International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 8 Issue 6, Nov-Dec 2024 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Pharmaceutico - Analytical Study of Vaidhyanatha Vati

Dr. Suryanarayana S H[1], Dr. Ravi. R. Chavan[2], Dr. Usha M[3]

[1]Final Year PG Scholar, Department of Post Graduate Studies in Rasashastra & Bhaishajya Kalpana,
[2]Professor, Department of Post Graduate Studies in Rasashastra & Bhaishajya Kalpana,
[3]Assistant Professor, Department of Post Graduate Studies in Rasashastra & Bhaishajya Kalpana,
[1,2,3]Taranath Govt. Ayurvedic Medical College & Hospital, Ballari, Karnataka, India

ABSTRACT

Rasashastra is the Ayurvedic chemistry, the science of life which deals with mercury and its processing. Bhaishajya Kalpana deals with the preparation of plant based medicine helps in treating the diseases.

Vaidhyanatha vati[1] is one of the unique kharaliya rasayana mentioned in Rasendra sara sangraha Udavartaanaha adhikara. This formulation having ingredients like Rasasindoora[2], Trikatu[3], Haritaki[4] and Shuddha Jayapala[5]. For the above mentioned ingredients Bhavana was done with Mandukaparni swarasa and Changeri swarasa for one day each, then making of vati of one ratti(125mg) size. It helps in curing the diseases like Udara, Kustha, Pandu, krimi and Gulma.

Physical tests shows pH of 5. 5, Total ash value of 3%, Acid insoluble ash-0. 5%, Water-Soluble ash-1%, Loss on drying at 105^{0}C was 3. 78%, Total Fungal Count and Total aerobic microbial count was Nil. Uniformity of weight of prepared vati was 77mg, Friability-0 Disintegration time -20min, Hardness of 2kg. SEM EDS result of Vaidhyanatha vati which shows presence of Hg and S.

Particle size is–2671. 1nm, FTIR peaks shows Carboxylicacid, Alcohol, Aminesalt, Alkane Aromatic ester, Alkyl aryl ether, Methylene, Aromatic ring, Carbonate, Aliphatic fluoro compound, Alkyl substituted ether, Disulphides and Thiols. Though all the parameters done for the preparation of Vaidhyanatha vati shows that it is beneficial in treating the diseases like Udara, Pandu, Kustha, krimi and Gulma.

How to cite this paper: Dr. Suryanarayana S H | Dr. Ravi. R. Chavan | Dr. Usha M "Pharmaceutico - Analytical Study of Vaidhyanatha Vati" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-8 | Issue-6, December 2024, pp.577-590, URL: www.ijtsrd.com/papers/ijtsrd71618.pdf

IJTSRD71618

KEYWORDS: *Vaidhyanatha vati[1], Udara, Pandu, Kustha, krimi and Gulma, Ayurveda medicine*

INTRODUCTION

The quality of the pharmaceutical products depends not only on the care taken in its preparation but also in confirming that the drugs has been correctly identified and then properly processed. A number of purificatory, detoxificatory, incineration procedures were elaborately explained by our ancient acharyas to make metals and minerals therapeutically useful. All these processes lead to Physico-chemical changes, that activate and potentiate the herbal or mineral drug.

Vaidhyanatha vati[1] is a unique herbo mineral preparation referred in Rasendrasara sangraha having ingredients like Rasa sindoora[2], Trikatu[3], Haritaki[4] and Shuddha Jayapala[5]. For the above mentioned ingredients Bhavana was done with Mandukaparni swarasa and Changeri swarasa for one day each, then making of vati of one ratti(125mg) size. It helps in curing the diseases like Udara, Kustha, Pandu, krimi and Gulma.

AIMS AND OBJECTIVES:

Aim:

PHARMACEUTICO-ANALYTICAL STUDY OF *VAIDHYANATHA VATI.*

Objective:

- To compile classical references about *Vaidhyanatha vati* and critically discuss them
- Preparation of *Vaidhyanatha vati* as per classical reference with due importance to SOP.
- To carryout Physico-chemical analysis of Kajjali, Rasa sindoora and *Vaidhyanatha vati.*

METHODOLOGY:

- Raw drugs which were having similar *Grahya lakshanas* as mentioned in the Rasa classical texts, were collected from the market.
- Extraction of Parada from Hingula by subjecting it to Urdwapatana vidhi[7].

- Parada was done shodhana with Haridra churna and did mardana for 24 hours then filtered through four folded cloth.
- Shodhana of Gandhaka was carried out in Godugdha by subjecting it to kurma puta by Bhoodhara yantra method[6].
- Shodhana of Jayapala[5] was carried out in Godugdha by Dola yantra swedana method for 1 yama three times.
- Samaguna Kajjali was prepared by mardana of shuddha parada and shuddha gandhaka for 200 hours.
- Kajjali was given Bhavana with Vatankura swarasa for a day till it get powder form.
- Preparation of Kupi, i. e. amber coloured glass bottle was wrapped with 7 layers of multani mitti smeared cloth and dried completely.
- 200gms of *Kajjali* was filled inside the bottle which occupied less than its lower 1/3rd part.
- Rasa sindoora was prepared by Kupipaka method for 20 hours according to classsics, Kramagni was maintained for whole procedure.
- Churnikarana of all the ingredients i. e., Trikatu, Haritaki, Jayapala was made and sieved by sieve no. 85, fine powder obtained was weighed and kept in a container.
- All the ingredients i. e. *Rasa sindoora, haritaki, trikatu, Shuddha jayapala* is taken in *khalva yantra* made into homogenous mixture. *Bhavana* is carried out by adding *Mandookaparni Swarasa* and *changeri swarasa* for one day each and prepared *vati* of one *ratti* size. (125mg)
- *Vaidhyanatha vati,* thus prepared was sent for Analytical tests.

