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Pharmaceutico - Analytical Study of Lokanatha Rasa

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ABSTRACT

Life science discoveries are helpful in improving the quality and standard of life and have applications in health and pharmaceutical industries. Rasashastra and Bhaishajya kalpana known as the art of vedic alchemy is a fusion between mineral and organic compounds. It is a branch of Ayurveda which has given great emphasis to the comprehensive knowledge of both mineral and herbal drugs, preparation, preservation and dispensing of the preserved drugs. It's a pottali preparation having herbo- mineral ingredients. Lokanatha rasa is one of the pottali kalpa preparation done in tamra samputa method in lavana yantra. Ingredients are Parada, Gandhaka, Kaparda bhasma with nimbu swarasa and chitraka kwatha as bhavana dravya Indicated in kasa, swasa, grahani, prouda rajayakshma, arsha, shotha, gulma, dourbhalya. Lokanatha Rasa has P^H 7.72. Elements present in Lokanatha rasa as confirmed by EDS study is Mercury - 44.12, Sulphur - 8.97, Calcium - 18.62, oxygen - 28.29.

KEYWORDS: *Lokanatha Rasa, pottali, kaparda bhasma, kajjali*

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INTRODUCTION

Ayurveda is not merely a science of diseases and drugs, where it has every aspect of life in its sphere. The main aim of this system is maintenance of good health as well as enhancing the bright & healthy life span.

Rasashastra is one which includes such procedures like shodhana and marana that removes toxicity of minerals and enhances its potency as medicinal drug.There are four types of rasayana kalpas which have been mentioned in classics. They are kharaliya rasayana, parpati, kupipakwa, pottali. Pottali Kalpana is a variety of murchita parada yoga which was invented with vision of its efficacy in treatment of emergency condition with minimum dosage. There are various methodologies mentioned for Lokanatha Rasa[1], they are lavana yantra paka, valuka yantra paka, putapaka, kaparda poorana, and bhavana. Kaparda and kajjali are important ingredients in this yoga. Lokanatha Rasa prepared by lavana yantra paka method is mentioned in Brihat Niganthu Ratnakara 5th part, Kasakarmavipaka adhyaya. Indicated in kasa, swasa, grahani, prouda rajayakshma, arsha, shotha, gulma, dourbhalya. It possesses properties like rejuvenation, ant- inflammatory, analgesic, anti-oxidant, antipyretic, anti bacterial, appitiser, costive.

METHODOLOGY

Reference: - Brihat nighantu ratnakara

Equipments: Khalva yantra, mrutika sharava, tamra sharava, puta yantra, weighing machine, cora cloth, pyrometer, spoons, cowdungs, pot, brush.

Preparation of *Lokanatha Rasa*:

- Raw materials were collected after authoritative and identification through grahya lakshana
- Hingulottha parada was collected from Hingula through urdhwapatana yantra[2]
- Gandhaka Shodhana was carried out by kurmaputa method[3]
- Kaparda Shodhana was carried in nimbu swarasa by swedana method[4]
- Kaparda bhasma was carried by nimbu swarasa as bhavana media and subjected to 3 gajaputa[5]
- *Samaguna kajjali* is prepared by mardana for 200 hours.
- *Kajjali* is subjected to *bhavana* with *nimbu swarasa* for 1 day, *kajjali* is kept inside *tamra*

sharava, closed by another *tamra sharava*, *sandhibandana* is done, kept for drying.

