WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 9, 799-815. Research Article ISSN 2277–7105

# A DESCRIPTIVE STUDY ON PRESERVATION TECHNIQUES OF *KUSHMANDAKA RASAYANA* AT PHARMACEUTICAL COMPANIES IN KERALA

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Article Received on 27 March 2026,
Article Revised on 16 April 2026,
Article Published on 01 May 2026,

https://doi.org/10.5281/zenodo.19876975

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**How to cite this Article:** [1]*Dr. Supriya Das M., [2]Dr. Muraleedharan A. K., [3]Dr. Hemah G. (2026). A Descriptive Study on Preservation Techniques of Kushmandaka Rasayana At Pharmaceutical Companies In Kerala. World Journal of Pharmaceutical Research, 15(9), 799–815.



## ABSTRACT

*Kushmandaka Rasayana* is a classical Ayurvedic formulation widely indicated in respiratory, haemorrhagic, wasting, and febrile disorders and is described in several *Samhitas* with notable variations in processing methods and therapeutic emphasis. Although the formulation is predominantly prepared as *Avaleha* or *Khanda*, differences in pharmaceutical procedures such as selection and maturity of raw materials, methods of cooking, degree of *paka*, choice of vessels, incorporation of *Khanda* as syrup or powder, timing of *Prakshepa*, and control of heat have resulted in heterogeneous manufacturing practices. These variations, coupled with the moisture-rich and sugar-based nature of the formulation, have raised concerns regarding product consistency, preservation, and shelf life in contemporary Ayurvedic pharmaceutical practice. A descriptive survey was conducted among selected Ayurvedic pharmaceutical companies in Kerala to document the manufacturing practices, quality control measures, preservation methods, and shelf-life management of *Kushmandaka Rasayana*. The survey

revealed variations in classical references followed, processing methods, vessel materials, assessment of *paka lakshana*, use of preservatives, and analytical parameters employed. While most manufacturers adhered to classical preparation principles, differences were noted in consistency evaluation and stability management. Shelf life was generally reported as satisfactory, though occasional spoilage was linked to raw material quality and processing conditions. The findings highlight the lack of uniformity in manufacturing and stability assessment practices and emphasize the need for standardized guidelines integrating classical concepts with modern quality control measures.

**KEYWORDS:** *Kushmandaka Rasayana*, Descriptive survey, Preservation, Stability, Ayurvedic pharmaceutical companies.

## INTRODUCTION

*Kushmandaka Rasayana*[1] is a classical Ayurvedic formulation indicated in conditions such as *Swasa, Kasa, Urakshata, Raktapitta, Kshaya, Trishna and Jwara*. It is described across several *Samhitas*, including *Bhaishajya Ratnavali*[2], *Chakradatta*[3], *Ashtanga Hridaya*[4], *Sahasrayoga*[5], *Yogaratnakara*[6] and *Sharangdhara Samhita*[7] with notable variations in ingredients, processing methods, dosage forms, and therapeutic emphasis. The formulation is predominantly prepared as *Avaleha* or *Khanda*. Although these texts show broad similarity in ingredient composition and proportions, significant differences exist in pharmaceutical procedures, including the type and maturity of *Kushmanda* used, selection of vessels, methods of cooking, extraction or omission of *Swarasa*, pre-processing prior to *Ghrita bharjana*, assessment and degree of *paka*, mode of incorporating *Khanda* or *syrup*, syrup consistency, proportion of *Madhura*, *Sneha*, and *Aushadha dravyas*, timing of *prakshepa churna* addition, and control of heat and temperature at various stages.