RESULTS:

Pharmaceutico-Analytical study results are described under 2 headings.

1. Pharmaceutical results
2. Analytical results

1. Pharmaceutical Results:

Showing results from *Hingulottha Parada*

Batch	Wt of *Hingula*taken for *urdhwapatana*	Wt of Parada obtained	Yield %
Batch I	270gm	180gm	70.37%
Batch II	270gm	200gm	

Showing results from *Hingulottha Parada Shodhana*

Wt of *Ashoditha Parada*taken	Wt of Shoditha *Parada*	Yield %
380g	365g	96.05%

Showing results from *Gandhaka Shodhana*

Wt of Gandhakataken	Wt of ShodithaGandhakaobtained	loss	Yield %
500 g	482 g	18gm	83%
482g	450g	32gm	
450g	415g	35gm	

Showing results from *Jayapala Shodhana*

Wt of Jayapalataken	Wt of ShodhitaJayapalaobtained	Loss	Yield %
147 g	134 g	13gm	75.5%
134g	130g	4gm	
130g	111g	19gm	

Showing results from preparation of *Kajjali*

Wt of Parada	*Wt of Gandhaka*	*Wt of Kajjaliobtained*	*Yield %*
360gm	*360gm*	*690gm*	*95.83%*

Showing results from *Churnikarana* of *Vaidhyanatha vati* Drugs

Name of Drug	Initial weight	Weight after *Churnikara*na	Loss	% of Yield
Maricha	50gm	34gm	16gm	77.14%
Pippali	50gm	33 gm	17 gm	75.71%
Shunti	50gm	38 gm	12gm	76%
Haritaki	50gm	40gm	10gm	80%
ShodithaJayapala	50gm	42gm	8gm	82.22%

Showing results from *Bhavana* of ingredients of *Vaidhyanatha vati*

Bhavana Dravya	Quantity of Homogenous mixture of ingredients taken	Quantity obtained	Gain/Loss	Yield %
Mandookaparni swarasa	140gm	147gm	7 gains	107.14%
Changeri swarasa	147gm	150gm	3 gains	

Analytical Results:

Showing Results of Organoleptic characters of *Kajjali*, *Rasa sindoora* and *Vaidhyanatha vati*

Physical test	Kajjali	Rasa sindoora	Vaidhyanatha vati
Colour	Black	Reddish	Greenish Brown
Odour	Odourless	odourless	Characteristic
Taste	Tasteless	Tasteless	Astringent
Touch	Fine	Fine	Tablet form

Showing Results of Physical tests of *Kajjali*, *Rasa sindoora* and *Vaidhyanatha vati*

Parameter	Kajjali	Rasa sindoora	Vaidhyanatha vati
pH (10 % Aqueous Solution)	6.25±0.10	6±0.10	5.5±0.10
Total Ash value	0.04%	0.10 %	3.0%
Acid insoluble ash	Nil	Nil	0.5%
Water soluble ash	Nil	Nil	1%
Loss on drying at 1050C	0.67%	0.20 %	3.78%
Specific gravity	0.95	0.93	0.99
Hardness	-	-	2kg
Uniformity of weight	-	-	77mg
Friability	-	-	0
Disintegration time	-	-	20min

Showing Total Microbial Count of *Kajjali, Rasa sindoora* and *Vaidhyanatha vati*

Parameters	Kajjali	Rasa sindoora	Vaidhyanatha vati
Total aerobic count	Nil	Nil	Nil
Total fungal count	Nil	Nil	Nil

Showing the Results of Chemical tests of *Kajjali, Rasa sindoora* and *Vaidhyanatha vati*

Elements	Kajjali	Rasa sindoora	Vaidhyanathavati
Total Mercury	60.50%	26.15%	19.34%
MercurousMercury	1.90%	0.30%	0.29%
Mercuric Mercury	58.25%	15.85%	14.05%
Free Mercury	0.35%	0.00%	0.00%
Total Sulphur	25.25%	22.18%	21.82%
Sulpide	22.50%	21.15%	21.24%
Sulphite	2.65%	1.03%	0.52%
Sulphate	0.00%	0.00%	0.00%
Free sulphur	0.02%	0.00%	0.00%

Showing XRD results of *Kajjali*

Sample	Compound Name	Chemical Formula	Crystal Structure
Kajjali	Metacinnabar	HgS	Cubic
	Sulphur	S	Orthorhombic

Showing XRD results of *Rasa sindoora*

Sample	Compound Name	Chemical Formula	Crystal Structure
Rasa sindoora	Metacinnabar	HgS	Cubic
	Sulphur	S	Orthorhombic

Showing XRD results of Vaidhyanatha vati

Sample	Compound Name	Chemical Formula	Crystal Structure
Vaidhyanatha vati	Metacinnabar	HgS	Cubic
	Sulphur	S	Orthorhombic

Showing SEM EDS result of *Kajjali*

Sl. no	Element	Weight %	Atomic %
1.	S K	22.58	64.60
2.	Hg M	77.42	35.40

Showing SEM EDS result of *Rasa sindoora*

Sl.no	Element	Weight%	Atomic%
1	S K	14.97	52.41
2	Hg M	85.03	47.59

Showing SEM EDS result of *Vaidhyanatha vati*

Sl.no	Element	Weight%	Atomic%
1	S K	13.13	48.59
2	Hg M	86.87	51.41

Showing Particle Size of *Kajjali*, *Rasa sindoora* and *Vaidhyanatha vati*

Sample	Mean diameter(nm)
Kajjali	526.2nm
Rasa sindoora	1386.8nm
Vaidhyanatha vati	2671.1nm

