Original Article

Process Standardization of Rasamanikya

K. Srimannarayana*, B. J. Patgiri**, P. K. Prajapati***
Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar.

Abstract

Rasamanikya is a famous drug, frequently used by Ayurvedic physicians for Vata-Kaphaja diseases like Shwasa, Kasa and Kushtha (Skin disorders). Various methods of preparation have been found described in Rasa classics. Generally it is prepared by Shuddha Haratala which is kept between two thin transparent Abharaka Patra (mica sheets) in small scale and in sharava for large scale, heated up to desired level. There are so many methods and different liquid media have been found described for Shodhana of Haratala. Therefore the methods of preparation of Rasamanikya and Shodhana process of Haratala have been validated through various experiments. Tankana-treated Haratala (T. Treated) is found best for Shodhana process and final product too i.e. Rasamanikya in terms of pharmaceutical standards i.e. Ruby in colour, along with reproducibility of fixed quality.

Key words: Shodhana, Validation, T-Treated Haratala.

Introduction

Rasamanikya has been first described in Rasendra Chintamani by Dhundhukanath3 in 13th century A.D. as “Rasam Manikya Prabham” which directly indicates the standard of finished product i.e. Ruby colour. The same product has been described by Krishnaram Bhatt in Siddha Bhesjaya Manimala5 as Kumuda Rasa. The product of Kupipakya method of preparation i.e. Tala Manikya also was one of the synonym called Rasamanikya. This product is one of the familiar medicaments used throughout India by Ayurvedic physicians for various disorders including Jvara5 (Fever), Kasa (Cough), Shwasa (Dyspnoea), Arshas (Piles), Bhagandara (Fissures), Nadi Vrana (Chronic wounds) and Kushtha4 (Skin ailments), with different Anupanas2 in various dosage forms. Haratala, one of the Arsenical raw materials emphasized since Samhita period8,9 turns into ambrosia after Shodhana processes and manufacturing techniques. This requires proper care, critical understanding and computed technology to get the desired character of Rasamanikya.

Standardization of Rasashadhies can be defined with the number of processes, involved in the production of a drug. The standard protocols mentioned in the classics7, which may be applied to the present manufacturing scientific pharmaceutical ambience, such as quality of raw materials1 to be taken for the process. The process standardization protocols are like temperature, time space, instrument and heating devices etc. along with purification protocols like number of Bhavana4, Swedana6 etc. and the finished drug protocol2 viz colour, fineness, safety profile, bioavailability and therapeutic efficacy etc. Validation13,14 of the method of preparation is to be done by manufacturing the same product by similar method and instrumentation, for any number of times, with standard raw material getting output of same product with specification of parameters. The analysis of the raw material (Ashuddha Haratala), intermediate (Shodhita Haratala) and finished product (Rasamanikya) in terms of percentage of Arsenic and Sulphur etc as compared with standard parameters, was carried out in same respect.

Aims and Objective

• To develop standard product (Rasamanikya) as per classical parameters.

Material & Methods

The Media for Shodhana like Kushmanda, Dadhy amla, Kanji etc. various heating devices like gas burner, electric muffle furnace etc. and instruments along with other accessories used as per (Table 1).

Methods for Shodhana: Shodhana of Haratala was done by adapting following procedures as unit process.

*Ph.D. Scholar, Dept. of Rasashastra & Bhaishajya Kalpana.
**Reader, Dept. of Rasashastra & Bhaishajya Kalpana.
***Professor & Head, Dept. of Rasashastra & Bhaishajya Kalpana.

DOI: 10.4103/0974-8520.68195
Bhavana (Wet-Trituration): It is a process in which the drug material is taken in a Khalva Yantra and the liquid material is added to it slowly up to Rasapankawat stage (semi solid) and then it is triturated till dryness. The process is repeated for 1 or 3 or 7 or more times as per reference. Kshipta (submerging in media): Kshipta is a process in which the drug material is kept in the media for one day (24 hours) or more as per reference, which is to be changed every day by adding the fresh media and this repeated for 3 or 5 or 7 days.