For instance, The *Ashtanga Hridaya* and the *Sahasrayoga* follow the same *Sloka*, but they differ in the context of adding *Khandasarkara*, former explains adding *Khanda* in powder form and latter explains preparation of *Khandapaka*, while the consistency of the final product is not mentioned in any of them. Likewise, there are variations in the amount of water used for *Swarasa* preparation: *Sharangdhara Samhita* recommends double the quantity of *Kushmanda* which is reduced to half; *Bhaishajya Ratnavali* prescribes 4 *Prastha Swarasa*, while *Ashtanga Hridaya* and *Sahasrayoga* do not specify the quantity. Unlike other *Samhitas*, *Bhaishajya Ratnavali* specifies taking the *Kushmanda* in the form of *Churna* for frying in ghee. Indications about the type of vessel used for cooking *Kushmanda* is also found in

various texts: *Bhaishajya Ratnavali* prescribes an *Audumbara kataha* for frying *Kushmanda Churna* and a *Tamra patra* for further procedures, while *Sharangdhara Samhita* also recommends a *Tamra patra*.

These variations have resulted in diverse manufacturing practices among pharmaceutical companies, leading to differences in product consistency and, in some instances, the use of artificial preservatives to enhance shelf life. While classical literature provides a robust conceptual framework for preparation and therapeutic application, contemporary Ayurvedic pharmaceutical practices often incorporate modifications to accommodate large-scale production, regulatory standards, and market demands. Such adaptations can influence critical parameters including consistency, quality control, preservation strategies, and shelf life. In recent years, concerns regarding the stability and uniformity of *Avaleha* and *Khanda* preparations, particularly moisture-rich, sugar-based formulations like *Kushmandaka Rasayana*, have gained prominence. Examining how pharmaceutical manufacturers address these challenges in practice is therefore essential to ensure safety, efficacy, and reproducibility of the formulation.

Against this background, the present survey study was designed to document and analyse the manufacturing, preservation, and quality-control practices adopted by selected Ayurvedic pharmaceutical companies in Kerala for *Kushmandaka Rasayana*. The findings aim to highlight existing variations, common challenges, and practical solutions, thereby supporting evidence-based integration of classical Ayurvedic principles with modern pharmaceutical standards.

## OBJECTIVE

To study the different methods of preparation and current trends in the preservation of *Kushmandaka Rasayana* adopted by pharmaceutical companies in Kerala through a Descriptive Survey.

## MATERIALS AND METHODS

A structured survey was conducted among 12 selected pharmaceutical companies in Kerala involved in the manufacturing of *Kushmandaka Rasayana*. The survey utilized a questionnaire comprising 38 questions designed to collect detailed information on various pharmaceutical aspects of this formulation from Ayurvedic companies located in Kerala.

The questionnaire focused on the following domains:

1. Production and Preservation – including manufacturing practices, processing conditions, and preservation methods.
2. Reference and Raw Materials – information on sourcing, quality, and standardization of ingredients.
3. Method of Preparation – details of procedures followed during the formulation of *Kushmandaka Rasayana*.
4. Shelf-life and Preservation – practices related to storage, packaging, and factors affecting the stability and potency of the product.

The survey aimed to provide a comprehensive understanding of how *Kushmandaka Rasayana* is prepared, preserved, and standardized in modern Ayurvedic pharmaceutical settings.

## OBSERVATIONS

A comprehensive survey was conducted among twelve ayurvedic pharmaceutical companies engaged in the production of *Kushmandaka Rasayana* in Kerala. The survey aimed to gather insights into the pharmaceutical aspects of *Kushmandaka Rasayana*, including reference materials, raw materials, preparation methods, and shelf-life preservation.

This survey provides valuable data that can inform future standardization efforts and quality control measures in the production of *Kushmandaka Rasayana*.

### Reference followed for the preparation of *Kushmandaka Rasayana*

**Table 1: References of KR followed by different companies.**

| Sl. No. | Reference | No. of companies |
|---|---|---|
| 1 | *Ashtanga Hridaya* | 2 |
| 2 | *Sahasrayoga*m | 6 |
| 3 | AFI | 4 |

Although each company follows different references, the ratio of ingredients remains the same across all of them, with only the quantities varying based on the batch size of production.

