



Research Article

J. Ayu. Herb. Med.
2016; 2(3): 73-77
May- June
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Pharmaceutical and analytical profiles of Savarnakara Yoga

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ABSTRACT

Background: *Savarnakara Yoga* is a herbo-mineral formulation mentioned in different Ayurvedic classics for management of *shvitra*. It contains *Bakuchi* (*Psoralea corilifolia* Linn.) and *Haratala* (Orpiment), which are well-known for their *shvitrahara* properties. But for better management and convenience, it was planned to convert the *Lepa* of *Savarnakara Yoga* into ointment form. **Aim:** To prepare *Savarnakara Yoga* in *Lepa* and ointment forms and develop their quality parameters. **Materials and Methods:** *Lepa* was prepared by using one part of *Bakuchi Churna* and one fourth part of *Ashudhdha Haratala* (Orpiment) triturated with *Gomutra* (Cows' urine); while Ointment was prepared using *Siktha Taila* as a base with the same ingredients of *Lepa*. Organoleptic and Physico-chemical analysis of raw drugs, intermediate and final products were carried out. **Observations:** Insignificant variations were found in organoleptic and physico-chemical profiles of both the forms of *Savarnakara Yoga* and showed alkaline nature due to *Gomutra*. **Conclusion:** Pharmaceutically, addition of *Kalka* remaining after *Taila Paka* gives more yield and better consistency to ointment. Analytical approaches used in the present study like Loss on Drying, Ash Value, Acid Insoluble Ash, Solubility, pH and percentages of Arsenic and Sulphur are useful in the quality control and standardization of *Savarnakara Yoga*.

Keywords: *Bakuchi* (*Psoralea corilifolia*), *Haratala* (Orpiment), *Lepa* (Dry powder), Ointment, *Savarnakara Yoga*.

INTRODUCTION

Ayurvedic science is dynamic and progressive. It is explained in classics that an ideal medicine having multiple actions, available in different dosage forms, possess all the required attributes suited to a patient to rid him of the disease and be devoid of any adverse effects.^[1] Several herbs having such qualities have been described in classics for the management of *shvitra* such as *Bakuchi* (*Psoralea corylifolia* Linn.),^[2] *Kakodumbara* (*Ficus hispida* Linn.),^[3] *Khadira* (*Acacia catechu* Wild.)^[4] etc. Several minerals are also found in classical literature used as a topical application for *shvitra* such as *Haratala* (Orpiment),^[5] *Manahshila* (Realgar),^[6] *Swarnamakshika* (chalco pyrite)^[7] etc. Among them *Bakuchi* and *Haratala* are main ingredients of *Savarnakara yoga*.^[8] It is described in ashtanga hridaya as *lepa* form for topical application along with *Gomutra* on the patches of *shvitra*. Now a day, pharmaceutically modified forms of *lepa* such as ointment, gel, liniment, cream are preferred in place of *lepa* for better convenience. Conversion of ancient dosage forms into convenient dosage forms as per requirement is need of present era. The preparation of the compound drug with respect to the changes during the processes of conversion creates a unique opportunity for formulating new formulation with improved stability and specially selected compositions for superior therapeutic qualities. *Malahara* (Ointment) is prepared by adding bases like *Sikhta*,^[9] *Sarjarasa*^[10] etc. to the *Sneha* (*Pakva* or *Apakva*) and mixed well to get the desired consistency, smoothness and softness. Hence *Malahara* may show better physical properties as well as therapeutic efficacy topically in *shvitra*. Here an attempt has been made to develop *Savarnakara lepa* into ointment and set up their quality parameters for future works.

MATERIALS AND METHODS

Test Drugs:

Savarnakara Yoga contains two ingredients *Bakuchi* (*Psoralea corylifolia* Linn.) and *Ashuddha Haratala* (Orpiment). (Table 1)

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Table 1: Formulation composition of *Savarnakara Lepa* for one batch

| S. No. | Ingredients | Part of use | Ratio | Quantity |
|--------|---|-------------|---------|----------|
| 1 | <i>Bakuchi</i> (<i>Psoralea corilifolia</i> Linn.) | Seed | 4 parts | 200 gm |
| 2 | <i>Ashudhdha Haratala</i> (Orpiment) | Whole | 1 part | 50 gm |
| 3 | <i>Gomutra</i> (Cows' urine) | Liquid | q.s. | 600 ml |

Procurement of Raw Material:

Among *Savarnakara Yoga*, *Bakuchi Churna* (powder of *Psoralea corilifolia* Linn.) and *Ashudhdha Haratala* (Orpiment) were procured from the Pharmacy, GAU, Jamnagar. *Gomutra* (Cows' urine) was procured from *Panjarapola Goshala* (Cow-shade), Jamnagar.