Showing FTIR Peaks of *Kajjali*

Sample peaks Cm-1	Bond	Functional groups
3435.45	O-H[strong] stretching N-H [Medium] stretching	Alcohol Primary amine
2920.82	O-H [Strong] stretching O-H [weak] stretching N-H [strong] stretching C-H [medium] stretching	Carboxylic acid Alcohol Amine salt. Alkane
2851.05	O-H[strong] stretching O-H [weak] stretching N-H [strong] stretching C-H [medium] stretching	Carboxylic acid Alcohol Amine salt. Alkane
1632.51	C=C [medium] stretching C=C [medium] stretching N-H [medium] stretching C=C [medium] stretching C=C [strong] stretching S=O [strong] stretching	Alkene vinylidene Conjugated alkene Amine Cyclic alkene Alkene sulfone
1418.31	C-H [medium] stretching O-H[medium] stretching S=O [strong] stretching	Alkane methyl group Alcohol Sulfate
781.97	C-H [strong] stretching C-H [strong] stretching	1,2,3 trisubstituted 1,3 disubstituted

Showing FTIR Peaks of *Rasa sindoora*

Sample peaks Cm-1	Bond	Functional groups
3779.85	O-H(strong) intermolecular bonded	Alcohol Aliphatic primary amine, Secondary amine
3435.77	O-H[strong] stretching N-H [Medium] stretching	Alcohol Primary amine
2973.25	O-H [Strong] stretching O-H [weak] stretching N-H [strong] stretching C-H [medium] stretch	Carboxylicacid Alcohol Amine salt Alkane

2345.99	N-H (medium), bending C=C (strong), stretching C=C (medium) stretching	Amine Alkene (Monosubstituted) Alkene(disubstituted), Conjugated alkene
2058.85	C-H(medium)bending O-H(medium) bending	Alkane (methyl group) Carboxylic acid
1637.27	C=C [medium] stretching C=C [medium] stretching N-H [medium] stretching C=C [medium] stretching C=C [strong] stretching S=O [strong] stretching	Alkene vinylidene Conjugated alkene Amine Cyclic alkene Alkene sulfone
1459.07	C-H(strong) bending C=C-C stretching	Methylene Aromatic ring Carbonate ion
1384.25	O-H bending C-H (strong)bending C=C (medium) bending	Phenol Alkane (methyl group) carbonyl
1152.90	C-N(strong) Stretching C-O(strong)Stretching	Aromatic amine Tertiary alcohol
1055.70	C-N(strong) Stretching Si-o-Si C-O(strong)Stretching C-F stretching	Aromatic amine silicone Alkyl-ether Aliphatic fluoro compound
953.07	C-H(medium)bending	Aromatic Silicate ion
816.84	C=C (medium) bending C-H(strong) bending	Alkene(trisubstituted) 1,4-disubstituted or 1,2,3,4-tetra substituted,
601.01	C-S stretching S-S strecthing	Disulphides Thiols
548.75	C-I(strong)stretching	Aliphatic

Showing FTIR Peaks of Vaidhyanatha vati

Sample peaks Cm-1	Bond	Functional groups
3420.00	O-H (strong)stretching C-H (strong) stretching	Alcohol, Aliphatic primary amine Alkyne
3010.04	O-H (strong) stretching O-H (weak) stretching N-H (strong) stretching C-H (medium) stretching	Carboxylic acid Alcohol Amine salt Alkane
2924.60	O-H [Strong] stretching O-H [weak] stretching N-H [strong] stretching C-H [medium] stretching	Carboxylic acid Alcohol Amine salt Alkane
2853.95	O-H[strong] stretching O-H [weak] stretching N-H [strong] stretching C-H [medium] stretching	Carboxylic acid Alcohol Amine salt Alkane
1744.09	C=C stretching	Carbonyl Alkyl carbonate
1711.81	C=C stretching	Carbonyl Carboxylic acid
1631.45	C=C[medium] stretching C=C[medium] stretching N-H [medium] stretching	Alkene vinylidene Conjugated alkene Amine

	C=C[medium] stretching C=C [strong] stretching S=O [strong] stretching	Cyclic alkene Alkene sulfone
1541.14	C-O (strong) stretching	Aromatic ester, Alkyl aryl ether
1457.46	C-H(strong) bending C=C-C stretching	Methylene Aromatic ring Carbonate ion
1382.99	O-H bending C-H (strong)bending C=C (medium) bending	Phenol Alkane (methyl group) carbonyl
1239.37	P-O-C stretching C-C vibration	Aromatic phosphates Methyne
1159.77	C-N(strong) Stretching C-O(strong)Stretching	Aromatic amine Tertiary alcohol
1077.91	C-C vibration C-H(strong) bending C-F stretching C-O (strong) stretching	Methyne Aromatic Aliphatic fluoro compound Alkyl substituted ether
759.80	C-Cl stretching C-H Bending	Aliphatic chloro compound 1,2,3-disubstituted
608.45	C-S stretching S-S strecthing	Disulphides Thiols
577.59	C-S stretching O-H bending	Disulphides Alcohol

