

Development and Analytical Evaluation of *Salasaradi Gaṇa Bhavita Silajatu*; A Classical Herbo-Mineral Formulation for *Madhumeha*

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ABSTRACT

Background: Ayurvedic pharmaceuticals comprises systematic procedures for the conversion of raw medicinal materials into therapeutically suitable dosage forms. The present pharmaceutical study was undertaken to evaluate the preparation of *Salasaradi Gaṇa Bhavita Silajatu* through sequential *Sodhana*, *Bhavana*, drying, powdering, and encapsulation procedures.

Materials and Methods: Raw *Silajatu* was subjected to *Sodhana* by the *Agnitapi* method using *Triphala Kwatha*. Half of the purified *Silajatu* was subjected to 21 *Bhavana* with *Salasaradi Gaṇa Dravya Kwatha* using an End Runner, while the remaining half was subjected to 21 *Bhavana* with the same *Kwatha* using a Wet Grinder. The *Salasaradi Gaṇa Kwatha* was prepared using 19 drugs out of the 23 drugs of the *Salasaradi Gaṇa*, taking 15 g of each drug in *Yavakuta* form. After completion of *Bhavana*, the material was dried, powdered, and filled into hard gelatin capsules of 500 mg strength.

Results: During preliminary *Silajatu Sodhana*, 1 kg of impure *Silajatu* yielded 450 g of purified *Silajatu*, corresponding to a 45% yield. In subsequent processing, 2 kg of impure *Silajatu* yielded 800 g of purified material in each of two Process, corresponding to a 40% yield. A total of 1900 g of *Sodhita Silajatu* was divided into two equal portions and subjected separately to 21 *Bhavanas* with *Salasaradi Gaṇa Dravya Kwatha* using an End Runner and Wet Grinder. The final weights obtained were 930 g from the End Runner (2.1% loss) and 920 g from the Wet Grinder (3.15% loss). A higher requirement of *Kwatha* was observed in the Wet Grinder. After drying and powdering, 3600 capsules of 500 mg were prepared.

Conclusion: The formulation was successfully prepared through a sequential pharmaceutical process involving *Sodhana*, *Bhavana*, drying, powdering, and encapsulation. The documented weight variation, yield, *Kwatha* requirement, processing time, and handling characteristics provide useful

pharmaceutical parameters for reproducibility of *Salasaradi Gaṇa Bhavita Silajatu*.

Keywords: *Salasaradi Gaṇa, Silajatu, Bhavana, Triphala Kwatha, Madhumeha, Ayurvedic Pharmaceutics.*

INTRODUCTION

Salasaradi Gaṇa Bhavita Silajatu was selected for the present pharmaceutical study based on its classical therapeutic relevance in *Madhumeha*. The drugs of *Salasaradi Gaṇa* are described with properties including *Kapha-Pitta Shamak*, *Madhumehahara*, *Mutra-Sangrahaṇiya*, *Rasayana*, and *Medohara*. The classical reference from *Rasatarāṅgiṇi* describes the processing of *Silajatu* with *Salasaradi* liquid and indicates its utility in *Madhumeha* and related conditions.¹

The pharmaceutical preparation involved two major processing stages. Initially, raw *Silajatu* was subjected to *Sodhana* using *Triphala Kwatha*. Subsequently, the purified *Silajatu* underwent repeated *Bhavana* with *Salasaradi Gaṇa Kwatha*. The final product was dried, powdered, and converted into a standardized capsule dosage form.

The present study was therefore undertaken to document the complete pharmaceutical process, including observations, weight changes, yield, *Bhavana* requirements, processing time, and practical difficulties encountered during preparation.

Aims And Objective:

To prepare *Salasaradi Gaṇa Bhavita Silajatu* according to classical Ayurvedic references and evaluate its organoleptic, physicochemical, qualitative, and quantitative characteristics using both classical and modern analytical parameters.

MATERIALS & METHODS

Procurement and Authentication of Raw Materials

Raw materials were procured from raw-drug markets of Jaipur, Amritsar, and Mumbai. Certain drugs, including *Tinduka* and *Sakha*, were collected from farmers of Chittorgarh, while *Tinisa* was collected from farmers of Kota. All raw materials were authenticated by experts from the Drug Testing Laboratory of DSRRAU and the Department of Dravyaguna, PGIA, Jodhpur.

The collected drugs were manually cleaned and dried under sunlight. Raw *Silajatu* was examined for preliminary quality assessment before initiating the *Sodhana* procedure.

PHARMACEUTICAL PROCEDURE

The formulation was prepared through the following sequential stages:

1. *Silajatu Sodhana*
2. Preparation of *Triphala Kwatha*
3. Preparation of *Salasaradi Gaṇa Kwatha*
4. *Bhavana* with *Salasaradi Gaṇa Kwatha* using End Runner
5. *Bhavana* using wet grinder
6. Drying and powdering
7. Encapsulation

1. SILAJATU SODHANA

शिलाधातुं च दुग्धेन त्रिफलामार्कव द्रवैः ।

लोहपात्रे विनिक्षिप्य शोधयेदतियत्नतः ॥ (R. R. Samu. 2/117)²

Method: *Agnitapi*

Sodhana medium: *Triphala Kwatha*

Date of commencement: 28/11/2025

Date of completion: 01/01/2026

Materials Required

Weighing balance, mortar and pestle, stainless-steel vessels, heating device, measuring jar, and clean cotton cloth were used.

