Pharmaceutico-Analytical Study of *Tulasiswarasadi Taila* - An Ayurvedic Polyherbal Formulation

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ABSTRACT

*Tulasiswarasadi Taila* is a type of medicated oil. It is a preparation in which oil, a fine paste of the drugs specified in the formulation composition and prescribed liquid media is being boiled together. The efficacy of a formulation can be increased by processing medicinal herbs with different types of oil. *Tulasiswarasadi Taila* has been mentioned in *Sahasrayogam* in the context of Taila Prakrana. The ingredients of *Tulasiswarasadi Taila* are Tulasi Patra (leaves) Swarasa (juice), Kundrushka and Tila Taila (sesame oil). *Tulasiswarasadi Taila Nasya* (Errhine therapy) has been mentioned for Nasadaurgandhya and Pratishyaya (Allergic Rhinitis). A drug should always be standardized to make it effective in pacifying the disease and it should not create any side effects or complications. Hence, current study was taken to standardize and analyse the *Tulasiswarasadi Taila* by developing standard protocol for testing. The value of loss on drying, specific gravity, refractive index, saponification value, acid value and iodine value was found to be 0.79%, 0.9219, 1.52, 177.668, 11.781 and 57.31, respectively for *Tulasiswarasadi Taila*. On HPTLC scan, at 254nm 13 peaks with major peak at Rf 0.15 contributing 23.19% area and at 366nm 3 peaks with major peaks at Rf 0.02 contributing 52.46% area was noted. These parameters can be set as standard values to derive quality constants for *Tulasiswarasadi Taila*.

KEYWORDS

*Tulasiswarasadi Taila*, Pharmaceutico-Analytical, Standardization
INTRODUCTION

Tulasiswarasadi Taila is a kind of Sneha Kalpana (unctuous substance). The medicinal herbs, when processed with Sneha to increase its efficacy, it is known as Sneha Kalpana. Medicated Taila is a preparation in which Taila, fine paste (Kalka) of the drugs and liquid media (Swarasa/Kashaya Etc.) is being boiled in a quantity specified in the formulation composition. Tulasiswarasadi Taila (oil) is being indicated internally, in the form of Nasya (errhine therapy) and Snehapan for Rogashamanartha (alleviating disease) especially in Nasadaurgandhya and Pratishyaya. The drug has been mentioned in Sahasrayogam in the context of Taila Prakrana.

The ingredients of Tulasiswarasadi Taila are Tulasi Patra (leaves) Swarasa (juice), Kundrushka and Tila Taila. In Ayurveda, the plant and mineral based medicines has been mentioned for treatment of various diseases with a view of proper knowledge of the drugs. The classical medicines should be examined precisely before prescribing, to yield better outcome. The lack of data about mechanism of action results in improper use of numbers of multidrug formulations. Many standard testing protocol were implemented to standardize and analyse the Tulasiswarasadi Taila in the current study.

MATERIALS AND METHODS

Collection of Raw drugs

Tulasi leaves were procured from local farm around Jamnagar, Kundrushka was procured from local market and Tila Taila was procured from Pharmacy of I.P.G.T and R.A, Gujarat Ayurved University at Jamnagar. Before processing these were recognized and authenticated at Department of Pharmacognosy of I.P.G.T and R.A, Gujarat Ayurved University at Jamnagar.

Preparation of Tulasiswarasadi Taila

Tulasi (Ocimum Sanctum Linn.) Patra Swarasa, Kundrushka (Boswellia Serrata Roxb.) and Tila (Sesamum indicum Linn.) Taila are the ingredients of Tulasiswarasadi Taila (Table 1).