**Batch size**

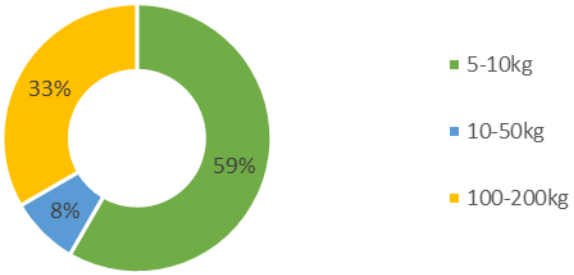


**Fig. 1: Batch size of different companies.**

About 59% of the companies manufacture *Kushmandaka Rasayana* in batches of 5–10 kg, while 33% produce on a large scale ranging from 100–200 kg. Only 8% of the companies prepare it in intermediate batches of 10–50 kg.

**Quality control parameters of Raw materials**

Companies prefer raw drug procurement from both local collection and from dealers. Random sample of raw drugs are primarily analysed to confirm the quality and identity before approving a batch. All the drugs were washed and dried before taking for production. Survey outcomes point that all the companies have in house standards derived from the API for checking the quality.

Quality control checking of *Kushmanda*: The quality checking is mainly organoleptic. Only two companies check the pH and TSS of *Kushmanda*. Out of the 12 companies, 4 select Vaidya Kumbalanga, a variety of *Kushmanda* considered to have higher medicinal value, for manufacturing. The remaining companies use the food-grade wild variety, which is chosen in its ripe stage and identified by the characteristic white powdery deposit on the outer skin.

Quality checking of *Ghrita*: All the companies evaluated the organoleptic parameters. Among them, 10 companies assessed the iodine value, 9 checked the refractive index, and 7 examined the specific gravity. Four companies measured the saponification value, while only 4 extended their analysis to additional parameters such as adulteration, moisture content, Halphen's test, free fatty acids (FFA), and others.

Quality checking of *Madhu*: Two companies limited their analysis to only organoleptic and physical tests. Among the others, 5 assessed specific gravity, 2 evaluated refractive index, and 6 determined moisture content. Additionally, 5 companies conducted Fiehe's test to

check adulteration; while 6 measured sugar content, though only 2 analysed the fructose-glucose ratio. Three companies performed additional tests such as ash value, 2 assessed brix value, and a few carried out parameters like loss on drying, acidity, and others.

Quality checking of other raw materials: Out of the 12 companies, 10 adhered to the API standards for testing other raw materials, while the remaining 2 limited their evaluation to organoleptic tests only.

**Type of vessel used for the manufacturing**

All companies reported that the references provide no specific guidelines regarding the type of vessel to be used. While a small group still adheres to traditional methods, the majority follow GMP standards and use stainless steel vessels for all manufacturing processes.

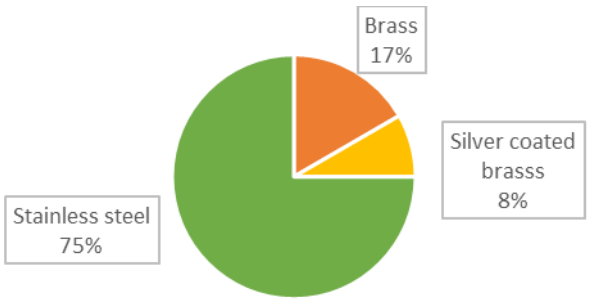


**Fig. 2: Graphical representation of type of vessels used.**

**Relevance of season and weather conditions**

Regarding the relevance of season and weather conditions, 8 out of 12 companies stated that climatic factors influence the shelf life of the formulation, while 4 expressed no opinion on the matter. Nevertheless, all companies reported that they manufacture *Kushmandaka Rasayana* strictly based on market demand.

**Relevance of Heat**

All companies unanimously agreed on the importance of heat regulation during each stage of manufacturing. Among them, 4 out of 12 maintained a moderate level of heat throughout the process, while 1 company strictly followed the API specifications for temperature. For the remaining companies, applying specific temperature guidelines was not practical, as they relied on thermic fluid passed through jacketed vessels for heating.

