



STANDARDIZATION OF SNUHI KSHARA THE FORMULATION OF UPAVISHA SNUHI (EUPHORBIA NERIIFOLIA LINN.): A PHARMACEUTICO-ANALYTICAL PROFILE

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DOI: 10.7897/2277-4572.104214

Received on: 30/06/21 Revised on: 31/07/21 Accepted on: 09/08/21

ABSTRACT

Snuhi (*Euphorbia nerifolia* Linn.) and its compound formulations are widely used in Ayurvedic classics to treat variety of disease conditions. Information pertaining to the formulations of Snuhi can be traced in various classical texts, under different chapters. In most of the formulations it is used as an ingredient. Snuhi Kshara is a single drug formulation of Upavisha Snuhi mentioned in Rasatarangini and Ayurvedsarasangraha. Kshara obtained from Snuhi is one of its dosage modifications, advocated in classics for therapeutic objectives. Very few attempts are made to formulate Snuhi Kshara. The present work has been carried out to provide the Standard Manufacturing Process and a systematic standardization profile for Snuhi Kshara. Snuhi Kshara was prepared according to procedure described in Sharangadhara Samhita followed by analytical standardisation. Standardization was done using guidelines of API, by employing tests like organoleptic (Colour, Odour, Taste), physicochemical (Loss on drying, Acid-insoluble ash, pH), Assay (Sodium, Potassium, Iron) and Thin Layer Chromatography. Findings of this work may enrich to documentary research as well as act as detailed scientific data about standardization of Snuhi Kshara for further studies.

KEYWORDS: Upavisha, Snuhi (*Euphorbia nerifolia* Linn.), Snuhi Kshara, Standardization, Agadtantra.

INTRODUCTION

Agadtantra is a branch of Ayurveda dealing with classification, mode of action, clinical manifestations and treatment of variety of Visha (Poisons). Visha is core of the subject detailedly described in the texts of Ayurveda. Upavisha is one more important aspect of classification of Visha given in Rasatarangini. ¹ Snuhi is one among these upavishas ² and it is having its own therapeutic importance and contributes for many fruitful regimes into the treasure of Ayurveda. Taxonomically it is identified as *Euphorbia nerifolia* Linn. and belongs to family Euphorbiaceae. ^{3,4}

The Ayurvedic pharmaceuticals is well developed discipline in the field of drug formulation. In Ayurveda, substances of natural origin, including whole plant or their part, animal parts and minerals are used as medicine either alone or in combination. Various classical texts have described use of these resources in a very planned and descriptive manner by formulating various medicines to treat human diseases. Acharya Charaka has mentioned 18 parts of plants which can be used for medicinal purpose and Kshara is one among them. ⁵ Kshara are alkaline substances obtained from the water-soluble ash of drugs of plant origin. ⁶ Kshara has the topmost place in all surgical and para surgical measures. ⁷ It can be used externally and internally according to the ailments of the body.

According to Acharya Sushruta, the substance which causes Ksharana of Mamsadi Dhatu is Kshara. ⁸ According to Acharya Vagbhata Kshara is indicated in diseases which are difficult to treat. ⁹ It also minimizes complication and reduces recurrence of diseases. The list of Ayurvedic herbs which can be used for Kshara preparation is given in classical texts like Sushruta Samhita and Ashtangahridaya. ^{10,11} Consideration of Upavisha Snuhi for Kshara preparation is taken from the similar context.

Snuhi Kshara is also mentioned in Ksharaashtaka. ¹² The detailed description of Snuhi Kshara regarding its therapeutic uses, dose, anupana is given in the classical texts like Rasatarangini and Ayurvedsarasangraha. Snuhi Kshara is indicated in Gulma, Udara, Shotha, Vishuchika, Ajirna, Udarshoola, Shwasa and for Yakrutdoshaprashamana, Agnidipana etc. ¹³ It is given in the dose of 2 to 4 Ratti with anupana of UshnaJala, Madhu, Tripthalakwatha. ¹⁴

Different opinions exist regarding ratio of ash and water, time for settling, cloth folding and numbers of filtration in the preparation of Kshara in Sushruta Samhita ¹⁵, Sharangadhara Samhita ¹⁶ and Rasatarangini. ¹⁷ Sushruta has cited to add six parts water into one part of ash whereas in Sharangdhara Samhita and Rasatarangini proportion of ash: water is 1:4. Settling time is 3 hrs. according to Rasatarangini and overnight as said by Sushruta and Sharangdhara. For filtration of Kshara Jala a 3 folded cloth is advised in Rasatarangini. Sushruta stated that Kshara Jala should be filtered 21 times through cloth and there is not any specification of cloth folds and number of filtrations given in Sharangadhara Samhita.

