Research Article

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PREPARATION AND PHYSICOCHEMICAL ANALYSIS OF HINGULIYA MANIKYARASA

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ABSTRACT

Rasashastra deals with the preparation of medicines mainly with the help of Mercury, minerals, metals and other herbs. It is our prime duty to develop basic standards at every step of drug preparation. The aim of the present research work was to study pharmaceutical and analytical aspect of Hinguliya Manikyarasa. For Pharmaceutical study the method used was the observations regarding time, temperature, cardinal stages, finished product and consumption of fuel. Temperature range for Hinguliya Manikyarasa was also studied. For Physicochemical study Crystallographic study, NPS test along with Chemical analysis of the same drug was done. The Result obtained as Hinguliya Manikyarasa requires 94 hours for preparation and the average temperature recorded for Mrudu Agni was 132.23^{0}C, for Madhyamagni was 303.66^{0}C and that for Tivra Agni was 499.83^{0}C. All the parameters like Time, Temperature and the amount of fuel used as parameters for standardization of Hinguliya Manikyarasa. The Nambury Phased Spot Test was used to identify and establish spot standards for the samples of Hinguliya Manikyarasa. The crystallographic study suggests that the compound Hinguliya Manikyarasa is a mixture of Sulphur, Arsenic Sulphide and Mercuric Sulphide. Another observation was As_2S_3 was found converted to AsS irreversibly.

Keywords: Kupipakwa rasayana, Hinguliya Manikyarasa, Crystallographic study, NPS test.

INTRODUCTION

Acharya Charaka in Indian Medical Science has given three sutras or basic pillars as Hetu (Causes), Linga (Symptoms) and Aushadha (Medicine), in which Aushadha have unique importance[1]. To maintain the health or to keep physical well being man learned the art of designing and manufacturing the medicines. In this process initially the organic sources of medicines i.e. the herbal medicines were in use and when the limitations of these herbal medicines were noticed inorganic substances like metals, minerals were introduced along with herbs. Rasashastra has its origin in Vedic period[2]. The main substance used was Mercury and other minerals were involved in the process. Then the inorganic substances also involved extensively in the therapeutics. It is given that there are number of remedies for curable disorders but for incurable disorders the only remedies are the Rasaushadhis[3]. These Rasaushadhis i.e. Parada murchita medicines are of four type's viz. Kharaliya, Parpati, Kupipakwa and Pottali[4]. Out of that kupipakwa rasayana is important formulation. So for the present study the drug selected for pharmaceutical and analytical study was Hinguliya Manikyarasa which is a Kupipakwa rasayana depicted in Rasatarangini[5]. No previous work has been carried out on Hinguliya Manikyarasa as far as the pharmaceutical and analytical part of the medicine is concerned.

Aim and Objective

To study pharmaceutical aspect of Hinguliya Manikyarasa and establishment of Hinguliya Manikyarasa with analytical findings.

MATERIALS AND METHOS

Selection of raw materials

A detailed description is available regarding the acceptable varieties of metals and minerals. So the ingredients of Hinguliya Manikyarasa i.e. the raw materials Hingula, Haritala and Gandhaka were selected after careful observation of grahya lakshanas, authentication was done and then used for present study. It is important that crude drugs of both vegetable and mineral origin should be subjected to purification process i.e. to remove the doshas by procedures like trituration etc[6]. Hence a detailed practical study was carried out.

Purification of ingredients of Hinguliya Manikyarasa

Purification of Hingula

Purification of Hingula was carried out as per the reference given in Rasatarangini. Unpurified Hingula was triturated well with juice of Ardraka. The mixture was subjected for trituration till the juice was dried up. Trituration was made constantly and cautiously, by the similar process 8 bhavanas were given.

Purification of Gandhaka

Purification of Gandhaka was carried out as per the reference given in Ayurved Prakash. Powdered Gandhaka was taken in a steel vessel and equal quantity of Goghruta was added in it and slow heating was provided. Milk was taken in another big vessel and a piece of cloth was tied on the mouth of the vessel. When Gandhaka was totally melted in to Goghruta the mixture was slowly poured in to the big vessel containing milk through the cloth. The solid mass of Gandhaka was washed thoroughly in hot water and kept for drying. The same procedure was followed for 3 times[7].