- Later, kept in *lavana yantra* and subjected to *agni* for *8 yama* (24 hours) After *swangasheeta* the product is collected, to that product *Kaparda bhasma* is added,
- product of lavana yantra and *kaparda bhasma* are taken in equal ratio and *bhavana* is given with *Chitraka kwatha*.
- After *bhavana, chakrika* are prepared, dried and kept in *sharava samputa*, *sandhibhandana is done* & dried, subjected to *laghu puta*. Final product will be collected, stored in air tight container

Dose – 3 *ratti*

Anupana –*Maricha churna* and *Vatsanabha churna*

Indication – *kasa, swasa, prouda rajayakshma, shotha, gulma, grahani, arsha*

RESULTS

Pharmaceutical Results:

Table no 01: Showing results from *Hingulotha Parada*

Batch	Wt of *Hingula* taken for *urdhwapatana*	Wt of *Parada* obtained	Yield %
Batch I	240gm	153gm	73.05
Batch II	250gm	154gm	

Table no 02: Showing results from *Hingulottha Parada Shodhana*

Wt of ashoditha *Parada* taken	Wt of shoditha *Parada*	Yield %
307g	295g	96.09

Table no 03: Showing results from *Gandhaka Shodhana*

Wt of *Gandhaka* taken	Wt of Sh. *Gandhaka* obtained	loss	Yield %
500 g	480 g	20gm	93.75
480g	460g	20g	
460g	410g	50g	

Table no 04: Showing results from preparation of *Kajjali*

Wt of *Parada*	Wt of *Gandhaka*	Wt of *Kajjali* obtained	Yield %
250gm	250gm	478gm	95.6

Table no 05: Showing results from *kaparda Shodhana*

No of *shodhana*	Quantity of *varatika* taken	Quantity obtained	loss	Yield %
1	500g	480g	20g	96

Table no 06: Showing results from 24hrs *lavana yantra paka*

Initial weight of chakrikas in gm	Obtained quantity in gm	Loss in gm	Yield %
218	148	134	52.4

Table no 07: Showing results from *kaparda marana*

Weight before *marana*	Weight after *marana*	loss	Yield %
500g	401g	99g	80.2

Table no 08: Showing results from *Lokanatha Rasa*

Qty taken	Qty obtained	Loss in gm	Yield %
220gm	190gm	30 gm	86.3

Analytical Results

Table no 09: Showing Organoleptic characters of *Kajjali*, *Kaparda Bhasma*, *Lokanatha Rasa*

Physical test	*Kajjali*	*Kaparda Bhasma*	*Lokanatha Rasa*
Colour	Jet black	Brown	Jet black
Odour	Odourless	Odourless	Odourless
Taste	tasteless	tasteless	Tasteless
Touch	Fine	Fine	Fine

Table no 10: DETERMINATION OF P^H VALUE.

Kajjali	Kaparda Bhasma	Lokanatha Rasa
6.25	10.53	7.72

Table no 11: DETERMINATION OF ASH VALUE

Kajjali	Kaparda Bhasma	Lokanatha Rasa
0.27%	98.05%	59.65%

Table no 12: DETERMINATION OF ACID INSOLUBLE ASH

Kajjali	Kaparda Bhasma	Lokanatha Rasa
0.02%	19.23%	1.26%

Table no 13: DETERMINATION OF WATER SOLUBLE ASH

Kajjali	Kaparda Bhasma	Lokanatha Rasa
0.00%	1.33%	2.24%

Table no 14: DETERMINATION OF LOSS ON DRYING AT 105^0C

Kajjali	Kaparda Bhasma	Lokanatha Rasa
0.91%	0.59%	0.70%

RESULTS OF QUANTITATIVE ANALYSIS

Table no 15: Showing results of Chemical tests of Kajjali

Contents	Kajjali (in %)
Total Mercury	58.75
Mercurous mercury	2.20
Mercuric mercury	56.50
Free Mercury	0.05
Total Sulphur	26.10
Free Sulphur	0.00
Sulphide	24.14
Sulphite	1.90
Sulphate	0.06