Standardization is an important measure to ensure reliable, specific and good manufacturing practice for drug development. Through review of previous documents available on standardization of Ksharas, it was found that in the context of Kshara preparation and standardization repeated attempts has been done to formulate specific Ksharas such as Apamarga Kshara, Palash Kshara etc. Being Upavisha, Snuhi is the least enlighten by the researchers. Present paper details out the most practical way of preparing Snuhi Kshara using classical reference and generates the scientific data that will serve as a reference standard for standardization of Snuhi Kshara for future studies.

MATERIALS AND METHODS

Preparation of Snuhi Kshara

Collection of Snuhi Kashtha – Fresh Snuhi Kashtha was procured from the field and weighed on digital weighing machine. Drug collection was done after fulfilling the conditions of Sangrahya dravyas in classical texts i.e., not affected by Krimi, Visha, Shastra, Atapa, Pavana etc.¹⁸

Authentication of Snuhi Kashtha – Authentication was done at the Dravyaguna Department of the Institute as well as at the Department of Botany (Rashtrasanta Tukdoji Maharaj Nagpur University, Nagpur. Herbarium No. 10407)

Drying of Snuhi Kashtha – It was then cut into small pieces of approximately 5 to 6 inches for easy drying. The cut Snuhi Kashtha was then placed for sun drying. After complete drying it was again weighed on the same digital weighing machine to avoid any instrumental error.

Table 1: Details regarding Collection and Drying of Snuhi Kashtha

Plant part collected	Snuhi Kashtha
Date of collection	12/12/2020
Weight	23 kg
Weight of Dried Snuhi Kashtha	2.3 kg
Duration for complete drying	40 Days

Drug Standardization – Analysis was done at authorized standard laboratory (Shital Analytical Laboratory, Sadashivpeth, Pune. ISO/IEC 17025/NABL) Parameters assessed for standardization were as described in Ayurvedic Pharmacopeia of India (API).¹⁹

Apparatus required – Weight machine, Iron pan for burning Snuhi Kashtha, Steel vessel, Measuring Jar, Pipe for decantation, Cotton cloth for filtration, Gas stove, Ladle, Airtight glass container.

Table 2: List of Apparatus Required

Apparatus	Use
Weight machine	For weighing fresh as well as dry Snuhi Kashtha
Iron Pan	For burning dry Snuhi Kashtha
Steele vessel	For Collection of ash and preparation of Kshara Jala
Measuring Jar	To Measure quantity of water and Kshara Jala to be obtained
Pipe	For Decantation
Cotton cloth	For Filtration of Kshara Jala
Gas stove	For Heating of Kshara Jala
Ladle	For Steering the Kshara Jala
Glass container	To Store the Kshara obtained

Method of preparation of Snuhi Kshara

Snuhi Kshara was prepared as per classical method of Kshara preparation as mentioned in Sharangadhara Samhita. Previous works on standardization of Snuhi Kshara were also taken into consideration.^{20,21} Whole process was divided into three phases.

Preparation of Ash – Dried Snuhi was taken into big iron pan and burnt completely. After the self-cooling, white ash was collected. (Fig. 2)

Preparation of Kshara Jala – Ash was collected in a steel vessel and four times of water was added to it. The contents were mashed thoroughly with hands and left undisturbed for overnight. After that, the clear supernatant liquid was carefully decanted with the help of pipe and filtered through double layered cotton cloth for 3 times i.e., till obtaining clear Kshara Jala without any sedimentary particles. (Fig. 3)

Preparation of Kshara – After filtration brownish coloured Kshara Jala was obtained. It was subjected to heat to evaporate the water content and Kshara was obtained from the vessel by scrapping (Fig. 4). After weighing, Snuhi Kshara was stored in airtight glass container. (Fig. 5)

