PHARMACOGNOSTICAL AND PHARMACEUTICAL
STUDIES ON KASAHARA DASHEMANI VATI

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Abstract: Background: In the present era of geometrical rise of demand for indigenous medicines, maintaining quality standards is the need of hour. Absence of reference standards for compound formulations is a hindrance on the way towards standardisation. Objectives: The present study is aimed at setting a preliminary pharmacognostical and pharmaceutical profile of Kasahara Dashemani Vati (KD tablet). Methods: Study included preparation of KD tablets using pre authenticated raw drugs following all SOPs. Later KD tablet was subjected to pharmacognostical, physicochemical and phytochemical analysis as per standard protocols. The final observations were systematically recorded. Results: Pharmacognostical findings matched with that of individual raw drugs negating any major change in the microscopic structure of the raw drugs during the pharmaceutical processes of preparation of tablet. Tested physicochemical parameters were within the optimum reference range for a tablet. Phytochemical components such as phytosterols, glycosides, flavonoids and tannins were tested positive. HPTLC gave a preliminary fingerprint of the formulation with 6, 5 and 5 spots on short UV, long UV and visible spectrum of light respectively. Conclusions: KD tablet can be screened pharmacognostically for the structures of individual raw drugs to authenticate the ingredients. It is inferred that the formulation meets the required qualitative standards at a preliminary level. Identified phytochemicals support intended actions of the formulation in respiratory system. Thus the quality of KD tablet can be ascertained by pharmacognostical, physicochemical and phytochemical screening for the findings in accordance with the observations in present study. The results of this study may be used as the reference in further research undertakings of its kind.

Keywords: Kasahara Dashemani Vati, Pharmacognosy, Chromatography, Standardization.

Introduction

Since ancient times humanity has depended on the diversity of plant resources for food, clothing, shelter, and traditional medicine to cure myriads of ailments. Ayurveda is an Indian system of medicine affluent with vast number of herbal, poly herbal and herbo-mineral formulations for various disease entities. During the past decade, there has been increasing acceptance and public interest in natural therapies in both developing and developed countries. To meet the market demands there is every chance of compromise in the quality of herbal products when there is scarcity of raw materials. Thus quality control for efficacy and safety of herbal products is of paramount importance.[1, 2] Quality can be defined as the status of a drug that is determined by identity and purity of contents; physical, chemical and biological properties and by the manufacturing processes.[3] Maintaining the quality standards of formulations is a challenge encountered by the science with thousands of years’ of experience. The development of this traditional system of medicines with the perspectives of safety, efficacy and quality will help not only to preserve the traditional heritage but also to rationalize the use of natural products in the healthcare.[3 4]

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Scarcity of reference standards for compound formulations is one of the hindrances in the way towards standardisation. First step in quality standardisation of compound formulations is to establish the presence of each ingredient in the finished product, followed by physicochemical and phytochemical analysis. Kasahara Dashemani (KD) is a group of ten herbs (Table 1) mentioned in Charaka Samhita (A fore line treatise of Ayurveda) which is meant for curing the ailments presenting with cough as principal symptom. Tablet form preserves the originality of drug and is also easier for prescription of appropriate dose. In present study KD tablets were subjected to Standard Pharmacognostical (powder microscopy) and Analytical (physicochemical and phytochemical tests along with HPTLC) evaluation in order to prepare a preliminary assay of the formulation.

Materials and Methods
(a) Collection and authentication of raw drugs
All the drugs except Vrishchira (Trianthema portulacastrum Linn.) were obtained from Pharmacy of GAU, Jamnagar. Vrishchira (Trianthema portulacastrum Linn.) was collected from the Jamnagar locality during the month of September. The ingredients with botanical source and parts used are given in Table 1. Pharmacognostical authentication of all the raw drugs was done based on the morphological features, organoleptic characters and powder microscopy of individual drugs. The API standards were used for authentication.

(b) Method of Preparation of KD tablets
All the pre authenticated drugs (enlisted 1 to 10 in Table 01) taken in equal proportions were properly dried and pulverized in to fine powder of mesh number 100. Later 3.5 % w/w of gum acacia was taken as binding agent and aqueous solution was prepared by dissolving it in sufficient quantity of distilled water and mixed with the fine powder of raw drugs to make a homogenous blend. This blend was then sieved through mesh number 12 to get granules of uniform size and dried in oven at uniform temperature of 50 degree Celsius. On the next day the granules were punched in to tablets of 500 mg each and uncoated tablets were packed in air tight packing. The whole process of tablet preparation was done at the Pharmacy under sterile environment.