Table no 16: Showing SEM - EDS result of *Kajjali*

Sl no	Element	Mass %
1	O	1.48
2	S	18.64
3	Hg	79.88

Table no 17: Showing SEM - EDS result of *Kaparda Bhasma*

Sl no	Element	Mass %
1	O	41.98
2	Ca	58.02

Table no 19: Showing SEM - EDS result of *Product of Lavana Yantra*

Sl no	Element	Mass %
1	C	25.07
2	S	12.40
3	Hg	62.54

Table no 18: Showing SEM- EDS result of *Lokanatha Rasa*

Sl no	Element	Mass %
1	O	28.29
2	S	8.97
3	Hg	44.12
4	Ca	18.62

Table no 20: Showing Particle Size of *Kajjali*, Kaparda Bhasma, Product of Lavana Yantra, Lokanatha Rasa,

Sample	Mean diameter(nm)
Kajjali	502.3nm
Kaparda Bhasma	1376.8nm
Product of Lavana Yantra	375.7nm
Lokanatha Rasa	278.6nm

Table no 21: Showing FTIR Peaks of *Kajjali*

Sample peaks Cm^{-1}	Bond	Functional groups
3435	N-H(stretching)	Amine
2851, 1465	C-H(stretching)	Alkane
	C-H	Alkane, methyl group
2920, 1418	O-H(stretching)	Alcohol
	O-H(bending)	Alcohol
1384	O-H(bending)	Phenol

Table no 22: Showing FTIR Peaks of Kaparda Bhasma

Sample peaks Cm^{-1}	Bond	Functional groups
3436	N-H	Amine
2924	N-H	Amine salt
2512	O-H	Carboxylic acid
1798	C=O	Acid halide
1719	C=O	Unsaturated ester
1181	C=O	Ester
1121	C=O	Tertiary alcohol
1082	C=O	Primary alcohol

Table no 24: Showing FTIR Peaks of Product of lavana yantra

Sample peaks Cm^{-1}	Bond	Functional groups
3435	N-H(stretching)	Primary amine
2922,2851	C-H(stretching)	Alkane
1417	O-H(bending)	Carboxylic acid
1384	O-H(bending)	Phenol

Table no 23: Showing FTIR Peaks of Lokanatha Rasa

Sample peaks Cm^{-1}	Bond	Functional groups
3436, 2922, 2852	N-H (stretching)	Amine salt
2511, 1427	O-H (bending)	Carboxylic acids
1631, 87,712	C=C (stretching)	Alkene
1798, 1124	C=O	Anhydride,
	C=O	tertiary alcohol
1163	S=O	Sulfonic acid
677	C-Br	Halo compound

Table no 25: Showing Observations during NPST

Sample	I phase (0-5min)	II Phase (5-20min)	III Phase (20 min-1hrs)
KB	Pinkish-red circle	Fading of colour started with whitening of inner side of circle	Faded to more than half of intensity after 24 hours

DISCUSSION

- Nimbu swarasa being a bhavana dravya, has tikshna quality and is highly acidic pH is 2, sour and can corrode metals which also aids in reduction of particle size
- The output product was black which indicates greater percentage of mercury.
- Tamra sharava must be covered with mritkapata completely so as to avoid product loss
- saindhava lavana which facilitates in faster transmission of heat uniformly. The maximum temperature attained was 270°C.
- The pH value of *Kajjali* is 6.25, Kaparda Bhasma is 10.53, Lokanatha Rasa is 7.72 respectively. The pH of Lokanatha rasa implies that drug solubility isn't affected by hyperacidity or alkality in GI system and absorption is in intestine.
- Ash value of *Kajjali* is 0.27%, Kaparda Bhasma 98.05% and Lokanatha rasa is 59.65%which indicates the presence of inorganic materials
- Acid insoluble ash of the *Kajjali* is 0.02%, Kaparda bhasma is 19.23%, Lokanatha Rasa, is 1.26%. acid insoluble ash value of Lokanatha rasa signifies that a considerable amount of drug is soluble in the acidic media of stomach.
- The water soluble ash of *Kajjali* is 0.00%, Kaparda bhasma is1.33%, Lokanatha Rasa is 2.24%. As the values of Lokanatha rasa is least and indicates that water is not soluble media for it.
- Loss on drying at 110^0C of *Kajjali* is 0.91%, Kaparda Bhasma is 0.59%, Lokanatha Rasa is 0.70%. Lokanatha rasa has very less amount of moisture content and very rare chance of bacterial and fungal growth.
- Elements found in *kajjali* are mercury -79.88%, Sulphur - 18.64%, Oxygen - 1.48% in the. This shows that mercury is in greater proportion and the elements may be in the form of oxides.
- Elements found in *Lokanatha Rasa* are mercury-44.12, Calcium - 18.62, Sulphur - 8.97 and Oxygen -28.29, Decrease in the percentage of mercury might be due to *puta samskara*.
- Elements found in *kaparda bhasma* are Calcium - 41.98 and Oxygen - 58.02
- Elements found in Product of Lavana Yantra are mercury - 62.54, Sulphur - 12.40 and Carbon - 25.07
- The obtained peaks of the *Kajjali*, Kaparda Bhasma, Lokanatha Rasa, Product of Lavana Yantra were compared with the standard peaks. It showed the presence of different functional groups like Alcohol, Phenols, Alkanes, Alkenes, Bromide, Ethers, Carboxylic acids, Esters, Anhydrides, Amines, Overtones, Primary and secondary amines and amides. This shows the presence of organic compounds in the drug.
- Funtional groups signifies: -