Analytical Study: It was carried out at Shital Analytical Laboratory, Sadashivpeth, Pune. In following manner-

For raw drug

Organoleptic parameters

- Colour
- Odour
- Taste

Physicochemical parameters

- Loss on drying at 110°C
- Ash value
- Acid Insoluble ash
- Water Soluble Extract
- Alcohol Soluble Extract

For Snuhi Kshara – Analytical assessment of Snuhi Kshara was done at Shital Analytical Laboratory, Sadashivpeth, Pune. Assessment was done as per the parameters of API.²²

Organoleptic parameters

- Colour
- Odour
- Taste

Physicochemical parameters

- Loss on drying
- Acid-insoluble ash
- pH

Assay

- Sodium Assay
- Potassium Assay
- Iron Assay

Chromatographic Assessment²³ – The chromatographic assessment of Snuhi Kshara was done using Thin Layer Chromatographic (TLC) Technique. (Graph 1)

OBSERVATIONS AND RESULTS

After complete drying of Snuhi Kashtha, percent loss was 90 %. Snuhi Kashtha burnt quickly as it was completely dried. Time required for complete burning was nearly 20 min. and duration of self - cooling was 3 hrs. Ash obtained from dry Snuhi was 15.30 % (Table 6).

Kshara Jala obtained after filtration was brownish in colour. It was filtered three times in an attempt to obtain clear Kshara Jala. Percent loss in Kshara Jala was 14.21% (Table 7).

Kshara obtained from dry Snuhi was 5 %. (Table 8).

Table 3: Organoleptic parameters of Dry Snuhi

Parameters	Results
Color	Faint brown creamish color
Odor	Strong pungent
Taste	Bitter

Table 4: Physicochemical parameters of Dry Snuhi

Parameters	Results
Loss on drying	4.21 %
Total Ash Content	7.02 %
Acid Insoluble Ash	Nil
Water Soluble Extract	26.47 %
Alcohol Soluble Extract	11.69 %

Table 5: Data for Ash Preparation

Observation	Results
Wt. of fresh Snuhi	23 kg
Wt. of dry Snuhi	2.3 kg
Loss after drying	20.7 kg
% Loss after drying	90 %
Wt. of ash obtained	352 gm
% of ash obtained from dry Snuhi	15.30 %
Time required for complete burning of dry Snuhi	20 min.
Time required for self-cooling of Ash	3 hrs.

Table 6: Data of Kshara Jala preparation

Parameters	Details
Wt. of Ash taken	352 gm
Volume of water added	1.408 lit
Kshara Jala obtained after filtration	1.208 lit
Kshara Jala obtained (% v/v)	85.79 %
Kshara Jala loss (% v/v)	14.21 %
Time required for Kshara Jala preparation	12 hrs.

Table 7: Data of Snuhi Kshara obtained

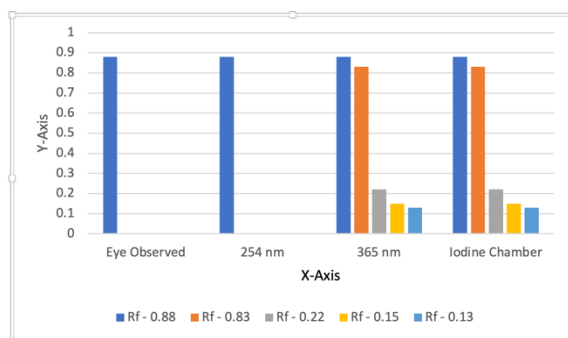
Parameters	Details
Volume of Kshara Jala taken	1.208 lit
Kshara obtained	118 gm
Kshara obtained (in comparison to dry Snuhi) (% w/w)	5.13 %
Kshara obtained (in comparison to fresh Snuhi) (% w/w)	0.51 %
Kshara obtained (in comparison to dry Snuhi ash) (% w/w)	33.52 %
Time required for Snuhi Kshara preparation	3 hrs.