Discussion

- *Vaidhyanatha vati* is a unique Herbo-mineral *Kharaliya* preparation explained under *udavarta-anaha rogaadhikara* in *Rasendra sara sangraha*. The name *Vaidhyanatha* for the formulation is because the formulation is told by *Acharya Vaidhyanatha.*
- In *Vaidhyanatha vati*, *Rasa sindoora* has been advised, *Rasashastra* texts signify utmost importance for quantity/Ratio of Sulfur to Mercury in *Rasa sindoora* preparation for desired therapeutic effect.
- Herbal Poisonous drug like *Shuddha Jayapala* was taken and other herbal drugs like *Trikatu, Haritaki,* are homogenously triturated with *Mandookaparni swarasa and Changeri swarasa* for 1 day each.
- *Acharya* has formulated this preparation in a unique way that ingredients help in *amadosha nivarana* and also does *Deepana, Pachana* and has *Rasayana* effect. Hence it can be used in *Udara, Kustha, Gulma, Pandu and krimi.*

Discussion on *Hingulottha Parada*:

Hingula contains *Parada* which is chemically bonded with *Gandhaka* which is an innate co-drug for *parada bandha*, and thus helps inorganic mercury to end in safe absorbable pharmaco-therapeutically effective mercury molecule.

***Bhavana* of *Hingula* with *Nimbu swarasa*:**

Mechanical trituration along with acidic media converts *Hingula* into finer particles and helps in sublimation, Here the surface area increases, this helps for rapid and uniform reaction.

- Citric acid helps in disintegration of HgS, Organic acid is responsible to weaken the bond and hence facilitates dissociation of mercury.

***Hingulottha Parada- Mardana* with *Haridra*:**

- *Parada* extracted from *Urdhwapatana vidhi* was triturated with *Haridra churna* for 24 hours, to remove the impurities present in *Parada* and to ensure further purity, safety and specific activity.

Discussion on *Gandhaka Shodhana*:

- *Gandhaka Shodhana* was done by *Kurmaputa* method, using milk as media[6].

Jayapala Shodhana

- *Godugdha* was used as a detoxifying agent for *Jayapala Shodhana*. When the Croton seeds were steamed in milk, the calcium present in milk chelated with crotonic acid and Tigilic acid, active constituents of *Jayapala*.

***Churnikarana* Process:**

- *Churnikarana* of *Shunti, Maricha, Pippali, Haritaki* and *Shuddha Jayapala* done in a mixer and then sieving was done with sieve no. 85, percentage of yield was 77. 14%, 75. 71%, 76%, 80%, and 82. 22% respectively.

***Kajjali* Preparation:**

- The process of constant trituration of *Shuddha Parada* and *Shuddha Gandhaka*, packs the *Gandhaka* molecules in between the layers of *Parada* molecules & the compact placement of Sulfur molecules becomes more fixed with continued trituration. Maximum duration of *mardana* may cause more bonding of Sulfur and mercury and reduce the free mercury.
- *Kajjali* was prepared in 200 hrs. Loss was there because volume of *Kajjali* was more, weight of *Kajjali* was 720gms when started, at the end of 200 hrs. it was 690gms. So utmost care is necessary during *Kajjali* preparation.

Preaparation of *Rasa sindoora:*

- *Kajjali* was prepared by combining *Shuddha parada* and *Shuddha Gandhaka*, then 200gms of *kajjali* was taken and subjected to bhavana with *Vatankura swarasa.* After drying, *Kajjali* made into powder form, then filled in *Kachakupi* which was smeared with 7 layers of *Multani mitti* smeared cloth. Later it was subjected to *Kupipaka* method where *kramagni* was maintained. It took 20 hours for completion of the preparation. Next day after *swangasheetata* the kupi bottle was broken by using thread dipped in kerosene for easy breaking of kupi without losing its product from the bottle. Then *rasa sindoora* was collected from the *kupi*, obtained quantity of the product was 108gms.
- It has therapeutic indication like *kaphaja roga, Balakshaya, Dhatu kshaya, Hruddaurbalya, Prameha, Gulma, Pandu, Sthoulya, Mandagni, Sannipataja jwara* and many other diseases with different *anupanas.*

Preparation of *Vaidhyanatha vati*

A. Preparation of *Vaidhyanatha vati* Mixture:

- *Vaidhyanatha vati* was prepared step by step, starting with 20gms of *Rasa sindoora,* which was finely powdered. Then, 60gms of *Trikatu and 20gms* of *Haritaki* were added and triturated. Finally, 40gms of *Shuddha Jayapala* was incorporated and triturated until a homogenous mixture was achieved.

B. Bhavana of Vaidhyanatha vati

- The obtained homogenous mixture of *Vaidhyanatha vati*, 250ml of *Mandookaparni swarasa* and 270ml of *Changeri swarasa*, was added until the mixture is completely immersed in the liquid and *Bhavana* was carried out for 1day each and up to *subhavita laxanas* observed. Then *vati* of 1 *ratti* size was made.
- By observing *bhavana* media, first bhavana *dravya* i. e *Mandookaparni swarasa* with chemical constituents of two tri-terpene acid – brahmic and iso-brahmic acid, two saponons, trieterpene glycoside. Fresh leaves contain essential oil, sitosterol and tannins. *Mandookaparni swarasa* is *Medhya* and used in *kamala*.
- Bhavana was done using *Changeri swarasa* which is having phytoconstituents of malic acid, tartaric acid, citric acid, isovitexin, carotene etc, which have properties like anti-fungal, immune modulator, skin diseases and stimulates digestive fire.
- Wet grinding of the drug with liquid media facilitates the particle size reduction and homogenization leading to modification of the properties (*Gunantaradhana*) of the end product. And makes inorganic substances suitable for body by reducing the *gunas* like *Shushkata, Rukshata* and *Teekshnata*.
- Chemical constituents such as Vitamin C, niacin, phosphorous, malic acid etc. and amino acids such as leucine, phenylalanine, arginine, tannins, sitosterol's were transferred into the
- *Vaidhyanatha vati* mixture. *Changeri swarasa* showed anti-allergic, anti-inflammatory activity, anti-viral, anti- pyretic activity, anti-oxidant property.
- Thus, these *bhavana dravyas* in one or the other way augments the properties and aids in treating *Udara, Gulma, kustha, krimi* and *Pandu.*