Ingredients

Material	Quantity
Impure <i>Silajatu</i>	1 kg
<i>Triphala Yavakuta</i>	1 kg
Water	8 L

Preparation of Triphala Kwatha

Amalaki, *Haritaki*, and *Bibhitaka* were manually cleaned, sieved, and dried under sunlight. Equal quantities of the three drugs were coarsely powdered using an *Udukhalā Yantra*. The initial quantity of *Triphala* was 1 kg, from which 985 g of *Yavakuta* was obtained, showing a mechanical loss of 15 g. The *Triphala Yavakuta* was soaked overnight in eight times its quantity of water (8 L). On the following day, it was heated with continuous stirring until the volume was reduced to one-fourth. The decoction was filtered through a double-layered cotton cloth.

Observed parameters:

1. Temperature: 95–102°C
 2. Heating time: 4 hours
 3. Final filtered *Kwatha*: 2 L
- 1 kg of impure *Silajatu* was powdered, yielding 975 g of powdered material.

Sodhana Procedure

The powdered *Silajatu* was added to lukewarm *Triphala Kwatha* and continuously stirred to facilitate dissolution. The mixture was filtered through a double-layered cotton cloth to remove insoluble stony and siliceous impurities.

The filtrate was kept undisturbed overnight for sedimentation. The clear supernatant was carefully transferred through a double-folded cotton cloth without disturbing the settled material. The clarified filtrate was then heated at approximately 60–70°C with continuous stirring until a semisolid consistency was achieved.

The residual sediment was separately processed with hot water for recovery of the remaining *Silajatu*. During this process, *Silajatu* appeared on the surface in the form of a *Santanika*-like layer. The recovered material was incorporated into the purified semisolid *Silajatu*.

Observation

During powdering, harder portions of *Silajatu* required greater effort for pulverization. Slight frothing was observed after addition to *Triphala Kwatha*. During concentration, the material gradually developed a slimy and glossy appearance and showed considerable adhesiveness to the vessel.

Approximately four hours of mild heating with continuous stirring were required to obtain the desired semisolid consistency. Complete drying required approximately 30–40 days.

After drying, the purified *Silajatu* demonstrated the observed classical quality parameters, including Lingakara formation and smokeless behaviour on heating. It also sank like a thread when placed on the water surface. The purified material exhibited *Katu-Tikta* taste and a characteristic odour.

Table 1. Pharmaceutical Yield During *Silajatu Sodhana*

S. No.	Material/Stage	Weight	Yield (%)
1	Impure <i>Silajatu</i>	1000 g	—
2	Powdered <i>Silajatu</i>	975 g	97.5
3	Purified <i>Silajatu</i>	450 g	45.0

The same procedure was subsequently performed on 4 kg of impure *Silajatu* in two separate batches of 2 kg each.

Table 2. Pharmaceutical Yield of *Silajatu Sodhana*

S. No.	Material/Stage	Weight	Yield (%)
1	Impure <i>Silajatu</i>	2000 g	—
2	Powdered <i>Silajatu</i>	1940 g	97.0
3	Purified <i>Silajatu</i>	800 g	40.0

Table 3. Pharmaceutical Yield of *Silajatu Sodhana*

S. No.	Material/Stage	Weight	Yield (%)
1	Impure <i>Silajatu</i>	2000 g	—
2	Powdered <i>Silajatu</i>	1940 g	97.0
3	Purified <i>Silajatu</i>	800 g	40.0

2. Preparation of Salasaradi gaṇa kwatha

Nineteen drugs out of the 23 drugs of Salasaradi Gaṇa were taken in Yavakuta form, 15 g each, giving a total weight of 285 g. The drugs were soaked overnight in approximately 2.3 L of water.

On the following day, the material was heated over mild heat without covering the vessel. Heating was continued until the volume was reduced to one-fourth. The decoction was filtered through a double-folded clean cotton cloth.

Table 4. Parameters of Salasaradi Gaṇa Kwatha Preparation

Parameter	Observation
Salasaradi Gaṇa Yavakuta	285 g
Initial water	2.3 L
Final Kwatha	570 mL
Number of drugs used	19 out of 23
Quantity of each drug	15 g
Colour	Brown
Taste	Kaṣaya
Odour	Insignificant

The same procedure was followed for preparing Salasaradi Gaṇa Kwatha for each Bhavana cycle.

3. Bhavana using End Runner

Number of Bhavanas: 21

Date of commencement: 23/02/2026

Date of completion: 25/03/2026

The initial quantity of Triphala Sodhita Silajatu was 950 g. Salasaradi Gaṇa Kwatha was prepared as described above.

The purified Silajatu was transferred to an End Runner and the Kwatha was gradually added. Continuous trituration was performed until the entire liquid was absorbed, producing a homogeneous semisolid mass.