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Contents</th>
<th>Latin name</th>
<th>Part used</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tulasi Swarasa</td>
<td>Ocimum Sanctum Linn.</td>
<td>Patra Swarasa</td>
<td>24 litres</td>
</tr>
<tr>
<td>2.</td>
<td>Kundrushka</td>
<td>Boswellia Serrata Roxb.</td>
<td>Niryasa</td>
<td>750 gm</td>
</tr>
<tr>
<td>3.</td>
<td>Tila</td>
<td>Sesamum indicum Linn.</td>
<td>Oil</td>
<td>6 litres</td>
</tr>
</tbody>
</table>

With the help of end runner, 24 litres Tulasi Patra Swarasa (juice) was extracted from 42 kg fresh leaves of Tulasi. The ingredients, part used, quantity and preparation of Tulasiswarasadi Taila was followed as per the reference of...
Sahasrayogam. Taila-Paka Vidhi was adopted to prepare Tulasiswarasadi Taila.5

Pharmaceutical Analysis
Different physico-chemical parameters that were assessed at pharmaceutical chemistry lab of I.P.G.T and R.A, Gujarat Ayurved University at Jamnagar were as follows:
1. Organoleptic examination
2. Refractive index
3. Loss on drying
4. Specific gravity
5. Saponification Value
6. Acid value
7. Iodine Value
8. HPTLC

Methodology

Loss on drying- 2g of Tulasiswarasadi Taila was placed in an evaporating dish and tared. It was kept for drying for 5 hours at 105°C, in hot air oven and then again weighed.

\[
\text{Loss on drying } \% = \frac{\text{Difference in weight}}{\text{Weight of sample in gram}} \times 100
\]

Refractive index – To measure refractive index, Abbé’s refractometer was used. A drop of distilled water was placed on the prism with the adjustment of the drive knob till exactly at the centre boundary line intersects the separatrix. 1.3325 is the refractive index of distilled water at 25°C according to that the instrument was calibrated. By using 1 drop of the Tulasiswarasadi Taila, refractive index was being determined at 25°C.

Specific gravity - An acetone and ether cleaned specific gravity bottle was taken, dried and weighed. At room temperature the specific gravity bottle was filled with Tulasiswarasadi Taila and the stopper was kept over it while removing the surplus liquid and it was weighed again. By replacing the Tulasiswarasadi Taila with distilled water, same procedure was repeated. The ratio between the weight of a given volume of Tulasiswarasadi Taila and the weight of an equal volume of distilled water is the specific gravity of Tulasiswarasadi Taila at the same temperature.

Acid value - In a conical flask, Tulasiswarasadi Taila (3.984 g) was added and shaken well with acid free alcohol-ether mixture (25ml+25ml) that was neutralised previously with the potassium hydroxide solution (0.1 M). Titration was done against Potassium hydroxide solution (0.1 M) after adding Phenolphthalein solution (1 ml). The reading of end point for the appearance of pink colour was noted (a).

Acid value = \( a \times 5.61 \times 0.1 \)

Saponification value - Into round bottom flask fitted with a reflux condenser, 2g of Tulasiswarasadi Taila was added with
25 ml of alcoholic potassium hydroxide (0.5N) and refluxed for 1 hour on a water bath. It was then titrated after cooling it at room temperature with Hydrochloric acid (0.5 N) and by adding Phenolphthalein solution (1 ml), the end reading was noted down (a). The procedure was repeated by omitting the sample for blank reading (b). Saponification value =

(b-a) X 28.05 X 1.000

Weight of sample in gram

**Iodine value** - In a dry iodine flask, the Tulasiswarasadi Taila was dissolved with CCl4 (10 ml) and iodine monochloride solution (20 ml) and potassium iodide moistened stopper was inserted. At 170°C, for 30 min this flask was kept in a dark place. While using starch as an indicator, Titration was done with Sodium thiosulphate (0.1N) after adding potassium iodide (15 ml) and water (100 ml). The reading (a) was noted. In the same manner with the same quantities of reagents, the experiment was repeated omitting the substance and the reading (b) was noted. Iodine value = (b-a) X 12.69 X 0.1

Weight of sample in gram

**HPTLC:**

**Sample preparation for HPTLC** – 0.1 ml of sample was taken and diluted with 1 ml of hexane and used for chromatography. Thereafter prechromatographic derivetisation was done with alcoholic KOH on plate itself. 5 μl of the above sample was applied on a precoated silica gel 60 F254 on aluminium plates to a band width of 6 mm using CAMAG Linomat 5 TLC applicator. The plate was developed in petroleum ether: diethyl ether: acetic acid (9:1:0.1) volume/volume 60°C - 80°C. The developed plate was derivatised by 5% H2SO4 by dipping technique and heated till complete colour development and the developed plates were scanned under UV 254 and 366 nm. The record of Rf, densitometric scan and colour of the spots were noted.

