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Pharmaceutico-Analytical Study of Rajata Bhasma: An Ayurvedic and Modern Perspective

Dr. Jija Ashok Lade[1], Dr. Ravi R Chavan[2], Dr. Lalitha[3]
[1]*Final year PG Scholar, Department of Rasashastra and Bhaishajya kalpana, TGAMC, Ballari, RGUHS Karnataka*
[2]*Head and Proff, Department of Rasashastra and Bhaishajya kalpana , TGAMC, Ballari, RGUHS Karnataka*
[3]*Assistant Proff Department of Rasashastra and Bhaishajya kalpana, TGAMC, Ballari, RGUHS Karnataka*

Abstract: ***Background: Rajata Bhasma is an important Ayurvedic metallic preparation made from Rajata, Parada, Gandhaka, and Haratala, processed with Nimbu Swarasa and subjected to Laghu Puta. It is attributed with properties such as Hridya, Balya, Rasayana, and Ojovardhaka.***
Objective: To prepare Rajata Bhasma as per classical methods and evaluate its pharmaceutico-analytical characteristics.
Methodology: Parada was extracted from Hingula by Urdhwa Patana method. Rajata underwent Samanya and Vishesha Shodhana, while Gandhaka and Haratala were purified using standard classical procedures. Rajata Bhasma was prepared through Bhavana with Nimbu Swarasa, Chakrika formation, and repeated Laghu Puta until attainment of Bhasma Siddhi Lakshanas.Analytical evaluation included physical and chemical analysis of Ashodhita Rajata, Shodhita Rajata, and Rajata Bhasma. Advanced instrumental analyses such as X-ray diffraction (XRD), scanning electron microscopy with energy dispersive X-ray analysis (SEM-EDAX), and Fourier transform infrared spectroscopy (FTIR) were carried out.
Results: XRD analysis showed transformation from crystalline elemental silver to predominantly Ag_2O with reduced crystallinity in the final product. SEM-EDAX revealed reduction in silver content along with the presence of sulphur and oxygen. FTIR analysis indicated the presence of functional groups such as phenols, amines, aromatics, and carboxylic acids, suggesting incorporation of herbal constituents during processing. The mean particle size of Rajata Bhasma was found to be 433 nm, indicating nanoscale reduction.
Conclusion: Rajata Bhasma prepared as per classical methods shows significant physicochemical transformation, reduction in particle size, and incorporation of herbal functional groups. These changes may enhance its bioavailability and therapeutic potential.
Keywords: Rajata Bhasma; Pharmaceutico-analytical study; Shodhana; Marana; XRD; SEM-EDAX; FTIR; nanoparticle.

I. INTRODUCTION

Ayurveda is a scientific discipline that focuses on the therapeutic applications of metals, minerals, and plant-based preparations to treat various conditions. One such application in Ayurveda is the use of Bhasma, which are herbo-metallic ashes that contain organometallic complexes formed by calcinating the metal along with herb-mineral ingredients. The correct calcination process should result in the formation of Bhasma that does not contain free metal or free organic constituents. Bhasma can be prepared using four distinct media, with the highest quality achieved through the utilization of Parad (mercury) and its compounds, followed by prepared solely using herbal media.When it is prepared by using gandhaka the quality of Bhasma diminishes. It is inadvisable to employ Ari-lauha (enemy metal metal, which destroys the metallic nature of other metals) in the preparation of metal Bhasma, as they may produce deleterious effects rather than therapeutic benefits.

Among various formulations, *Bhasma Kalpana* holds a unique position due to its organometallic nature, enhanced bioavailability, and therapeutic efficacy. Bhasmas are considered highly potent and are widely utilized in clinical practice owing to their ability to act in small doses with significant therapeutic effects.

Rajata (silver), a noble metal, is extensively described in classical Rasashastra texts. *Rajata Bhasma* is an important herbo-mineral preparation used in various formulations. Classical texts describe its properties as *Kashaya-Amla Rasa*, *Snigdha Guna*, *Sheeta Veerya*, and *Madhura Vipaka*, with *Vata-Kapha hara* action. It is also attributed with *Balya*, *Rasayana*, *Ayushya*, and *Ojovardhaka* properties, indicating its rejuvenative and strengthening potential.

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The preparation of Rajata Bhasma involves a series of meticulous pharmaceutical procedures, including *Shodhana* (purification) and *Marana* (incineration), which are essential to convert raw metal into a safe and therapeutically effective form. These processes not only detoxify the material but also bring about significant physicochemical transformations.

In the present era, the standardization and scientific validation of Ayurvedic formulations have become essential. Modern analytical techniques such as X-ray diffraction (XRD), scanning electron microscopy with energy dispersive X-ray analysis (SEM-EDAX), Fourier transform infrared spectroscopy (FTIR), and particle size analysis play a crucial role in understanding the structural, compositional, and morphological characteristics of Bhasma.

Pharmaceutico-analytical evaluation helps to establish quality, safety, and efficacy by correlating classical parameters with modern scientific findings. Such studies are essential to validate traditional knowledge and ensure reproducibility and standardization of formulations.