Table 5. Bhavana Schedule Using End Runner

Bhavana No.	Date	Kwatha (mL)	Time
1	23/02/2026	400	8.15 h
2	25/02/2026	250	9.30 h
3	27/02/2026	100	8.05 h
4	05/03/2026	160	8 h
5	06/03/2026	170	8.15 h
6	07/03/2026	170	8 h
7	09/03/2026	210	8.02 h
8	10/03/2026	190	8 h
9	11/03/2026	190	8 h
10	12/03/2026	150	8 h
11	13/03/2026	100	8 h
12	14/03/2026	100	9 h
13	15/03/2026	150	8 h
14	16/03/2026	190	8 h
15	17/03/2026	170	8 h
16	18/03/2026	150	8 h
17	19/03/2026	150	8 h
18	20/03/2026	170	8 h
19	21/03/2026	150	8 h
20	24/03/2026	150	8 h
21	25/03/2026	150	8 h

Observations

During trituration, Silajatu gradually softened and acquired a mud-like

consistency. Progressive darkening and development of a shiny appearance were observed after successive Bhavanas.

Adequate trituration was maintained to ensure proper incorporation of the Kwatha. Care was taken to minimize spillage and material loss. During End Runner operation, proper phase configuration was particularly important because reverse rotation could result in expulsion of the material from the grinding chamber.

Result

Parameter	Observation
Initial <i>Sodhita Silajatu</i>	950 g
Final <i>Bhavita Silajatu</i>	930 g
Weight loss	20 g
Percentage loss	2.1%

The loss was attributed to accidental spillage during trituration and adherence of material to the inner surface of the End Runner

4. Bhavana using Wet Grinder

Number of Bhavanas: 21

Date of commencement: 11/03/2026

Date of completion: 08/04/2026

A total of 21 Bhavanas were administered to purified Silajatu using Salasaradi Gaṇa Kwatha in a wet grinder.

Table 6. Bhavana Schedule Using Wet Grinder

Bhavana No.	Date	Kwatha (mL)	Time
1	11/03/2026	400	8.10 h
2	12/03/2026	120	8.15 h
3	13/03/2026	150	8 h
4	14/03/2026	200	8 h
5	15/03/2026	200	8 h
6	16/03/2026	200	8 h
7	17/03/2026	200	8 h
8	18/03/2026	200	8 h
9	19/03/2026	220	8 h
10	20/03/2026	200	8 h
11	24/03/2026	150	8 h
12	25/03/2026	170	8 h
13	26/03/2026	170	8 h
14	27/03/2026	150	8 h
15	30/03/2026	150	8 h
16	01/04/2026	170	8 h
17	02/04/2026	170	8 h
18	04/04/2026	180	8 h
19	06/04/2026	180	8 h
20	07/04/2026	180	8 h
21	08/04/2026	180	8 h

The procedure and precautions were generally similar to those followed with the End Runner. However, a comparatively higher quantity of *Kwatha* was required during wet-grinder *Bhavana*. The source study attributed this observation to increased evaporation during the hot climatic conditions of March–April and/or the double-rotation mechanism of the wet grinder, which may have enhanced absorption.

RESULT

Parameter	Observation
Initial <i>Sodhita Silajatu</i>	950 g
Final <i>Bhavita Silajatu</i>	920 g
Weight loss	30 g
Percentage loss	3.15%

The loss was attributed to accidental spillage and adherence of material to the inner surface of the wet grinder.

5. Drying and Powdering

After completion of the *Bhavana* process, the *Bhavita Silajatu* was spread uniformly over a polyethylene sheet to minimize sticking. The material was exposed to sunlight daily and broken into smaller pieces to increase surface area and facilitate uniform drying.

After complete drying, the material was pulverized using a mixer grinder to obtain a fine powder suitable for encapsulation.

6. Encapsulation

The dried *Salasaradi Gaṇa Bhavita Silajatu* powder was converted into a standardized capsule dosage form containing 500 mg per capsule.

Date of commencement: 16/04/2026

Date of completion: 18/04/2026

Equipment

Capsule filling machine, stainless-steel vessels, mortar and pestle, Kharala Yantra, stainless-steel spoon, cloth, PET containers, gloves, and masks were used.

Procedure

The powder was uniformly blended and filled into hard gelatin capsules using a manual capsule-filling machine. Each capsule contained 500 mg of *Salasaradi Gaṇa Bhavita Silajatu*. The capsules were properly locked and inspected for uniformity and visible defects.

A total of 3600 capsules of 500 mg strength were prepared and stored in airtight containers.

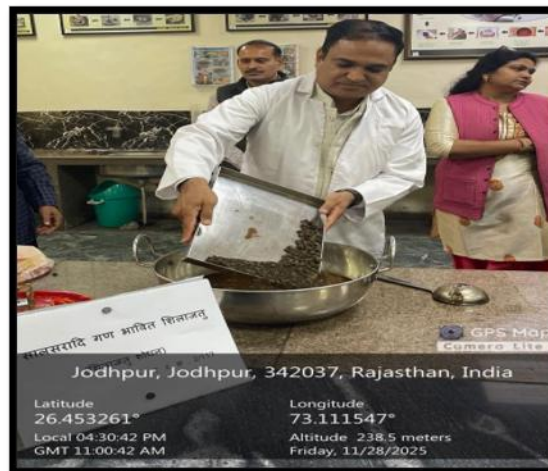
Observations

The formulation was dry and finely powdered and exhibited good flow properties. Uniform settling of powder into the capsule bodies facilitated smooth filling. No significant clogging, sticking, or operational difficulty was observed. The filled capsules appeared uniform and were properly locked. Only negligible powder loss occurred during filling.