1. amine salt- makes drug water soluble hence more bioavailable
2. phenols – anti inflammatory property
3. bromide- they decrease the sensitivity of CNS which makes them effective use as sedative, anti epileptic, tranquilizers
4. ether- act as solvents, flavorings
5. amine – increases drug solubility and trigger its key biological functions, tranquilizers

- Mean Particle size of *Kajjali* is – 502.3nm

Mean Particle size of Kaparda Bhasma is – 1376.8nm

Mean Particle size of Product of Lavana Yantra is - 375.7nm

Mean Particle size of Lokanatha Rasa is – 278.6nm

Smaller the drug particle size, larger the surface area leads to faster dissolution and increases the bioavailability of drug.

- The color appeared on whatman paper was pinkish red in 1st phase, fading of colour started with whitening of inner side of circle in 2nd phase and faded to more than half of intensity after 24 hours in 3rd phase indicates drug is *kaparda bhasma*.

CONCLUSION

- Lokanatha rasa is a pottali preparation mentioned in Brihat niganthu ratnakara in kasa adhikara
- It is unique method of preparation done in tamra sharava by lavana yantra method which is one among the methods of pottali preparation till date no research work has been carried hence thought worth, taken for study.
- It possesses properties deepana (appitiser), pachana, vatanulomana, lekhana (scrapping), rasayana (rejuvenation), shothahara (ant-inflammatory), grahi (costive), vrishya (aphrodisiac), krimigna (anti bacterial), shoolahara (analgesic), anti- oxidant, antipyretic.
- Lokanatha rasa is Indicated in kasa (cough), shwasa grahani (IBS), prouda rajayakshma (tuberculosis), arsha (haemorroids), shotha

(inflammation), gulma, dourbhalya (general weakness) and sarva roga (all diseases).

- Physical testshows Lokanatha rasa is jet black colour, characteristic odour having p^H 7.72
- Elements present in *Lokanatha Rasa* are mercury-44.12, Calcium - 18.62, Sulphur - 8.97 and Oxygen -28.29
- FTIR analysis of Lokanatha rasa shows it contains Amine **sa**lt, Carboxylic acids, Alkene, tertiary alcohol, Sulfonic acid.
- Mean Particle size of Lokanatha Rasa is – 278.6nm.

FIGURES: -

1. Parada and Gandhaka

2. kajjali

3. shodhita kaparda

4. Kaparda bhasma

5. kajjali bhavana with nimbu swarasa

6.chakrika in tamra sharava

7. Lavana yanatra paka

8.product of paka

9. bhavana of kajjali& kaparda bhasma with chitraka kwatha

10. Chakrika after bhavana

11. subjecting to laghu puta

12. Lokanatha rasa

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