II. MATERIALS AND METHODS

A. *Collection and Authentication of Raw Drugs*

The raw materials required for the study were procured from reliable sources and selected based on the *Grahya Lakshanas* described in classical *Rasashastra* texts to ensure their authenticity and quality. Rajata (silver), characterized by its shiny appearance, malleability, and ductility, was procured from Siddhanath Jewellery, Koppal (24 carat). Hingula, identified by its dark red color, heaviness, and presence of silvery-white shining streaks, was obtained from Bharath Raw Drug Supplier, Mumbai. Gandhaka, which is yellow, crystalline, smooth, and possesses a characteristic sulphur odor, and Haratala, which is yellow, shiny with a rough surface and typical arsenic odor, were procured from Vaidika Mart, Ballari.

In addition to the major raw drugs, several associated materials were used during pharmaceutical processing. Tila Taila, Haridra, Nimbu Swarasa, Kushmanda Swarasa, Godugdha and Goghrita were procured from local market .Kanji was prepared in the Rasashastra Department following standard classical procedures. Takra was also prepared in the department as per the reference of *Bhavaprakasha*. Kulattha Kwatha was freshly prepared in the department and utilized for the required pharmaceutical procedures.

B. *Instruments and Equipment*

The pharmaceutical procedures were carried out using classical and modern instruments. The major instruments included Tula Yantra, Khalwa Yantra, Urdhwa Patana Yantra, Kurma Puta, and Laghu Puta. Temperature monitoring during the Puta process was achieved using a thermocouple with a digital pyrometer. Various metallic and earthen vessels were used for processing.

In addition, several auxiliary instruments and materials were employed, including earthen pots (Sharava), gas stove, Kora cloth, knife, spoon, and other utensils. Cow dung cakes were used as fuel for the Puta process, along with Multani Mitti for sealing purposes. Other supporting materials included matchsticks, thread, glass beakers, funnels, and scissors.

III. PHARMACEUTICAL STUDY

A. *Rajata Shodhana*

Purification of Silver was done by Nirvapa (quenching) method. Thin silver foils were heated to red hot stage and subsequently immersed 7 times in Tila Taila, Takra, Gomutra, Kanji, and Kulattha Kwatha (decoction of Dolichos biflorus Linn.) consecutively for Samanya Shodhana (Simple Purification). Similarly seven times quenching was done in Nimbu Swarasa for Vishesha Shodhana (Special Purification).

Table No: 1 Showing observations made during Samanya and vishesha Shodhana:

SLNO	Name of media	Total quantity of media(L)	Initial wt (gm) of Rajata patra	Final wt (gm) of Rajata patra	Loss in (gm)
1	Tila taila	3.5	150	148	2
2	Takra	3.5	148	147	1
3	Gomutra	3.5	147	146.5	0.5
4	Kanji	3.5	146.5	146.5	0
5	Kulattha kwatha	3.5	146.5	146.5	0
6	Nimbu swarasa	3.5	146.5	146	0.5

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B. Extraction and Purification of Parada

Hingulottha Parada was extracted by the *Urdhwa Patana Yantra* method using 270 g of Nimbu Swarasa Bhavita Hingula. The processed Hingula was uniformly spread in the lower pot, and proper *Sandhi Bandhana* was performed using cloth smeared with Multani Mitti. The setup was subjected to *Kramagni* heating for 12 hours (Mandagni – 4 hours, Madhyamagni – 5 hours, and Tivragni – 3 hours) with continuous cooling of the upper pot. After self-cooling, the apparatus was dismantled, and sublimated Parada was collected from the upper pot.

A total of 175 g of Parada was obtained from 270 g of Hingula, yielding 64.81%. The collected Parada appeared bright, shining, and silvery in color, with no unburnt Hingula observed.

Further purification of Parada was carried out by *Mardana* with Haridra Churna. Hingulottha Parada (175 g) was triturated with 11 g of Haridra Churna for 8 days, followed by filtration through double-layered cloth. The final yield of Shuddha Parada was 170 g, with a yield of 97.06%. The purified Parada was bright, silvery, and free-flowing.

C. Shodhana of Gandhaka (Kurma Puta Method)

Gandhaka Shodhana was carried out using the *Kurma Puta* method. A total of 500 g of Ashuddha Gandhaka was purified using 1.5 L of Godugdha. An earthen pot smeared with Goghrita was filled with milk and covered with Kora cloth. Powdered Gandhaka was spread uniformly over the cloth and covered with a Loha Sharava. The setup was subjected to heating using 11 cow dung cakes. After *Swanga Sheeta*, the apparatus was dismantled, and Shodhita Gandhaka settled at the bottom was collected, washed with hot water, and shade-dried. The process resulted in removal of physical impurities such as dirt and stones. The purified Gandhaka was bright yellow, shiny, and predominantly granular in form. A total of 475 g of Shodhita Gandhaka was obtained from 500 g of raw Gandhaka, indicating minimal loss.

