharmaceutical Chemistry Laboratory, 4Ph.D. Scholar, Department of Basic Principle, Institute of Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India.

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Abstract

Background: WHO defines drug as, "Any substance or product that is used or intended to be used to modify or explore physiological systems or pathological states for the benefit of the recipient". This definition appears more in compliance with the terms of Ayurveda, which aims at the preservation of health apart from mitigation of disease. Aim: The present study was aimed at setting up a standard profile of Drakshadi Gutika (Tablet) on the terms of its pharmacognostical and physico-chemical aspects. Materials & Methods: The trial drug Drakshadi Gutika was subjected to authentication by subjecting it to above analysis as per standard procedures and the observations were systematically recorded. Results: Pharmacognostical findings like scleroids of Haritaki, parenchyma of Draksha, stone cells of Draksha, silica crystals of Sita confirms the presence of authentic ingredients of Draksha, Haritaki and Sita in Drakshadi Gutika. HPTLC was carried out after organizing appropriate solvent system in which maximum 3 spots were distinguished at 254 nm and 4 spots at 366 nm. Conclusion: After the analysis of the various pharmacognostical and physico-chemical parameters of Drakshadi Gutika it was concluded that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level.

Keywords: Drakshadi Gutika, Pharmacognosy, Physico-chemical analysis

Introduction

Drakshadi Gutika is the formulation mentioned in textbook Yogratnakara under Amlapitta Adhyaya (Hyper acidity Chapter). Amlapitta is very widespread disease in society & in present era prevalence of the disease has increased due to irregular dietary habits, faulty diets, hectic life style etc. Drakshadi Gutika contains Draksha, Haritaki and Sita.. It has been indicated in Amlapitta, Hrutkantha Daha (Burning sensation of throat & epigastric region), Trishna (thirst), Murcha (vertigo), Bhrama (dizziness), Mandagni (low digestive capacity), Amavata (rheumatoid arthritis).[1]

Draksha (Common Grape Vine) is a species of Vitis, native to the Mediterranean region, central Europe, and Southwestern Asia, from Morocco and Spain, North to Southern Germany and East to Northern Iran.[2] It is a liana growing to 35 m tall, with flaky bark. The leaves are alternate, palmately lobed, 5–20 cm long and broad. The fruit is a berry, known as a grape; in the wild species it is 6 mm diameter and ripens dark purple to blackish with a pale wax bloom; in cultivated plants it is usually much larger, up to 3 cm long, and can be green, red, or purple. The species typically occurs in humid forests and stream sides. Fruit contains malic, tartaric, racemic acidic along with 0.05% ash, fruit contains glucose and other substances. In traditional medicine of India V. vinifera is used in prescriptions for cough, respiratory tract catarrh, sub acute cases of enlarged liver and spleen, as well as in alcohol-based tonics (Aasavas).[3] Using the sap of grapevines, European folk healers sought to cure skin and eye diseases. Other historical uses include the leaves being used to stop bleeding, pain and inflammation of hemorrhoids. Unripe grapes were used for treating sore throats, and raisins were...
given as treatments for consumption (tuberculosis), constipation and thirst. Ripe grapes is used for the treatment of cancer, cholera, smallpox, nausea, skin and eye infections as well as kidney and liver diseases.\textsuperscript{[4,5]}

T. chebula is a medium to large deciduous tree growing up to 30 m (98ft) tall, with a trunk up to 1 m (3ft 3 in) in diameter. The leaves are alternate to sub opposite in arrangement, oval, 7–8 cm (2.8–3.1 inch) long and 4.5–10 cm (1.8–3.9 inch) broad with a 1–3 cm (0.39–1.18 inch) petiole.\textsuperscript{[6]} A number of glycosides have been isolated from Haritaki, including the triterpenes Arjun glucoside I, arjungenin, and the chebulosides I and II. Other constituents include a coumarin conjugated with gallic acids called chebulin, as well as other phenolic compounds including egllic acid, 2,4-chebuly1-β-D-glucopyranose, chebulinic acid, gallic acid, ethyl gallate, punicalagin, terflavin A, terchebin, luteolin, and tannic acid.\textsuperscript{[7,8]} Chebulic acid is a phenolic acid compound isolated from the ripe fruits.\textsuperscript{[9,10]} Luteic acid can be isolated from the bark.\textsuperscript{[11]} T. chebula also contains terflavin B, a type of tannin, while chebulic acid is found in the fruits.\textsuperscript{[12]}

