



## Research Article

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## Quality assessment of an Ayurvedic formulation: Potaki Taila

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### ABSTRACT

**Background:** Quality assessment of herbal drugs is becoming very important in the world. Potaki Taila has mentioned for Sukha Prasava in Bhavaprakasha Yoni Roga Chikitsa. The main ingredients in Potaki Taila are roots of *Basella alba* and seed oil of *Sesamum indicum*. Quality assessment of Potaki Taila has not been done before. **Objective and Methodology:** The aim of the present study was to assess the quality of Potaki Taila by using standard protocols. **Results:** Average values of refractive index, viscosity, iodine value, saponification value, acid value, peroxide value, free fatty acid value and total fatty matter were noted as 1.471,  $6.073 \times 10^{-4}$  sec, 43.0 g per 100 g, 149.2 mg/g, 1.1 mg KOH/g, 0.33 Meq/kg, 0.1 %, and 82.6 % respectively. **Conclusion:** Physico-chemical parameters of Potaki Taila were established for the first time and output of the present investigation may be used as reference standard for the Potaki Taila.

**Keywords:** Potaki Taila, Quality, Physico-chemical parameters.

### INTRODUCTION

*Basella alba* Linn. is belonging to the plant family Basellaceae. It is a wildy cultivated, cool season vegetable with climbing growth habit. *B. alba* is a succulent, branched, smooth, twining herbaceous vine, several meters in length. Stems are purplish or green. Leaves are fleshy, ovate or heart-shaped, 5 to 12 cm long, stalked, tapering to a pointed tip with a cordate base. Spikes are axillary, solitary, 5-29 cm long. Fruit is fleshy, stalkless, ovoid or spherical, 5-6 mm long, and purple when mature. *B. alba* is known as Ceylon spinach or Malabar spinach or Indian spinach in English and Lalbachlu or Potaki in Hindi<sup>[1,2]</sup>. Various parts of the plant are used for different healing activities of human beings as well as animals across the world. *B. alba* is used as a remedy for hemorrhages, skin diseases, sexual weakness, ulcers and as laxative in children and pregnant women. The plant is febrifuge, its juice is a safe aperient for pregnant women and a decoction has been used to alleviate labour<sup>[3]</sup>. Potaki Taila has mentioned for Sukha Prasava in Bhavaprakasha, Yoni Roga Chikitsa. This taila is made of roots of *B. alba*, seed oil of *Sesamum indicum* and kalka (paste made with roots of *B. alba*)<sup>[4]</sup>.

In Ayurvedic and traditional medicinal systems, different medicated oils are used for application on the body, with or without massage for providing health benefits and to treat specific indications. Among them, most of medicated oils are for external usage and certain types of medicated oils that are processed with milk are administered orally<sup>[5]</sup>. Even though medicated oils are used external or internal it is important to assess the quality of these oils. Therefore, an attempt was taken to evaluate the quality of Potaki Taila for the first time.

### MATERIALS & METHODS

#### Collection of plant materials

Fresh roots of *B. alba* were collected from Ganga river bank of Varanasi, India. Plant materials were authenticated by experts in Department of Dravya Guna Vignana and Ayurvedic Pharmacy, Banaras Hindu University.

#### Preparation of Potaki Taila

Air dried powdered roots of *B. alba* (6 kg) were added to a stainless steel container containing 12 L of water and boiled till the total volume of the decoction was reduced to 1/4<sup>th</sup> of the initial volume.

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Subsequently liquid was filtered and obtained decoction was mixed with 2 L of *S. indicum* seed oil and kalka. The mixture was exposed for mild heating until it become to characteristic texture. Finally, prepared taila was filtered slowly through a muslin cloth and stored in air tight glass bottles.

#### Evaluation of organoleptic properties

Organoleptic properties such as color, smell and appearance were observed for the Potaki Taila.

#### Evaluation of physico-chemical parameters

Physico-chemical parameters such as refractive index, viscosity, iodine value, saponification value, acid value, peroxide value, free and total fatty acid contents were determined for Potaki Taila using the standard protocols.

#### Refractive Index:

Refractive Index was measured by using refractometer (Model No: AR – 22- 5898, Sipcon Optical Industries, Haryana, India) at 40 °C.

#### Viscosity:

Viscosity was calculated by using the following equation:

$$\text{Viscosity} = 0.00000237 t - 0.00145/t \text{ (if } t > 100)$$

Where “t” denotes efflux time

Efflux time of the taila was determined by using a viscometer.

#### Iodine Value:

Accurately weighed (0.5 – 1 g) taila was transferred to a clean and dry iodine flask. It was dissolved in 10 ml of  $\text{CCl}_4$  and added 25 ml of Hanu's solution. Moistened the stopper of the iodine flask with a drop of KI solution and inserted into the flask. The flask was gently rotated to ensure through mixing of the contents. The flask was kept in a dark cupboard for 30 – 40 min. with occasional stirring. After that the flask was taken out from the cupboard and KI (15 ml) solution was added and shaken well. Then, 100 ml distilled water was added to wash down any iodine on the stopper. Excess of iodine was titrated against N/10 Thiosulphate solution until yellow colour of  $\text{I}_2$  had almost disappeared. Simultaneously a blank determination was done using exactly similar quantities of all other things except taila under exactly identical conditions.