**RESULTS**

**Organoleptic findings**

Tulasiswarasadi Taila was having brownish yellow colour with aromatic oily odour. It was oily viscous in appearance, greasy in touch and bitter in taste (Table 2).

<table>
<thead>
<tr>
<th>Properties</th>
<th>Tulasiswarasadi Taila</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Oily Viscous</td>
</tr>
<tr>
<td>Colour</td>
<td>Brownish Yellow</td>
</tr>
<tr>
<td>Odour</td>
<td>Aromatic Oily</td>
</tr>
<tr>
<td>Touch</td>
<td>Greasy</td>
</tr>
<tr>
<td>Clarity</td>
<td>Clear</td>
</tr>
<tr>
<td>Taste</td>
<td>Bitter</td>
</tr>
</tbody>
</table>

**Pharmaceutical Evaluation**

Physico-Chemical parameters of Tulasiswarasadi Taila like Loss on drying, Refractive index, Specific gravity, Saponification value, Acid value and Iodine value were assessed. Details are being given in Table 3.
Table 3 Results of the drug analysis on Physico-chemical parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Tulasiswarasadi Taila</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss on drying</td>
<td>0.79%</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.52</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.9219</td>
</tr>
<tr>
<td>Acid value</td>
<td>11.781</td>
</tr>
<tr>
<td>Saponification value</td>
<td>177.668</td>
</tr>
<tr>
<td>Iodine value</td>
<td>57.31</td>
</tr>
</tbody>
</table>

High Performance Thin Layer Chromatography (HPTLC)

In HPTLC, in short UV-254 nm, maximum 13 spots were observed in Tulasiswarasadi Taila; while in long UV-366nm, maximum 3 spots were observed as given in Table 4 and shown in Figure 1 and Figure 2.

Table 4 Chromatographic results of Tulasiswarasadi Taila

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Rf values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short ultra violet (254 nm)</td>
<td>0.02, 0.04, 0.08, 0.15, 0.21, 0.23, 0.31, 0.38, 0.47, 0.60, 0.70, 0.84, 0.94</td>
</tr>
<tr>
<td>Long ultra violet (366 nm)</td>
<td>0.02, 0.21, 0.31</td>
</tr>
</tbody>
</table>

Discussion

Loss on drying determines the amount of moisture, it was 0.79% for Tulasiswarasadi Taila. Refractive Index was found to be 1.52 for Tulasiswarasadi Taila, it indicates its density of liquid. Specific Gravity was found to be 0.9219 and it indicates its weight in comparison with that of distilled water. The Acid Value for Tulasiswarasadi Taila was found to be 11.781, it indicates the presence of free fatty acids in the oil. In the present study, Tulasiswarasadi Taila is having high Saponification Value.
(177.668) indicative of faster rate of absorption\(^6\). In the present study, *Tulasiswarasadi Taila* is having 57.31 Iodine value that indicates of good possibility of atmospheric oxidation and absorption. These parameters can be set as standard values to derive quality constants for *Tulasiswarasadi Taila*. On Densitometric scan, The HPTLC unfold that at 254nm, 13 peaks with major peak at \(R_f\) 0.15 contributing 23.19% area; at 366nm, 3 peaks with major peak at \(R_f\) 0.02 contributing 52.46% area was noted.