Swedana (Heating under liquid bath) - Swedana is a process in which the substance is placed in a cloth which should be four-folded and made into Pottali. Then it is hanged with a glass rod in a pot in such a manner that it should not touch any side and remain suspended in centre. It is known as Dola Yantra which is filled with liquid media and subjected to mild heat up to prescribed duration.

Following liquid media were taken for Shodhana-
- Churnodaka
- Kushmanda Swarasa (juice of Benincasa Hispida)
- Shalmali Kwatha (Decoction of Salmalia malabarica)
- Tilakshara Jala (Alkaline water of Sesamum indicum)
- Kanji + Churnodaka (T. method)

Total six methods were adopted for the preparation of Rasamanikya including Sarava Samputa (Antardhuma), Open Sharava Samputa, (Bahirdhuma), Mica sheets (Open air method), Fuse bulb method along with modified heating device pattern i.e. blow lamp method (Modified Vankanala) and Kupipakwa method, also used to befit present scientific and technological advancement with the control on temperature pattern and duration of heat as mentioned above.

Results

Lime water (After purification of Hartala)
Physical appearance was Pale yellow solution with suspended particles, smell of Hydrogen Sulphide H$_2$S having Ash value 0.58 % w/w, test for Arsenic (Reinsch Test) positive and in Qualitative analysis of ash following Cations were present viz., Fe, Ca, Mg, Na and CO$_3$, SO$_4$, Cl, S , AsO$_4$ Anions were present. Analysis of Ash value, Arsenic content and free sulphur of samples of Ashuddha Haratala, Churnodaka treated Haratala, T-treated Haratala, Residue (T-treated), Churnodaka treated Rasamanikya (Mica), T-treated Rasamanikya (Mica) and T-treated Rasamanikya (Kupi) were carried out. Results are shown in Table 3.

Methods of preparation of Rasamanikya
In preparation of Rasamanikya by Mica sheets, Blow lamp and Fuse bulb loss was 5%-10% on an average whereas in Kupipakwa method loss was minimum i.e. 2.5%. Time consumed and remarks are shown in Table 5. General observation of yield of Rasamanikya with various media are shown in Table 6.

| Table 1: Material, Media and Accessories required for Shodhana & preparation of Rasamanikya |
|-----------------|-----------------|-----------------|-----------------|
| Media for Shodhana | Heating Device | Instrumentation / Accessories |
| Churnodaka | Gas stove | Vessels, Sand Bath, Earthen |
| Kushmanda Swarasa | Blow lamp (Modified Vankanala) | Sharavas, Amber Glass, Cloth, |
| Dadhi, Amla | Chullika | Thread, Mica sheets, fuse bulb, Knife, |
| Kanji | Electric heater | Holders, Clips, Iron rod, torch light, |
| Nimbu Swarasa | Electric Muffle Furnace | Spoons |
| Tankana |

| Table 2: Different Method of Preparation of Rasamanikya |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Scholars / Methods | Sarava Samputa (Antardhuma) | Open Sharava Samputa (Bahirdhuma) | Mica sheets (Open air method) | Fuse bulb method |
| 1. Harish Anadkat et.al. | Sand bath on Chulika | Chulika | Chulika | Gas stove |
| 2. D.K.Mishra et.al. | Sand bath on gas stove | Gas stove | Gas stove | Gas stove |
| 3. K. Srimannarayana et.al. | Sand bath on electric heater | Electric Heater | Blow lamp method (modified Vankanala) | |

| Kupipakwa method |
|-----------------|-----------------|-----------------|-----------------|
| Chulika | Gas stove | Electric Muffle Furnace |
Table 3: Results of quantitative chemical analysis

