Original Research Article

An analytical study on panchavalkala choorna - a poly herbal compound in the management of psoriasis

Prasanth Dharmarajan1, Harisha2, Raiby Paul3, Anup B. Thakar4, Switu Jani5

1Ph.D. Scholar, Department of Panchakarma, I.P.G.T. & R.A., Jamnagar, India
2Head, Pharmacognosy Lab, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, India
3Assistant Professor, Department of Dravya Guna, Amrita School Of Ayurveda, Vallickavu, Kollam, India
4Associate Professor and I/C head department of Panchakarma, I.P.G.T. & R.A., G.A.U., Jamnagar, India
5Ph.D, scholar, Pharmacognosy Lab, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat AyurvedUniversity, Jamnagar, India

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ABSTRACT

Background: Panchavalkala Choorna is a poly herbal compound made from the barks of five major drugs from the Ficus family. It is widely quoted as an effective remedy in various skin disorders explained under the wide spectrum of Kushta (skin disorders), mentioned in Ayurvedic classics. However, till date no published data is available on the analytical profile of this compound formulation. The present study was aimed to standardize and develop the pharmacognostical and phytochemical profile of Panchavalkala Choorna. The compound was prepared as per classical methods and analytical findings were systematically recorded. The samples were subjected to organoleptic analysis, physicochemical analysis and High performance Thin Layer Chromatography (HPTLC) examination by optimizing the solvent systems. Pharmacognostical profile of Panchavalkala Choorna was established. Loss on drying, Specific gravity, Viscosity and Refractive index, Iodine value, Acid value and Saponification value of Panchavalkala Choorna were found within prescribed limits. HPTLC fingerprinting profile of ST revealed 6 spots at 254 nm and 4 spots at 366 nm. Two spots were merging in both the long and short UV, showing common characters in both the wavelengths.

Introduction

Psoriasis is a chronic, autoimmune disease that appears on the skin. There is about 2.5 % of whole world population today who are suffering from psoriasis1. Psoriasis occurs when the immune system sends out faulty signals that speed up the growth cycle of skin cells. Psoriasis is not contagious. It commonly causes red, scaly patches to appear on the skin, although some patients have no dermatological symptoms. The scaly patches commonly caused by psoriasis, called psoriatic plaques, are areas of inflammation and excessive skin production. Skin rapidly accumulates at these sites which gives it a silvery-white appearance.

The cause of psoriasis is not fully understood, but it is believed to have a genetic component and local psoriatic changes can be triggered by an injury to the skin known as Koebner phenomenon. It has been found in large survey 1/3rd of patient have a positive family history. Various environmental factors have been suggested as aggravating to psoriasis including stress, withdrawal of systemic corticosteroid, excessive alcohol consumption, and smoking but few have shown statistical significance. There are many treatments available, but because of its chronic recurrent nature psoriasis is a challenge to treat.2

Ayurveda always advocates regimens and therapies that promote the physical and emotional levels of wellbeing. In any case if there is an intervention required to cross check the same, Ayurveda addresses it with the dual therapies Shodhana and Shamana(eliminating and pacifying therapies)3. Shodhana (eliminating therapy) purifies the body in a deeper level by the eliminating vitiated doshas (bodily humors) that are responsible for the manifestation of a disease4. Shamana Chikitsa is the next step followed by Sodhana Chikitsa for the
Materials and Methods
Collection of raw materials

Raw drugs of Panchavalkala Yoga were procured from Jamnagar and were identified and authenticated at Pharmacognosy laboratory in the month of November-December.

Pharmacognostical evaluation

As per Ayurvedic Pharmacopeia of India, raw drugs were identified and authenticated by the Pharmacognosy Lab. The identification was carried out based on the organoleptic features and powder microscopy of the individual drugs. Later, pharmacognostical evaluation of Panchavalkala Yoga was carried out. Panchavalkala Yoga dissolved in small quantity of distilled water, studied under the Carl zeiss trinocular microscope attached with camera, with stain and without stain. The microphotographs were also taken under the microscope.