D. Shodhana of Haratala (Dolayantra Method)

Haratala Shodhana was performed using the *Dolayantra* method with Kushmanda Swarasa as the medium. Fresh Kushmanda fruits (8 kg) were processed to obtain 5 L of Swarasa. A total of 500 g of Ashuddha Haratala was tied in a four-layered Kora cloth to form a *Pottali* and suspended in the Swarasa. The setup was subjected to *Mridu Agni* for 3 hours.

After completion of *Swedana* and subsequent cooling, the Pottali was removed, and the purified Haratala was washed with hot water and shade-dried. During the process, changes such as formation of greenish froth, reduction in luster, and deposition of blackish-brown material on the Pottali were observed.

A final yield of 495 g of Shodhita Haratala was obtained from 500 g of raw material, indicating minimal loss.

E. Preparation of Rajata Pishti

Rajata Pishti was prepared by triturating equal quantities of Shodhita Rajata Patra (50 g) and Shuddha Parada (50 g) in a Khalva Yantra. The mixture was subjected to continuous *Mardana* for approximately 4 hours until a homogeneous dark grey mass was formed, indicating proper amalgamation. The obtained Pishti was then subjected to *Bhavana* with Nimbu Swarasa (60 ml) for 12 hours, followed by washing with normal water and drying. During trituration, gradual mixing of Parada with Rajata was observed, leading to reduction in particle size and formation of a smooth, steel-grey to cement-grey mass with reduced metallic lustre. A final yield of 99.5 g of Rajata Pishti was obtained, indicating minimal loss.

F. Preparation of Rajata Bhasma (Marana Process)

Rajata Marana was carried out by subjecting Rajata Pishti to repeated *Laghu Puta* after proper trituration with Shodhita Gandhaka, Shodhita Haratala, and Nimbu Swarasa. Initially, Rajata Pishti (99.5 g) was mixed with equal quantities of Gandhaka and Haratala (50 g each) and triturated thoroughly, followed by Bhavana with Nimbu Swarasa. Upon attainment of *Subhavita Lakshana*, Chakrikas were prepared, dried, and enclosed in *Sharava Samputa* with proper *Sandhi Bandhana*. The setup was subjected to *Laghu Puta* using cow dung cakes, and temperature was monitored using a thermocouple.

In the first Puta, a maximum temperature of 405°C was recorded, and 180 g of intermediate product was obtained. Subsequent Puta processes (2nd and 3rd) were carried out following the same procedure, with gradual physicochemical changes observed, including reduction in metallic luster, development of characteristic color changes (brick red to reddish brown), and improvement in classical Bhasma parameters. The temperature range increased in later Puta, reaching up to 650°C. After the 4th Puta, Rajata Bhasma exhibited classical *Bhasma Siddhi Lakshanas* such as *Rekhapurnatva*, *Varitara*, and *Unama*. The final product was soft, fine, reddish-brown, and odorless, indicating proper incineration. The final yield obtained was approximately 80 g.

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Table. No.: 2 showing results of ancient parameters of rajata Bhasma 1st and 4th puta

Parameters	1st Puta	2nd Puta	3rd Puta	4th Puta
Colour	Dark brown	Brick red colour	Reddish brown	Reddish brown
Taste	Metallic	Slightly metallic	Tasteless	Tasteless
Odour	Sulphur and arsenic	Sulphur and arsenic	Odourless	Odourless
Touch	Soft	Soft	Soft	Soft
Appearance	Powder	Powder	Powder	Powder
Rekhapurnatva	Negative	Negative	Positive	Positive
Varitara	Negative	Negative	Positive	Positive
Unama	—	—	Positive	Positive
Apunarbhava	—	—	Positive	Positive
Niruttha	—	—	Negative	Positive

IV. ANALYTICAL STUDY

In the present study, three samples—Ashodhita Rajata (A.R), Shodhita Rajata (S.R), and Rajata Bhasma (R.B)—were analyzed to evaluate their physico-chemical properties, qualitative and quantitative characteristics, and particle size. The study employed both classical Ayurvedic parameters and modern analytical techniques. Organoleptic and physical evaluations were carried out at the P.G. Department of Rasashastra, T.G.A.M.C, Bellary, and Quality Control Laboratories, SDM College, Udupi. Chemical analyses including X-ray diffraction (XRD), Energy Dispersive X-ray analysis (EDX), particle size analysis using Zeta PALS, and Fourier Transform Infrared Spectroscopy (FTIR) were performed at the Indian Institute of Science (IISc), Bangalore. Classical parameters for Rajata Bhasma were also assessed at the Rasashastra department, TGAMC, Bellary.

Table no.03 Showing classical parameters for Analysis of Rajata Bhasma.