Equipment specifications:

1. Mortar of Stone: Length: 24 inches; Width: 10 inches; Depth: 2.5 inches and Pestle: Length: 8 inches; Diameter of Base: 3 inches
2. Stainless steel vessel: Depth: 8 inches; Diameter: 12 inches; Capacity: 10 L with respective size of stainless steel ladle: length: 21.5 inches
3. Cotton cloth: 1 x 1 meter
4. Digital weighing machine
5. Measuring jugs of 2 L capacity
6. Mercury thermometer (range: 0°C to 360°C)

A. Preparation of *Savarnakara Lepa*:

Bakuchi Churna (200gm) and *Ashudhdha haratala Churna* (50gm) were taken in a big *Kharala* (Mortar & Pestle of Stone) and 600 to 800ml

Gomutra was added in graded manner. This mixture was triturated for one hour thoroughly to obtain homogenous mixture. After getting proper consistency, *Lepa* was stored in Air tight (50 gm) containers. Total five batches of *Savarnakara Lepa* were prepared; the details of which are placed in Table 2. (Figure 1)



Figure 1: Preparation of *Savarnakara Lepa*: a-Fine powder of *Bakuchi* and *Haratala*, b- *Gomutra*, c- *Bhavana* in *Kharala*, d- Prepared *Lepa*

Table 2: Showing the results of preparation of *Savarnakara Lepa*

| Batch | <i>Bakuchi</i> | <i>Ashudhdha Haratala</i> | <i>Gomutra</i> | Time of Trituration | Final product |
|---------|----------------|---------------------------|----------------|---------------------|---------------|
| Batch 1 | 200 gm | 50 gm | 600ml | 60 min | 285 gm |
| Batch 2 | 200 gm | 50 gm | 700ml | 65 min | 292 gm |
| Batch 3 | 200 gm | 50 gm | 650ml | 60 min | 280 gm |
| Batch 4 | 200 gm | 50 gm | 700ml | 70 min | 298 gm |
| Batch 5 | 200 gm | 50 gm | 800ml | 75 min | 282 gm |
| Average | 200 gm | 50 gm | 681ml | 66 Min | 287.4 gm |

B. Preparation of *Savarnakara* ointment:

Bakuchi Churna (200 gm) and *Ashudhdha haratala Churna* (50 gm) were levigated by adding *Gomutra* (300 gm) to prepare *Kalka*. *Tila Taila* (1000 gm) was taken in a steel vessel and heated over *Mandagni* (80°C to 90°C) to remove moisture contents in it. Increments of *Kalka* was added to the *Tila Taila* and fried properly. Heating was continued and added with four times of *Gomutra* (4000 gm) maintaining temperature in between 80°C to 90°C. The contents were stirred continuously throughout the process. At regular intervals; *Kalka* was rolled in between the fingers to check the consistency. Heating was stopped after observing the characteristic features of *Taila Paka*. It was filtered while hot through clean cotton cloth into a sterile stainless steel container. Prepared *Taila* (924.6 gm) was subjected to heat. (Table 3)

When the temperature of *Taila* reaches to 80°C, small pieces of *Siktha* (154.1 gm) were added and allowed to melt completely with continuous stirring. The contents were filtered through a clean cloth while hot to separate insoluble principles possibly present in the *Siktha*. After that residual *Kalka* was also added in it and stirred continuously till the blend became cool, homogenous semisolid mass. Then it was allowed for self-cooling and stored in air tight (50 gm) containers. Total Five Batches of *Savarnakara* Ointment were prepared; the average details of which are placed at Table 4 and 5. (Figure 2)