Preparation of Panchavalkala Choorna

Panchavalkala Choorna was prepared as per classical method. Reference of Panchavalkala Choorna is available in Bhaisajya Ratnavali and Sahasra yoga a south Indian compilation of various useful Ayurvedic formulations. All ingredients were taken in prescribed ratio equal in quantity (Table 1). Powdered and stored in airtight glass jars under hygienic conditions.

Analytical study

Raw materials Panchavalkala Yoga and prepared final product in choorna form were analyzed by employing various analytical parameters. Physicochemical analysis was carried out on all three batches. Organoleptic characteristics (colour, odour, taste, touch) were assessed (Table 2) along with physicochemical analysis such as loss on drying at 110°C, acid value, PH value, water soluble ash, acid soluble ash and ash value tests were carried out and depicted in (Table 3).

Qualitative tests

Panchavalkala Choorna was subjected various qualitative analysis for the presence of proteins, steroids, flavonoids, glycosides, tanin & phenolic compounds. Details of which are depicted in (Table no :4)

HPTLC Profile

Instrument used was CAMAG make HPTLC with WINCATS 1.4.3 software and Linomat 5 sample applicator. The stationary phase used was HPTLC plate’s silica gel 60 F254 and mobile phase was Toluene: Et. Acetate (8:2). The sample was prepared in methanol, and 2µl sample was applied as 8 mm band for each spot. The plate was visualized under short and long ultraviolet (UV) radiations and density of the separated spots was recorded using scanner III. The plate was sprayed with vanillin-sulphuric acid reagent and observed in daylight. The Rf values were recorded [Table 5]. HPTLC and Peak display densitogram of ST at 254 and 366 nm is placed in plate 2.

Results and Discussion

Pharmacognostical evaluation

Organoleptic characters

Organoleptic parameters like Taste, Colour, odour and touch were scientifically studied and results are depicted in the table 2.

Microscopic characters

Diagnostic characters were observed under the microscope were rhomboidal crystals, crystal fibres, cork with brown contents of Ashwatha, rosette and prismatic crystals, simple and compound starch grains, and lignified fibres in parisha, where as lignified cork on surface, tanin content, fiber and prismatic crystals were observed in plaksha, Rhomboidal crystals, tanin content and cork cells on surface were observed in Udumbara, Rhomboidal crystal, cork cells on surface, and tanin contents were seen in Vata. Details of which are depicted in plate no:(1-15)

Physicochemical analysis:

Physicochemical analysis of Panchavalkala choorna ie Ash value, loss on drying pH were scientifically studied and the results were detailed in Table 3.

HPTLC Study:

Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 6 of spots at 254 nm and 4 spots at 366 nm. Phyto-components with 0.85 Rf values were recorded in both long and short UV, they showed that 2 spots were merging which may be responsible for expression of its pharmacological and clinical actions. This shows common characters in both the wavelength and it reflects presence of steroidal components in product.

Discussion

Pharmacognostical evaluation showed that the Yoga contains all the ingredients which were observed in the microscopical characters, this shows that the purity and quality of the product. Phytochemical analysis showed that material gains moisture during storage, which eventually may affect the quality of product. The presence of tanin, calcium oxalate

Crystals and starch grains present in all five ingredients which are helpful in skin disorders. Average value of Loss on drying (LOD) was found within normal limits (2.135% w/w), which indicates prompt care taken during packaging and storage of product. The obtained values of these tests were found within normal limits in Panchavalkala choorna, which indicate good quality of product. The ph value of the compound was found to be 5.5 and the water soluble ash was found to be 5.3%, the acid insoluble ash constituted 0.977%, whereas total ash value was 20.28%. HPTLC results showed that the 6 spots at 254 nm and 4 spots at 366 nm, where two common spot observed at both spectrum.

**Conclusion**
Pharmacognostical and phyto-chemical evaluation of Panchavalkala choorna illustrated the specific characters of ingredients which were used in the preparation. Physico-chemical profile is an essential parameter for quality assurance; in present work the obtained results were found within prescribed limits. For the first time, pharmaceutical and analytical profile of Panchavalkala choorna was established. On the basis of observations and experimental results, this study may be used as reference standard in the further quality control researches.