**Processing of *Kushmanda* – cooking, frying in *Ghrita* and grinding**

**Table 2: Method of cooking *Kushmanda* adopted by different companies.**

| Sl.No. | Method | Number | Percentage |
|---|---|---|---|
| 1 | Steam | 8 | 66.7 |
| 2 | Boiling in water | 3 | 25 |
| 3 | Not cooked | 1 | 8.3 |

Nine companies filtered the *Kushmanda* and prepared it as a paste before frying it in *Ghrita*. Two companies directly used the *Kushmanda* for frying, while the remaining company grated the raw *Kushmanda* into small pieces and fried it without prior cooking.

The *Ghrita* used by all companies was not pretreated, as it was of Agmark quality. Regarding the quantity for frying *Kushmanda*, 9 companies followed the reference specifications, 1 company used half the specified amount, and 2 companies used an amount sufficient for frying without strictly adhering to the reference.

After frying in *Ghrita*, 11 companies converted the *Ghrita-bharjita Kushmanda* into a paste, while one company did not consider this step necessary.

*Ghrita* is added later by two companies, typically after adding *Kushmanda* into the *Khandapaka*, while one company adds it only if deemed necessary. The remaining companies do not add *Ghrita* at any stage of the preparation.

**Processing of *Khanda***

Among the 12 companies, only one added *Khanda* in powdered form, while the remaining 11 prepared it through *Khandapaka*. The substrate used for making *Khandapaka* varied: some companies used *Swarasa*, while others used water or the filtrate obtained from filtering cooked *Kushmanda*.

**Table 3: Substrates used for *Khandapaka* by different companies.**

| Sl.No. | Substrate | Number of companies |
|---|---|---|
| 1 | *Swarasa* | 1 |
| 2 | *Swarasa* + water | 1 |
| 3 | Filtrate | 9 |

Two companies specified the amount of *Drava Dravya* used as approximately 2 times and 4 times the quantity of *Kushmanda*, while the remaining companies did not express a specific preference and instead utilized the entire amount of filtrate obtained.

**Time for flame off**

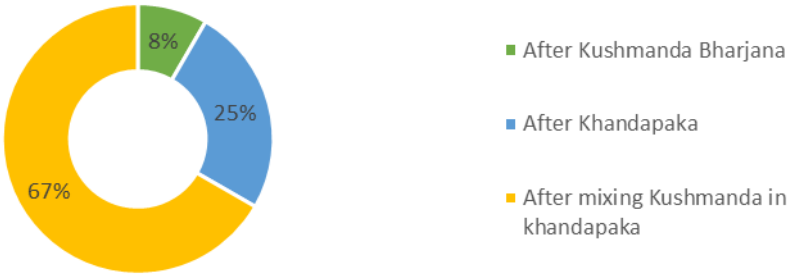


**Fig. 3: Patterns in flame off time followed in different companies.**

***Churna* added as *Prakshepaka***

All the companies add *Churnas* as *Prakshepa* after flame-off, while the mixture is still hot (approximately 50–70°C). This is generally done to prevent the loss of volatile constituents in the *Prakshepa churna*s. A few companies also noted that adding *Churna*s at this temperature avoids overheating and ensures proper mixing.

**Addition of Honey**

Out of 12 companies, 10 add honey only at the final stage, once the entire mixture has completely cooled. The remaining 2 companies, which use mechanized stirrers or condensers, add honey along with the *Prakshepa churna* to ensure better mixing.

**Assessment of *Paka lakshanas***

Evaluating the *Paka* is a challenging part of *Kushmandaka Rasayana* preparation because *Kushmanda* is a soft, watery, yet crisp fruit, which is sometimes harvested unripe, and the *Madhura Dravya* (*Khanda* Sarkara) is susceptible to caramelization, crystallization, or underheating. The survey revealed that all companies recognize this difficulty, with some suggesting that skill, experience, and careful judgment can help address these issues.

The *Paka* is assessed differently across companies: some evaluate it after *Khandapaka* alone, others after both *Khandapaka* and the final product, and some after adding *Kushmanda* to the *Khandapaka*.

