Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 12 [7] June 2023 :25-30

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Quality Assessment of the Loknath Rasa through Namburi Phase Spot Test

Jyoti Sharma [1]*, Ebin T.U [2],Anitha H [3]

1. PG Scholar, Department of RSBK, Parul Institute of Ayurveda, Vadodara-390019, Gujarat, India.
2. Assistant Professor, Department of RSBK, Parul Institute of Ayurveda, Vadodara-390019, Gujarat, India.

2. Professor, Department of RSBK, Parul Institute of Ayurveda Vadodara, -390019, Gujarat, India.

***Corresponding Author's** Email: -js226622@gmail.com

ABSTRACT

Lokanatha Rasa is a Parada Sagandha, Saagnimoorchita yoga. Many references in Rasashastra can be found in the names Lokanatha rasa, Lokanathapottali, Lokeshwara rasa, and Lokeshapottali.The main elements include Kaparda, Shankha, Parada, Gandhaka, and Tankana, which are known for their antibacterial capabilities in treating conditions including atisara, grahani, kshaya, and kasa, among others. Calcium aids in the treatment of both secretory and inflammatory diarrhoea. It also serves as a functional nutrient, which is essential since diarrhoea causes divalent mineral loss. Standardisation of ayurvedic formulation is required in order to ensure formulation quality and uniformity. A minimal laboratory setup can be used to conduct the Namburi Phased Spot Test, which is a basic analytical procedure based on the chromatography concept. A sample (Loknath Rasa) was taken to evaluate the formulation's purity and quality, and NPST research was conducted on several reacting materials. NPST was performed on the sample by CCRAS guidelines, and observations were made at three separate time intervals. Conclusion: Loknath Rasa supplied data for the current study that met NPST requirements.

KEYWORDS: - *Loknath Rasa, Qualitative test, Bhasma Analysis, NPST*

Received 18.03.2023 Revised 16.04.2023 Accepted 21.05.2023

INTRODUCTION

Evolution of Herbo-mineral medicines is considered as a mild stone in Ayurvedic treatment. Use of drugs belonging to Minerals, metals, non-metals, poisonous herbs was well practiced since ancient period. Even in *Samhita kala* some of the above said drugs were more potent[1]. Herbo-mineral drugs are generally coined as *Rasaushadhis* and the science deals with such drugs and formulations is known as *Rasashastra*. Terms *'Rasa'* is may be described in different outlooks. It may be a considered as mercury. *Rasaushadhis* include processed mercurial drugs *DhathuBhasma* (incinerated metals), certain poisonous plants [10]. Pharmaceutically *Rasaushadhis* may be classified as *Kharaliya Rasayana, Parpati Rasayana, Kupipakwa Rasayana*and *Pottali Rasayana*. Each dosage forms holds its uniqueness in therapeutic characteristics. The pharmacokinetic action of these Rasaushadhis with respect to modern perspective is less known. The chemical changes in the prepared formulations relating to parent drugs could be assessed by different techniques like XRD, XRF, AAS, and ICP etc which enable the identification of elements which is present in the formulation qualitatively and sometimes quantitatively. NPST (Namburi phase spot test) is one among analytical technique which gives qualitative results of metal content in a Bhasma.

REVIEW OF LITERATURE

Pottali Rasayana embraces its uniqueness on account ofitscompact size, easy administration, therapeutic potency. The term *Pottali* implies *samsleshana* 'adhered 'or glued. In the classical works of *Rasashastra*, formulations prepared through three pharmaceutical methods were included under the term *Pottali*. One which is prepared by boiling in molten *Gandhaka*(Sulphur) until it reaches a compact form (eg; *Talagarbha Pottali*) [3]. This may be termed as *Gandhaka Dravapaka Pottali*. *Pottali*can also be prepared by packing the drugs inside a *Varatika*(Sea shell) or *Shankha*(Conch shell) and subjected to incineration *(eg: Lokanatha Rasa)* [5].This may be termed as *VaratikaGarbhaPottali* or *Shankha GarbhaPottali.Pottali*can also be prepared by simply grinding the prescribed drugs in a recommended medium till the compound attains a fine powder state (*eg: HamsaPottali*) [4]. The latter two are powder

