PRELIMINARY DEVELOPMENT OF PHARMACOGNOSTICAL AND PHYSICO–CHEMICAL PARAMETER OF UDVARTANA- AN AYURVEDIC FORMULATION


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ABSTRACT

Udvartana has been explained in Dincharya by ayurvedic seers for maintenance of health and treatment of different diseases. Udvartana Yoga is An Ayurvedic formulation considered as Kapha pacifying. The present study was aimed at setting up a standard profile of Udvartana Yoga which was prepared using pharmacognostical authenticated drug like Yava (Hordeum Vulgare), Kulattha (Dolichos Biflorus) and Bajara (Pennisetum Typhoides) followed by subjecting it to detailed physico-chemical analysis as per standard protocol. Its microscopic powder characters and preliminary physico-chemical parameters were studied. Physico-chemical parameters showed that water soluble extract 9.377% w/w is more than methanol soluble extract 7.60% and loss on drying 2.47%%, etc. HPTLC was carried out after organizing appropriate solvent system in which maximum four spots were distinguished at 254 nm and five spots at 366 nm. The findings of the study will be useful for the identification and standardization of the Udvartana Yoga.

KEYWORDS: Udvartana Yoga, Yava, Kulattha, Bajara, Pharmacognosy, Physico-chemical analysis.

INTRODUCTION

In today’s era, acceptance and popularity of Panchakarma is increasing day by day. The process of Udvartana described in Ayurveda is safe and effective to reduce body fat. Udvartana is the procedure of massaging the powders of herbs in direction opposite to the orientation of hair on the body. This process is explained in ancient text of Ayurveda like Astanga Hridaya by Vagbhatacharya, Charaka Samhita by Charakacharya. Chakrapani opines that Udvartana is applied after Abhyanga and it is same as ‘Sharira Parimarjana’ mentioned by Charaka.¹
As per Acharya Vagbhata Udvartana normalizes vitiated Kapha and liquefies the Medas (Fat). Udvartana opens the circulatory channels, facilitates the metabolic activity, provides firmness to body, smoothness to skin and improves the complexion of the skin.[2]

In the present study Udvartana Yoga contains Yava (Hordeum Vulgare), Kulattha (Dolichos Biflorus) and Bajara (Pennisetum Typhoides). Grains for Udvartana was purchased from local market of Jamnagar and the sample was analyzed pharmacognostically and physico-chemically. To evaluate the quality of finished products, it becomes necessary to subject the drug or raw materials to different chemical analysis/studies in the prospect of science. The drugs which are used should be well understood in the light of Modern Chemistry to provide proper scientific background. The present research work deal with the studies of some important Pharmacognostical, Physicochemical and Phytochemical characteristics of the grains of Udvartana Yoga individually as well as separate as whole and its powdered form including HPTLC.

MATERIALS METHODS:
A. Material:
For this study, the raw materials i.e. Yava, Kulattha and Bajara for Udvartana Yoga were taken. These are listed in below shown table 1.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Drug</th>
<th>Latin Name</th>
<th>Family</th>
<th>Part used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yava</td>
<td>Hordeum vulgare Linn.</td>
<td>Poaceae</td>
<td>Seed</td>
</tr>
<tr>
<td>2</td>
<td>Kulattha</td>
<td>Dolichos biflorus Linn.</td>
<td>Leguminosae</td>
<td>Seed</td>
</tr>
<tr>
<td>3</td>
<td>Bajara</td>
<td>Pennisetum glaucum Linn.</td>
<td>Poaceae</td>
<td>Seed</td>
</tr>
</tbody>
</table>

B. Methods:

Raw drugs i.e. Yava, Kulattha and Bajara for Udvartana Yoga used in the research study were collected from the local market of Jamnagar. Yava, Bajara and Kulattha in same proportion for Udvartana yoga was grinded and filtered through 40 no. sieve in the Pharmacy, Gujarat Ayurved University, Jamnagar. The organoleptic examination and powder microscopy of all ingredient individually as well as compound yoga were carried out in Pharmacognosy Laboratory, I.P.G.T. & R.A, Jamnagar. Physicochemical analysis of the compound was carried out in the pharmaceutical laboratory of I.P.G.T. & R.A, Jamnagar, Gujarat.
Pharmacognostical evaluation:

The purpose of the pharmacognostical study was to confirm the authenticity of the drugs used in the preparation of Udvartana Yoga. Pharmacognostical evaluation of Udvartana Yoga based on Organoleptic characters i.e. colour, taste, odour and texture. Small quantity of Udvartana Yoga was dissolved in distilled water and filtered through filter paper then filtrate is dried and placed on slide, 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. The micro photographs were taken under Carl Zeiss Binocular microscope attached with camera.\(^3\),\(^4\),\(^5\)

Pharmaceutical Analysis:

- **Physico-Chemical Parameters**

  Parameters were selected on the basis of common parameters mentioned for powder in Ayurvedic Pharmacopoeia of India and CCRAS guidelines.\(^6\) Water-soluble extract, methanol-soluble extract, pH (5% solution), ash value, loss on drying parameters were analyzed for different physico-chemical parameters by today’s routine methods.

- **High performance Thin Layer Chromatography study (HPTLC)**\(^7\):

  Methanol extract of Udvartana Yoga was spotted on pre coated silica gel GF 254 aluminium plate as 5mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of a Camag Linomate 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 254nm and 366 nm under control of win CATS software. The slit dimensions were 6 mmx0.45 mm and the scanning speed was 20 mm per second. All HPTLC plates were scanned with filter fraction Savitsy-goloy 7, minimum slope 5, minimum height 10 AU, minimum area 50 AU, and maximum height 990 AU with absorption unit.

OBSERVATION AND RESULT:

Organoleptic characteristics:

Organoleptic characters colour, odour, taste and texture were scientifically recorded and depicted in the table no.2
Table 2: Organoleptic characteristic of Udvartana Yoga

<table>
<thead>
<tr>
<th>Properties</th>
<th>Yava</th>
<th>Bajara</th>
<th>Kulattha</th>
<th>Udvartana Yoga as compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Creamish white</td>
<td>Ash</td>
<td>Creamish red</td>
<td>Creamish</td>
</tr>
<tr>
<td>Odour</td>
<td>Sweetish</td>
<td>Slightly Aromatic</td>
<td>Slightly pungent</td>
<td>Sweetish</td>
</tr>
<tr>
<td>Taste</td>
<td>Sweetish (Madhura) end with Astringent (Kashaya)</td>
<td>Sweetish (Madhura) end with Astringent (Kashaya)</td>
<td>Astringent (Kashaya) end with Pungent (Tikta), Sweetish (Madhura)</td>
<td>Sweetish (Madhura) end with Astringent (Kashaya)</td>
</tr>
<tr>
<td>Texture</td>
<td>Coarse</td>
<td>Coarse</td>
<td>Coarse</td>
<td>Coarse</td>
</tr>
</tbody>
</table>

**Powder microscopy:**

For that microscopy of *Udvartana Yoga* showed Oil globules, Simple fibre, Simple starchgrains, Simple Trichoms of *Yava*; Annular vessels, Mesocarp cells, Rhomboidal crystal, Simple fibre, Simple Starch grains with hilum, Simple Starch grains without hilum, Spool Shaped cells, Wavy Parenchyma cells of *Kulattha*; Endosperm cell with starchgrain, Fragments of Tegma with brown contant, Prismatic crystal, Simple fibre, Stained starchgrain, Wavy Parenchyma cells of *Bajara*. Results matched with the API *Yava* and *Kulattha*. *Bajara* were not given in API and thus confirmed the genuineness of the drugs used in the finished product. (Microphotographs Plate 1, 2 & 3)

**Plate 1: Microphotographs of Yava**

(Fig. 1.1) Oil globules of *Yava*   (Fig. 1.2) Simple fibre of *Yava*
**Plate 2: Microphotographs of Kulatha**

(Fig. 2.1) Annular vessels of Kulatha  
(Fig. 2.2) Mesocarp cells of Kulatha  
(Fig. 2.3) Rhomboidal crystal of Kulatha  
(Fig. 2.4) Simple fibre of Kulatha  
(Fig. 2.5) Simple Starch grains with hilum of Kulatha  
(Fig. 2.6) Simple Starch grains of Kulatha
Plate 3: Microphotographs of *Bajara*

(Fig. 2.7) Spool Shaped cells of *Kulattha*

(Fig. 2.8) Wavy Parenchyma cells of *Kulattha*

(Fig. 3.1) Endosperm cell with starchgrain of *Bajara*

(Fig. 3.2) Fragments of Tegma with brown content of *Bajara*

(Fig. 3.3) Prismatic crystal of *Bajara*

(Fig. 3.4) Simple fibre of *Bajara*
Pharmaceutical Evaluation:

Physico-Chemical parameters of *Udvarana Yoga* like loss on drying, ash value, water-soluble extract, methanol-soluble extract and pH all were found to be within the permissible range. Details are given in Table 3.