**Table 1: Composition of Panchavalkala choorna**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Drug</th>
<th>Bot. Name &amp; Family</th>
<th>Family</th>
<th>Parts Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Nyagrodha</td>
<td>Ficus bengalensis Linn.</td>
<td>(Moraceae)</td>
<td>Bark</td>
</tr>
<tr>
<td>02</td>
<td>Udumbara</td>
<td>Ficus glomerulata. Roxb.</td>
<td>(Moraceae)</td>
<td>Bark</td>
</tr>
<tr>
<td>03</td>
<td>Ashwatha</td>
<td>Ficus religiosa Linn.</td>
<td>(Moraceae)</td>
<td>Bark</td>
</tr>
<tr>
<td>04</td>
<td>Plaksha</td>
<td>Ficus gibosa-bluume</td>
<td>(Moraceae)</td>
<td>Bark</td>
</tr>
<tr>
<td>05</td>
<td>Pareesha</td>
<td>Thespesia populnea soland Ex.Correa</td>
<td>(Malvaceae)</td>
<td>Bark</td>
</tr>
</tbody>
</table>

**Table: 2 Organoleptic characters of Panchavalkala choorna**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characters</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Colour</td>
<td>Dark brown</td>
</tr>
<tr>
<td>02</td>
<td>Odour</td>
<td>Agreeable</td>
</tr>
<tr>
<td>03</td>
<td>Taste</td>
<td>Bitter</td>
</tr>
<tr>
<td>04</td>
<td>Touch</td>
<td>Hard</td>
</tr>
</tbody>
</table>

**Table 3: Physicochemical assay of Panchavalkala choorna**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss on drying at 110°C (w/w)</td>
<td>2.135</td>
</tr>
<tr>
<td>Ph value (5% v/v aqueous solution)</td>
<td>5.5</td>
</tr>
<tr>
<td>Water soluble ash (% w/w)</td>
<td>5.3</td>
</tr>
<tr>
<td>Acid soluble ash (% w/w)</td>
<td>0.977</td>
</tr>
<tr>
<td>Ash value (% w/w)</td>
<td>20.28</td>
</tr>
</tbody>
</table>

**Table: 4: Qualitative tests of Panchavalkala choorna**

<table>
<thead>
<tr>
<th>Component</th>
<th>Test</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>Biurate test</td>
<td>Absent</td>
</tr>
<tr>
<td>Steroid</td>
<td>Salkowski test</td>
<td>Present</td>
</tr>
<tr>
<td>Glycoside</td>
<td>Keller Killiani (Glacial acetic acid, FeCl₃, Con.H₂SO₄)</td>
<td>Positive</td>
</tr>
<tr>
<td>Flavonoid</td>
<td>Shinoida test</td>
<td>Negative</td>
</tr>
<tr>
<td>Tanin &amp; Phenolic Compounds</td>
<td>Lead acetate solution</td>
<td>Positive</td>
</tr>
<tr>
<td>Saponin</td>
<td>Foam test</td>
<td>Present</td>
</tr>
</tbody>
</table>
Table 5: HPTLC profile of *Panchavalkala choorna*

<table>
<thead>
<tr>
<th></th>
<th>Under 254 nm</th>
<th></th>
<th>Under 366 nm</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of peaks (spots)</td>
<td>Under 254 nm</td>
<td>No. of peaks (spots)</td>
<td>Under 366 nm</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>0.01, 0.15, 0.34, 0.49, 0.71, 0.80</td>
<td>04</td>
<td>0.01, 0.06, 0.80, 0.90</td>
<td></td>
</tr>
</tbody>
</table>

Plate 1: Microphotographs of *Panchavalkala choorna*

1. Rhomboidal crystals of Ashwatha
2. Crystal fibers of Ashwatha
3. Cork with brown content in Ashwatha
4. Rosette and prismatic crystals of Parisha
5. Simple and compound strach grains of Parisha
6. Lignified fiber of Parisha
7. Lignified cork in surface of Plaksha
8. Tannin content in Plaksha
9. Fiber & prismatic crystals of Plaksha
Conflict of interest statement
We declare that we have no conflict of interest.

References
3. Vagbhata Astanga Hridayam with commentaries Sarvangasundari of Arunadatta and Ayurveda rasayana


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