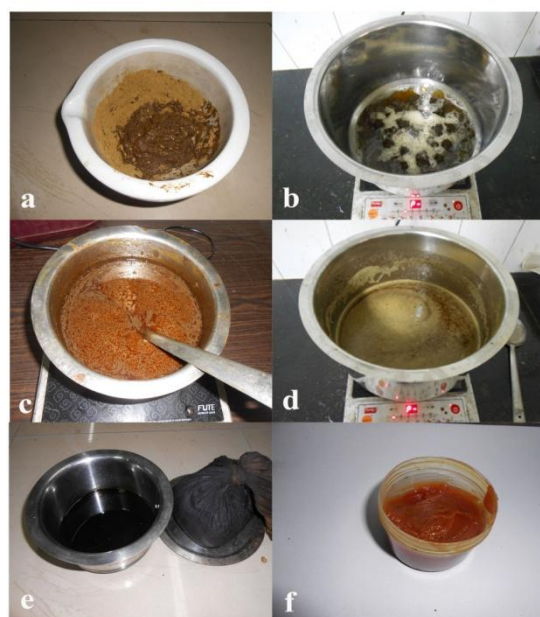


Figure 2: Preparation of *Savarnakara* Ointment: a- Raw Drugs, b- Addition of *Kalka* in *Taila* c- Addition of *Gomutra* in *Taila*, d- Final stage of *taila paka*, e- Prepared oil and residual *kalka*, f- Prepared Ointment

Table 3: Formulation composition of *Savarnakara* Ointment for one batch

| S. No | Ingredient | Ratio | Quantity |
|-------|---------------------------|---|----------|
| 1 | <i>Ashudhdha Haratala</i> | 1 part | 50 gm |
| 2 | <i>Bakuchi</i> | 4 parts | 200 gm |
| 3 | <i>Tila Taila</i> | 20 parts | 1000 gm |
| 4 | <i>Gomutra</i> | 80 parts | 4000 gm |
| 5 | <i>Siktha</i> | 1/6 th part of prepared <i>Savarnakara Taila</i> | 154.1 gm |

Table 4: Showing observations and results of *Savarnakara Taila Nirmana*

| Batch | Quantity | | | Temp. (°C) | Yield (gms) | Yield % |
|----------------|---------------------------|-------------------------|----------------------|---------------|--------------|--------------|
| | <i>Kalka Dravya</i> (gms) | <i>Tila Taila</i> (gms) | <i>Gomutra</i> (gms) | | | |
| Batch 1 | 250 | 1000 | 4000 | 80 -90 | 932 | 93.2 |
| Batch 2 | 250 | 1000 | 4000 | 80 -90 | 920 | 92.0 |
| Batch 3 | 250 | 1000 | 4000 | 80 -90 | 928 | 92.8 |
| Batch 4 | 250 | 1000 | 4000 | 80 -90 | 918 | 91.8 |
| Batch 5 | 250 | 1000 | 4000 | 80 -90 | 925 | 92.5 |
| Average | 250 | 1000 | 4000 | 80 -90 | 924.6 | 92.46 |

Table 5: Showing details of *Savarnakara* Ointment

| Batch | Quantity | | Residual <i>Kalka</i> (gm) | Temp. When <i>Siktha</i> was added | Yield (Gm) |
|----------------|-------------------------------|--------------------|----------------------------|------------------------------------|----------------|
| | <i>Savarnakara Taila</i> (gm) | <i>Siktha</i> (gm) | | | |
| Batch 1 | 932 | 154.10 | 292.2 | 80 ^o C | 1378.3 |
| Batch 2 | 920 | 153.33 | 278.0 | 80 ^o C | 1351.33 |
| Batch 3 | 928 | 154.67 | 280.6 | 80 ^o C | 1362.67 |
| Batch 4 | 918 | 153.0 | 267.9 | 80 ^o C | 1338.9 |
| Batch 5 | 925 | 154.17 | 295.8 | 80 ^o C | 1374.97 |
| Average | 924.6 | 153.85 | 282.9 | 80^o C | 1361.23 |

Analytical study:

Both the forms of *Savarnakara Yoga* were subjected to organoleptic and physico chemical studies in order to develop analytical profile. The following parameters were carried out in this phase:

Organoleptic characteristics^[11] like *Sparsha* (Consistency and Texture), *Rupa* (Colour), *Rasa* (Taste), *Gandha* (Odour) and Appearance were evaluated. (Table 6)

Physico-chemical characteristics:

- For raw drugs, Loss on drying,^[12] Ash value,^[13] Acid insoluble ash^[15] and Water soluble extractive^[16] were evaluated. (Table 7)
- For liquid media (*Gomutra*), pH, Specific gravity and Total solid content were evaluated. (Table 8)
- For liquid media (*Tila taila* and *Savarnakara taila*), Loss on drying, Refractive index and Saponification value were evaluated. (Table 9)
- For final products (*Savarnakara Lepa* and Ointment), Loss on drying; Ash value, Acid insoluble ash, Solubility in water and pH value (10 Aqueous Sol.) were evaluated. (Table 10)