**Pharmacological actions:** Draksha has shown presence of Antifungal, Angiotensin-Converting Enzyme (ACE), Antiulcer, Hepato -Protective, Antioxidant, Wound Healing, Anti Mutagenic, Anti Herpetic, Cardio Protective, Breast Cancer Suppressor, Antibacterial Activity.\textsuperscript{[13]}

Haritaki has Antimicrobial, Antibacterial, Antistress, Antifungal, Antispasmodic, Hypotensive, Anti helminthic, Purgative, Anti hepatitis B activity, Hypolipidemic, Endurance promoting activity.\textsuperscript{[14]}

**Materials and Methods**

**Collection of Raw Drugs:**

Properly dried raw drugs viz. Haritaki, Draksha and Sita were obtained from the Department of Pharmacy, I.P.G.T. & R.A., G.A.U., Jamnagar. All the drugs were confirmed to be authentic and of good quality by the Pharmacognosy Laboratory, I.P.G.T. & R.A. The API standards were used for authentication. Drakshadi Gutika was prepared as per classical reference and physicochemical analysis of the final product was carried out in the laboratory.

**Preparation of Drakshadi Gutika:**

In the above mentioned drug one part of Haritaki, one part Draksha and two parts of Sita were taken and made it in to fine powders, at the same time the Draksha was grinded well and the paste was prepared. Haritaki powder was mixed to the paste of Draksha in mortal and pestle and triturated well to attain a homogenous mixture, then to this mixture two parts of Sita was added and Gutikas (tablets) of 500 mg each were prepared by weighing with the help of electronic weighing machine. Thus formed Gutikas was kept for some times and packed in air tight covers.

**Pharmacognostical Evaluation:**

Included Organoleptic characters evaluation i.e. colour, taste, odor and texture.\textsuperscript{[15]} Microscopic evaluation of small quantity of Drakshadi Gutika dissolved in distilled water, filtered through filter paper and the filtrate was then dried and placed on slide. It was first observed in plain water and then stained with Phloroglucinol and concentrated HCl to study the characters of the drug. The identification was carried out based on morphological features, organoleptic characters and powder microscopy of the drugs as mentioned in API.\textsuperscript{[10]} Microphotographs were taken by using Carl-Zeiss Trinocular microscope.

**Pharmaceutical Evaluation:**

Following parameters were analyzed for different physico-chemical parameters\textsuperscript{[17]} at the pharmaceutical chemistry lab of IPGT & RA.

1. Uniformity of tablet
2. Tablet disintegration time
3. Acid-insoluble Ash
4. Water-soluble Extract
5. Methanol-soluble Extract
6. pH (5% solution)
7. Ash Value
8. Loss on Drying

**High performance Thin Layer Chromatography (HPTLC):**

Methanol extract of Drakshadi Gutika was spotted on pre coated silica gel GF 254 aluminium plate as 5 mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of a Camag Linomat V sample applicator fitted with a 100 μL Hamilton syringe. Ethyl acetate: water: Acetic acid (8:1:1) were used as the mobile phase. After development, densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software. The slit dimensions were 6 mm×0.45 mm and the scanning speed was 20 mm per second. All HPTLC plates were scanned with filter fraction Savitsky-goloy 7, minimum slope 5, minimum height 10 AU, minimum area 50
AU, and maximum height 990 AU with absorption unit. [18]

Results

Organoleptic Characters:
The results of the organoleptic findings of Drakshadi Gutika has been tabulated in Table 1.

Table 1: Organoleptic Characters

<table>
<thead>
<tr>
<th>Properties</th>
<th>Drakshadi Gutika</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Coffee Brown</td>
</tr>
<tr>
<td>Odor</td>
<td>Bitter</td>
</tr>
<tr>
<td>Taste</td>
<td>Astringent &amp; ends with Sweet</td>
</tr>
<tr>
<td>Texture</td>
<td>Smooth</td>
</tr>
</tbody>
</table>

Pharmacognostical study:
Microscopy of trial drug showed Annular vessels of Draksha, Tannin of Draksha, epicarp cells of Haritaki, Lignified Scleriods of Haritaki, Stone cells of Drakshabeeja, Stone cells of Haritaki, oil globules of Draksha, silica crystals of Sita. Results matched with the API and thus confirmed the genuineness of the drugs used in the finished product (Plate 1). [17]

Pharmaceutical Evaluation:
Physico-chemical parameters of Drakshadi Gutika were found to be within the normal range. Details are tabulated in Table 2.