(c) Pharmacognostical analysis
Pharmacognostical analysis of KD tablets based on Organoleptic characters i.e. color, odor, taste and texture were recorded. Microscopic

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Sanskrit Name</th>
<th>Botanical Name</th>
<th>Parts Used</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draksha</td>
<td>Vitis vinnifera Linn.</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>2</td>
<td>Abhaya</td>
<td>Terminalia chebula Retz.</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>3</td>
<td>Amalaki</td>
<td>Emblica officinalsGaertn.</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>4</td>
<td>Pippali</td>
<td>Piper longum Linn.</td>
<td>Fruit</td>
<td>1 part</td>
</tr>
<tr>
<td>5</td>
<td>Duralabha</td>
<td>Fagonia cretica Linn.</td>
<td>Whole Plant</td>
<td>1 part</td>
</tr>
<tr>
<td>6</td>
<td>Shringi</td>
<td>Pistacia integerrima Stewart ex Brandis</td>
<td>Gal</td>
<td>1 part</td>
</tr>
<tr>
<td>7</td>
<td>Kantakarika</td>
<td>Solanum surattenseBurn.</td>
<td>Whole Plant</td>
<td>1 part</td>
</tr>
<tr>
<td>8</td>
<td>Vrishchira</td>
<td>Trianthema portulacastrum Linn</td>
<td>Whole Plant</td>
<td>1 part</td>
</tr>
<tr>
<td>9</td>
<td>Punarnava</td>
<td>Boerhavia diffusa Linn.</td>
<td>Whole Plant</td>
<td>1 part</td>
</tr>
<tr>
<td>10</td>
<td>Bhumyamalaki</td>
<td>Phyllanthus urinaria Linn.</td>
<td>Whole Plant</td>
<td>1 part</td>
</tr>
</tbody>
</table>
studies i.e. dissolving KD tablets 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 and later compared with the findings of individual ingredients of the KD tablet. The micro photographs were taken under Carl Zeiss Binocular microscope attached with camera.[9,10, 11]

(d) Physicochemical analysis

KD tablet was analyzed with appropriate protocols for standard physicochemical parameters such as aqueous extractive, alcohol extractive, hardness, uniformity of weight, total ash, acid insoluble ash, disintegration time and loss on drying as per CCRAS recommendations at the Pharmaceutical chemistry lab of the institution.[12-14]

(e) Phytochemical analysis

Qualitative tests: The methanol extract of the sample was analyzed for different functional groups.[15]

HPTLC: Methanol extract of KD tablet was spotted on pre coated silica gel GF 60 254 aluminum plate by means of Camag Linomate V sample applicator fitted with a 100 μL Hamilton syringe. The mobile phase consisted of Toluene, Ethyl acetate and Acetic acid in a ratio of 6:3:1 v/v. After development densitometric scan was performed with a Camag T. L. C. scanner III in reflectance absorbance mode at 254 and 366nm under control of Win CATS Software (V 1.2.1. Camag). Then the plate was sprayed with Anisaldehyde sulphuric acid followed by heating and then visualized in day light.[16]

Observation and Results

Pharmacognostical

Organoleptic Characters

The sample (powdered KD tablet) was greenish brown solid powder with predominant Kashaya (astringent) taste followed by Katu (pungent) and Amla (sour) and characteristic smell.

Microscopic Characters

Powder microscopy of KD showed the striking characters of all individual ten drugs of KD group. Such as prismatic crystals and cluster crystals of Draksha, fibers, sclerides and tannins of Abhaya, stone cells and pitted vascular fibres of Amalaki, beaker shaped stone cells and starch grains of Pippali, pitted vessels and sclerides of Duralabha, tannins of shringi, Unicellular Multi serrated trichomes of Kantakari, prismatic crystals of Vrishchira, trachieds of Punarnava, cluster crystals of Bhumyamalaki (Fig. 3-5).

Physicochemical

The observations of physicochemical parameters such as aqueous extractive, alcohol extractive, uniformity of weight, total ash, acid insoluble ash, disintegration time and loss on drying were shown in Table 2.

