ANALYTICAL STUDY OF PHALATRIKADI GHRITA: AN AYURVEDIC FORMULATION

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INTRODUCTION
Triphala strengthens the muscles of the eyes and improves eyesight. It is helpful in curing various eye problems like cataracts, glaucoma, progressive myopia, and conjunctivitis. It is also used to wash the eyes, in order to reduce their redness. Triphala is very helpful in treating impaired vision[1] It is used in Naktandhya.[2] Good for eye and eyesight/ vision.[3] It is essential to gratify the international standards and quality control of the drug used by convincing the drug regulatory authorities. Present study is carried out to maintain the ‘quality control’ of Phalatrikadi Ghrita[4] by proper identification of raw materials at the basic level with the help of microscopic, morphological characteristics and Physico-chemical analysis.

MATERIALS AND METHODS
Collection of raw materials
The raw drugs for the study were procured from the Hansa Pharmacy Premnagar Asram, Haridwar Uttarakhand. The final product i.e. Phalatrikadi Ghrita was prepared in the Hansa Pharmacy Premnagar Asram, Haridwar Uttarakhand.

Method of preparation of Phalatrikadi Ghrita
The Phalatrikadi Ghrita was prepared by classical method of Ghrita paka. For Ghrita paka 5 kg Ghrita was taken, Kwatha drayvas: Haritki, Vibhitak, Amlaki, Shatavari. Kalka dravya: Yashtimadhu. In a large vessel Go-Ghrita was poured, when it gets melted under moderate flame Kalka dravyas in particular ratio were added followed by addition of Kwatha drayvas Haritki, Vibhitak, Amlaki, Shatavari. To get final product, the contents were subjected to heat till up to Sneha Siddhi lakshana were observed then Prakshepa dravayas were added into it. The contents of Phalatrikadi Ghrit and there proportion is mentioned in Table no. 1.

Analytical study
Raw materials and prepared final product (Phalatrikadi Ghrita) were analyzed by employing various analytical parameters.

Oraganoleptic study
Oraganoleptic characteristics for various sensory characters like color, taste, odor etc and was carefully noted down.[5][Table no. 2].

Powder Microscopy
Powder microscopy of individual coarse powders of raw drugs was also carried out; and microphotographs were taken under the carl-zeiss trinocular light microscope attached with camera.[6,7] Both stained and unstained images were visualized.

Physicochemical analysis
Physicochemical analysis such as loss on drying at 110°C, Water soluble extractive, Total ash, Acid insoluble ash, Alcohol soluble extract [Table no. 3]. Specific gravity at 25°C, viscosity, refractive index, tests were carried out.[8]

Phalatrikadi Ghrita was further subjected to High Performance Thin Layer Chromatography (HPTLC) study.[9]

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 plates silica gel 60 F_{254} and mobile phase was Toluene: Et Acetate (90:10). 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 vaniline-sulphuric acid reagent and observed in daylight. The Rf values were recorded. Peak display densitogram of PTG shows in Figure No. 14

RESULTS AND DISCUSSION
Pharmacognostical Analysis
Organoleptic evaluation was performed at two stages of preparation viz. for coarse powders and finished product (Observations of organoleptic analysis are tabulated in Table 4).

Raw herbs were authenticated and analyzed before processing because good quality products mainly depend upon genuine raw materials.

Powder microscopy characters
Coarse powders of individual Ingredients were observed under the microscope are detailed as below:

In fruit of Haritaki
Mesocarp cells, starch granule sand sclerides of various shapes and sizes but mostly elongated. [Figure 3, 5 and 7].

In fruit of Bibhitak
Lignified sclerid, tannin, trichome, simple starch grains and some stone cells found in most of mesocarp cells, [Figure 2, 4 and 6].

In fruit of Amalaki
Lignified sclerid was found, mesocarp forms bulk of fruit, mesocarp contains large aggregates of numerous irregular silica crystals. [Figure 1].

In Satavari root
Annular vessels, raphides, scleriform vessels, aiclar crystals, corkin surface, pitted vessel, simple fibres, starch granules were found. [Figure 8, 9 and 11].