SI no	PARAMETERS	Rajata Bhasma
1	Varna	Brick red colour
2	Sparsha	Smooth ,fine
3	Gandha	Nirgandha
4	Varitaratva	Positive
5	Rekhapoornatva	Positive
6	Unnama	Positive
7	Gatarasatva	Positive
8	Niruttha	Positive
9	Nischandrata	Positive
10	Apunarbhava	Positive

A. Modern Test

Table No.04 Showing Result Of Organoleptic Character Of Rajata Bhasma

Organoleptic Character	Rajata Bhasma
Colour	Brown
Odour	Odourless
Taste	Tasteless
Touch	Amorphous

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Table no:05 Showing Result Of Physical Test Of Rajata Bhasma

Contents	Rajata Bhasma
pH value	6.46
Total ash	90.20%
Acid insoluble ash	20.02%
Water soluble ash	7.02 %
Loss on drying	3.03%

B. Chemical test: X-Ray Diffraction

Table no. 06: Showing XRD results of *A.R:*

Compound Name	Chemical Formula	Crystal Structure
silver	Ag	Cubic (face centered)

Table no. 07: Showing XRD results of *S.R:*

Compound Name	Chemical Formula	Crystal Structure
Silver oxide	Ag2O	Cubic

Table no. 08: Showing XRD results of Rajata Bhasma:

Compound Name	Chemical Formula	Crystal Structure
Silver oxide	Ag2O	(cubic cuprite-type)
Acanthite(minor)	Ag2S	orthorombic

Table No.09: showing EDX of A.R

Element	Weight %	Atomic %
C	0.00	0.00
O	0.00	0.00
Mg	0.00	0.00
Ag	99.17	96.21

Table No. 10: showing EDX of S.R

Element	Weight %	Atomic %
C	3.40	18.13
O	6.86	27.51
Mg	0.49	1.29
Ag	89.25	53.06

Table No. 11: showing EDX of R. B

Element	Weight %	Atomic %
C	3.01	14.40
O	7.73	27.77
Si	2.56	5.24
S	11.51	20.63
As	3.02	2.32
Ag	55.65	29.65

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Table no:12 showing the result of mean particle size of R.B

Name of the sample	Mean particle size
Rajata Bhasma	433 nm

FTIR analysis of Ashodhita Rajata (A.R) showed mainly O–H and H–O–H vibrations, indicating the presence of adsorbed moisture with minimal impurities. Shodhita Rajata (S.R) exhibited additional peaks corresponding to C–H, C≡C/C≡N, C=C/C=O, and C–O/Si–O groups, suggesting the presence of residual organic materials and minor silicate contamination after purification. In contrast, Rajata Bhasma (R.B) displayed a wider range of functional groups including O–H/N–H, C–H, C≡N, C–O, Si–O, and metal–oxygen bonds, indicating the formation of complex organo-metallic compounds and silver oxide during the incineration process.

V. DISCUSSION

A. On Pharmaceutical study

1) Selection and Shodhana of Materials

Hingulottha Parada was selected due to its natural association with Gandhaka, which stabilizes mercury and enhances its safety and therapeutic efficacy. Mardana with Nimbu Swarasa aids in particle size reduction and impurity removal through citric acid-mediated chelation, while Urdhwapatana facilitates purification by sublimation. Gandhaka Shodhana using Godugdha improves its purity and bioavailability, and Haratala Shodhana with Kushmanda Swarasa reduces toxicity through oxidation and chelation. Samanya and Vishesha Shodhana of Rajata using various media help eliminate impurities through their chemical actions, making the metal suitable for further pharmaceutical processing.

2) Pharmaceutical Processing and Marana

Nirvapa, involving repeated heating and quenching, weakens interatomic bonds, induces oxidation, and enhances brittleness of Rajata, facilitating its conversion. Preparation of Rajata Piṣṭi through amalgamation with Parada increases surface area and promotes uniformity.

Bhavana with Nimbu Swarasa further aids in disintegration and purification. During Marana, Parada acts as a catalytic agent, while Gandhaka and Haratala promote sulphide and oxide formation, reducing toxicity and stabilizing the compound. Sequential Puta processes result in gradual transformation into non-metallic, bioassimilable forms, as confirmed by classical Bhasma Siddhi Lakṣaṇas.

3) Effect on Particle Size

The pharmaceutical processes significantly influence particle size reduction. Repeated Mardana, Nirvapa, and Bhavana lead to mechanical disintegration and increased brittleness of the metal. Amalgamation with Parada enhances penetration and breakdown of particles, while repeated heating and quenching cycles create microfractures, resulting in finer particles. The final Rajata Bhasma exhibited a mean particle size in the nanometer range (433 nm), indicating effective conversion into a fine and uniform powder, which enhances surface area and bioavailability.

4) Effect on Physico-Chemical Parameters

The transformation from metallic Rajata to Bhasma leads to significant changes in physicochemical properties. Organoleptic characteristics shift to a fine, odourless, and tasteless reddish-brown powder. The pH remains near neutral, indicating mild nature and suitability for internal use. High total ash value reflects the inorganic nature of Bhasma, while acid-insoluble and water-soluble ash values indicate the presence of stable and bioavailable fractions. Advanced analytical studies (EDX and FTIR) confirm reduction in metallic silver content and formation of complex compounds such as oxides, sulphides, and organo-metallic structures, demonstrating successful pharmaceutical processing.

5) Final Product Characteristics

Laghu Puta ensures controlled and uniform heating, leading to complete incineration. The characteristic reddish-brown colour of Rajata Bhasma is attributed to the formation of silver oxides and related complexes during repeated heating and interaction with processing media, indicating successful preparation of a stable, non-toxic, and therapeutically potent formulation.