Table 2: Results of the drug analysis on Physico-chemical parameters

<table>
<thead>
<tr>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Loss on Drying</td>
<td>5.1132% w/w</td>
</tr>
<tr>
<td>2 Ash Value</td>
<td>12.42 % w/w</td>
</tr>
<tr>
<td>3 Acid-insoluble Ash</td>
<td>13.39% w/w</td>
</tr>
<tr>
<td>4 Water-soluble Extract</td>
<td>65.80 % w/w</td>
</tr>
<tr>
<td>5 Methanol-soluble Extract</td>
<td>54.7% w/w</td>
</tr>
<tr>
<td>6 pH (5% solution)</td>
<td>6.5</td>
</tr>
<tr>
<td>7 Tablet disintegration time</td>
<td>12 minutes</td>
</tr>
<tr>
<td>8 Uniformity of tablet</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

HPTLC study results
On performing HPTLC, visual observation under UV light showed only few spots where as on analyzing under densitometer more number of spots were observed. At 254 nm, the chromatogram showed 3 peaks with Rf values 0.01, 0.04, 0.22, While at 366 nm the chromatogram showed 4 peaks with Rf values 0.01, 0.04, 0.14, 0.28 (Table-3 and Plate-2).

Table 3: Showing consolidated data of HPTLC profile of Drakshadi Gutika

<table>
<thead>
<tr>
<th>Condition</th>
<th>No. of spots</th>
<th>Max. Rf</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short UV (254 nm)</td>
<td>3</td>
<td>0.01</td>
<td>2222.6</td>
</tr>
<tr>
<td></td>
<td>0.04</td>
<td>226.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.22</td>
<td>1401.9</td>
<td></td>
</tr>
<tr>
<td>Long UV (366 nm)</td>
<td>4</td>
<td>0.01</td>
<td>1624.7</td>
</tr>
<tr>
<td></td>
<td>0.04</td>
<td>583.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.14</td>
<td>209.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.28</td>
<td>344.6</td>
<td></td>
</tr>
</tbody>
</table>

Discussion
Medicinal plants plays a major role in Ayurvedic medicine preparation therefore the correct identification of those plants are quite necessary. The system is currently burdened with an additional problem of quality control of crude drugs. To get the full therapeutic impact of the drugs it mandatory to use genuine drugs which are not adulterants & which possess all the essential ingredients present in it. Drakshadi Gutika is one such commonly used formulations which has been analyzed in the present study to authenticate the formulation through preliminary pharmacognosical and physico-chemical studies. [19]

Sugar estimation of the Gutika was not done in the laboratory, as their was no specific instruments for its estimation. The ingredient of the tablet contained paste of Draksha in it and hence the shape of tablet was not uniform.

The results of organoleptic, powder microscopy & physico-chemical study has revealed acceptable results. Drakshadi Gutika showed the specific characters of all ingredients which were used in the preparation. Raw drugs were cross verified with API and no major changes were observed. When the finished product was analyzed under the microscope, it was concluded that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level.

Conclusion
Though the groundwork essentials for the standardization of Drakshadi Gutika was covered in the current study, additional important analysis and investigations are required for the identification of all the active chemical constituents. The results of this study may be used as the reference standard in advance research undertakings of its kind.
Reference


Plate 1: Microphotographs of Drakshadi Gutika

A) Stone cells of Draksha beeja
B) Acicular crystals of Draksha
C) Parenchyma cells with oil of Draksha
D) Annular vessels of Draksha
E) Brown content of Draksha
F) Fibers of Draksha
G) Mesocarp cells of Draksha
H) Silica crystals of Sita
I) Epicarp cells of Haritaki
J) Group of scleroides of Haritaki
K) Lignified Scleroid in Haritaki
L) Scleroid of Haritaki
Plate 2: Densitogram of Drakshadi Gutika

At 254 nm

At 366 nm

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