Table 6: Comparative organoleptic characters of the final products

| S. No. | Parameters | <i>Savarnakara Lepa</i> | <i>Savarnakara Ointment</i> |
|--------|------------|--------------------------------|--------------------------------|
| 1 | Touch | Soft | Soft, Greasy |
| 2 | Colour | Brown with yellow Spots | Dark brown |
| 3 | Taste | Not applicable | Not applicable |
| 4 | Odour | Characteristic/ <i>Gomutra</i> | Characteristic/ <i>Gomutra</i> |
| 5 | Appearance | Soft powder | Semi solid, Thick, Opaque |

Table 7: Showing Physico-chemical parameters of the raw drugs

| S. No | Parameters | <i>Haratala</i> | <i>Bakuchi Churna</i> |
|-------|---------------------------------|-----------------|-----------------------|
| 1 | Loss on Drying at 110°C (%w/w) | 0.44 | 1.2 |
| 2 | Ash Value(%w/w) | 0.04 | 7.6 |
| 3 | Acid Insoluble Ash(%w/w) | 0.02 | 1.08 |
| 4 | Water soluble extractive (%w/w) | 0.01 | 11.92 |

Table 8: Showing Physico-chemical parameters of *Gomutra*

| S. No | Parameters | <i>Gomutra</i> |
|-------|---------------------|----------------|
| 1 | PH | 7.46 |
| 2 | Total Solid Content | 5.02 |
| 3 | Specific Gravity | 1.032 |

Table 9: Showing Physico-chemical parameters of *Tila taila* and *Savarnakara taila* (Average of five batches)

| S. No | Parameters | <i>Tila taila</i> | <i>Savarnakara taila</i> |
|-------|----------------------|-------------------|--------------------------|
| 1 | Specific Gravity | 0.9214 | 0.9622 |
| 2 | Refractive Index | 1.47 | 1.48 |
| 3 | Saponification Value | 188 | 190 |
| 4 | Acid Value | 1.98 | 3.482 |
| 5 | Iodine Value | 102.2 | 82.6 |
| 6 | Paroxide Value | 3.12 | 2.76 |

Table 10: Comparative Physico-chemical parameters of the finished products (Average of five batches)

| Analytical data | <i>Savarnakara Lepa</i> | <i>Savarnakara Ointment</i> |
|---------------------------------|-------------------------|-----------------------------|
| Loss on Drying at 110°C (%w/w) | 2.02 | 7.01 |
| Ash Value (%w/w) | 20.16 | 4.72 |
| Acid Insoluble Ash (%w/w) | 0.59 | 0.84 |
| Solubility in water (%w/w) | 6.5 | 1.2 |
| pH value 10 Aqueous Sol. (%w/w) | 8.08 | 8.51 |
| % of Arsenic | 10.27 | 4.12 |
| % of free Sulphur | 0.08 | 0.04 |

OBSERVATIONS AND DISCUSSION

Smoothness is necessary in *Lepa* to facilitate better local application due to increase surface area. Hence ingredients of *Lepa* must be either liquid soluble or very fine. *Haratala* is partially soluble in water therefore fine powder of *Haratala* sieved through 120 number mesh was taken for preparation of *Lepa*. Both powders were very fine, so after addition of *Gomutra*, trituration is required to form homogenous *Lepa*.

Generally Ointments are prepared by two methods incorporation and fusion. In fusion method, all or some of the components of ointment are combined by being melted together and cooled with constant stirring until congealed. Similar method was described in classics by advocating use of *Siktha Taila*^[17] for base of ointment. Considering this, *Siktha Taila* was selected as base for ointment.

Savarnakara Taila was prepared by following general principles of *Sneha (Taila) Paka*.^[18] Average 80 ml *Gomutra* was required to prepare *Kalka* of 250 gm *Bakuchi* and *Ashuddha Haratala* each. Increments of *Kalka* was added as bolus form to the 1000 gm *Tila Taila* and fried for few minutes.

Heating was continued and added with four times of *Gomutra* (4000 gm) maintaining temperature in between 80^o C to 90^o C. The contents were stirred continuously throughout the process, after five to ten minutes of heating (*Paka*), bubbles started to emerge and characteristic odor of *Gomutra* and *Bakuchi* was observed during the process. Contents became brownish colored after some time that may be due to reactions between the ingredients *Bakuchi* and *Gomutra*. *Haratala* was settling down to bottom of the vessel because it is not soluble in oil and *Gomutra*, so continuous stirring was required. After 30 minutes of heating, dark yellow colored *Gomutra* was changed to brown and extensive froth was observed during the process due to presence of ammonia.