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B. On Analytical Study

1) Ancient (Classical) Parameters

Rajata Bhasma was observed as a reddish-brown, fine, tasteless, and odourless powder, fulfilling all classical Bhasma Parikṣha parameters.

It successfully passed Rekhapurṇata and Varitara tests, indicating fineness and lightness, while Unnama reflected proper surface characteristics.

The absence of metallic lustre (Nischandratva) and positive results for Apunarbhava and Niruttha confirmed complete incineration, chemical stability, and transformation into a safe, non-metallic form.

2) Physico-Chemical Parameters

The pH of Rajata Bhasma (6.46) indicates a near-neutral to slightly acidic nature, suitable for internal administration. A high total ash value (90.20%) reflects its predominantly inorganic composition. Acid-insoluble ash (20.02%) indicates proper conversion into stable, bioactive forms, while water-soluble ash (7.02%) suggests the presence of minor soluble inorganic components within acceptable limits. Loss on drying (3%) signifies low moisture content, contributing to better stability and shelf life.

3) Structural and Elemental Analysis

XRD analysis demonstrated a transformation from crystalline metallic silver in Ashodhita Rajata to silver oxide phases in Shodhita Rajata, and further to mixed silver oxide (Ag_2O) and silver sulphide (Ag_2S) phases in Rajata Bhasma, indicating oxidation and structural modification during Maraṇa.

The reduction in peak intensity in the final product suggests partial amorphous nature, correlating with Nischandratva. SEM-EDX analysis showed a gradual decrease in elemental silver (99.17% → 55.65%) along with the incorporation of elements like oxygen, sulphur, silicon, and arsenic, confirming the formation of complex inorganic and organo-metallic compounds and successful Bhasmikaraṇa.

4) Particle Size and Functional Group Analysis

Particle size analysis revealed a mean size of 433 nm, indicating submicron range particles formed due to repeated trituration and incineration, which enhances surface area and bioavailability. FTIR analysis showed the presence of O–H, C–H, C≡N, C–O, Si–O, and metal–oxygen bonds, indicating incorporation of organic residues, silicates, and oxide phases.

These findings confirm the transformation of metallic silver into a chemically stable, bioassimilable Bhasma with enhanced therapeutic potential.

VI. CONCLUSION

The present study highlights that Bhasma Kalpana is a unique pharmaceutical process in Rasashastra that transforms metals into safe, stable, and therapeutically potent forms with enhanced bioavailability. Rajata Bhasma was successfully prepared as per classical guidelines using purified Rajata, following systematic Shodhana and Marana procedures involving herbal and mineral media.

Shodhana through Nirvapa in various media and Vishesha Shodhana with Nimbu Swarasa effectively removed impurities and prepared the metal for further processing. Marana carried out with Parada, Gandhaka, and Haratala through four Laghu Putas resulted in the attainment of classical Bhasma Siddhi Lakṣaṇas, confirming complete transformation.

Analytical studies validated these findings, where XRD showed conversion from metallic silver to oxide and sulphide forms, and EDX confirmed reduction in elemental silver with incorporation of other elements. FTIR analysis indicated the presence of organic functional groups derived from processing media.

The mean particle size of 433 nm demonstrated formation of submicron particles, contributing to enhanced surface area, absorption, and therapeutic efficacy.

Overall, the study confirms the successful preparation of Rajata Bhasma with desired classical and modern analytical characteristics, ensuring its safety, stability, and potential clinical utility.

