Impact of Bhavana on Laghu Sutashekhara Rasa - A promisable formulation in Ardhavabhedaka (migraine)

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Abstract

Aim: To evaluate the impact of Bhavana on Laghu Sutashekhara Rasa (LSR). Materials and Methods: The raw drugs are identified and authenticated, and powder microscopy was done in the Pharmacognosy Laboratory, Institute for Post Graduate Teaching and Research in Ayurveda (IPGT), Gujarat Ayurved University (GAU), Jamnagar, Gujarat, India. The study includes organoleptic evaluation and microscopic evaluation. Physico-chemical parameters and high-performance thin layer chromatography (HPTLC) studies carried out at pharmaceutics laboratory, IPGT and RA, GAU, Jamnagar, Gujarat, India. LSR was levigated with Swarasa of Nagavalli (Piper betle Linn.) to prepare Bhavita Laghu Sutashekhara Rasa (BLSR). Both the samples were subjected to accelerated stability by following standard guidelines. Results and Discussion: The pharmacognostical results of LSR showed oleoresin content of Sunthi, dark brown content of Gairika, etc. Contents of BLSR showed Trichome of betel leaves loaded by Gairika, stomata with epidermal cells of betel leaves, fragments of annular vessels of Sunthi, etc. Physico-chemical analysis of LSR revealed loss on drying 1.0376% w/w, water-soluble extract 1.32% w/w, etc. Physico-chemical analysis of BLSR revealed loss on drying 1.8793% w/w, water-soluble extract 4.5% w/w, etc. In HPTLC, almost all spots were merging in both samples showing common characters in both the wavelengths. Conclusion: Disturbed walls ruptured cellular particles of ingredients signify that Bhavana incorporates additional therapeutic attributes and also increases the potency of drug.

Key words: Bhavana, high-performance thin layer chromatography, Laghu Sutashekhara Rasa, pharmacognosy, physico-chemical

INTRODUCTION

Laghu Sutashekhara Rasa (LSR) is a herbo-mineral formulation. It is promisable formulation in the management of Ardhavabhedaka (Migraine) and acid peptic disorders. It is one such prime formulation which takes corrective action on the Pitta Dosha. LSR - a herbo-mineral-powder formulation has been mentioned in Rasatarnini.[1] The trial compound has only two contents, which are Gairika (Fe₂O₃) and Sunthi (Zingiber officinale Roxb.). Both contents are easily available. Individual drugs Gairika and Sunthi were powdered and blended in specified ratio, i.e., 2:1, respectively, to obtain LSR. LSR was levigated with Swarasa of Nagavalli (Piper betle Linn.) to prepare Bhavita Laghu Sutashekhara Rasa (BLSR). Proper identification of raw materials at the basic level with the help of microscopic and morphological characteristics and adequate analytical methods are

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essential to ensure the quality and standards of the prepared medicine. Here, an attempt is made to observe the changes in microscopic examination and physico-chemical parameters after levigation process by Nagavalli Swarasa. Previously, some worked carried out on the concept of Bhavana\(^2^3\) and also on physico-chemical parameters of LSR tablets\(^4\) but till date; there is no data available regarding pharmacognostical evaluation of LSR and especially on the effect of Nagavalli Swarasa by Bhavana (levigation process). With this background, LSR with levigation process and without levigation process was subjected for pharmacognostical and physico-chemical analysis.

**MATERIALS AND METHODS**

**Plant Material**

The raw drug materials were collected from the Pharmacy Department, Institute for Post Graduate Teaching and Research in Ayurveda (IPGT), Gujarat Ayurved University (GAU), Jamnagar, Gujarat, India.

**Pharmacognostical Evaluation**

The raw drugs are identified and authenticated, and powder microscopy was done in the Pharmacognosy Laboratory, IPGT and RA, GAU, Jamnagar, Gujarat, India. The study includes organoleptic evaluation and microscopic evaluation.\(^5\)

**Microscopic Study**

The individual powered drug is first examined under distilled water for the observation of calcium oxalate crystals and other cellular materials, then stained with phloroglucinol and conc. HCl\(^6\) for the lignified characters, then stained with iodine to observe the starch grains. Raw drugs were separately studied under microscope; the diagnostic characters microphotographs are taken using Carl Zeiss Trinocular microscope.\(^7\)

**Organoleptic Study**

Contents of LSR and BLSR were evaluated for organoleptic characters such as taste, odor, and color.\(^8\)

**Physico-chemical Parameters**

LSR and BLSR were analyzed at the Pharmaceutical Chemistry Laboratory of IPGT and RA, Gujarat Ayurved University, Jamnagar. The common parameters mentioned for in Ayurvedic pharmacopoeia of India\(^9\) and CCRAS\(^10\) guidelines were considered for pharmaceutical evaluation. The presence of more moisture content in a sample may create preservation problem. Hence, loss on drying was also selected as one of the parameters.