Discussion on pH value:

- The pH value of *Kajjali, rasa sindoora, Vaidhyanatha vati* were 6. 25±0. 10, 6±0. 10 and 5. 5±0. 10 respectively. The pH of *Vaidhyanatha vati* was around 5. 5±0. 10 which implies that drugs are better absorbed from stomach. In acidic medium acidic drug is present in unionized form, which increases its absorption.

Discussion on Total Ash Value:

- *Kajjali*, *rasa sindoora, vaidhyanatha vati* were evaluated for ash value and it was found to be 0. 04%**,** 0. 10% and 3% respectively which indicates the presence of inorganic materials.

Discussion on acid insoluble ash

- Acid insoluble ash of the *Kajjali*, *rasa sindoora, vaidhyanatha vati* were nil**,** nil and 0. 5% respectively. It signifies that lesser amount of silica material, dirt or sand in the sample.

Discussion on water soluble ash

- The water-soluble ash of *Kajjali*, *rasa sindoora, vaidhyanatha vati* were Nil, Nil and 1 % respectively. It indicates that water soluble contents of the drug.

Discussion on loss on drying at 1050c

- In the present study *Kajjali, rasa sindoora, vaidhyanatha vati* are having 0. 67 %**,** 0. 20% and
- 78% respectively, loss on drying at 105^0C. Hence it can be stated that all have very less amount of moisture content and very rare chance of bacterial and fungal growth.

Discussion on Microbial limit test

- Total Bacterial count and Total Fungal count are Nil; Shows no growth. This may be due to least moisture content in the sample and proper storage of the drug in an air tight container.

Friability Test:

- Friability of Tablets of *Vaidhyanatha vati* was zero (0) which shows the physical strength and durability of the prepared *vati* is acceptable.

Disintegration time:

- The time duration at which the tablet disintegrated was 20 minutes which shows that *vati* is easily absorbable in the gut.

Hardness Test:

- The force of fracture was 2kg which implies bioavailability and drug release profiles of the prepared *vati* is acceptable.

Particle size Analysis (by Zeta PALS method):

- Mean Particle size of *Kajjali* is –526. 2 nm
- Mean Particle size of *Rasa sindoora* is – 1386. 8 nm
- Mean Particle size of *Vaidhyanatha vati* is –2671. 1 nm
- The particle size has significant influence on dissolution rate. Smaller the drug particle size larger the surface area, leads to faster dissolution.
- Particle size reduction will result in precise drug delivery and thereby increasing the bio availability of the drug.
- The increase in particle size after Bhavana may be due to the aggregation of particles with the liquid media.

Discussion on FTIR:

- The obtained peaks of the *Kajjali*, *rasa sindoora, vaidhyanatha vati* were compared with the standard peaks. It showed the presence of different functional groups like Alcohol, Amine salts, Anhydrides, Alkanes, Alkenes, Alkynes, Aromatics, Bromide, Iodide, Chloride, Ethers, Carboxylic acids, Esters, Amines, Nitro, Fluro, Halo compounds, Sulfone, Primary and secondary amines and amides. This shows the presence of organic compounds in the drug.

Discussion on SEM EDX:

- Elements found in *Kajjali* are Hg, S, in the percentage of 77. 42%, 22. 58% respectively. This shows that mercury is in greater proportion and the elements may be in the form of sulphide and oxides.
- Elements found in *Rasa sindoora* are S, Hg in the percentage of 14. 97%, 85. 03%, respectively.
- Elements found in *Vaidhyanatha vati* are S, Hg in the percentage of 13. 13, 86. 87, respectively.
- Variation in the percentage of the element might have also occurred due to heterogeneous mixing of the sample.

Probable Mode of Action

- Observing to all ingredients of Vaidhyanatha vati, suggest that it mostly contains *Dipana, Pachana, Rasayana* and *Srotoshodhaka dravyas.* Collectively they mainly act on *Rasavaha, Annavaha,* and *Swedavaha Srotas.*

Ingredients present in Vaidhyanatha vati Such as

- *Shuddha Parada* and *Shuddha Gandhaka* together form a compound called *Kajjali*; than from that *Kajjali*, *Rasa sindoora* was prepared, this compound is found to be effective in diseases of all *Srotas*. The impact is *Tridoshahara*, and *rasayana* which immediately spreads in the body when consumed because of fast acting of *rasasindoora*.
- *Rasa sindoora* is not absorbed in the GI tract, it is postulated that it eventually acts as GI stimulant, locally also as a neuro-chemical irritant for the intestinal mucosa. It also acts as a catalyst and hence through its catalytic activity, better absorption of herbal pharmacological molecules is achieved. Hence, the net resultant activity of *Rasa sindoora* is that it eventually increases the bioavailability of ingested drugs.
- *Sunthi* is an excellent remedy for *Amapachana* as it is gastrointestinal stimulant and also known for its Anti-pyretic, Anti-inflammatory, Anti-cancer and Anti-microbial properties.
- *Maricha* is having Antioxidant, Muscle-relaxant, Anti-inflammatory, sedative and Analgesic activity, particularly valuable in treating fever, especially as a supportive agent alongside more

potent febrifuge drugs. It stimulates the digestive system throughout its entire length.