forms. In *Varatikagarbha Pottali*, the medicinal drug is packed in *Varatika* sealed with suitable agents like *Tankana* (Borax)[9]. This is dried and subjected to incineration. *Varatika*, which is marine origin, is calcium carbonate compound. On *Bhasmeekarana* (incineration), the obtained product should therefore be a calcium compound. Different references of *Varatika Garbha Pottali* are found in *Sarangadhara Samhita*, *Rasayoga Sagara*, namely *MrigangaPottali, Ratnagarbha Pottali, Hiranyagarbha Pottali, Hemagarbha Pottali*.In *Lokanatha rasa, Kajjali* prepared of varied proportions of *Parada* (Mercury) and *Gandhaka* (Sulphur)is the packed material. This may be considered as *Ksharabandha*, where Parada is binded with alkaline substances. In fact,*bandana* is a processing method of converting *Parada* (Mercury) into a therapeutically active compound. *Ksharabandha* enables the mercurial compound to be useful in conditions like *shoola*(correlated to acid peptic disease). Thus, the final product *Lokanatha rasa* is expected to be compound of calcium and mercury

NPST method is adopted for the qualitative assessment of metal present in *bhasma*of various rasa *dravya*. The principle of NPST is truly the chemical reaction of metal fraction present in the compound on the promptly made reacting papers. The reaction is presented as spot and further the assessment is made based on the colour change in all the possible areas of spots with respect to time. This time gap is divided as phases which include immediate 5 minutes after the contact of sample solution with the reacting papers. This is followed by observation on changes in the reacting papers after 20 minutes [11].

MATERIAL AND METHODS

The present study includes pharmaceutical preparation of *LokanathaRasa* and its NPST analysis to analysis and to confirm the presence of corresponding metals in the product. The study is also meant to give an ample proof regarding the use of this analytical technique in determining the metallic constituents of various *bhasmas* which may have undergone various chemical changes with respect to the parent drug.

Preparation of *Lokanatha Rasa [6]*

The reference of present formulation is taken from *RasayogaSagara*, with a slight modification.

Table- 01

Drug	Quantity
Parada(Mercury)	1 part
Gandhaka(Sulphur	1 part
Varatika(sea shell)	Q.S.
Tankana(Borax)	Q.S.

Sodhana of *Parada*and *Gandhaka [8]*

Parada- Ashtasamskarita Parada was taken for the present preparation. *Ashtasamskara* is a special processing method of *Parada*. Here *Parada* is subjected to techniques like *Swedana* (Sudation), *Mardana* (Grinding), *Patana* (Sublimation),*Stapana* (Stagnation). *Ashtasamskara* enables *Parada* to have an integrated therapeutic activity. *Gandhaka*was done *sodhana* (Therapeutic optimisation) using milk as the medium.

Preparation of *Kajjali [7]*

Parada and *Gandhaka* was grinded together in a stone mortar till it became a black collyrium like product which is *Kajjali. 'Kajjali'* is considered as a partially stable compound of *Parada* and*Gandhaka*, which is included as *Kajjalibandha* by *Acharya Vagbhata* in *Rasaratnasamuccaya. Kajjali* may also be considered as *Krishna* (Black) *Bhasma* of *Parada*. It may be anticipated as Black sulphide of mercury. The optimum features of *Kajjali*are*(Nischandratha)* lack of shining (which indicate free mercury particle), *Rekhapurnata*(Capability to enter the furrows of fingers indicating its fine size). *Varitaratwa*(capability of floating in water- indicating its lightness to be acted upon by the surface of water).