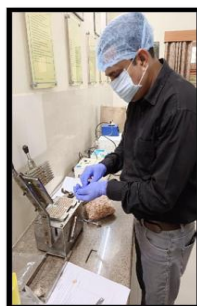


PHARMACEUTICAL IMAGE SHILAJATU SHODHANA





BHAVANA OF SHILAJEET BY SALSARADI GANA KWATHA AND ENCAPSULATION



Statistical Analysis

The prepared *Salsaradi Gana Bhāvita Shilājatu* was selected for analytical evaluation. The formulation was subjected to

systematic analysis using organoleptic, physicochemical, qualitative, and quantitative parameters.

The analytical investigations were carried out at Jeevanrekha Analytical Services (OPC) Private Limited, Deolai, Aurangabad, and Drug Testing Laboratory, DSRRAU, Jodhpur.

RESULTS

Organoleptic Characters

Table 1. Organoleptic characteristics of Salsaradi Gana Bhāvita Shilājatu

Organoleptic characters	
Appearance	Resinous or semi-solid mass with a glossy surface.
Colour	Blackish-brown to dark brown,
Texture	Smooth, sticky, resinous, and soft at warm temperatures; becomes hard and brittle on cooling
Smell	Characteristic Gomutra Gandhi (smell of cow's urine.)
Taste	Bitter, astringent, and slightly pungent with a persistent aftertaste.

The formulation exhibited characteristic resinous properties consistent with the nature of *Shilājatu*. The blackish-brown appearance, sticky and smooth texture, and

characteristic taste were noted during organoleptic examination.

Physicochemical Parameters

Table 2. Physicochemical parameters of Salsaradi Gana Bhavita Shilajatu

S.NO.	NAME OF TEST	UNIT	RESULT	REFERENCE
1.	pH value	-	5	API PART- I
2.	Loss on drying	%	6.73	API PART- I
3.	Total Ash value	%	25.75	API PART- I
4.	Acid Insoluble Ash	%	0.97	API PART- I
5.	Water Soluble Extract	%	68.63	API PART- I
6.	Alcohol soluble Extract	%	4.77	API PART- I

ANALYSIS USING SOPHISTICATED INSTRUMENTAL TECHNIQUE (Qualitative & Quantitative)

1. Particle Size Determination³

Particle size analysis was performed using the BIOVIS PSA 2000 Particle Size

Analyzer. The analytical evaluation generated particle size distribution and morphological profiles of the sample. The source document includes analytical reports for *Salsaradi Gana Bhavita Shilajatu* after 21 *Bhavanas*.

STATS(Excluding: Agglomerates, Unclassified)

	Area	Aspect	Axis(Major)	Axis(Minor)	AreaEqv Dia	Circularity(Eqv)
	sq microns		microns	microns	microns	
Min	0.000000001	0.7070429	0.0811615	0.000000001	0.1295267	0.3441361
Max	2.4904	19.4999	3.1656	1.9125	1.7807	2.5069
Mean	0.000000001	1.357	0.2587754	0.1912321	0.2677292	1.472
Sum	1222.81	23595.2	4499.586	3325.143	4655.276	25594.76
Std.Dev	0.1026015	0.5710248	0.2050958	0.1279439	0.1336509	0.4373534

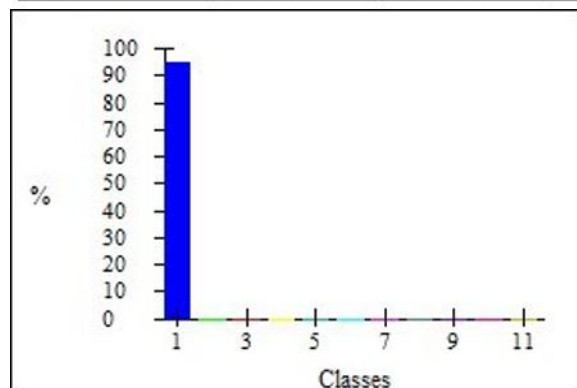
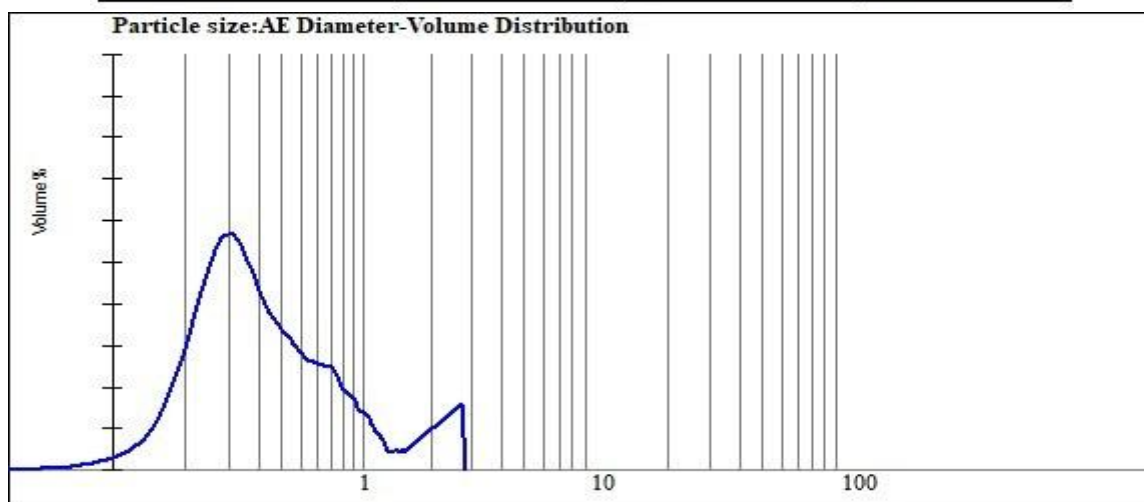