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ANNEXURE-1

Fig: 01



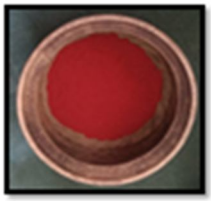
Raw hingula

Fig: 02



hingula spread at base of Nimbu swarasa

Fig: 03



hingula mardana with lower pot

Fig: 04



Urdhwapatana vidhi

Fig: 05



parada collected at base of Upper pot

Fig:06



parada shodhana with haridra

Fig:07



Shuddha parada

Fig: 08



Raw Gandhaka

Fig: 09



Godugdha for Gandhaka shodhana

Fig:10



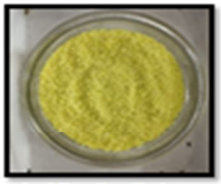
Gandhaka Placed in Kurma Puta

Fig: 11



Ignition

Fig:12



shuddha Gandhaka

Fig:13



Raw haratala

Fig:14



haratala swedana with kushmanda Swarasa

Fig:15



shuddha haratala

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Fig: 16



Raw silver

Fig: 17



Heating of rajata patra

Fig: 18



Nirvapa in Tila taila

Fig: 19



Nirvpa in Aranala

Fig: 20



Takra for nirvapa

Fig: 21



Fig: 22



Kulattha kwatha

Fig: 23



Nimbu swarasa

Fig: 24



Ashuddha Rajata patra

Fig: 25



After samanya shodhana

Fig: 26



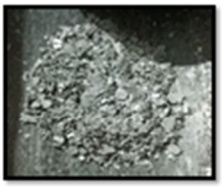
After vishesha shodhana

Fig: 27



Churnita rajata

Fig: 28



Rajata pishti

Fig: 29



After washing Rajata Pishati

Fig: 30



Added sh.Gandhaka &Haratala

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Fig: 31



Homogenous mixture

Fig: 32



Chakrika before 1st puta

Fig: 33



Sharava samputa

Fig: 34



Laghuputa

Fig: 35



Chakrika after 1st puta

Fig: 36



Rajata bhasma after 1st puta

Fig: 37



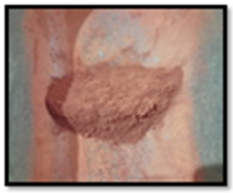
Chakrika before 2nd puta

Fig: 38



Chakrika after 2nd puta

Fig: 39



Rajata bhasma after2nd puta

Fig: 40



gandhaka & Haratala added

Fig: 41



Fig: 42



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Chakrika before 3rd puta

Fig: 43



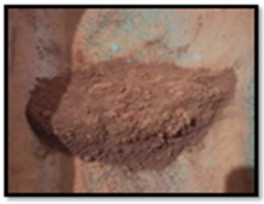
Chakrika aftr 3rd puta

Fig: 44



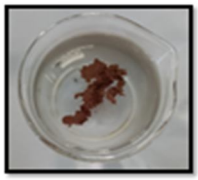
Chakrika before 4th puta

Fig: 45



Rajata bhasma after 4th puta

Fig: 46



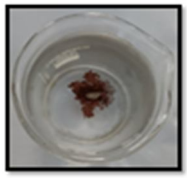
Varitara

Fig: 47



Rekhapurnata

Fig: 48



Unnama

Fig: 49



Mitrapanchaka

Fig: 50



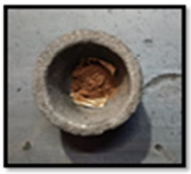
chakrika before Apunarbhava

Fig: 51



Chakrika before Apunarbhava

Fig: 52



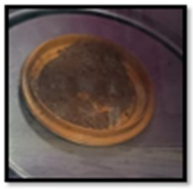
Mushu

Fig: 53



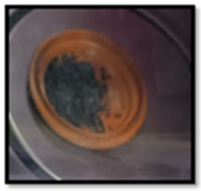
Red hot Mushu

Fig: 54



Rajata bhasma before mrutha

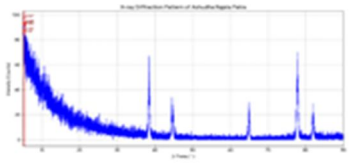
Fig: 55



Rajata bhasma after mrutha

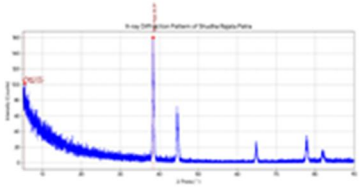
ANALYTICAL STUDY

Fig: 62



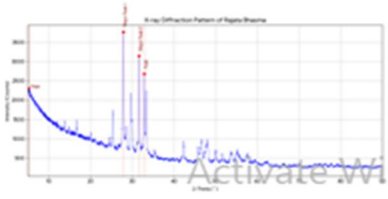
XRD of shuddha rajata

Fig: 63



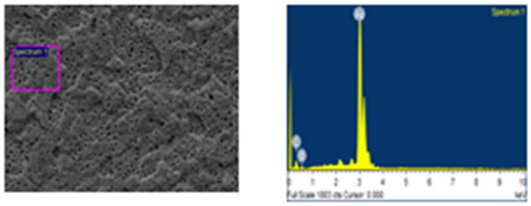
XRD of Ashuddha rajata

Fig: 64



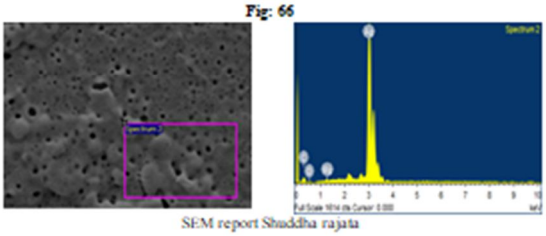
XRD of Rajata bhasma

Fig: 65



SEM report Ashuddha rajata

Fig: 66



SEM report Shuddha rajata

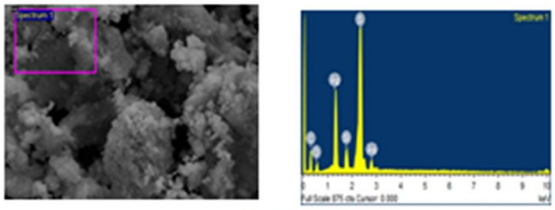
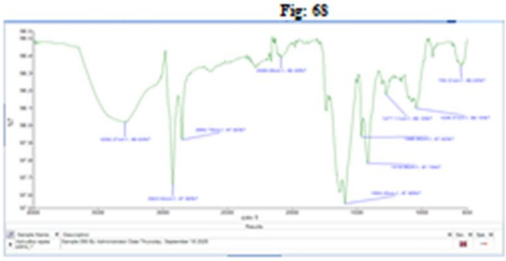