Table 8: Organoleptic Parameters of Snuhi Kshara

Parameters	Results
Color	Faint brownish creamy color
Odor	Kshara Odor
Taste	Faint saline

Table 9: Physicochemical Parameters of Snuhi Kshara

Parameters	Results
pH	10.95 %
Loss on drying	0.98 %
Acid Insoluble Ash	1.14 %
Sodium assay	2.09 %
Potassium assay	41.08 %
Iron assay	40.07 ppm



Graph 1: Thin Layer Chromatography of Snuhi Kshara

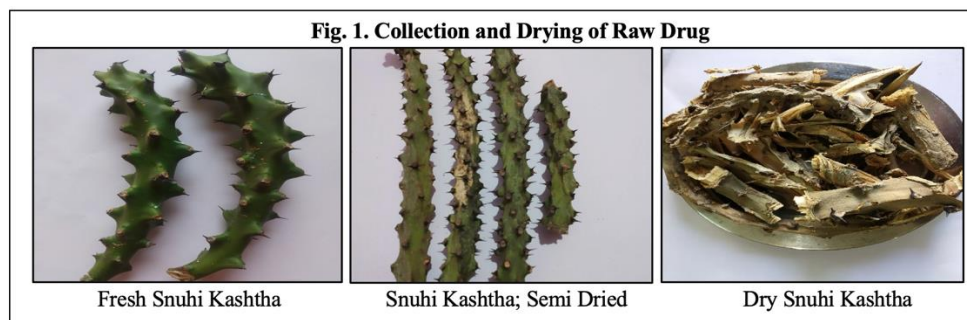


Fig. 1. Collection and Drying of Raw Drug

Fig. 2. Preparation of Snuhi Kashtha Ash

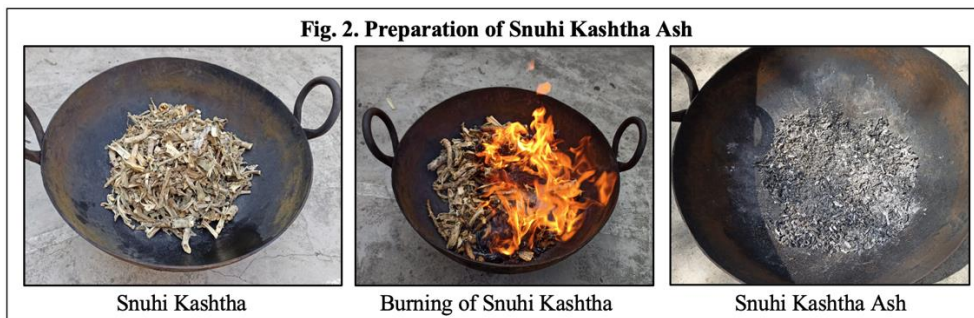


Fig. 3. Preparation of Kshara Jala

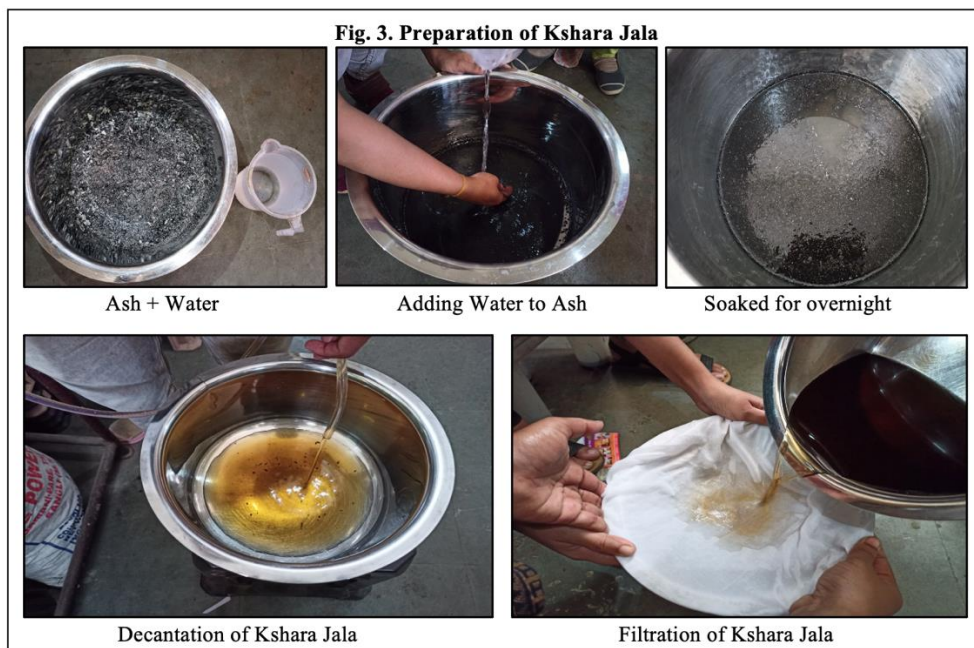


Fig. 4. Evaporation of Kshara Jala

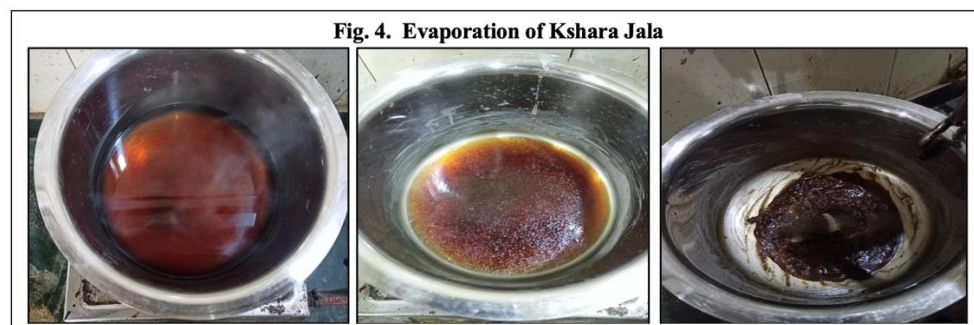
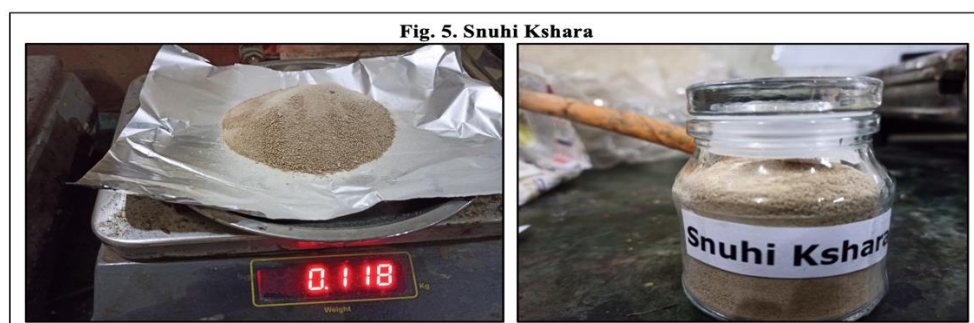


Fig. 5. Snuhi Kshara



DISCUSSION

The present work of preparation of Snuhi Kshara was done as described in Sharangadhara Samhita and standardization as per standard parameters in API. Freshly collected Snuhi Kashtha should be made into small pieces for better drying and easy handling. The burning process should be carried out in a big vessel instead of floor in an order to avoid contamination of soil particles. While burning the material, Kashtha should be gradually added for proper and complete burning. Whitish ash formed should be collected properly after complete self-cooling, care should be taken to avoid any loss in open air due to low bulk density of ash.

While adding water to ash deep vessel should be used to avoid spillage, ash should be properly macerated with hands for proper mixing and should be kept undisturbed overnight. Decantation with the help of small opening rubber pipe is advisable by creating negative pressure. It helps to decant only Kshara jala with least number of sedimentary particles. After decantation Kshara Jala obtained was filtered with cotton cloth to remove the possible sedimentary particles. It is advisable to use a cotton cloth which should be de-starched for this purpose. It should be soaked in warm water for few hours and sun dried before use. Kshara Jala obtained was brownish in color.

During the process of evaporation of Kshara Jala it was kept on low flame, with progression of time, aggregation of small particles was seen at the base of vessel. Kshara Jala started to aggregate, and consistency was changed to semisolid paste like. During the final stage with popping sound brownish colored Kshara started sticking to the bottom of vessel. It was stirred continuously to avoid sticking to vessel. At the end after complete evaporation of water, powdered crystalline brownish colored Snuhi Kshara was obtained. Then after cooling stored into airtight glass container.