Sodhana of *Varatika [9]*

Varatika which is calcium carbonate of marine origin. Ideal *Varatika* should be selected for therapeutic purpose. This includes, yellowish nodule on the dorsal surface, long teeth on the ventral side. The surface of *varatika* is smooth and shiny. As a procedure *of sodhana, varatika* is subjected to *swedana* (sudation) in *dolayantra*. The medium used for *sodhana* was *AmlaKanjika* (Sour rice gruel). Time period of *swedana* was 1 *yama*(app 3 hrs).After*sodhana*, the smooth and shiny surface of *Varatika* becomes rough and corroded by the action of acidic gruel.

Packing *Kajjali* in *Varatika [5]*

Unike the reference of *lokanatha rasa* explained in *Sarangadharasamhita* where the proportion of *kajjaliatoVaratika* is, the quantity of *Kajjali* to be packed in not mentioned in the present formulation. On an attempt of filling *Kajjali*, nearly one-gram*kajjali* was filled in each *Varatika*. After filling *Kajjali,* the

mouth of each *Varatika* was sealed using *Tankana* prepared as paste with milk. *Varatika* was then left undisturbed in shade till *tankana* was entirely dried.

Putapaka [4]

For the purpose of *Putapaka* (incineration), 2 earthern plates were taken. *Varatika* was filled in one of the earthern plate. This was closed with another plate and sealed with 7 layers of mud smeared cloth. The entire structure is again kept in shade for proper drying of mud smeared cloth. For the purpose of incineration, electrical muffle furnace was opted. The sealed earthern plates containing *varatika* was kept in muffle furnace, at a temperature of 650 degree Celsius for a period of 6 hours. This process was repeated twice after finding that the initial put was insufficient to incinerate the *varatika*. After *Swangaseeta* (Self cooling), the seal was broken and *varatika* was collected, grinded in a mortar till it became a very fine white powder. This was stored in a clean dry air tight container.

NPST ANALYSIS [5]

For performing of NPST, the manual was followed

Step 1

Preparation of Reacting papers

Keeping the manual as the reference, special reacting papers should be prepared for detecting corresponding metal. In *Lokanatharasa,* the resultant metal to be detected is Mercury and calcium. Reacting paper for mercury is prepared out of Whatman filter paper treated and dried with 5%Potassium ferrocyanide solution. Another set of reacting papers prepared using Whatman filter paper treated with 10% Potassium iodide is also essential. For detecting Calcium compounds in *Lokanatha rasa*, filter paper prepared out of*Haridra* (Turmeric) is vital.*Haridra* reacting papers are prepared by dipping Whatman filter paper in an alcoholic solution turmeric.

Fig-1 Methanol and Haridra

Fig-2 Haridara extract & whatman filter paper

Fig- 3 Haridra Extract Paper

Step 2

a. Preparation of Solution for detecting Mercuryin test sample: -

- **Quantities of sample** – 250 mg (each)
- **Reagents-** 5N HNO3,Distilled water each 0.5ml
- **Time allowed to react** – 48 hrs.

250mg of each sample were taken into test tubes and added with reagent 0.5 ml 5N HNO3.Test tubes were shaken and kept undisturbed for 48 hours to react with the reagents. Same procedure was conducted with reagent 0.5ml of 20% HCl and 0.5ml of Distilled water. After 48 hrs, prepared solution was introduced on 10% Potassium Iodide paper and 5% Potassium Ferro cyanide paper with the help of dropper observed. Changes in colour of reacting papers was observed in three intervals of time. First phase was at 0- 5 min. Second phase was between 5min - 20min, third phase was at 20 min – 24 hrs.

b. Preparation of Solution for detecting calcium in test sample: -

- **Quantities of sample** – 250 mg (each)
- **Reagents-** 5N HNO3,Distilled water each 0.5ml
- **Time allowed to react** – 10 mints.