- *Pippali* serves as a *Rasayana* or Rejuvenator agent. It possesses Anti-histaminic, Insecticidal Anti-tubercular, Immunomodulatory, Hepatoprotective, Anti-inflammatory, Anti-fungal and Anti-depressant activity.
- *Haritaki* which is *Kashaya rasa pradhana pancharasa*, *Madhura vipaka, Ushna virya* and having *lekhaniya, smritiprada, rasayana, shothanut, deepana, pachana* properties helps in treating the disease.
- *Shuddha Jayapala* with acrid, bitter taste has thermogenic, emollient, drastic purgative, digestive carminative, Anti-helminthic, anti-inflammatory, vermifuge, diaphoretic, expectorant, vesicant irritant, rubefacient, also does *lekhana, krmighna, virechaka*, helps in removal of obstruction in *srotas* and elimination of vitiated *doshas. Virechana* is chief line of treatment in *Udara roga* and *jayapala* containing formulations are used in various diseased conditions of *Udara roga* as it has purgative action.
- *Mandookaparni* which is one among the *Medhya chatushka* which improves brain function and calms the mind.
- *Changeri swarasa* is *amla rasa pradhana Dravya* it helps in *Aruchi* and *agnimandya.* It has karma like *shothahara, lekhana, Sangyaprabhodana.*
- The presence of *shuddha Jayapala and Rasa sindoora* is an unique feature of *Vaidhyanatha vati* which has quicker action in lower dosage.
- Importance of *Bhavana Dravya* - Repeated *Bhavana* (levitation) of ingredients with above said *Bhavana Dravya* makes these formulations more effective and fast-acting.
- *Tikta* and *Katu rasas* are present in majority of the ingredients. *Deepana, Pachana, Lekhana, Shotagna* and *Krimighna* properties are present in majority of the ingredients which aids in *Samprapti vighatana* of *Udara, Kustha, Pandu, Gulma and krimi.*
- *Rasasindoora* act as bio enhancers to effectively augment the qualities of the above formulation.

CONCLUSION

Conclusions are drawn based on the observation and interpretations made during the whole study.

[1] *Vaidhyanatha vati is* one of the *Kharaliya Rasayana.* There are 3 references with no variation in quantity of ingredients. Among them *Rasendra sara sangraha* reference was selected for study as it is considered as authoritative books of Ayurveda, specified in first Schedule of Drug and Cosmetic Act.

[2] *Vaidhyanatha vati* total quantity prepared was 150gms. It is prepared by *R*asa sindoora– 20gms, *Trikatu–60 gms, Haritaki– 20gms,* and *Shuddha Jayapala–* 40 gms and given *bhavana* with *Mandookaparni swarasa and Changeri swarasa, .*

[3] Physical test shows *Vaidhyanatha vati* is greenish brown in colour with bitter and astringent to taste, fine to touch, characteristic odour and with pH – 5. 5±0. 10.

[4] XRD study compared with 2θ angle and JCPDF standards and confirms that *Vaidhyanatha vati* is a compound of Metacinnabar in cubic crystal system, Sulfur in Orthorhombic crystal system.

[5] Elements present in *Vaidhyanatha vati* has confirmed by the EDS study are S and Hg in the Weight percentage of 13. 13 and 86. 87 respectively.

[6] FTIR analysis of *Vaidhyanatha vati* shows it contains organic functional group like Amine salt, Alkyne, CarboxylicAcid, Alcohol, Alkane, Aromatic compound, Amine, Alkene, Nitro-Fluro-Halo compound, Phenol, Aromatic ester, Alkene.

[7] Mean particle size of *Vaidhyanatha vati* is 2671. 1 nm, lesser the particle size greater the bio availability of the drug.

[8] *Vaidhyanatha vati* at the dose of one ratti size *with* suitable *anupana* solely indicated in and *Udara, Gulma, Pandu, Kustha and Krimi.*