Table 2. Observations of various physicochemical parameters of KD tablet

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aqueous Extractive</td>
<td>37.5 %w/w</td>
</tr>
<tr>
<td>2.</td>
<td>Alcohol Extractive</td>
<td>24.9 %w/w</td>
</tr>
<tr>
<td>3.</td>
<td>Hardness</td>
<td>4.0 kg/m²</td>
</tr>
<tr>
<td>4.</td>
<td>Uniformity of weight</td>
<td>&lt; 5% Variation</td>
</tr>
<tr>
<td>5.</td>
<td>Total Ash</td>
<td>11.39 % w/w</td>
</tr>
<tr>
<td>6.</td>
<td>Acid insoluble ash</td>
<td>7.09 % w/w</td>
</tr>
<tr>
<td>7.</td>
<td>Disintegration time</td>
<td>23 min</td>
</tr>
<tr>
<td>8.</td>
<td>Loss on drying</td>
<td>5.40 % w/w</td>
</tr>
</tbody>
</table>

Phytochemical Analysis & HPTLC

Qualitative tests:

Preliminary phytochemical analysis through suitable tests for the presence of various functional groups indicates the presence of steroids, glycosides, flavonoid and tannins. On performing HPTLC, the chromatogram showed 6 peaks with Rf values 0.17, 0.24, 0.49, 0.58, 0.73 and 0.84 at 254nm. While at 366nm the chromatogram showed 5 spots with Rf values 0.16, 0.25, 0.49, 0.58, and 0.73 (Fig. 1-2).
When viewed under day light after post chromatographic derivatisation with Anisaldehyde Sulphuric Acid it showed peaks with Rf values 0.33, 0.38, 0.66, 0.74 and 0.85.

**Discussions**

Taste of the final product was *Kashaya* (astringent) followed by *Katu* (pungent) and *Amla* (sour) as majority of the ingredients had *Kashaya* taste. Study on the KD tablet is a step towards pharmacognostical and physico-chemical standardization of polyherbal drugs in tablet form. Powder microscopy of KD tablet showed the striking characters of all individual ten drugs of KD group. Few microscopic findings are
overlapping as those are basic structures in plants body, to overcome these in present study only the findings highly specific for the particular herb are considered as its marker, such as cluster crystals of Draksha, schlerides of Abhaya, pitted vascular fibres of Amalaki, beaker shaped stone cells of Pippali, unicellular multi branched trichomes of Kantakari, trachieds of Punarnava, prismatic crystals and paracytic stomata of Vrishchira. This confirms there is no major change in the microscopic structure of the raw drugs during the pharmaceutical processes of preparation of tablet excluding minor changes in the larger structures such as stomata, multi-branched trichomes etc.

All the pharmaceutical parameters analyzed showed acceptable values. Variation in weight was less than 5%, hardness of 4 kg/cm² and rate of disintegration was 23 minutes which are well within the permissible limit. Higher percentage of water soluble extractive may be indicating the abundance of water soluble tannins, glycosides, sugars and also the presence of binding agent which is water soluble.

Phytochemicals such as steroids, flavonoids and tannins are proven for their action on various structural and functional components of respiratory system. Tannins and flavonoids also have anti-infective action. HPTLC study of the drug has yielded standard finger prints of the formulations with 6, 5 and 5 peaks on short UV, long UV and when viewed in day light after post chromatographic derivatisation with Anisaldehyde Sulphuric Acid. Among which few chromophores are susceptive to both short and long UV. This polysusceptivity is frequently expected when there are clusters of larger phytochemical constituents such as tannins.

Conclusions
Pharmacognostical findings confirm the similarities in the microscopic characters of individual ingredients and the finished product with no major changes in the microscopic structures during the pharmaceutical processes of tablet preparation. Physicochemical parameters of the tablet were within the permissible limits. Identified phytochemical components support the intended action of the formulation in respiratory system. It is inferred that the formulation meets the required qualitative standards at a preliminary level. Results of this study may be used as the reference standard for testing the samples of KD tablet or in further research undertakings of its kind.

References
1. EMEA: Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products, EMEA/CVMP/81400 Review. London: European Agency for the Evaluation of Medicinal Products; 2005


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