| Sr. no. | Samples                        | Ash value (w/w) | Arsenic (w/w) | Soluble extract of Carbon disulphide (w/w) |
|---------|-------------------------------|-----------------|---------------|------------------------------------------|
| 1       | Ashuddha Hartala              | 0.05            | 57.95         | Nil                                      |
| 2       | Churnodaka treated Haratala   | 0.034           | 57.95         | Nil                                      |
| 3       | T-treated Haratala            | 0.83            | 58.01         | 0.10                                     |
| 4       | Residue (T-treated)           | 37.98           | 16.71         | 0.09                                     |
| 5       | Churnodaka treated Rasamanikya (Mica) | 1.12 | 56.53 | Nil                                      |
| 6       | T-treated Rasamanikya (Mica)  | 60.95           | Nil           |                                          |
| 7       | T-treated Rasamanikya (Kupi)  | 54.74           | Nil           |                                          |

Table 4: Results of Shodhana with various Procedures and Media

| Media                                | Process      | Loss | pH Before | pH After | Colour            |
|--------------------------------------|--------------|------|-----------|----------|-------------------|
| Lime water                           | Swedana      | 2%   | 11        | 9        | Cream             |
| Kushmanda Swarasa                    | Swedana      | 5%   | 6         | 6.5      | Slight creamy     |
| T-treated                            | Swedana      | 1.5% | 6         | 7.5      | Golden yellow     |
| Shalmali Kwatha                      | Swedana      | 3%   | 5.5       | 6        | Greenish yellow   |
| Dadhyamla                            | Kshipta      | -    | 2         | 3        | Slight whitish    |
| Kushmanda Swarasa                    | Kshipta      | -    | 6         | 6.5      | Creamy            |
| Dadhyamla                            | Bhavana      | -    | 2         | -        | -                 |
| Kushmanda Swarasa                    | Bhavana      | -    | 6         | -        | -                 |

Table 5: Results of Rasamanikya prepared by different methods with respect to time duration & loss

| Method                               | Loss | Time | Remarks                                      |
|--------------------------------------|------|------|----------------------------------------------|
| Mica sheets                          | 6%   | 6 min| Tilt the product for uniformity              |
| Blow lamp                            | 5.5% | 4-5 min| Tilt the product for uniformity             |
| Fuse bulb                            | 10%  | 6-7 min| Keep fuse bulb for total melting            |
| Open Sharava                         | 15%  | ½ hour| Self cooling for 20 min                     |
| Antardhuma (Electric heater)         | 13%  | 1-1½ hour| Sand bath and heating device require time and temp range (3-6 hours) |
| Kupipakwa                            | 2.5% | 33 min| Shalaka test done for melting of product, then heating should be stopped |

Table 6: Results of Rasamanikya prepared with various media

| Media                               | Colour of Shuddha Hartala | Rasamanikya colour  |
|-------------------------------------|---------------------------|---------------------|
| Churnodaka                          | Dull yellow               | Blackish red        |
| Kushmanda Swarasa                   | Yellow                    | Dark red            |
| Shalmali Kwatha                     | Greenish yellow           | Blackish            |
| Kushmanda Dadhi Kshipta             | Dull yellow               | Bright red          |
| Kushmanda Dadhi Bhavita             | Dull yellow               | Blackish/Slight reddish |
| Tankana treated                     | Bright yellow             | Bright ruby colour  |

Table 7: Different media used, Shodhita Hartala and yield of Rasamanikya

| Media                               | Wt. of Shodhita Hartala | Finished product (yield of RM) | % loss |
|-------------------------------------|-------------------------|--------------------------------|--------|
| Churnodaka                          | 92 gm                   | 88 gm                          | 5      |
| Shalmali Kwatha                     | 56 gm                   | 52 gm                          | 8      |
| T-treated                           | 150 gm                  | 140 gm                         | 7      |
| Kushmanda Swarasa                   | 65 gm                   | 60 gm                          | 8      |
| Dadhi+K. Swarasa (Kshipta)          | 100                     | 95                             | 5      |
| Dadhi+K. Swarasa (Bhavita)          | 100                     | 90                             | 10     |
Discussion

Grahya Lakshanas of Patra Haratala as per the classics has been taken as Qualitative Protocols viz. authentication of raw material - Patra Haratala, Chemical configuration - AspS3, Colour -(Swranabhavm) Golden Yellow, Texture - (Bluapatram) with layer, Weight -(Guru) heavy. Based on characteristics of purified Haratala, the limewater treated Haratala and other methods of purification as said to be well and good. The marker of purification is said to be quality of finished product i.e. Rasamanikya. Various colour obtained after Shodhana and preparation of Rasamanikya varied with different media.