In the analytical assessment of raw drug, the identity, purity, and strength of Snuhi (*Euphorbia nerifolia* Linn.) was found up to the mark comparing with the standard values. Total ash value was 7.02% (not > than 8%), acid insoluble ash was nil (not > than 1%), water soluble extract was 26.47% (not < than 15%), Alcohol soluble extract was 11.69% (not < than 5%).

During the analytical assessment of Snuhi Kshara, pH test was performed, pH value defines acidity or alkalinity of drug. It was found to be 10.95% indicating towards alkalinity of Snuhi Kshara, as it is given in the definition that Kshara are alkaline substances. Loss on drying is an analytical technique to determine water and other volatile impurities in sample. It denotes limit to which sample has absorbed moisture, the lesser the value of Loss on drying the stable the Kshara is considered. Loss on drying of Snuhi Kshara was 0.98% this value suggests that Snuhi Kshara is less hygroscopic and hence more stable. Acid insoluble ash value indicates the percentage of inorganic content of sample which is insoluble in dilute acid, such as Silica. This value should be less for standard product, for Snuhi Kshara acid insoluble ash value was 1.14%. Through Ion estimation of the sample, it is found that sodium, Iron, and potassium ions are the key component of Snuhi Kshara. Percentage of sodium and Potassium ions were 2.09% and 41.08% respectively, whereas Iron ions were 40.07 ppm. Readings of all above stated parameters were considerable comparing to previous standardization works.

Thin Layer Chromatography profile is an additional analysis of Snuhi Kshara performed during present study which is peculiarly differentiating from previous works. Snuhi Kshara showed five bands both at 365 nm and Iodine chamber at Rf 0.88, 0.83, 0.22, 0.15 and 0.13 respectively. And single band was observed at 254

nm and via naked eye at Rf 0.88. As Snuhi Kshara is least prepared, the previous scientific data for detailed interpretation and comparison for Thin Layer Chromatography is not available. Hence here remains scope for further chromatographic evaluations and interpretations of Snuhi Kshara.

CONCLUSION

Snuhi Kshara is unique formulation of Upavisha Snuhi mentioned in classical texts. Though the raw drug seems to be uncommon, but it can be made available by inspecting local fields. Snuhi Kshara can be prepared with no trouble by implicating the classical method of Kshara preparation given in classical text Sharangadhara Samhita. In the present work final product obtained was 118 gm from 23 kg of fresh Snuhi. The total duration required to obtain Kshara from Kshara Jala was 3 hrs. Data evolved from physico-chemical analysis can be incorporated for laying down standards for manufacturing, processing and ascertaining the authenticity of Snuhi Kshara for further studies.

ACKNOWLEDGEMENT

Authors are grateful to faculties and post graduate colleagues of Department of Rasashastra Evum Bhaishajya Kalpana, namely Vd. Raman Belge (H.O.D and Prof. Department of Rasashastra Evum Bhaishajya Kalpana Department, Shri Ayurved Mahavidyalaya, Nagpur) and Vd. Vinod Ramteke (Asso. Prof. Department of Rasashastra Evum Bhaishajya Kalpana Department, Shri Ayurved Mahavidyalaya, Nagpur) for their constant guidance and sustenance.