**Table 4: Stages of *paka lakshana* assessed by different companies.**

| Sl.No. | Stage of preparation | Number of companies |
|---|---|---|
| 1 | *Kushmanda bharjana* | 1 |
| 2 | *Khandapaka* | 10 |
| 3 | After adding *Kushmanda* to *Khandapaka* | 1 |
| 4 | Final product | 8 |

***Kushmanda bharjana paka***

All the companies consider the common '*Madhuvarna'* as the *Paka Lakshana*. However, the exact shade is described differently, ranging from brown, golden brown, to honey brown.

***Khandapaka***

All 11 companies that prepare *Khandapaka* follow the classical *Paka Lakshana*, aiming for a 1 or 1–2 thread consistency. Among these, three companies also assess the total soluble solids (TSS) and Brix value to monitor the syrup consistency more precisely.

***Avaleha paka***

Eleven companies follow the *Paka Lakshana* described in the classical texts. Among the 12 companies, 8 assess the Brix value, 4 measure total solids, 4 determine moisture content, and 3 evaluate the pH of the preparation.

**Consistency of the final product**

When asked to rate the consistency on a 0–10 scale (with 0 representing fluid *lehya* and 10 representing crispy granules), the average rating was 6, indicating a thick *leha* consistency, almost bordering on *Khanda*.

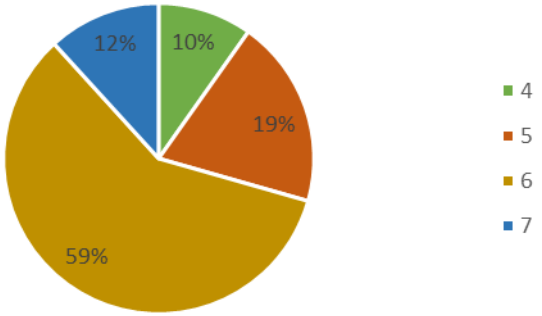


**Fig. 4: Graph showing consistency obtained at different pharmacies.**

**Duration for preparation**

The time taken for the manufacturing differs with the facilities available at the companies.

**Table 5: Time taken from cooking *Kushmanda* till adding *Madhu.***

| Sl.No. | Time range | Frequency (in number) |
|---|---|---|
| 1 | 4-5 hrs | 3 |
| 2 | 6-8 hrs | 2 |
| 3 | 12 hrs | 1 |
| 4 | 1 day | 3 |
| 5 | Varying | 3 |

**Nomenclature- logic behind '*Rasayana*'**

Two companies attribute this to the consistency or form of the formulation, while the others believe it is due to its inherent properties and therapeutic effects. Some specifically highlight its *Rasayana* effect and karmas, such as *"bala-vṛiddheṣhu yujyate"*, *"medha-smṛiti-bala prasadanam"*, and its indication in *kṣhaya roga*.

**Challenge in Shelf life**

While eight companies stated that they face no challenges in maintaining shelf life and, in fact, obtain a very promising duration, three companies reported that spoilage occurs only rarely, attributing it possibly to the use of unripe *Kushmanda*. In contrast, two companies expressed that maintaining shelf life is very difficult, with the formulation sometimes fermenting within 2–4 weeks, and in one case, even when preservatives were added.

Some companies emphasized that extended shelf life can be achieved without added preservatives by ensuring high-quality raw materials and using purified water during processing. Others opined that ingredients like *Ghrita*, *Khanda*, and *Madhu* themselves act as natural preservatives, eliminating the need for additional agents.

**Use of Artificial preservatives**

2 among 12 companies do not use artificial preservatives while all others do. Among them, three of them keeps the data about preservation confidential. Others use methyl-propyl paraben, sodium benzoate or citric acid according to their in-house standards.