Results of Shodhana by Swedana, Kshipta and Bhavana processes of various media were shown in Table 4. Shodhana by limewater and Kushmanda Swarasas showed a loss of 2% and 5% respectively and cream colour and slight cream colour of Shodhita Haratala. Where as a loss of 1.5% of media by T-treated and golden yellow colour of Shodhita Haratala was observed.

Standard protocol of Shodhana - Swedana

Media: Churnodaka, Kushmanda Swarasa, Shalmali Kwatha, Kanji+Churnodaka (Tankana treated)
The stainless steel vessel was taken for study, which was having diameter of 15 cm diameter, height of vessel from out side 10cm,. The size of vessel, from in side (occupied) 5cm height of the media, 4 cm vacant, 12 cm diameter. It was heated on LPG stove, for 3 hours. The temperature of the liquid has been maintained 90°C - 95°C.

Details of T method

Ashuddha Haratala (500 g.) was made into yavakuta (coarse powder) passed through 40no. mesh. Added 10% of Tankana i.e. 50 g. by weight to it. And first wash was given with lemon juice (200 ml.) followed by second wash which was given with Kanji (200 ml.). The washed Haratala (498 g.) was transferred into a cloth and prepared in the form of pottali. This pottali was hanged in Dola Yantra filled with the mixture of Kanji and Churnodaka (Equal quantity i.e.1:1). Then it was heated for three hours by maintaining the temperature range of liquid at 90°C to 95°C on mild heat. After completion of heating process and Ten minutes of cooling, the Haratala was taken out from Pottali and washed with hot water to remove the residue of liquid. The obtained material was dried at room temperature weighed and stored in suitable container.

The Shodhita Haratala was spread between two mica sheets and closed with clips. It was then heated on LPG stove till it converts into Rasamanikya.

In Kupipakwa method, Shodhita Haratala was filled in a Kupi which was coated by three layers of mud smeared cloth and subjected to heat. During the preparation the temperature formelting was observed 359°C and boiling at 415°C while the temperature at which product was prepared at 450°C. The colour of finished product was Ruby i.e. Rasamanikya. Total time consumed by E.M.F. was 33 minutes and after self cooling the Rasamanikya was collected from the bottle.

The mica sheet method was found cheaper and easier for less quantity i.e. only 10 gm at a time but it is not useful for pharmaceutical companies and due to same reason the fuse bulb method was also not found suitable in present context. Antaradhuma (sand bath) method produced good quantum of Rasamanikya but it is time consuming and not economical. It was also not found suitable for reproducibility of the good quality product. The Open Sharava method produces a lot of Arsenic vapours due to which causes exposure to the person and polluted the environment too. Thus, it is not a suitable method considering the hygienic point of view, and due to same problem the blow lamp method is also not found suitable.

The Kupipakwa method was found best because, it produces good quality of Rasamanikya also supported by previous studies by Harish et al. and D.K. Mishra et al. though they have prepared it by valuka yantra and with churanodaka Shodhita Haratala. Here the Haratala was Shodhita by Tankana treated method and Rasamanikya was prepared in electric muffle furnace which is found easier and economical too.

Conclusion

Tankana treated method for the Shodhana of Haratala is found better because the Rasamanikya prepared by it is having good quality, so it is validated qualitatively and quantitatively,The Rasamanikya prepared by Kupipakwa method stands economical, less time consuming and gives best results in terms of reproducibility.