Fig.no. 1 Report of Salsaradi Gana Bhavita Shilajatu (21 bhavna)

Classes(Excluding: Agglomerates, Unclassified)

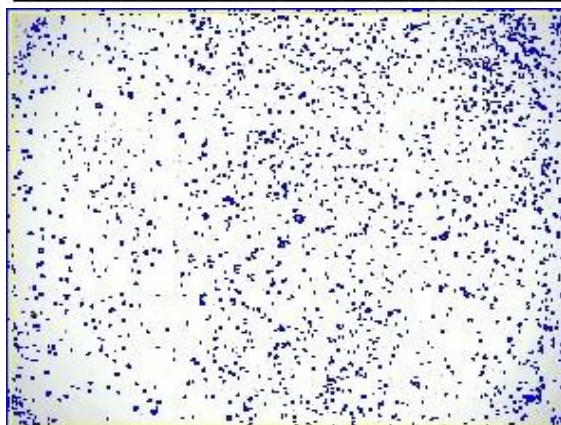
Classes	Counts	%Count	%Count(All)
#1: 0 to 2.5	17388	100	95.3237
#2: 2.5 to 5	0	0	0
#3: 5 to 10	0	0	0
#4: 10 to 15	0	0	0
#5: 15 to 20	0	0	0
#6: 20 to 25	0	0	0
#7: 25 to 30	0	0	0
#8: 30 to 40	0	0	0
#9: 40 to 50	0	0	0
#10: 50 to 100	0	0	0
#11: 100Above	0	0	0



Particle Sizing:Results Summary

Fields measured 5
Particles count 18241

.Type	Count	d10	d50	d90	D(3,2)	D(4,3)	D(1,0)
		microns	microns	microns	microns	microns	microns
Single	17388	0.1295267	0.2423223	0.3992282	0.4490673	0.6237885	0.267729
Agglomerates	852	0.1586372	0.3663569	0.8688916	4.3242	6.5769	0.532102
Unclassified	0	0.5935659	0	0	0	0	0
All(combined)	18241	0.1295267	0.2423223	0.4197145	1.6315	5.4382	0.280095



STATS(Group 1)

	Area	Aspect	Axis(Major)	Axis(Minor)	AreaEqv Dia	Circularity(Eqv)
	sq microns		microns	microns	microns	
Min	0.000000001	0.7070429	0.0811615	0.000000001	0.1295267	0.3441361
Max	2.4904	19.4999	3.1656	1.9125	1.7807	2.5069
Mean	0.000000001	1.357	0.2587754	0.1912321	0.2677292	1.472
Sum	1222.81	23595.2	4499.586	3325.143	4655.276	25594.76
Std.Dev	0.1026015	0.5710248	0.2050958	0.1279439	0.1336509	0.4373534

Particle Size Analysis revealed uniform distribution of particles within the formulation. Uniform particle size is an important pharmaceutical characteristic because it influences dissolution rate, absorption, bioavailability, and therapeutic efficacy. The repeated *Bhāvana* process carried out during the preparation of *Salsaradi Gana Bhāvita*

Shilajatu likely contributed to the reduction and homogenization of particle size. Better particle uniformity also improves mixing properties and ensures dose uniformity in the final capsule formulation.