Fig: 67
SEM report Rajata Bhasma

Fig: 68



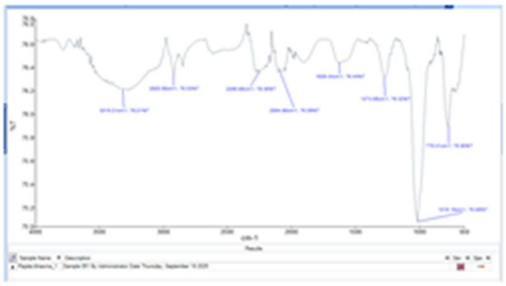
FTIR of Ashuddha rajata

Fig: 69



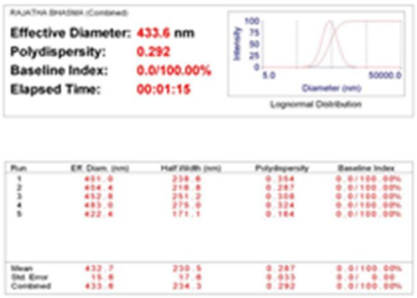
FTIR of shuddha rajata

Fig: 70



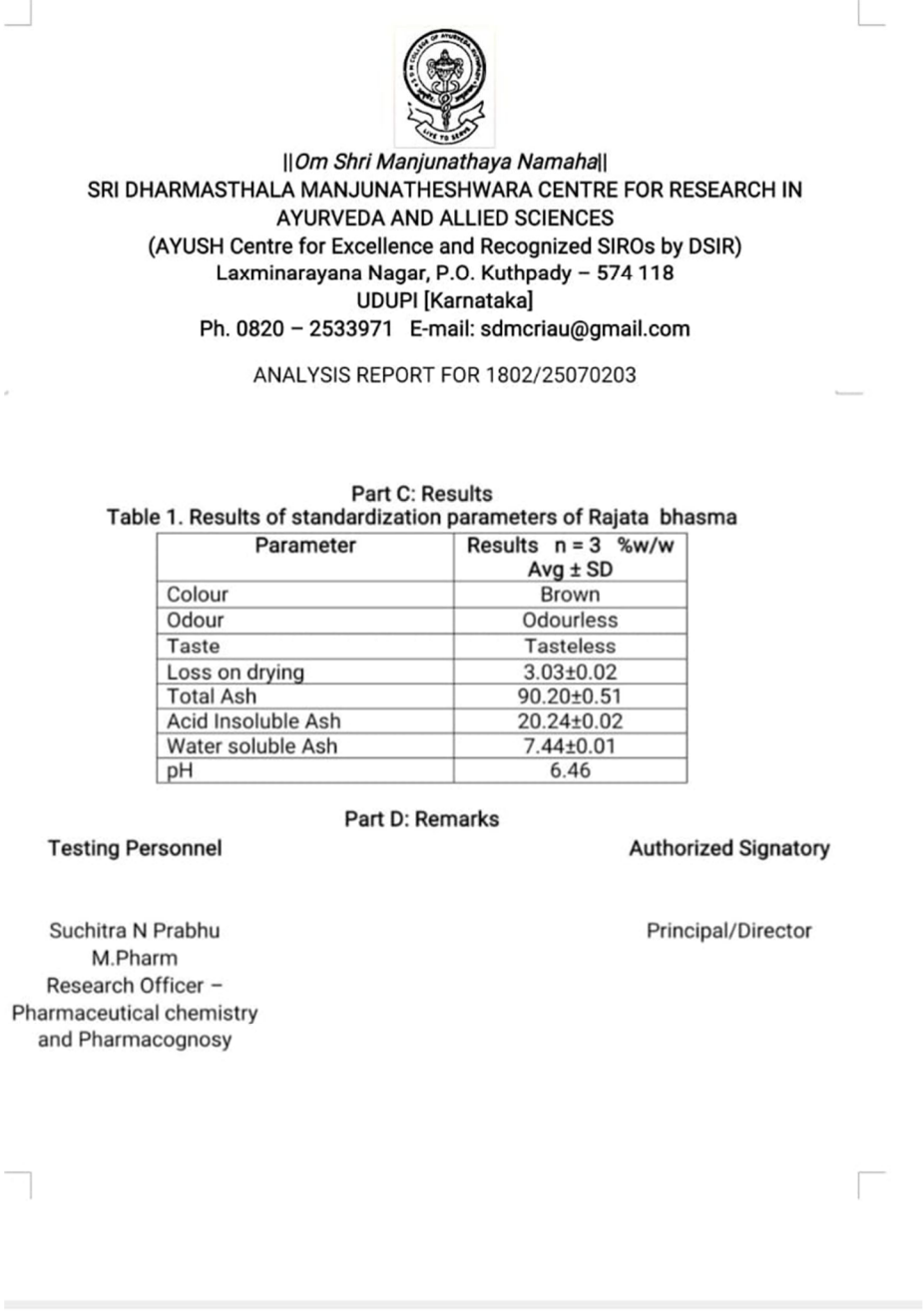
FTIR of Rajata Bhasma

Fig: 71



Particle size analysis

fig: 72



||*Om Shri Manjunathaya Namaha*||
SRI DHARMASTHALA MANJUNATHESHWARA CENTRE FOR RESEARCH IN AYURVEDA AND ALLIED SCIENCES
(AYUSH Centre for Excellence and Recognized SIROs by DSIR)
Laxminarayana Nagar, P.O. Kuthpady – 574 118
UDUPI [Karnataka]
Ph. 0820 – 2533971 E-mail: sdmcriau@gmail.com