Photos

Fig no 1
Hingula mardana

Fig no 2
Hingulotha Parada Yantra

Fig no 3
Hingulottha Parada

Fig no 4
Hingulottha Parada shodana with Haridra churna

Fig no 5
Shodita parada

Fig no 6
Gandhaka Shodhana

Fig no 7
Kurmaputa for Gandhaka shodhana

Fig no 8
Shodhitha Gandhaka

Fig no 9
Shodhita parada+ shodhita gandhaka

Fig no 10
Observation after 5 min

Fig no 11
Observation after 3 hr

Fig no 12
Rekhapurnatva test

Fig no 13
Varitara Test

Fig no 14
Jayapala Shodhana with Milk

Fig no 15
Shodhita Jayapala

Fig no 16
Vatankura swarasa bhavana for kajjali

Fig no 17
Materials for Kupi preparation

Fig no 18
Kupi bhatti

Fig no 19
Kupi in Valuka yantra

Fig no 20
Suryodaya laxana

Fig no 21
Copper coin test

Fig no 22
Breaking of Kupi

Fig no 23
After opening of kupi

Fig no 24
Rasa sindoora

Fig no 25
Churnas for Vaidhyanatha vati

Fig no 26
Vaidhyanatha vati

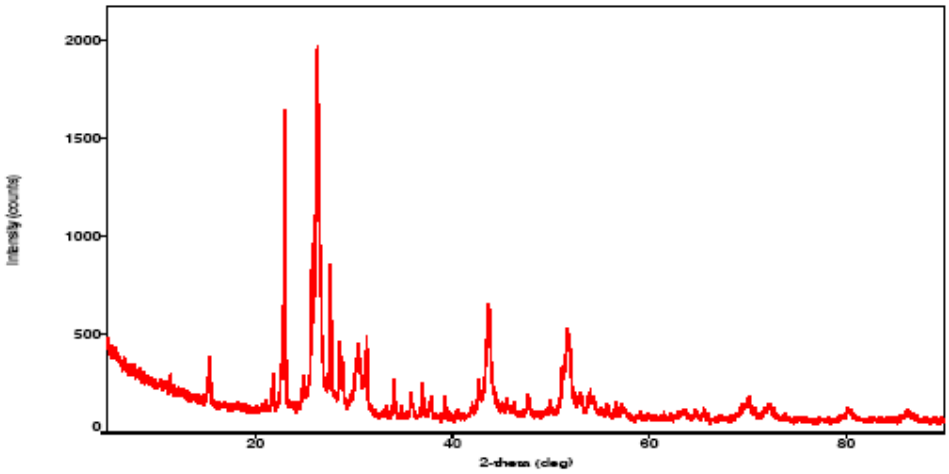


Fig no 27
XRD Peaks of
Rasa sindoora

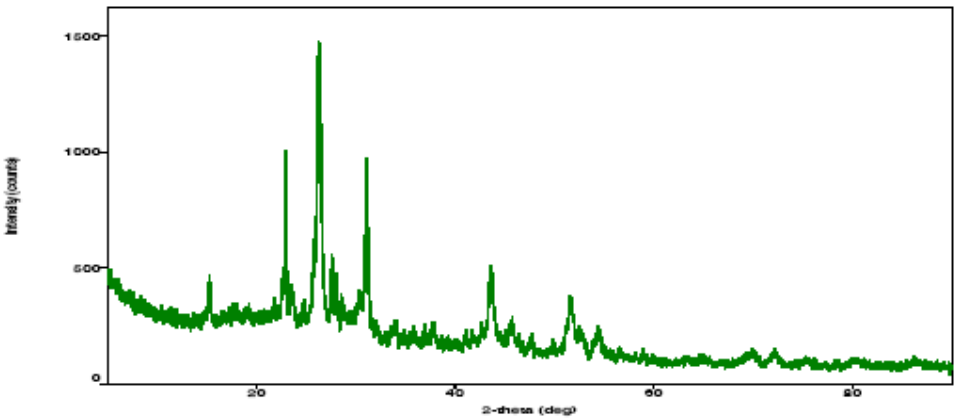
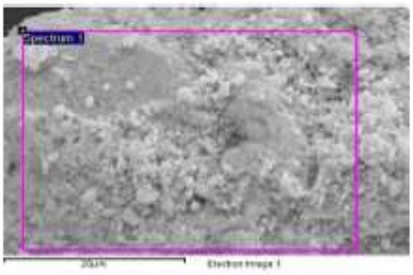