250mg of each sample were taken into test tubes and added with reagent 0.5 ml 5N HNO3.Test tube with the solution is heated using spirit lamp till the base of test tube appears red in colour. This was kept undisturbed for 10 mints to react with the reagents. Same procedure was conducted with reagent in 0.5ml of Distilled water. After 10 minutes, prepared solution was introduced on 10% Potassium Iodide paper and 5% Potassium Ferro cyanide paper with the help of dropper. Changes in colour of reacting papers was observed in three intervals of time. First phase was at 0- 5 min. Second phase was between 5min - 20min, third phase was at 20 min – 24 hrs.

RESULTS

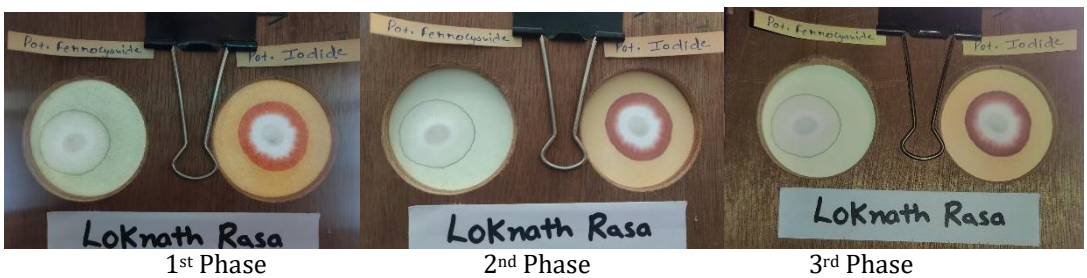
Mercury Compound

Table-02**NPST analysis were carried out on *Loknatha Rasa* with 5% of Pot. Ferrocyanide Paper**

Phases	**Sample 1 (LR + 5N HNO3)**	**Sample 2 (LR + Distilled water)**
1st Phase	A dark grey spot formed immediately and white margin encircled the entire spot with dark green ring periphery	No spot was formed at centre and light green periphery with yellow spikes inward.
2nd Phase	No change	At centre white colour filled with light green or light yellowish ring at periphery.
3rd Phase	No change	No change

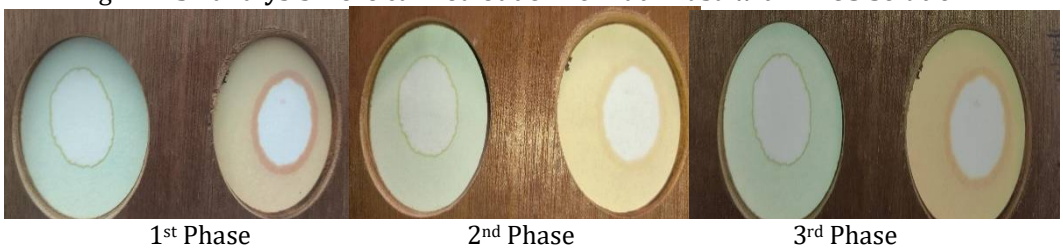
Table- 03: **NPST analysis were carried out on *Loknatha Rasa* with 10% of Pot. Iodide Paper**

Phases	**Sample 1 (LR + 5N HNO3)**	**Sample 2 (LR + Distilled water)**
1st Phase	A grey spot formed immediately and white spikes margin encircled the entire spot with light brown ring periphery	No spot was formed at centre and light brown periphery margin.
2nd Phase	Grey spot in centre and light grey encircled the entire spot with American browncolour periphery.	At centre white colour filled with dark yellow ring at periphery. Light Yellow colour ring was formed at inner surface of outer ring
3rd Phase	Light Brown spot in centre with dark brown periphery ring.	No change



1st Phase 2nd Phase 3rd Phase

Fig- 4**NPST analysis were carried out on *Loknath Rasa with HNO3 Solution***



1st Phase 2nd Phase 3rd Phase

Fig- 5 **NPST analysis were carried out on *Loknath Rasa with Distilled water***

Calcium Compound

Table- 04**NPST analysis were carried out on *Loknatha Rasa* with*Haridra* Extract Paper**