ANALYSIS REPORT FOR 1802/25070203

Part C: Results
Table 1. Results of standardization parameters of Rajata bhasma

Parameter	Results n = 3 %w/w Avg ± SD
Colour	Brown
Odour	Odourless
Taste	Tasteless
Loss on drying	3.03±0.02
Total Ash	90.20±0.51
Acid Insoluble Ash	20.24±0.02
Water soluble Ash	7.44±0.01
pH	6.46

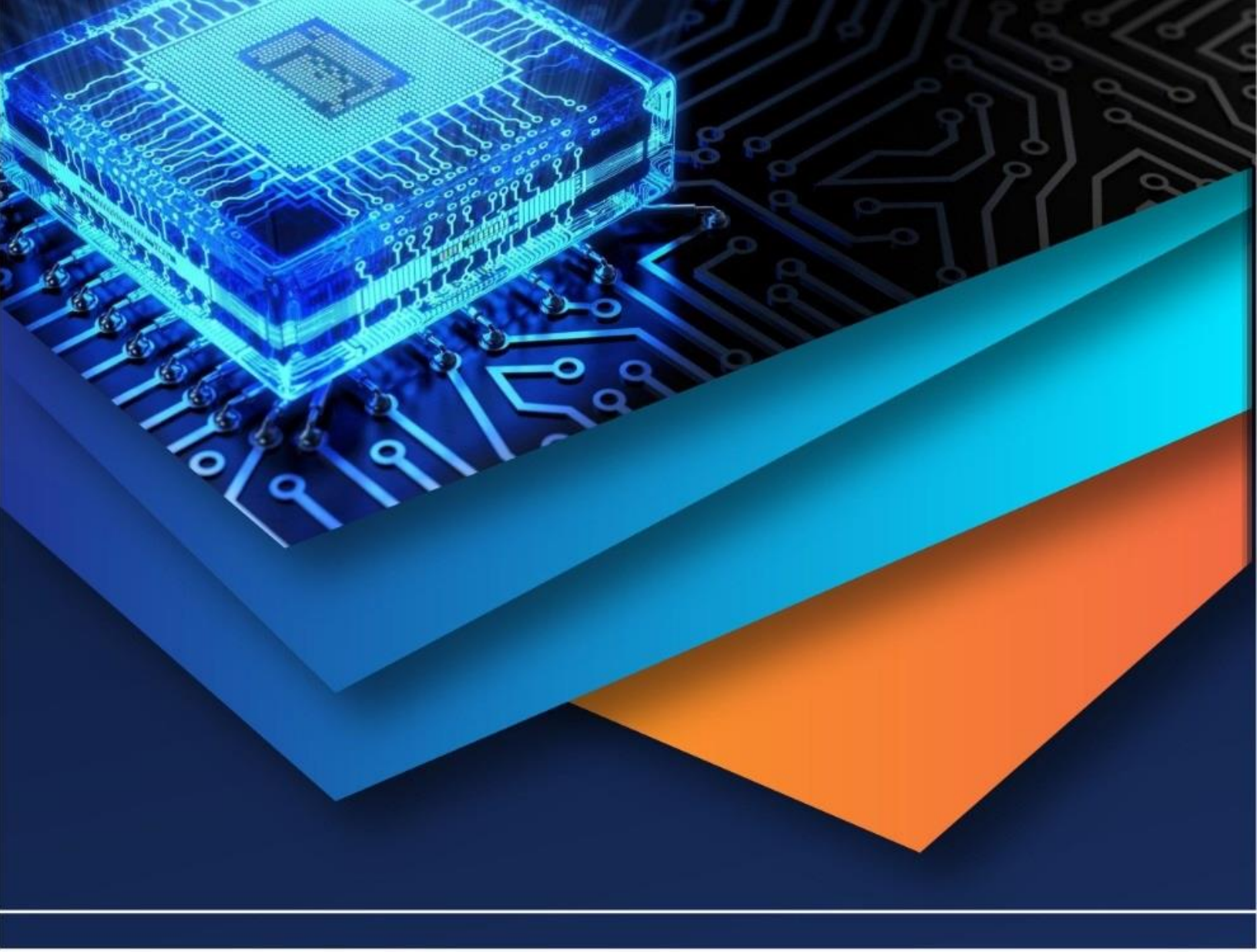
Part D: Remarks

Testing Personnel

Suchitra N Prabhu
M.Pharm
Research Officer –
Pharmaceutical chemistry
and Pharmacognosy

Authorized Signatory

Principal/Director



10.22214/IJRASET

45.98

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