Fig no 28
XRD Peaks of
Vaidhyanatha
vati



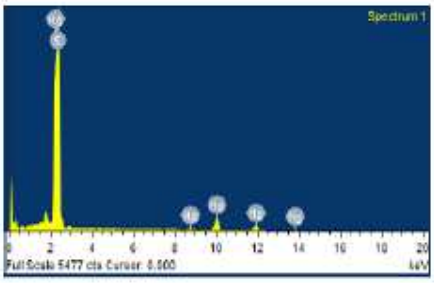


Fig no 29
SEM-EDS of Kajjali

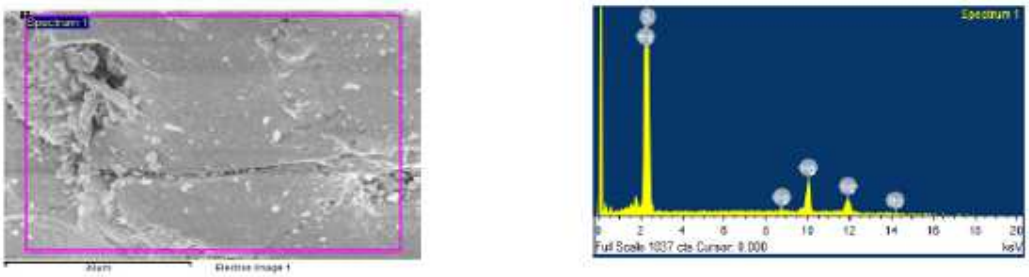


Fig no 30
SEM-EDS of Rasa sindoora

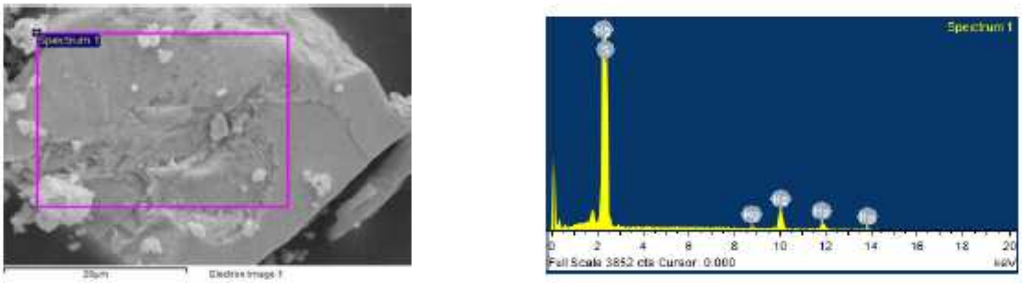
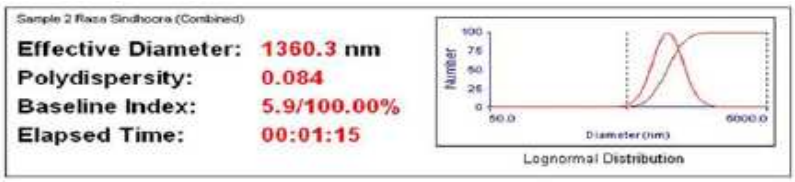


Fig no 31
SEM-EDS of Vaidhyanatha vati

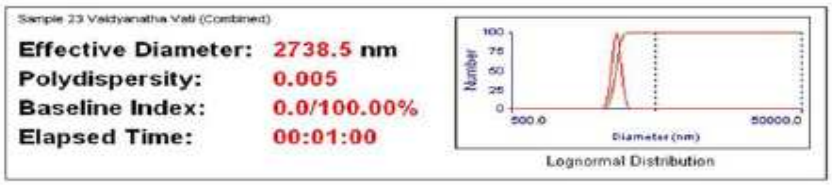
Run	Eff. Diam. (nm)	Half Width (nm)	Polydispersity	Baseline Index
1	505.3	35.7	0.005	4.1/100.00%
2	628.4	44.4	0.005	5.7/100.00%
3	333.4	84.9	0.065	5.6/100.00%
4	480.4	34.0	0.005	7.8/100.00%
5	344.3	24.3	0.005	9.8/100.00%
Mean	458.4	44.7	0.017	6.6/100.00%
Std. Error	54.9	10.5	0.012	1.0/ 0.00
Combined	539.5	38.1	0.005	6.6/100.00%

Fig no 32
Particle Size Analysis of Kajjali



Run	Eff. Diam. (nm)	Half Width (nm)	Polydispersity	Baseline Index
1	1236.3	87.4	0.005	0.0/100.00%
2	1290.7	91.3	0.005	9.4/100.00%
3	1431.2	378.1	0.070	3.1/100.00%
4	1410.5	812.3	0.332	0.0/100.00%
5	1421.6	322.2	0.051	3.0/100.00%
Mean	1358.1	338.3	0.093	3.1/100.00%
Std. Error	39.7	132.4	0.061	1.7/ 0.00
Combined	1360.3	393.1	0.084	5.9/100.00%

Fig no 33
Particle Size Analysis of Rasa sindoora



Run	Eff. Diam. (nm)	Half Width (nm)	Polydispersity	Baseline Index
1	3329.7	235.4	0.005	0.0/100.00%
2	3021.2	213.6	0.005	2.1/100.00%
3	2247.2	1229.1	0.299	0.0/100.00%
4	2271.2	1060.7	0.219	9.7/100.00%
5				
Mean	2717.1	884.7	0.132	3.0/100.00%
Std. Error	271.7	268.0	0.075	2.3/ 0.00
Combined	2738.5	193.6	0.005	0.0/100.00%

Fig no 34
Particle Size Analysis of Vaidhyanatha vati

References:

[1] Shri Gopala krsna. Rasendra sara sangraha. Edited by Pt. Brahma Sankar Mishra. 6thEdition. Varanasi: Chaukhamba Amarabharati Prakashan; Udavartaanaha chikitsa adhyaya, verse, 1-2, 335-336pp.

[2] Sri Sadananda Sharma, Rasa Tarangini, edited by Kashinath Shastri, 11th Edn, New Delhi, Motilala Banarasidas publication, 1979, 6th Chapter, Version 168-189.

[3] P. C. Sharma, M. B. Yelne, T. J. Dennis. Database on medicinal plant used in Ayurveda and siddha. CCRAS:NewDelhi; Reprint 2005, Vol 4, 187pp.

[4] Dr. J. L. N. Shastri, Dravya Guna Vijnana (Study of Essential Medicinal plants in Ayurveda), 2nd Edn, Varanasi, Chaukhambha Orientalia, 2005, I volume, 108pp.

[5] Dr. J. L. N. Shastry. DravyaGunaVijnana (Study of Essential Medicinal plants in Ayurveda), 2ndEdition. Varanasi: Chaukhambha Orientalia; 2005, II volume, 209pp.

[6] Dr. J. L. N. Shastri, Dravya Guna Vijnana (Study of Essential Medicinal plants in Ayurveda), 2nd Edn, Varanasi, Chaukhambha Orientalia, 2005, II volume, 105-106pp.

[7] Sri Sharma Sadananda. Rasa Tarangini. Edited by Pandith Kashinath shastri. 11th Edition. Delhi: Motilal Banarasidas Publication; 1979. 24th Taranga, Verse 5, 647pp.

[8] Acharya Shri Madhava, Ayurveda Prakasha, Hindi commentaries, edited by Shri Gulrajsharma Mishra, reprint, Varanasi, Chaukhambha Bharati Academy publication, 1999, 2nd chapter, verse 19, 260pp

[9] Prof. Siddinandan Mishra, Ayurvediya Rasa Shastra, 10th Edition, Varanasi Chaukhambha Orientalia, 2000, 209pp. or siddhabhaishaja manimala 5th chapter.