#### Saponification Value:

In brief, taila (1-2 g) was weighed and added to a 250 ml clean conical flask. Then 25 ml of neutral alcohol was added and shaken well to dissolve the taila. Further 25 ml of alcoholic KOH was added into that flask and contents of the flask were gently boiled with occasional shaking for 1 h under a well washed air condenser.

An exactly similar determination was done as blank experiment omitting the taila. The blank and sample determinations were done simultaneously and for the same reaction period. After 1 h of the reaction period about 0.5 ml of phenolphthalein was added to the saponified and blank solutions. Those solutions were titrated with  $\text{H}_2\text{SO}_4$  (0.5 N) under hot condition. The difference in titre values gave the amount of alkali consumed in terms of standard acid.

#### Acid Value:

Accurately weighed (0.5 – 1 g) taila was added into a 125 ml Erlenmeyer flask which containing 25 ml of neutralized ethanol. Then

warmed the content and stirred to dissolve. After that, cooled the content and 25 ml of anhydrous ether was added. A reagent blank was prepared containing 25 ml each neutralized ethanol and ether. Then the solution was titrated with KOH solution.

#### Peroxide value:

In brief, accurately weighed (0.5 – 1 g) taila was added to a 250 ml glass stopper Erlenmeyer flask containing 30 ml of the acetic acid and chloroform solution and swirled the flask until the sample was dissolved in the solution. Saturated potassium iodide (0.5 ml) was added and allowed the solution to stand with occasional shaking for exactly 1 min. Then 30 ml of distilled water was added.

Finally, the solution was titrated with 0.1N sodium thiosulfate. An exactly similar determination was done as blank experiment omitting the taila. The blank and sample determinations were done simultaneously and for the same reaction period.

#### Free Fatty Acids:

Free fatty acid content in the taila was determined by using following equation:

$$\text{Acid Value} = \% \text{ fatty acid} \times 1.195$$

#### Total Fatty Matter:

In brief, taila was weighed (5 g) and poured into a beaker. Then added 100 ml of warm water was added and heated up to 30 min. After that 15 g of stearic acid was added and boiled again. The beaker was kept out from the heater after 30 min. and allowed to cool. When the cake was formed upper layer of the beaker was collected and weighed after drying. Total fatty acid content was determined by following equation:

$$\% \text{ of Total fatty acids} = \{(\text{Weight of the taila after drying}) \div (\text{Weight of the taila})\} \times 100$$

#### Development of Thin Layer Chromatography (TLC) profile

Potaki Taila (1 ml) was mixed with hexane (1 ml) and spotted (10  $\mu\text{L}$ ) on a pre-coated TLC plate. As the mobile phase ethyl acetate and hexane was used in ratio of 0.5: 9.5 v/v. Spots were visualized by exposing to iodine vapour.

#### RESULTS AND DISCUSSION

Potaki Taila is a yellowish color, pleasant Taila and observed physico-chemical parameters are listed in Table 1. Establishment of physico-chemical parameters of herbal drugs such as taila, powders, decoctions are important to assess the quality of these drugs. Quality control parameters were established for many taila including Mustadi Taila<sup>[6]</sup>, Vipadikahara Grita Taila<sup>[7]</sup> and as well as Shwadnanshradi Taila<sup>[8]</sup>, Bhrngamalkadi Taila<sup>[9]</sup> and Vajigandhadi Taila<sup>[10]</sup> which used in Ayurvedic treatments in Sri Lanka and India respectively. Refractive Index of Potaki Taila was 1.471 and this value was comparable with that of *B. alba*<sup>[11]</sup>, the major ingredient of Potaki Taila. However, iodine value, saponification value, acid value and peroxide value of Potaki Taila were significantly lower than those of *B. alba*<sup>[11]</sup>. It is well known that oils which have high peroxide values tend to be rancid in a short period. Peroxide value of Potaki Taila was very low and therefore, has a longer shelf life. Iodine value is the mass of iodine in grams that is consumed by 100 grams of a chemical substance<sup>[12]</sup>. It is often used to determine the amount of unsaturated fatty acids. Iodine value of Potaki Taila is 43.0 g per 100 g which means it has lesser amount of unsaturated fatty acids. The lower iodine value evidenced that Potaki oil is more stable and less vulnerable to oxidation and free radical production<sup>[13]</sup>. TLC is a simple cheap technique used to establish the

fingerprint of a herbal product. In the present study, three prominent spots bearing  $R_f$  values of 0.33 (purple), 0.54 (purple) and 0.66 (dark purple) were present after exposure to iodine vapor.

**Table 1:** Physico-chemical parameters of Potaki Taila

Parameters	Values
Refractive Index (at 40 °C)	1.471
Viscosity	$6.073 \times 10^{-4}$ sec.
Iodine value	43.0 g per 100 g
Saponification value	149.2 mg/g
Acid value	1.1 mg KOH/g
Peroxide value	0.33 Meq/kg
Free fatty acid value	0.1 %
Total fatty matter	82.6 %

\*experiments are done in replicates

## CONCLUSION

In conclusion, for the first time, physico-chemical parameters of Potaki Taila were established and results of the present study may be used as reference standard for the Potaki Taila.

**Source of support** – Nil.

**Conflict of interest** – None declared.

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