2. Fourier Transform Infrared Spectroscopy (FTIR)⁴

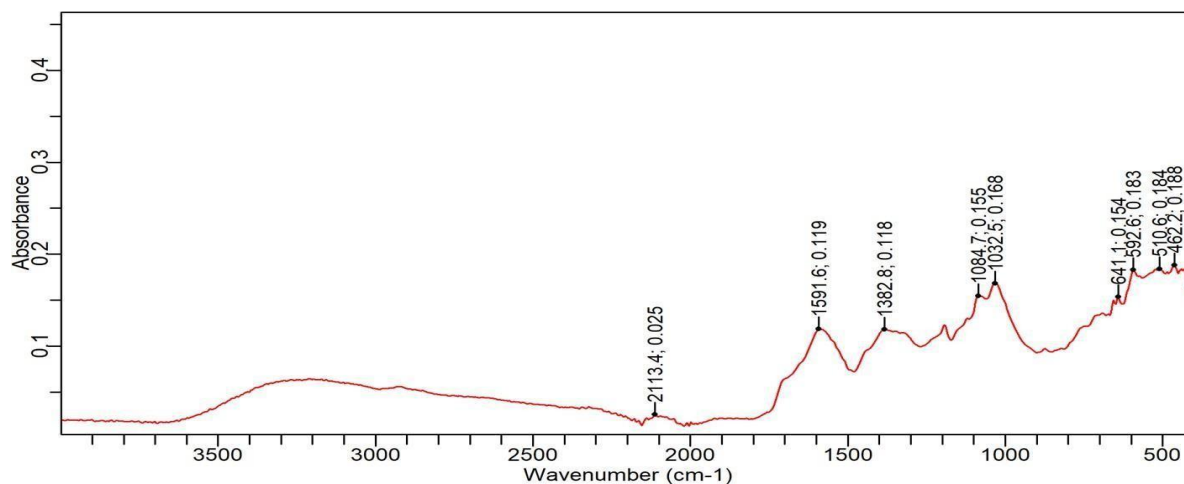


Fig no.2

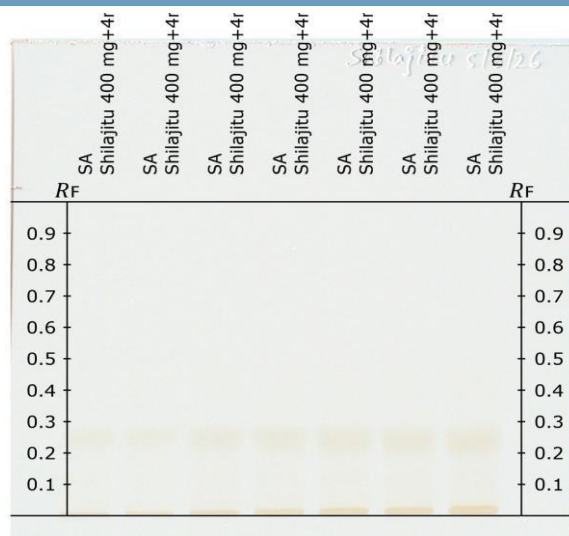
Peak Number	Wavenumber (cm ⁻¹)	Intensity
1	462.2	0.188
2	510.6	0.184
3	592.6	0.183
4	641.1	0.154
5	1032.5	0.168
6	1084.7	0.155
7	1382.8	0.118
8	1591.6	0.119
9	2113.4	0.025

FTIR analysis demonstrated characteristic absorption peaks corresponding to different functional groups present within the formulation. The observed spectral peaks indicate the presence of hydroxyl, carboxyl, aromatic, and other oxygen-containing functional groups, which are commonly associated with humic substances, fulvic acid, phenolic compounds, and other

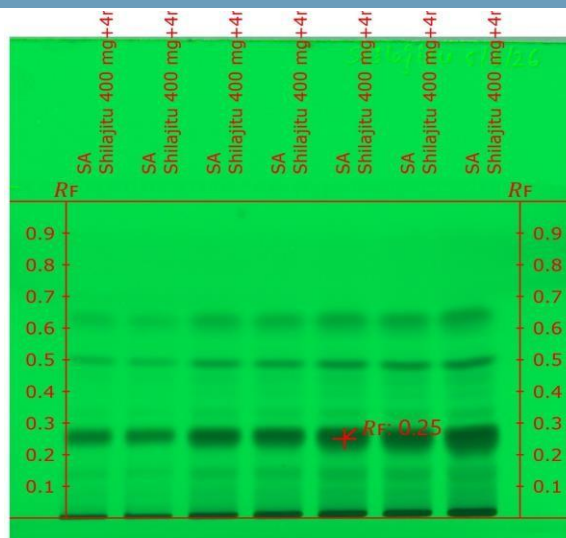
phytoconstituents of *Shilajatu*. The FTIR spectrum therefore confirms the chemical integrity of the formulation and supports the presence of important bioactive constituents without evidence of major chemical degradation during pharmaceutical processing.

3. HPTLC (HIGH-PERFORMANCE THIN LAYER CHROMATOGRAPHY)⁵

R White - Developed, RemissionVis



R 254 - Developed, Remission254



R 366 - Developed, Remission366

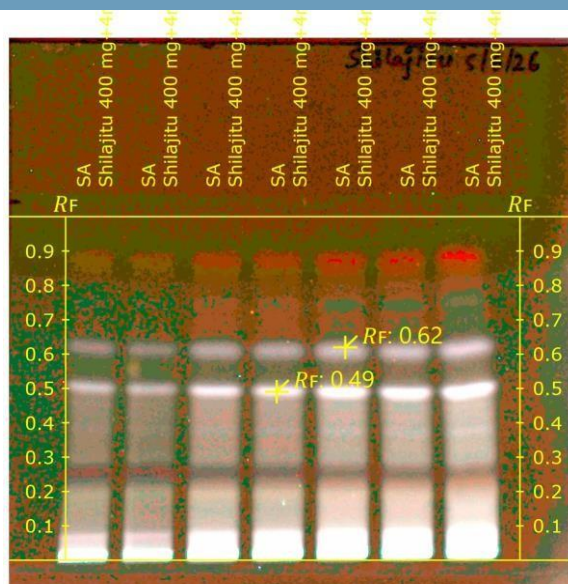


Fig.no.3. Graph showing HPTLC result

HPTLC fingerprinting generated distinct chromatographic bands at different R_f values, producing a characteristic fingerprint profile of the formulation. The band observed around R_f 0.25 may correspond to gallic acid, while the band around R_f 0.49 may indicate the presence of dibenzo- α -pyrones, which are recognized bioactive constituents of *Shilajatu*. The band at R_f 0.62 may represent fulvic acid, an important

therapeutic marker compound of *Shilajatu*. These findings support the authenticity of the prepared formulation and provide a reproducible chromatographic fingerprint that can be used for future quality control and standardization.