Phases	**Sample 1 (LR + Distilled water)**
1st Phase	A deep purple spot was formed at centre with purple colour periphery margin with sharp spikes.
2nd Phase	Deep purple spot present at centre with light purple colour periphery margin with sharp spikes.
3rd Phase	No change

1st Phase 2nd Phase 3rd Phase

Fig- 6 **NPST analysis were carried out on *Loknatha Rasa* with*Haridra* Extract Paper**

DISCUSSION

Lokanatha rasa is a formulation which include *Kajjali* and *Varatika*. Hence it may be counted in *Ksharabandha* which is specially advised in GIT disorders like Parinamasula (Acid peptic disease). *Bandha* which is helpful in converting the moderately bonded black mercuric sulphide (beta cinnabar) [2]into a suitable dosage form may thus be converted into *Sweta Varna Bhasma* (White color powder). It is to be assumed that the free mercury must undergo certain oxidation process with the aid of Calcium compounds. The results in NPST carried out in the present study showed similar presentations in the reacting papers. Brown colour in the reacting papers followed by sequential changes gives sufficient evidence that transformation of mercury in the form of β Hg S which is moderately safe to a safe mercurial preparation through suitable *bandha.*

In the earlier classical texts like *Rasa RatnaSamuccaya, Rasarṇavam, Rasahdaya- Tantram*and *RasendraCintamani* a group like *Sudhavarga* does not appear. But in a later text namely *'Rasamṛtam'* written by *Vaidya JadavajiTrikamjiAcarya*which is widely followed this group was introduced bringing together various *Bhasma*of which calcium salts constitute major component. The raw material of each of the *Sudhavargabhasma* is drawn from one of the three different specific sources as follows:

1. *Samudraja* (Marine origin)
2. *Jantuja*(Animal origin)
3. *Niksepaja* (Mines-ores).

Varitika (Cowrie shell) comes under *Samudraraja* (Marine origin). When these shells are made into *bhasma* they are chemically identified as oxides and carbonates of Calcium as the case may be. Once shells, corals, and pearls have been transformed into *bhasma*, a simple chemical study cannot identify which *bhasma* was made from which of the three materials.

In the context of this new technique (N.P.S.T.) and methodology evolved to identify *Bhasma* of *Sudhavarga*, with minute differences in overall chemical reactions, it has become necessary to study the organoleptic properties of these *Bhasma* in comparison with the organoleptic properties of standard as mention in CCRAS NPST Book.

When *Varātika* in *bhasma* form -1st phase was a deep purple solid spot forms followed by a more deep purple margin by the end of 1st phase. In this spot no wet periphery forms.

Therefore some relative standards of these *Bhasma* are to be laid down particularly with reference to their solubility, Settling time and time taken for fading away of the spots.

1. Solubility: The amount of distilled water adsorbed by the known quantity of *bhasma* is termed as 'Normal Quantity'. So also when any *Bhasma* of Sudhavarga possessing same weight as that of bhasma adsorbs same amount of distilled water as above is termed as "Normal".

2. Settling Time: The time taken by the contents *bhasma* of the test tube to settle down after shaking with distilled water is termed as 'Normal Settling Time'. Similarly when any *Bhasma* of *Sudhavarga* possessing same weight as that of *bhasma* takes the same time to settle down is termed as "Normal Settling Time".
3. Fading Away Time: The time taken by a spot of standard *bhasma* to fade away on *Haridra* paper is termed as 'Rapid'. Thus the fading away of spots of various *Bhasma* of *Sudhavarga* are described as 'Slow' and 'Very Slow' as the case may be when compared with the fading away time for standard *bhasma*.

There are some identification of *Bhasma* WSR to *Varitaka*containing *Bhasma*

a) Smell: - On heating the sample in a micro test tube till the bottom of test tube become red hot was Nil
b) Clarity: - Time taken by solution to become clear or to allow the sediment to settle down was taken 5 mints.
c) Colour: - Colour of the solution was Colourless.