Purification of Harital

Haritala was purified by the process given in Rasatangini. 1.5 Kg. Powder of Harital was kept on a piece of cloth and pottali was prepared. Dolayantra containing Kushmand Swarasa was prepared in which the pottali was so adjusted that it was kept immersed in to the Swarasa. The mandagni was given for 1 Yama i.e. 3 hours. After completion of 3 hours, the pottali was taken out, was washed with water and the powder of Harital was dried. The above same procedure was repeated in dolayantra by using Churnodaka (Lime water)

Preparation of Hinguliya Manikyarasa kajjali

Hinguliya Manikyarasa Kajjali was prepared as per the classics. Juice of Palasha was extracted by the method given in Sharangadhara i.e. the flowers of Palasha were dipped in to 8 times water for 2 hours and mild heating was given till ¼ water remained and that was filtered and treated as Juice. Purified Hingula, Haritala and Gandhaka were taken in to mortar and pestle sufficient quantity of juice was taken and the mixture was triturated well till it completely dried. Such types of bhavanas were given for 7 days.

Preparation of Hinguliya Manikyarasa by Kupipakwa Rasayana method

240 g Hinguliya Manikyarasa kajjali was taken and filled in kachakupi. Valukayantra was placed exactly at the centre of the furnace and kupi placed at the centre of the valukayantra. The thermometer was applied through iron pipe and the furnace was set fire. Heat was gradually increased by adding hard and soft coals at regular interval. When the Sulphur fumes ceased at the mouth of the kupi, red hot rod was introduced frequently to ignite the Sulphur and clear the pathway. Cold rod test was performed as per the requirement to observe the status of kajjali and subsequent stages. When the blue flame appeared on the mouth of the bottle the temperature was maintained till the flame remained and when the flame ceased, the temperature was gradually increased. When the flame, fumes were completely stopped, Cold rod test was positive, Copper coin test was negative and base of the bottle was red hot like rising Sun, The mouth of the bottle was corked. The sand layer of about 2-3 inches surrounding the bottle neck was move aside. Gradually increasing Heating Pattern was strictly maintained throughout the practical as 24 h Mild, 24 h Moderate and 24 h severe heating. After self cooling the bottle was removed, the layers of kapadmitti were scrapped and kupi was broken by observing the level of the compound. Hinguliya Manikyarasa was collected from the neck region and powdered.

RESULTS

Table 1: Time in h and temperature in ^{0}C relation during the preparation of Hinguliya Manikyarasa

Duration in h	Temperature in ^{0}C
00	32
02	65
04	88
08	110
12	84
16	180
20	220
24	200
28	210
32	280
36	310
40	360
44	342
48	470
52	448
56	462
60	472
64	530
68	572
72	560

Table 2: Average temperature in ^{0}C during the preparation of Hinguliya Manikyarasa

Type of Agni	Temperature in ^{0}C
Mrudu	132.23
Madhyama	303.66
Tivra	499.83

Table 3: Time in h and temperature in ^{0}C recorded during 10 cardinal stages of Hinguliya Manikyarasa

Cardinal stages	Time in h	Temperature in ^{0}C
Initial stage	00	42
Fumes started	02	65
Yellow fumes	08	110
Profuse fumes	42	350
Blue flame	56	462
Flame stopped	64	530
Red hot base	66	560
Corking	66	560
Completion	66	560
Self cooled	94	44

Table 4: Total fuel consumed, weight of Hinguliya Manikyarasa Kajjali taken, weight of Hinguliya Manikyarasa obtained, weight of residue and their percentage

Total fuel consumed	91.34 kg
Weight of Hinguliya Manikyarasa Kajjali taken	240 g
Weight of Hinguliya Manikyarasa obtained	92 g
Weight of residue remained	40 g
Percentage of Hinguliya Manikyarasa obtained	38.33 %
Percentage of residue remained	16.66 %

Table 5: Analytical data of Hingula

Parameters	Before purification (% weight/weight)	After purification (% weight/weight)
Mercury as "Hg"	89.14	84.37
Free Sulphur	Nil	Nil
Ash value	0.14	1.00

Table 6: Analytical data of Gandhaka

Parameters	Before purification (% weight/weight)	After purification (% weight/weight)
Free Sulphur	99.88	98.86
Ash value	0.15	0.03

Table 7: Analytical data Harital

Parameters	Before purification (% weight/weight)	After purification (% weight/weight)
Total Arsenic	55.92	57.01
Free Sulphur	1.00	0.80
Total Sulphur	41.09	42.82
Ash value	0.05	0.45