In Yasthimadhu

<table>
<thead>
<tr>
<th>Name of drug</th>
<th>Latin Name</th>
<th>Part used</th>
<th>Ratio</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haritaki</td>
<td>Terminalia chebula Retz.</td>
<td>Fruit</td>
<td>2</td>
<td>Kalka</td>
</tr>
<tr>
<td>Bibhitaka</td>
<td>Terminalia bellirica Roxb</td>
<td>Fruit</td>
<td>2</td>
<td>Kalka</td>
</tr>
<tr>
<td>Amalaki</td>
<td>Emblica officinalis Gaertn.</td>
<td>Fruit</td>
<td>2</td>
<td>Kalka</td>
</tr>
<tr>
<td>Shatavari</td>
<td>Asparagus racemosus willd</td>
<td>Root</td>
<td>2</td>
<td>Kalka</td>
</tr>
<tr>
<td>Yasthimadhu</td>
<td>Glycyrrhiza glabra Linn</td>
<td>Root</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Madhu</td>
<td></td>
<td></td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Ghrita</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Table No. 2 Organoleptic Parameters of Phalatrickadi Ghrita

<table>
<thead>
<tr>
<th>Properties</th>
<th>Phalatrickadi Ghrita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>Yellow Brown</td>
</tr>
<tr>
<td>Odour</td>
<td>Offensive</td>
</tr>
<tr>
<td>Touch</td>
<td>Waxy</td>
</tr>
<tr>
<td>Taste</td>
<td>Sweetish</td>
</tr>
</tbody>
</table>

Physicochemical analysis
Results of physicochemical analysis of PTG are detailed in Table 3.

Loss on drying, Specific gravity, Viscosity and Refractive index, are in normal range. If Saponification value is more than normal range it indicates lower molecular saturated fatty acids. Higher the iodine value, the less stable will be the Ghrit and the more vulnerable it is to oxidation and free radical production. High iodine value Ghrit are prone to oxidation and polymerization and the sample becomes rancid thus decreasing the shelf life of product. If acid value is more, then chances of photo-oxidation and rancidity are more. The obtained values of these tests were found within normal limits in Phalatrickadi Ghrita, which indicate good quality of product. In addition, no rancidity was found in finished product.

High Performance Thin Layer Chromatography (HPTLC)
Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish finger printing profile. It showed 4 of spots and phyto-components with Rf values 0.35, 0.53, 0.67, 0.84 and 0.35, 0.51 were recorded, which may be responsible for expression of its pharmacological and clinical actions.

CONCLUSION
Pharmacognostical and phyto-chemical evaluation of Phalatrickadi Ghrita 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 Phalatrickadi Ghrita 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 No.3: Physico-chemical parameters Of *Phaltrikadi Ghrita* Analysis

<table>
<thead>
<tr>
<th>Parameter</th>
<th><em>Phaltrikadi Ghrita</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss On Drying</td>
<td>1.36%</td>
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<tr>
<td>Water soluble extractive</td>
<td>39.10%</td>
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<tr>
<td>Total ash</td>
<td>33.69%</td>
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<tr>
<td>Acid insoluble ash</td>
<td>2.23%</td>
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<tr>
<td>Alcohol soluble extractive</td>
<td>18.10%</td>
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<tr>
<td>pH</td>
<td>5.10</td>
</tr>
</tbody>
</table>

Table No. 4 Pharmacognostical Analysis

- Lig.sclerrid of *Amlaki* (Figure-1)
- Lig. Sclerrid of *Bibhitaki* (Figure-2)
- Mesocarp cells of *Haritaki* (Figure-3)
- Tannin content of *Bibhitaki* (Figure-4)
- Starch granule of *Haritaki* (Figure-5)
- Trichome of *Bibhitaki* (Figure-6)
- Sceleride of *Haritaki* (Figure-7)
- Annular vessels *Satavari* (Figure-8)
Raphides of *Satavari* (Figure-9)  
Broad pitted vessels of *Yastimadhu*  
(Figure-10)

Scalariform vessels of *Satavari* (Figure-11)  
Crystal fibre of *Yastimadhu* (Figure-12)

Pitted vessels of *Yastimadhu* (Figure-13)

Table no. 5 High Performance Thin Layer Chromatography (HPTLC) Densitogram and Peak list

<table>
<thead>
<tr>
<th>Peak</th>
<th>Type: Sample 2</th>
<th>Name: PHALTIRKADI GHR</th>
<th>X-Position: 20.0 mm</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>41.2</td>
<td>7042.91</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>51.7</td>
<td>101.75</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>60.4</td>
<td>466.99</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>73.7</td>
<td>564.45</td>
</tr>
</tbody>
</table>
REFERENCES
2. API-Vol-4.pdf 1: 122
4. Chakradutta Netra Roga Roga, 59/179