Sometimes, it is claimed that *dhatus* (metals) subjected to *Marana* (calcination) in association with *Parada* (Mercury or any one of its compounds) are superior in action than with *Mulika*(herbs). These two sets of preparations are in vogue and on sale. It is therefore imperative that these two sets of preparations should be specifically identified by a suitable method.

It is to be noted that when *Parada* (Mercury or any one of its compounds) are taken along with Primary *Dhatu* (metal) for its *Marana* (Calcination), the *Parada* (Mercury) or one of its compounds taken at the time of *Marana* is not found in physical form after the completion of *Marana*.

Though three tests are given in *Rasashastra* to confirm whether the prepared *Bhasma* possess such qualities as *Rekhapurita* (indicating standard of fineness), Varitara (indicating a standard of lightness) and *Apunarbhava* (irriversibility to its original *dhatu*-metallic state), they are inadequate to differentiate genuine *Bhasma* from spurious ones. In apunarbhava test a bhasma should not revert to its original *dhatu*state (metallic state) if it is a genuine *bhasma*. But when *bhasma* cannot be reverted to its original *dhatu*, how *bhasma* can be identified correctly? So this test is only useful to confirm the already known *Bhasma* whether it is genuine one. This test is not helpful to identify the unknown Bhasma.) The remaining two tests or standards viz., *Rekhapurita* and *Varitara*can be manoeuvred even in the case of spurious *Bhasma*, none of these tests helps in identifying any coded *Bhasma* or *Sindoor*. Therefore these three standards are to be considered only for quality standardisation of already known *Bhasma.* Quality standardisation means more in *Rasa shastra*in the context of standardisation of *Bhasma* and *Sindura* than what is understood in chemistry which is being discussed in the foregoing pages.

CONCLUSION

The chemical reactions seen in NPST of *Lokanatha Rasa* was similar to the observations described in the manual. *Lokanatha Rasa,* is a compound preparation of elements mercury, sulphur and calcium. NPST is used to detect the presence of metal. Application of NPST in the final compound helps to endorse the presence of parent metallic in turn elements which may be in a transformed form. The method of presentation is unique for each metal element which is obtainable through the reacting papers in different phases of test. The reacting papers act as presenting media in NPST. In fact the elements in the compound react with the agents in the reacting paper to present the characteristics in different phases.

REFERENCES

1. H, D. N. (1970). Application of standardized Namburi Phased Spot Test. 57.
2. Hariprapannaji. (2012). *Rasayogasagara-volume II.* Varanasi,: Chowkhamba Krishnadas Academy.
3. Hariprapannaji. (1972). Rasayogasagara Volume II. *Chowkhamba Krishnadas Academy* , 1284-1287: 300.
4. Jha, P. C. (2006). Sharangadhara Samhita. *Chaukhamba, Varanasi* , 266.
5. Jha, P. C. (2006). Sharangadhara Samhita. *Chaukhamba, Varanasi* , 267.
6. Kulkarni, A. D. (2018). Rasa Ratana Sammuchaya.
7. Sharma, D. (1962). *Rasa Ratna Sammuchaya.* Varanasi: Surbharati Prakashan.
8. Sharma, D. (1962). *Rasaratna sammuchaya, (ed)II* . Varanasi: Surbharati Prakashan edition.
9. Sharma, J. (2022). A Critical Review on Namburi Phase Spot Test. *International Journal for Research Trends and Innovation* , Volume 7, Issue 12 .
10. Sharma, S. (2016). Rasa Tirangini. 278.
11. Sharma, S. (2012). Rasa Tirangini-12. *edition 11* , 300.

CITATION OF THIS ARTICLE

Jyoti Sharma, Ebin T.U ,Anitha H . Quality Assessment of the Loknath Rasa through Namburi Phase Spot Test. Bull. Env. Pharmacol. Life Sci., Vol 12[6] June 2023: 25-30.