4. ICP-OES (Inductively Coupled Plasma–Optical Emission Spectroscopy)⁶

Table no. 3 SHOWING ELEMENTS in ICP-OES

Element	Wavelength (nm)	Label	Type
As	188.980	As(188.980nm)	Analyte
Mg	279.553	Mg (279.553n)	Analyte
Mn	257.610	Mn (257.610n)	Analyte
Ni	231.604	Ni (231.604nm)	Analyte
Pb	220.353	Pb(220.353nm)	Analyte
Se	196.026	Se (196.026nm)	Analyte

Table no.4 SHOWING SUMMARY OF CALIBRATION RESULT

Element and wavelength	Type	Units	Equation	Correlation Coefficient	%RSE
As (188.980nm)	Analyte	ppm	3.37449312 * Concentration + 14.68190849	0.99971	2.84854318
Mg (279.553nm)	Analyte	ppm	2092.60800256 * Concentration + 15364.70049045	0.99950	6.05157964
Mn (257.610nm)	Analyte	ppm	405.46408745 * Concentration + 90.83276974	0.99986	4.33854279
Ni (231.604nm)	Analyte	ppm	34.19333826 * Concentration + 23.43188987	0.99988	3.00763112
Pb (220.353nm)	Analyte	ppm	9.90347797 * Concentration + 48.22742761	0.99928	9.64889963
Se (196.026nm)	Analyte	ppm	1.83836925 * Concentration + 7.82141505	0.99976	4.65078123

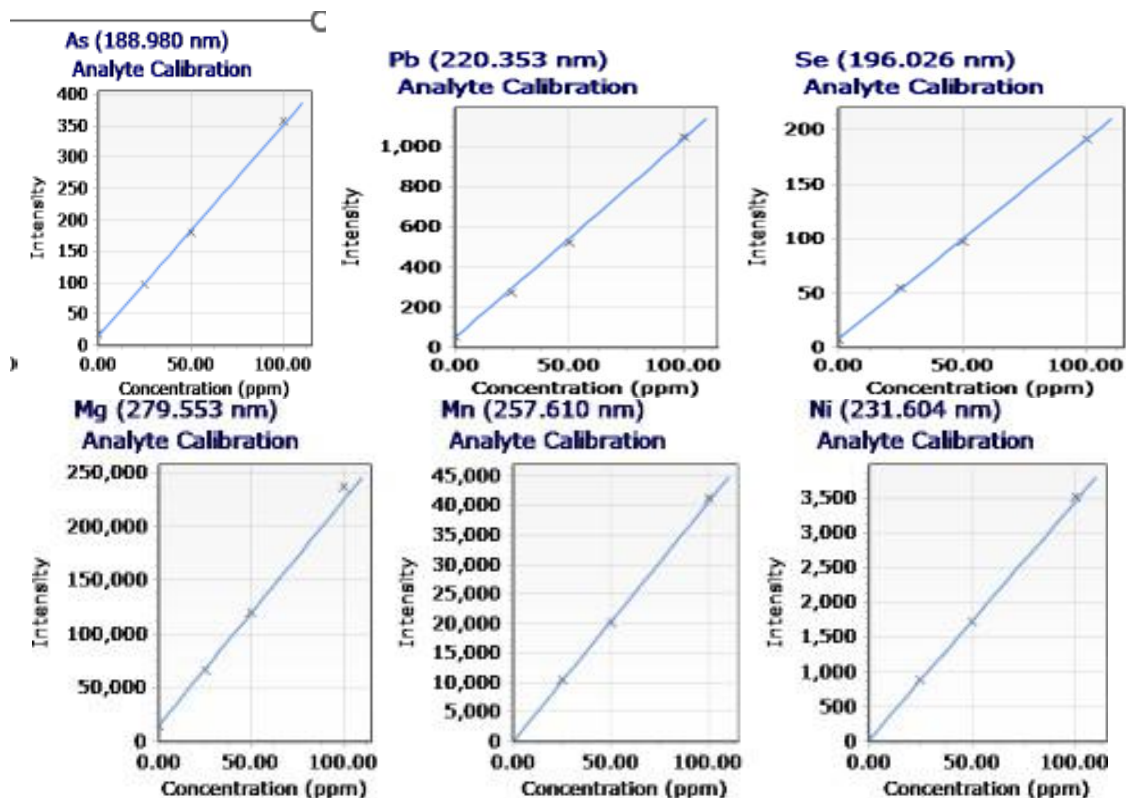


Table no.5 SHOWING RESULT of ICP-OES

Solution Label	As (188.980 nm)	Mg (279.553 nm)	Mn (257.610 nm)	Ni (231.604 nm)	Pb (220.353 nm)	Se (196.026 nm)
Shilajitu	1394.79(ppm)	##### (ppm)	8044.90(ppm)	4853.317(ppm)	270.989(ppm)	2403.26(ppm)

ICP-OES analysis confirmed the presence of various essential mineral elements within the formulation. Since *Shilajatu* is a naturally occurring mineral exudate, the presence of trace and major elements is expected and contributes to its therapeutic significance. The observed elemental profile provides scientific evidence regarding the mineral composition of *Salasaradi Gana Bhavita Shilajatu* and establishes a baseline for future standardization and quality assurance studies.

RESULT

The pharmaceutical preparation of *Salasaradi Gana Bhavita Silajatu* was completed through sequential *Sodhana*, *Bhavana*, drying, powdering, and encapsulation procedures. During preliminary *Silajatu Sodhana* 1 kg of impure *Silajatu* yielded 450 g of purified material, corresponding to a 45% yield. On processing two additional batches of 2 kg each, 800 g of purified *Silajatu* was obtained from each batch, corresponding to a 40% yield. The purified material exhibited classical characteristics including *Lingakara* formation, smokeless behaviour on heating, and sinking in water like a thread.