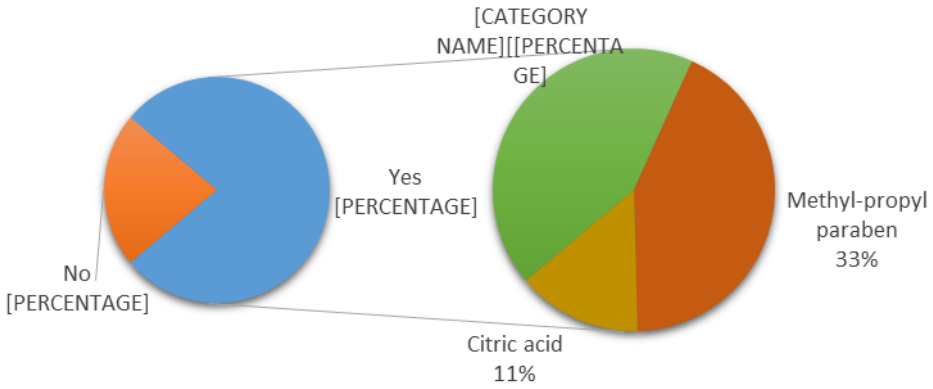


**Fig. 5: Graph showing details about preservatives.**

**Analytical tests of Final product**

The API prescribes clear analytical parameters for the assessment of *Kushmandaka Rasayana*. In practice, all surveyed companies reported evaluating organoleptic characters;

however, two companies admitted that they rely exclusively on these parameters without conducting further analytical testing. The majority—ten companies—reported carrying out more detailed analyses including loss on drying (LOD), pH, Brix value, ash value, and sugar content. Interestingly, three companies follow independent in-house standards, which differ slightly from the API specifications, while only a few others tested parameters such as extractive values, depending on perceived necessity. In cases where the formulation is exported abroad, companies are required to conduct more stringent quality checks, including heavy metal estimation and microbiological testing, in line with international regulatory requirements.

Notably, during the survey it was observed that not all companies were fully transparent in disclosing their exact testing protocols, suggesting some degree of variability in how analytical standards are interpreted and applied across manufacturers.

## DISCUSSION

- The survey across 12 Ayurvedic pharmaceutical companies revealed the most followed reference to be *Sahasrayoga*.
- The survey revealed considerable consistency in the selection of ingredients, particularly *Kushmanda*, which were sourced from trusted vendors or homegrown sources. All companies performed quality control (QC) on raw materials, with most emphasizing organoleptic evaluation; a few also included pH, TSS, and other physicochemical parameters for better standardization. *Ghrita* and *Madhu*, the other key components, were also tested for multiple parameters including refractive index, specific gravity, iodine value, and moisture content, depending on the company.
- The type of vessel varied across companies, ranging from traditional brass or silver-plated brass to stainless steel (SS), with several opting for SS for compliance with GMP standards.
- Climatic conditions were considered relevant by most companies, even though production was based on market demand.
- Heat application during cooking was recognized as a critical factor for product consistency, especially for maintaining shelf life.
- *Kushmanda* processing prior to frying – whether crushed, filtered, or made into paste – also showed variability, reflecting adaptation to local practices and equipment.

- The *paka lakshana* was largely guided by classical references, with most companies assessing it after *Khandapaka* or after addition of *Kushmanda*.
- Challenges in maintaining *paka* were generally minimal, though some highlighted issues when using unripe *Kushmanda*.
- Addition of *Prakshepa churna* was done after flame off so as to preserve volatile components, while the addition of *Ghrita* was less standardized.
- Honey was mostly added at the cooled stage to avoid heat changes in honey
- Batch sizes ranged from 5–10 kg in smaller pharmacies to 100–200 kg in larger industrial setups, with the final consistency of the product averaging between 5–7 on a scale of 0–10 (0 = fluid *leha*, 10 = crispy granules).
- Most companies agreed that the designation "*Rasayana*" relates to its therapeutic action rather than its form, emphasizing its rejuvenative properties and suitability across age groups.
- Regarding stability, opinions varied: while some pharmacies reported no issues, others faced occasional fermentation or spoilage, particularly with unripe *Kushmanda*.
- Preservatives such as sodium benzoate, citric acid, methyl/propyl paraben were used variably, mainly in powdered formulations, whereas some companies relied on the inherent preservative properties of *Ghrita*, *Madhu* and *Khanda*.
- Shelf life without added preservatives was considered unpredictable by several respondents.
- Analytical testing practices were diverse, ranging from basic organoleptic checks to in-depth physicochemical testing, with more comprehensive assays performed for exports.