**High-Performance Thin Layer Chromatography (HPTLC) Profile\(^11\)**

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 F254, and mobile phase was toluene:Et. acetate (8:2). The sample was prepared in methanol, and 2 µl 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-sulfuric acid reagent and observed in daylight. The R\(_f\) values were recorded in 31°C temperature and 48% humidity.

**RESULTS AND DISCUSSION**

**Microscopic Study**

Diagnostic characters of LSR showed oleoresin content of Sunthi, oil globule of Sunthi, silica deposition of Gairika, starch grain of Sunthi, fibers of Sunthi, brown content of Sunthi, cork in surface view of Sunthi, cork in tangential view of Sunthi, dark brown content of Gairika, and parenchyma cells with brown content of Sunthi [Plate 1 - Figures 1-10]. Diagnostic characters of BLSR showed starch grains of Sunthi and other particles of Gairika. Gairika particles are loaded on the cellular particles of Sunthi, Trichome of betel leaves loaded by Gairika, oil globule of betel leaves, stomata with epidermal cells of betel leaves, prismatic crystals of betel leaves, fragments of annular vessels – Sunthi, disturbed walled cork cells of Sunthi loaded by Gairika [Plate 1 - Figures 11-18].

The borders of cellular constituents of Sunthi and Nagavalli are damaged due to levigation process, and it also increases the potency of the drug.

**Pharmacognostical Evaluation**

**Organoleptic characters of LSR**

On comparison, both the samples are brick red and aromatic odor with light crispy sound. BLSR is found astringent with piercing nature and hard touch in comparison of LSR [Table 1].

**Physico-chemical tests**

Both the samples LSR and BLSR have same pH value which suggests slide acidic nature of medicine. Ash values are helpful in determining the quality and purity of crude drugs, especially in powder form. The objective of ashing vegetable drugs is to remove all traces of organic matter, which may otherwise interfere in an analytical determination.\(^12\)
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Figure 1: Oleoresin content – Sunthi

Figure 2: Oil globule – Sunthi

Figure 3: Silica deposition – Gairika

Figure 4: Starch grain – Sunthi

Figure 5: Fibers – Sunthi

Figure 6: Brown content – Sunthi

Figure 7: Cork in surface view – Sunthi

Figure 8: Cork in tensential view – Sunthi

Plate 1: Microphotographs of Laghu Sutashekhara Rasa
Figure 9: Dark brown content – Gairika

Figure 10: Parenchyma cells with brown content – Sunthi

Figure 11: Starch grains of Sunthi and another cellular particles of Gairika

Figure 12: Gairika particles are loaded on other particles of Sunthi

Figure 13: Trichome of betel leaves loaded by Gairika

Figure 14: Oil globule of betel leaves

Figure 15: Stomata with epidermal cells of betel leaves

Figure 16: Prismatic crystals of betel leaves

Plate 1: Continued....
and extracting values are useful for determining of crude drugs and it gives an idea about the nature of the chemical constituents present.\[13]\) The less value of moisture content of drugs could prevent content bacterial, fungal, or yeast growth through storage.\[14]\) For present study, the values for LSR and BLSR are ash values are 71.62% w/w and 61.639% w/w, acid insoluble ash value 62.062% w/w and 48.80% w/w, water-soluble extract are 1.32% w/w and 4.5% w/w, and methanol-soluble extract are 1.48% w/w and 2.28% w/w, loss on drying values are 1.0376% w/w and 1.8793% w/w, iron estimation values are 7.3% w/w and 7.8% w/w, respectively [Table 2].

**HPTLC study results**

Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. Results showed 4 spots at 254 nm and 6 spots at 366 nm in LSR and 6 spots at 254 nm and 7 spots at 366 nm in BLSR with R values were recorded which may be responsible for expression of its pharmacological and clinical actions, i.e., 0.71 for LSR and 0.9 for BLSR [Plate 2].

In HPTLC, almost all spots were merging in both sample showing common characters in both the wavelengths and it reflects the presence of flavonoids components in product [Plates 3 and 4, Tables 3 and 4].

**CONCLUSION**

Pharmacognostical and pharmaco-chemical evaluation of LSR and BLSR illustrated the specific characters of ingredients which were used in the preparation. All the
therapeutic attributes and also increases the potency of the drug. As no published data available on consequence of Bhavana of LSR; the current observations can be considered as standard for future studies.

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