The properties of *Tulasi* are Katu (pungent) Tikta (bitter), Ruksha (dry), Ushna (hot) and Kapha Vata Shamaka\(^7\). The properties of Kundrushka are Madhura (sweet), Tikta (bitter) Katu (pungent), Tikshana (strong), Kapha Vata Shamaka\(^8\), and The properties of Tila Taila are Tikta (bitter) Kashaya (astringent), Ushna (hot), Guru (heavy), Sara (movable), Vyavayi (spreading), Vikasi (opening channels), Vata Kapha Shamaka and Lekhaniya (scrapping)\(^9\).

The aqueous extract of *O. sanctum* L. significantly increases the anti-oxidant activity, possess antibacterial activity\(^1\), increase neutrophil and lymphocyte counts with enhanced phagocytic activity and phagocytic index\(^2\), shows immunomodulatory effect\(^3\), anti-inflammatory activity\(^4\). The resinous part of *Boswellia serrata* possesses anti-inflammatory activity\(^5\), anti-anaphylactic and mast cell stabilizing activity\(^6\), have effect on cell mediated components of the immune system\(^7\), shows anti-asthmatic activity\(^8\). The sesame seeds are used to treat dry cough, asthma, lung diseases and common cold\(^9\). Ogunsola O. K and Fasola T. R in 2014 reported use of the young leaves for respiratory diseases as medicine and the use of seed oil for soothing effect in chest complaints\(^10\).

So, the properties of *Tulasiswarasadi Taila* can be taken as Katu (pungent) Tikta (bitter) Kashaya (astringent), Ushna (hot), Tikshana (strong), Vata Kapha Shamak and it can be used in the imbalances of Vata and Kapha disorders. It has been indicated in Pratishyaya. Due to its Ushna Tikshna properties, it can be used as a Shirovirechaniya drug for removing Kapha Avarana, expelling vitiated Doshas from Shira and to remove Srotoavarodha (open the blockage) of channels. Its Vyavayi (spreading), Vikasi (opening channels) & Sara (movable) Guna may improve the availability of drugs. It may have anti-oxidant, antibacterial, immunomodulatory, anti-inflammatory, anti-anaphylactic, mast cell stabilizing, anti-asthmatic activity and may have effect on cell mediated components of the immune system. It can be used to treat dry cough, asthma, common cold and other respiratory diseases and may
show the soothing effect for chest complaints.

CONCLUSION

*Tulasiswarasadi Taila* is said to be the best in treating *Vata and Kapha Vyadhi* such as *Nasadaurgandhya* and *Pratishyaya* and all the details pertaining to its ingredients are explained in *Sahasrayoga*. The Saponification Value and Iodine Value of *Tulasiswarasadi Taila* is found to be higher indicative of faster and better absorption justifying relevance of its indication in *Nasyakarma*. The result of the analytical study with HPTLC, *Rf* value and Densitometric Scan can be used as the standard quality control test if the same protocol is being followed to identify and check the quality as well as the *Paka* of *Tulasiswarasadi Taila* so that it can be used for various *Panchakarma* procedures as per the requirement.
REFERENCES


2. Sahasrayogam; Tailaparakarana; Hindi translation by Dr. Ramnivas Sharma and Dr. Surendra Sharma, Published by Chaukhambha Sanskrit Pratishthana, Delhi; 2016; P.88.


7. Shri Bhavamishra, BhavaPrakash Part I Pushpa varga verse 62-63; with Vidyotini Hindi Commentary by Pt. Sri Brahmasankara Mishra Published by, Chaukhambha Sanskrita Bhavana, Varanasi;2016; P.668

8. Shri Bhavamishra, BhavaPrakash Part I Karpuradi varga verse 50-51; with Vidyotini Hindi Commentary by Pt. Sri Brahmasankara Mishra Published by, Chaukhambha Sanskrita Bhavana, Varanasi;2016; P.396

9. Shri Bhavamishra, BhavaPrakash Part I Taila varga verse 02-07; with Vidyotini Hindi Commentary by Pt. Sri Brahmasankara Mishra Published by, Chaukhambha Sanskrita Bhavana, Varanasi;2016; P.927


19. Patil GG, Mali PY, Bhadane VV. Folk remedies used against respiratory disorders in Jalgaon district, Maharashtra.