Table 8: Table showing the analytical data of Hinguliya Manikyarasa Kajjali

Parameters	Hinguliya Manikyarasa Kajjali (% weight/weight)
Mercury as Hg	25.77
Arsenic as As	9.88
Total Sulphur as S	43.23
Free Sulphur	29.32
Combined Sulphur	13.91
Ash value	4.63
Water soluble extractive	9.20

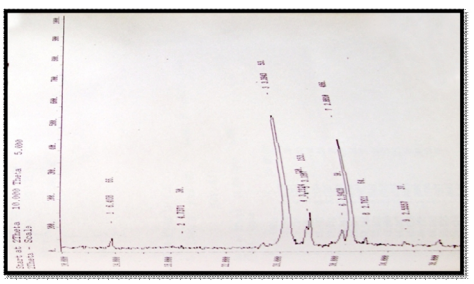
Table 9: Table showing the analytical values of Hinguliya Manikyarasa

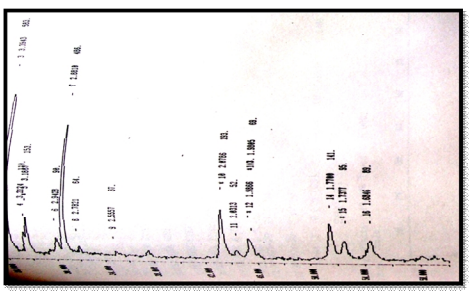
Parameters	Upper part (% weight/weight)	Lower part (% weight/weight)
Mercury as Hg	48.05	0.17
Arsenic as As	17.84	25.11
Total Sulphur as S	27.50	27.73
Free Sulphur	0.86	2.30
Combined Sulphur	26.64	25.43
Ash value	0.33	39.65

Table 10: Table showing the organoleptic parameters for all samples of Hinguliya Manikyarasa

Organoleptic parameter	Hinguliya Manikyarasa
Appearance	Sublimed crystal having one face adhered to kupi shining, smooth and other is rough, rhombohedral or conconical crystal type shape
Color	The ruby red or crimson red
Tactility	Heavy, hard, cool and smooth
Sound	No specific sound, brittle and forms crystals in longitudinal shape
Taste	Tasteless
Smell	Odorless but slight Sulphuric smell may be observed

Spectrum of X-Ray Crystallography





Crystallography Study by X-Ray Diffraction Method

This method is used to determine the atomic and molecular structure of organic, inorganic material or metal, mineral or salts[8]. Here it was used to establish some standards regarding the nature of crystal of Hinguliya Manikyarasa. It was carried out at Tata Institute of Fundamental Research, Mumbai, India. The result showed that Sulphur was present most probably in orthorhombic form. Arsenic Sulphide was most probably present in monoclinic form and Mercuric Sulphide was in Hexagonal form. This observation suggests that the compound Hinguliya Manikyarasa may be a mixture of Sulphur, Arsenic Sulphide and Mercuric Sulphide. Another observation was As_2S_3 was found converted to AsS irreversibly.

NPS Test Study

The Nambury Phased Spot Test was carried out to identify and establish spot standards for the samples of Hinguliya Manikyarasa. Another 3 samples namely Shilasindur, Mallasindur and Samirapannaga rasa which also contain Arsenic, Mercury and Sulphur were taken for comparison[9].

Whatman paper impregnated with 10 % Potassium Iodide

The reagent for drug solution was Aquaregia. The pattern of the spot was central reddish orange colored spot surrounded by whitish cream colored margin surrounded by brown colored circle. As this may be the pattern for Sindura compounds containing Arsenic, Mercury and Sulphur. When observed very carefully the minute

differences were noted which may be probably due to the differences of percentage of the above said elements in respected samples.

Whatman paper impregnated with 5 % Potassium Ferocyanide

The reagent for drug solution was Aquaregia. The pattern for Sindura compounds containing Arsenic, Mercury and Sulphur may be like central blue colored spot surrounded by whitish or light blue colored space limited by thick blue colored ring and periphery of bluish green colored. This was almost same for all four samples with minute differences for each sample.

Whatman paper impregnated with 5 % alcoholic extract of Haridra

The reagent for drug solution was Aquaregia. The pattern was brown colored central spot for all the four samples and almost remained same in all the three phases.