REFERENCES

1. Acharya Sadananda Sharma, Rasatarangini, Pt. Shashtri Kashinath (ed), 11th edition, 1979. Delhi: Motilal Banarasidas, Taranga 24/6; p. 648.
2. Acharya Sadananda Sharma, Rasatarangini, Pt. Shashtri Kashinath (ed), 11th edition, 1979. Delhi: Motilal Banarasidas, Taranga 24/163-164; p. 676.
3. The Ayurvedic Pharmacopoeia of India, The controller of publications civil lines, Delhi, (Reprint), 2001; Part 1(Vol.1): pp. 100.
4. Sharma P C, Yelne M B, Dennis T J. Database on Medicinal Plants Used in Ayurveda. (Reprint), Central Council for Research in Ayurveda and Siddha. New Delhi. 2002; Vol 4: pp. 514 – 517.
5. Charaka, Charaka Samhita (Ayurved-Dipika hindi commentary), Vd. Yadavji T (ed), Vol. 1; Reprint 2017. Varanasi: Chaukhambha Sanskrit Sansthan, Sutrasthana 1/73; 2015. p. 20.
6. The Ayurvedic Pharmacopoeia of India. Part 2/1. First edition. The controller of publications civil lines. New Delhi. 2007; p. 100.
7. Sushrut, Sushruta Samhita, Shastri Ambikadatta (ed), Vol. 1; Reprint 2010. Varanasi: Chaukhamba Sankrit Sansthana. Sutrasthana 11/3; p. 45.
8. Sushrut, Sushruta Samhita, Shastri Ambikadatta (ed), Vol. 1; Reprint 2010. Varanasi: Chaukhamba Sankrit Sansthana, Sutrasthana 11/4; p. 45.
9. Vagbhata, Astanga Hridaya, Paradkar S. S (ed), Vol. 1; Reprint 2017. Varanasi: Chaukhamba Surbharati Prakashan, Sutrasthana, 30/2; p. 352.
10. Sushrut, Sushrut Samhita, Shashtri Ambikadatta (ed), Vol. 1; Reprint 2016. Varanasi: Chaukhambha Sankrit Sansthan, Sutrasthan, 11/12; p. 47.
11. Vagbhata, Astanga Hridaya, Paradkar S. S (ed), Vol. 1; Reprint 2017. Varanasi: Chaukhamba Surbharati Prakashan, Sutrasthana, Chapter 30/8-9; p. 353.

12. Acharya Sadananda Sharma, Rasatarangini, Pt. Shashtri Kashinath (ed), 11th edition, 1979. Delhi: Motilal Banarasidas, Taranga 2/8; p. 12.
13. Acharya Sadananda Sharma, Rasatarangini, Pt. Shashtri Kashinath (ed), 11 th edition, 1979. Delhi: Motilal Banarasidas, Taranga 14/92-93; p. 343.
14. Ayurved Sarsangraha, Vd. Pathak R(ed), Reprint 2015. Nagpur: Shree Baidyanath Ayurved Bhavan, Ksharalavansatva Prakaran; p. 702.
15. Sushruta, Sushruta Samhita, Kaviraj Ambikadutta Shastri (ed), Vol. 1; Reprint 2015. Varanasi: Chaukhambha Sanskrit Sansthana. Sutrasthana 11/13; p. 47.
16. Sharangadhara, Sharangadhara Samhita, Pt. Shashtri Vidyasagar P (ed), Reprint 2013. Varanasi: Chaukhambha Surbharati Prakashan, Madhyam Khanda, Adhyaya 11/101-103; p. 256.
17. Acharya Sadanandsharma, Rasatarangini, Pandit Kashinathshastri (ed), 11th edition, 1979. Delhi: Motilal Banarasidas, Tarang 14/59-61; p. 337.
18. Sushruta, Sushruta Samhita, Shastri Ambikadatta(ed), Vol. 1, Reprint 2015. Varanasi: Chaukhambha Sanskrit Sansthana, Sutrasthana 37/4. p.180.
19. The Ayurvedic Pharmacopoeia of India, The controller of publications civil lines, Delhi, (Reprint), 2001; Part 1(Vol.1); p. 100.
20. Umrethia Bharti L et al, Pharmaceutical Standardization of Snuhi (*Euphorbia Neriifolia* Linn.) Kshara, International Journal of Applied Ayurved Research, volume 3, Issue 9, Jul –Aug 2018; 1289-1297.
21. Gupta Tarun et al, Preliminary Pharmaceutico-Analytical Study of Snuhi Kshara, World Journal of Pharmaceutical and Medical Research, 3(11), 2017; 121-124.
22. The Ayurvedic Pharmacopoeia of India. Part 2/1. First edition. The controller of publications civil lines. New Delhi. 2007; p. 101-102.
23. The Ayurvedic Pharmacopoeia of India. Part 2/1. First edition. The controller of publications civil lines. New Delhi. 2007; p. 144.

How to cite this article:

Asolkar Geeta Govindrao et al. Standardization of snuhi kshara the formulation of Upavisha snuhi (*Euphorbia neriifolia* Linn.): A pharmaceutico-analytical profile. J Pharm Sci Innov. 2021;10(4):111-116.
<http://dx.doi.org/10.7897/2277-4572.104214>

Source of support: Nil, Conflict of interest: None Declared

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