The preparation methods followed by different pharmacies are in accordance with the descriptions given in classical Ayurvedic texts such as *Bhaishajya Ratnavali*, *Ashtanga Hridaya* and *Sahasrayoga*, including aspects like the quantity of *drava dravya* as specified in *Bhaishajya Ratnavali*, the addition of *khanda* as described in both texts, and the assessment of *paka lakshanas.* Overall, the survey underscores the blend of traditional knowledge and modern pharmaceutical practices, highlighting the importance of ingredient quality, heat control, and process standardization in achieving a stable and therapeutically effective *Kushmandaka Rasayana*.

## CONCLUSION

The survey revealed that while all companies follow classical references for the preparation

of *Kushmandaka Rasayana*, there is considerable variation in processing methods and quality control parameters. Most companies emphasize the importance of heat control, ripe *Kushmanda* selection, and assessment of *paka* to ensure consistency and efficacy. Although most of them use preservatives, others rely on the inherent preservative properties of *Ghrita*, *Madhu*, and *Khanda*. Analytical testing practices vary widely, with a few companies following comprehensive in-house standards, while others perform minimal checks. Overall, the survey highlights that traditional knowledge is being adapted to modern pharmaceutical practices, but variations in methodology and interpretation of classical guidelines continue to influence product consistency, stability and quality.

**ACKNOWLEDGEMENT**

First and foremost, I bow in reverence to the Supreme Being and my forefathers for their blessings, which guided me throughout this journey. I express my sincere gratitude to my Guide, Dr. Muraleedharan A K, and my Co-Guide, Dr. Hemah G for their constant guidance and support. I am thankful to the faculty members of the department for their valuable insights and support. My heartfelt thanks to my friends, colleagues, seniors, and juniors for their encouragement. I extend my gratitude to the pharmaceutical company officials for their support. Above all, I am deeply grateful to my parents, husband, family, and in-laws for their unwavering love, support, and faith in me. Finally, I thank everyone who directly or indirectly contributed to this work.

**REFERENCES**

1. Ayurvedic Formulary of India (AFI) Part 1. 2nd ed. 3/7. National Institute of Science Communication and Information Resources, CSIR, New Delhi. Delhi; The Controller of Publications Civil Lines, 121.
2. Sri Govinda Das. Bhaishajya Ratnavali. Vidyotini commentary. Kaviraj Ambikadattashastri, interpretor. Rajeshwar Dutt Shastri, editor. Raktapittachikitsa prakaran. 13/95-101. Varanasi; Chaukhambha Sanskrit Sansthan, 2014; 400-401.
3. Chakrapanidatta. Chakradatta. Bhavarthasandeepani commentary. Jagdishwar Prasad Tripathi, explainer. Brahmashankar Shastri, editor. Raktapittachikitsa Adhyaya, Sloka 67-73. Varanasi; Chaukhambha Sanskrit Series, Krishnadas Academy, 125-126.
4. Vagbhata. Ashtanga Hridaya. K R Srikantha Murthy, translator. Reprint, 2018; 2. Chikitsa Sthana 3/114-118. Varanasi; Chowkhamba Krishnadas Academy, 2018; 234.

5. K V Krishnan Vaidyan. Sahasrayoga. with Sujanapriya commentary. 2021 ed. Lehyayoga 12. Alappuzha: Vidyarambham Publishers, 2021; 211-212.
6. Yogaratnakara. Madham Shetty Suresh Babu, editor, translator. Purvardha. Raktapitta Adhyaya. Varanasi; Chaukhambha Krishnadas Academy, 1: 441.
7. Sharangdharacharya. Sharangdhara Samhita. Parasuram Shastri Vidyasagar, editor. Adhamalla's 'Dipika' and Kasirama's 'Gudhartha-Dipika' commentary. Reprint 2000. Prathamakhanda 1/52. Varanasi; Krishnadas Academy, 2000; 13.