References

1. Shri Vagbhattacharya, Rasa Ratna Samuchchaya, Kulkarni D.A., Hindi commentary, Motilal Banarsidas Publication, New Delhi, 1998, (3/70-72, p. 64).
2. Sadananda Sharma, Rasa Tarangini, I st Edition, Motilal Banarsidas, New Delhi, 2000, (2) 49 pp. 21, 11/83-93, p. 257-258).
3. Dhundhukanath, Rasendra Chintamani, Mishra S. N., Hindi commentary, Chaukhamba Orientalia, Varanasi, 2000, (9/128-133, p.376).
4. Bhatta K.G., Rasendra Sara Sangraha, Tripathi I. D., Hindi commentary, 2nd Edition, Chaukhamba Orientalia, Varanasi, 1998, (1/191-196, p. 48-49).
5. Krishnaram Bhatt, Siddha Bhesjaha Manimala, Kaladhar Bhatt Hindi commentary Published by Chaukhamba Krishna das Academy, Varanasi. 3rd Edition, (4/66-67, p. 159, 160).
6. Parvatiputra Nityanath, Rasa Ratnakar;Vedikhanda Rishi Adhikarama, commentary by Swaminath Mishra, Published by Chaukhamba Publishers, Varanasi, 2nd Edition 2003, (3/84-86, p. 35).
7. Hari Prapanji Ji, Rasa Yoga Sagar;Vol. II, Krishna das Academy, Varanasi, 1st Edition, 1998, (2531-2538, p. 563-565).
8. Agnivesha’s Charaka Samhita, Chikitsa, Vol.V, Ayurved Dipika & Jalpa Kalpataru Edition, 1998, (2531-2538, p. 563-565).
commentary, Edited by Y. T. Acharya, 2nd Edition, Chaukhambha Publishers, Varanasi, 2002, (23/4, p. 3197-3199).

9. Sushruta, Sushruta Samhita, Kalpa Sthan, Nibandha Sangraha Dalhana commentary, Edited by Y. T. Acharya et al, 9th Edition, Chaukhambha Surabharati Prakashan, Varanasi, 2003, (2/5, p. 564).

10. Patel and Bhatt, Rasamanikyam - P.G. Thesis, GAU, 1966-1967.

11. Harish A. Aradkat et al, Pharmaceutico - clinical study of Rasamanikyam resulting its efficacy on Kshudra Kushta, 1988.

12. D.K. Mishra et al, Rasamanikya Evam Yashadamrut Malahoro Ka Nirmanatmaka Tatha Vicharchika Vyadhi Par Prabhavostapaka Adhyayana, 1999.

13. K. Shrimannarayan, "A compilation work on Drug Research Standardisation of Rasashadhi", GAU, 2004.

14. W.H.O.'s General guidelines for methodologies on research of traditional medicine, Geneva, 2000.

**Author Help: Online submission of the manuscripts**

Articles can be submitted online from http://www.journalonweb.com. For online submission, the articles should be prepared in two files (first page file and article file). Images should be submitted separately.

1) **First Page File:**
   Prepare the title page, covering letter, acknowledgement etc. using a word processor program. All information related to your identity should be included here. Use text/rtf/doc/pdf files. Do not zip the files.

2) **Article File:**
   The main text of the article, beginning with the Abstract to References (including tables) should be in this file. Do not include any information (such as acknowledgement, your names in page headers etc.) in this file. Use text/rtf/doc/pdf files. Do not zip the files. Limit the file size to 1 MB. Do not incorporate images in the file. If file size is large, graphs can be submitted separately as images, without their being incorporated in the article file. This will reduce the size of the file.

3) **Images:**
   Submit good quality color images. Each image should be less than 2048 kb (2 MB) in size. The size of the image can be reduced by decreasing the actual height and width of the images (keep up to about 6 inches and up to 1800 x 1200 pixels). JPEG is the most suitable file format. The image quality should be good enough to judge the scientific value of the image. For the purpose of printing, always retain a good quality, high resolution image. This high resolution image should be sent to the editorial office at the time of sending a revised article.

4) **Legends:**
   Legends for the figures/images should be included at the end of the article file.