**Table 3: Results of the analysis on physico-chemical parameters of *Udvarana Yoga***

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss on Drying</td>
<td>2.47 %w/w</td>
</tr>
<tr>
<td>Ash Value</td>
<td>2.497 %w/w</td>
</tr>
<tr>
<td>Water-soluble Extract</td>
<td>9.377 %w/w</td>
</tr>
<tr>
<td>Methanol-soluble Extract</td>
<td>7.600 %w/w</td>
</tr>
<tr>
<td>pH (5% solution)</td>
<td>6</td>
</tr>
</tbody>
</table>

**HPTLC study results**

On performing HPTLC, Methanol extract of drug was spotted on pre-coated silica gel at 254 nm and 366 nm. Results are depicted in the table no. 4 and plate no. 4 & 5.

**Table 4: Showing consolidated data of HPTLC profile of *Udvarana Yoga***

<table>
<thead>
<tr>
<th>Drug</th>
<th>Condition</th>
<th>No. of spots</th>
<th>Max. Rf</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Udvarana yoga</em></td>
<td>Short UV</td>
<td>4</td>
<td>0.04, 0.70, 0.77, 0.91</td>
<td>11905.3, 2121.5, 2984.0, 7595.3</td>
</tr>
<tr>
<td></td>
<td>(254 nm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long UV</td>
<td>5</td>
<td>0.04, 0.12, 0.71, 0.75, 0.93</td>
<td>13588.4, 548.1, 967.0, 709.2, 979.6</td>
</tr>
<tr>
<td></td>
<td>(366 nm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION:

Medicinal plants are having great part of the Ayurvedic treatment as raw materials therefore the correct identification of those plants are quite necessary. The Ayurvedic system of medicine is facing another major problem that is quality control of crude drugs. To get the full therapeutic impact of the drugs it should be remained free from adulterants and thus the quality of the drugs can be lift up to the adequate standard. For this, proper identification of the plant excluding with the adulterant microscopically and morphologically is necessary.

The present study was undertaken to standardize Udvartana Yoga, hence the material was subjected to minimum Pharmacognostical and Pharmaceutical analysis. In Pharmacognostical
study microscopic characters viz. Oil globules, Simple fibre, Simple Starch grains etc. in Yava; Annular vessels, Mesocarp cells, Rhomboidal crystal etc. in Kulattha; Endosperm cell with starchgrain Prismatic crystals, Fragments of Tegma with brown content, Prismatic crystal, Wavy Parenchyma cells etc. in Bajara were found. All characters also were found in compound of these drug i.e. Udvartana Yoga.

Physico-Chemical parameters of Udvartana Yoga like Loss on drying, Ash value, pH Value all were found to be within the permissible range. The loss on drying of any sample is directly related to its moisture content. So it can be correlated with presence of Jala mahabhuta. It was found in Udvartana Yoga 2.47%w/w, which show it is Ruksha. Water solubility is a reflection of the extent of which the drug spreads in body. Vayu is Chala and Akash is Laghu. These mahabhuta will spread easily in body. In present study water solubility was found 9.377%w/w, it can be said that Udvartana Yoga spreads easily in the body i.e. it has good bioavailability. pH of the substance is useful to determine whether the solution is acidic or alkaline. It can be correlated as Tikshna or Manda property respectively. As acidic solution (pH < 7) is subjected to dilution its pH changes to alkaline (pH > 7). Here pH vale was found 6, which suggests Udvartana yoga has Tikshna guna and Agni mahabhuta.

CONCLUSION

Pharmacognostical evaluation of Udvartana Yoga showed that all the observed characters which are from all three ingredients used in the compound formulations showed that genuinity and purity of the finished product. All the physico-chemical parameters prove dominance of Vayu, Agni and Akasha Mahabhuta in Udvartana Yoga. The results of pharmacognostical and physico-chemical parameters can be considered as reference standards in future studies.

REFERENCES