**ANNEXURE**

**QUESTIONNAIRE FOR THE DESCRIPTIVE SURVEY**

This questionnaire intents to gather information related to the pharmaceutical aspects of *Kushmandaka Rasayana* from Ayurveda pharmaceutical companies situated in Kerala. This survey will address following domains of *Kushmandaka Rasayana* Production and Preservation

- Reference and raw materials
- Method of preparation
- Shelf-life and Preservation

The investigator ensures maximum confidentiality for the shared data. The data obtained from the survey will purely be used for the study purposes and the details of the participated companies will remain anonymous.

**Section 1- Reference and Raw Materials**

2. Which is the reference selected for the preparation of *Kushmandaka Rasayana*
3. What are the particulars of the raw materials used? Are all the ingredients adopted same as in the reference, their ratio/quantity?
4. What are the criteria for selecting *Kushmanda*?

Prompt: Vaidya kumbalanga / elavan

5. Where do you procure the raw materials from and explain the characteristics.
6. Do you check the quality control parameters of the raw materials?
7. What are the quality checking parameters for *Kushmanda*?
8. What are the quality checking parameters for *Ghrita*?
9. What are the quality checking parameters for Honey?

**Section 2- Preparation**

10. Is there any specification about the material of vessel used for the preparation of *KR*? If yes, mention.
11. What type of vessel is used for the production of *Kushmandaka Rasayana*?
12. Is there any relevance for Season and Weather conditions for the preparation? If yes, which season is selected by your company for the production?
13. Is there any relevance for the amount of heat applied at each step?
14. What are the flame temperatures at each step?
15. How is the *Kushmanda* cooked?

a. Steam ☐ b. Water ☐

If water boiled, what is the amount of water taken to cook the *Kushmanda*?

16. How is the cooked *Kushmanda* processed before frying in ghee?
17. What amount of ghee is taken for frying the *Kushmanda*?
18. Is the ghee processed before it is used to fry the *Kushmanda*?
19. Is the ghee-fried *Kushmanda* made into paste?
20. In what form is the *Khanda Sarkara* added?
    a. If powdered, when is it added?
    b. If syrup, what is the syrup made from(solvent)? Why?
21. At what *Paka* of *Kushmanda* frying is the *Khanda Sarkara* added?
22. What is the amount of solvent taken for 100 *pala Kushmanda*?
23. What is thread consistency of *Khanda paka*?
24. When is the fine powders (*churna*) added?
25. What is the general idea for adding churnas as prakshepaka?
26. When is the vessel taken out from flame?
27. What is the estimate of duration for the production?
28. What is/are the *Paka lakshana* followed in your company?
29. When is the *paka lakshanas* assessed?
30. Do you find difficulty in maintaining the *Paka* of *Kushmandaka Rasayana*?
31. When is honey added?
32. Do you add *Ghrita* at any other stage of preparation?
33. What is the size of each batch?
34. What is the consistency of the final product? How will you grade if choice is given as:

| | | | | |
|---|---|---|---|---|
| 2<br>Leha | 4 | 6 | 8 | 10<br>Khanda |

35. Why is this formulation called '*Rasayana'*? Which form/consistency is more fulfilling for the term '*Rasayana'* and its therapeutic properties as well?

**Section 3- Shelf-life and Preservation**

36. Are there challenges in maintaining the stability of *Kushmandaka Rasayana*?
37. Are artificial preservatives added to the finished product?

a. If no, what is the shelf life and what are the measures adopted to extend the shelf life?

b. If yes,

i. which is the preservative added and mention the concentration?

ii. What are the criteria followed while selecting the preservative?

iii. What is the shelf life of the *Kushmandaka Rasayana* after adding preservative?

iv. What is the form and time of adding preservative?

38. What is your opinion on the shelf life of the *Kushmandaka Rasayana* without adding preservatives?

**Section 4 – Quality control**

39. What are the analytical parameters for *Kushmandaka Rasayana.*