DISCUSSION

The temperature recorded after every two hours indicates that after completion of first 24 h the temperature was within the range of 200- 210^{0}C, at the end of 48 h the temperature range was 346-382^0 C while after the end of 72 h the temperature range was 560-598^{0}C. [Table 1] For the preparation of Hinguliya Manikyarasa the average temperature for Mrudu Agni was 132.23^{0}C, for Madhyamagni was 303.66^{0}C and that for Tivra Agni was 499.83^{0}C [Table 2]. The temperature recorded and the time required for every cardinal stage was also noted. Profuse fumes came out from bottle at 350^{0}C and the blue flame was appeared at 462^{0}C. The corking was done after 66 hours and the temperature was 560^{0}C. The bottle was removed after self cooling and for that total 94 hours required [Table 3]. Total 92 g Hinguliya Manikyarasa was obtained, the percentage was 38.33. The Total fuel consumed was 91.34 kg [Table 4]. The percentage of Mercury was reduced after the process of purification of Hingula while the ash value was increased [Table 5]. The percentage of free Sulphur was reduced along with the ash value after purification of Gandhaka [Table 6]. The percentage of total Arsenic was increased and the percentage of free Sulphur was reduced after the purification of Harital [Table 7]. Hinguliya Manikyarasa kajjali contains about 9.20 % water soluble extractive. Arsenic content was less than the expected value considering the Arsenic content in Harital [Table 8]. The percentage of Mercury was 48.05 i.e. much lesser than it was in Hingula. The percentage of Arsenic was 17.84 it was also less as compared to the Arsenic content of Harital. The percentage of free Sulphur was too less as compared to that in purified Gandhaka [Table 9]. The organoleptic characteristics of Hinguliya Manikyarasa were having ruby red colored, heavy, hard and having some Sulphuric smell. [Table 10]

CONCLUSION

Hinguliya Manikyarasa was prepared by Textual method as described in Rasatarangini and it requires 94 hours. For the preparation of Hinguliya Manikyarasa the average temperature for Mrudu Agni was 132.23^{0}C, for Madhyamagni was 303.66^{0}C and that for Tivra Agni was 499.83^{0}C. All the parameters like Time, Temperature, the amount of Fuel used as parameters for standardization of Hinguliya Manikyarasa. The Nambury Phased Spot Test was used to identify and establish spot standards for the samples of Hinguliya Manikyarasa. The crystallographic study suggests that the compound Hinguliya Manikyarasa may be a mixture of Sulphur, Arsenic Sulphide and Mercuric Sulphide. Another observation was As_2S_3 was found to be converted to AsS irreversibly.

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REFERENCES

1. Dr Tripathi Brahmanand, Charakasamhita, Charaka Chandrika Hindi Commentary, Chaukhambha Surabharati Prakashan, Varanasi, Revised edition, Sutrasthan, Adhyay 1, Shloka No. – 24; 2001. p. 9.
2. Dr K Rama Chandra Reddy, Text Book of Rasashastra, Chaukhambha Sanskrit Bhavan, Varanasi, First Edition; 2007. p. 4.
3. Dr Tripathi Indradeva, Rasendrasarasamgraha by Gopalabhatta, Savimarsha Rasavidyotini Hindi Commentary, Chaukhambha Orientaliya, Varanasi, Fourth Edition; 2006. p. 2.
4. Dr Mishra Siddhinandan, Ayurvediya Rasashastra, Chaukhambha Orientaliya, Varanasi, Eleventh Edition; 2001. p. 247.
5. Vd Sharma Sadanand, Rasatarangini, Motilal Banarasidas Prakashan Delhi, Edition XI, Tarang 9, shloka no. 50-53; p. 207.
6. Dr Zha Chandrabhushan, A Textbook of Rasashastra, Chaukhambha Surabharati Prakashan, Varanasi, Revised edition; 2007. p. 72.
7. Acharya Shri Madhav, Ayurved Prakash, edited with the Arthavidyotini and Arthaprakashini Sanskrit and Hindi commentaries by Vaidya Vachaspati Shri. Gularaj Mishra, Chaukhambha Bharati Prakashan, Varanasi, IV, edition, Adhyaya 2 shloka 21 – 24; 1994. p. 261.
8. Web Ref – www.google.com - http://en.wikipedia.org/wiki/X-ray_crystallography; 2013.
9. CCRAS, Ministry of Health and Family Welfare, Application of Standardized Namburi Phased Spot Test in identification of Bhasma and Sindura preparations of Ayurveda, New Delhi, CCRAS; 1991.

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