It was observed that *Ashuddha Haratala* and *Bakuchi* were not 100% soluble in oil and after *Taila Paka* both became smooth and easily applicable on skin. Considering this, it was decided to add them on *Siktha Taila*. Total five batches were prepared and average 92.46% yield (924.6gm) was observed. (Table- 4)

In second phase of preparation, *Siddha Taila* was subjected to heat to dissolve 153.85 gm of *Siktha* at 80^oC. Contents were filtered through a clean cloth. After that residual *Kalka* (282.9 gm) was also added in it.

An average of 1361.23gm yield was observed in the process which is brownish black colored, semisolid, smooth and oily in touch. (Table- 5)

Organoleptic characters like touch and odour were same in *Lepa* and Ointment like soft, greasy touch, characteristic/*Gomutra* odour and taste was not applicable due to it contains arsenic as *Ashuddha Haratala*. *Lepa* showed Brown color and greasy, thick and opaque in appearance while Ointment showed dark brown color and semi solid, thick and opaque in appearance. (Table- 6)

There was considerable difference in loss on drying (LOD) in powders of *Haratala* and *Bakuchi*. As Powder of *Bakuchi* is hygroscopic in nature, it showed more LOD value. *Savarnakara Lepa* and *Savarnakara Ointment* also indicating presence of more moisture contents in both samples, it was more in Ointment due to addition of *Kalka*, *Gomutra* and *Tila Taila*. (Table- 10)

Boiling point of *Haratala* (Orpiment) is 707^oC^[19]. Ash value of *haratala* was found very less (0.04) with negligible Acid insoluble Ash since it is an inorganic compound and very less organic matter. A drug must first pass into solution before it can be absorbed, so the acid insoluble ash test for drug is therapeutically very important. Acid insoluble Ash of *Savarnakara Lepa* and *Savarnakara Ointment* was less than *Bakuchi Churna*. That suggests comparatively more suitable form of the Formulations for better physiological absorption.

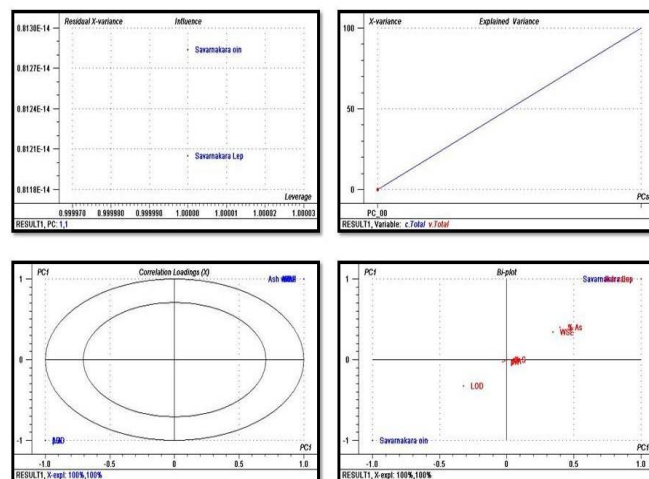


Figure 3: PCA analysis of both formulations

Savarnakara Lepa and *Savarnakara Ointment* showed pH 8.08 and 8.51 respectively. Comparatively pH of *Savarnakara Ointment* was found slight more than *Savarnakara Lepa*, which may be due to treatment with four times *Gomutra* for ointment preparation. PCA Analysis of both the formulations showed linear presentation, which suggest the validation of the formulations. (Figure 3)

CONCLUSION

The adopted methods for preparation of *Savarnakara Yoga* may be considered as easy, convenient and standard methods. In preparation of *Malahara*, addition of *Kalka* remaining after *Taila Paka* gives more yield and better consistency. Analytical approaches used in the present study are useful in the quality control and standardization of *Savarnakara Yoga*. A detail further study and sophisticated analysis is needed.

Source of support - IPGTRA, Gujarat Ayurved University, Jamnagar, India.

Conflict of interest – None declared.

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HOW TO CITE THIS ARTICLE

Shingadiya R, Joshi K, Shukla VJ, Prajapati PK. Pharmaceutical and analytical profiles of *Savarnakara Yoga*. J Ayu Herb Med 2016;2(3):73-77.