For *Salasaradi Gana Kwatha*, 19 drugs out of the classical 23 drugs were used in *Yavakuta* form, with 15 g of each drug, giving a total of 285 g. Approximately 2.3 L of water was used, yielding 570 mL of final *Kwatha*.

A total of 1900 g of *Sodhita Silajatu* was processed through 21 *Bhavana* cycles separately using an End Runner and Wet Grinder. In the End Runner process, 950 g of *Sodhita Silajatu* yielded 930 g of *Bhavita Silajatu*, with a weight loss of 20 g (2.1%). In the Wet Grinder process, 950 g yielded 920 g, with a weight loss of 30 g (3.15%). Greater *Kwatha* requirement was observed during Wet Grinder processing.

After completion of *Bhavana*, the material was dried, powdered, and successfully filled

into 500 mg hard gelatin capsules. A total of 3600 capsules were prepared, with good flow characteristics and negligible powder loss during filling.

The finished formulation showed a blackish-brown to dark-brown colour, smooth and resinous texture, characteristic odour, and bitter-astringent taste. Physicochemical evaluation showed pH 5, loss on drying 6.73%, total ash 25.75%, acid-insoluble ash 0.97%, water-soluble extractive 68.63%, and alcohol-soluble extractive 4.77%.

Particle-size analysis demonstrated a uniform particle distribution. FTIR analysis showed characteristic absorption peaks associated with hydroxyl, carboxyl, aromatic, and other oxygen-containing functional groups. HPTLC produced a characteristic chromatographic fingerprint, while ICP-OES demonstrated the presence of As, Mg, Mn, Ni, Pb, and Se in the analysed sample.

DISCUSSION

The pharmaceutical preparation of *Salasaradi Gana Bhavita Silajatu* demonstrated that the formulation requires careful control at each stage, particularly during *Silajatu Sodhana* and repeated *Bhavana*. The initial yield of 45% obtained during preliminary *Sodhana* decreased to 40% in the subsequent larger batches. This variation may be related to differences in the amount of removable impurities, recovery of *Silajatu* from the residual sediment, and handling-related losses during processing. The appearance of a *Santanika*-like layer during recovery and the gradual development of a slimy, glossy and adhesive consistency during concentration were important practical observations of the *Sodhana* process.

The use of *Triphala Kwatha* as the *Sodhana* medium facilitated removal of insoluble stony and siliceous impurities through filtration and sedimentation. The

requirement of prolonged mild heating and continuous stirring reflects the adhesive nature of *Silajatu*. The classical quality observations recorded after drying further indicated successful completion of the purification process.

Preparation of *Ssalasaradi Gana Kwatha* using 19 drugs and reduction of 2.3 L water to 570 mL produced the liquid medium required for repeated *Bhavana*. During *Bhavana*, progressive softening, darkening and development of a glossy appearance were observed, indicating gradual incorporation of the *Kwatha* into *Silajatu*. Repeated trituration also helped in obtaining a homogeneous mass and subsequently contributed to uniform particle characteristics.

Comparison of the two processing methods showed a slightly greater weight loss in the Wet Grinder (3.15%) than in the End Runner (2.1%). The documented losses were mainly attributed to accidental spillage and adherence of material to the internal surfaces of the equipment. The Wet Grinder also required comparatively greater quantities of *Kwatha*. The study attributed this observation to increased evaporation under the prevailing climatic conditions and/or the operational characteristics of the Wet Grinder.

The successful conversion of the processed material into 500 mg capsules demonstrates the suitability of the final dried powder for a standardized dosage form. Good flow properties, smooth filling, absence of significant clogging and negligible powder loss indicate satisfactory handling characteristics during encapsulation.

Analytical evaluation further provided a quality profile of the prepared formulation. The physicochemical parameters establish measurable characteristics for future comparison and standardization. Uniform particle-size distribution is pharmaceutically relevant for mixing and dose uniformity. FTIR findings demonstrated characteristic functional groups, while HPTLC generated a reproducible fingerprint profile. ICP-OES additionally established the elemental profile

of the formulation, providing baseline information for quality-control investigations.

CONCLUSION

The present pharmaceutical study successfully established a sequential and reproducible method for the preparation of *Salasaradi Gana Bhavita Silajatu*. The process involved *Silajatu Sodhana* with *Triphala Kwatha*, preparation of *Salasaradi Gana Kwatha*, 21 repeated *Bhavana* cycles using End Runner and Wet Grinder, followed by drying, powdering and encapsulation. The End Runner process resulted in comparatively lower processing loss (2.1%) than the Wet Grinder (3.15%), whereas the Wet Grinder required a greater quantity of *Kwatha*. A total of 3600 capsules of 500 mg strength were successfully prepared.

The organoleptic, physicochemical and instrumental analytical findings provided a preliminary quality profile of the formulation, including its particle-size characteristics, functional-group profile, chromatographic fingerprint and elemental composition. Overall, the documented pharmaceutical observations regarding yield, processing loss, *Kwatha* requirement, handling characteristics and analytical parameters provide a useful foundation for standardization, quality control and reproducibility of *Salasaradi Gana Bhavita Silajatu*.

Declaration by Authors

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