

PHARMACEUTICO ANALYTICAL STUDY OF SHRI RAMBANA RASA

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ABSTRACT

Shri ramban rasa is a unique formulation which is favourable in the management of *amavata*. Regardless of its betterment in the management of *amavata*, no research work has been carried out till date. The main aim of this study was preparation of *Shri ramban Rasa* as disclosed in the classics & Physico-chemical analysis of *Shri ramban Rasa*. *Shri ramban Rasa* was processed using *Kajjali, vatsanabha, lavanga, maricha, jatiphala, chinchaphala swarasa*. The above ingredients were mixed to get a homogenous mixture of *Shri ramban Rasa* which was given 1 *Bhavana* with *chinchaphala swarasa* and later it is dried and stored in air-tight container. The Physico chemical analysis of *Shri ramban Rasa* before (*RB-BB*) and after *bhavana* (*RB-AB*) was done. *Shri ramban Rasa* is not only used in *amavata* but also in *agni mandya* and *grahani* also.

Keywords: *Shri ramban Rasa*, XRD, FTIR, SEM-EDAX.

INTRODUCTION

Rasashastra is a branch of *Ayurveda* which deals with metallo-mineral preparations aimed at achieving *Lohavada* & *Dehavada*. These preparations became acceptable due to its assimilatory property in the minute doses. *Shri rambanRasa*¹(*RB*) is one such *Khalviya rasayana* mentioned in the classics which have a distinct method of preparation than any other formulation that is beneficial in the management of *Amavata*². There are numerous formulations in the name of *Shri rambanRasa*. In the present study the formulation is taken from the text *bhaishajya ratnavali agni mandya adhikara*.

The analytical study reveals the chemical composition of the formulations as well as their concentration. By this it helps to ensure safety limits and accuracy of the drug. Physico-chemical analysis of the drugs is carried out by using current analytical methodologies for understanding and interpretation of physico-chemical changes occurring

during and after pharmaceutical processing. The Physico chemical analysis of *Shri rambanRasa* before *bhavana* (*RB-BB*) and after *bhavana* (*RB-AB*) was done.

MATERIALS AND METHODS

Pharmaceutical stride involved in preparation of *Shri rambanRasa*:

1. Extraction of *parada* from *hingula* by *hingulottha parada* method³.
2. *Vatsanabha shodhana* by *gomutra sthapana* for 3days under sunlight⁴.
3. *Gandhaka shodhana* by *kurmaputa method*⁵.
4. Preparation of fine powder of other ingredients.
5. Preparation of homogenous mixture of *Shri ramban Rasa* ingredients.
6. Addition of *Chincha phala swarasa* and *bhavana* was given till it dried completely.

Table 1: Table showing list of drugs with Quantity

Sl no	Drug Name	Quantity
1.	<i>Shuddha parada</i>	100g
2.	<i>Shuddha Gandhaka</i>	100g
3	<i>Shuddha vatsanabha</i>	100g
4	<i>Lavanga</i>	100g
5	<i>Maricha</i>	200g
6	<i>Jatiphala</i>	50g
7	<i>Chincha/Tintidi phala swarasa</i>	Q.S

Procedure:

METHOD OF PREPARATION- Add 1 part each of *Sh.parada* and *Sh.gandhaka* in a clean *khalwa* and do *mardhana* till *kajjali siddhi lakshana* is attained. Later add fine powders of *Sh.Vatsanabha*, *Lavanga*, *Maricha* and *Jatiphala* according to above mentioned quantity, when it turns to homogeneous mixture add *chinchaphala swarasa* and do *bhavana* till it completely dries.

Observations:

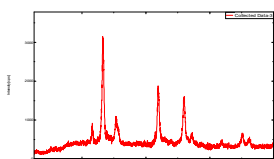
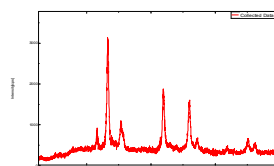
- ❖ Mixing of *kajjali* and *Vatsanabha churna* , took 1 hour and the mixture was light black in colour.
- ❖ Mixing of *lavanga churna* took 2 hour. The colour of mixture changed to dark brown in colour with pungent odour.
- ❖ Mixing *maricha churna* took 2 hour. The mixture was brownish black in color and was irritated pungent odour.
- ❖ Mixing of *jathiphala* took 1 hour and colour of mixture changed to blackish brown with pungent odour.

- ❖ Initially when the *chinchaphala swarasa* was added and as soon as *mardana* was started RBR became thin paste and there was very free movement of *Peshani* during *Bhavana*.
- ❖ After about one and half hours of *Bhavana* the paste started becoming sticky. After two and half hours of *Bhavana*, paste became thicker. After about three and half hours of *Bhavana*, the product was highly thick and was adhering to both *Peshani* and *Khalva* and it became difficult for the free movement of *Peshani* in the *Khalva*. At this there was flap of product observed while taking the product with the spoon to the centre of *Khalva*. By around 6 hours of *Bhavana*, the product completely got dried up.
- ❖ During levigation smell of *chinchaphala* was found continuously.

The colour of *Shri ramban rasa* was changed from jet black to greyish black

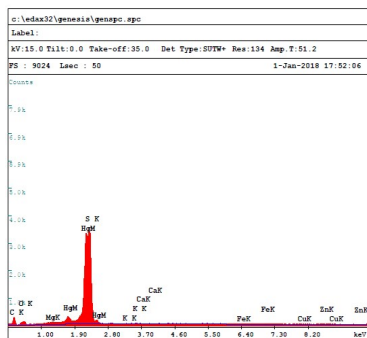
XRD Results of RB-BB & RB-AB:

□ XRD peaks of *RB-BB* & *RB-AB* samples which were compared with standard D-space JCPDF values confirmed the presence of Meta-cinnabar (HgS) in Cubic, Sulfur (S) in Trigonal crystal system.

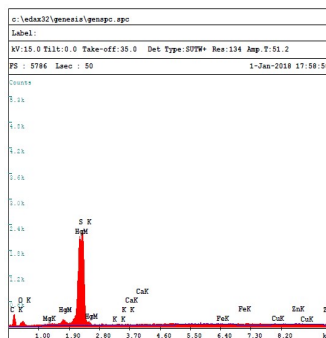
*RB-BB**RB-AB***Table 2:** Showing Comparative SEM-EDX results of *RB-BB* & *RB-AB*

R.B-B.B		RB-AB.	
Element	Mass %	Element	Mass %
C	12.04	C	17.32
O	2.58	O	3.42
S	12.07	S	11.98
K	0.20	K	0.30
Ca	0.20	Ca	0.12

Fe	0.45	Fe	0.58
Cu	1.10	Cu	0.95
Zn	2.10	Zn	1.80
Mg	0.59	Mg	0.38
Hg	68.69	Hg	63.14



RB-BB

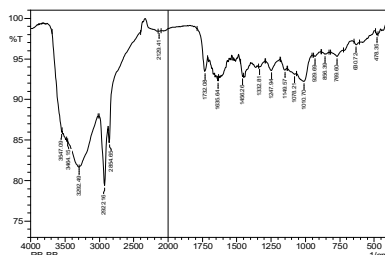


RB-AB

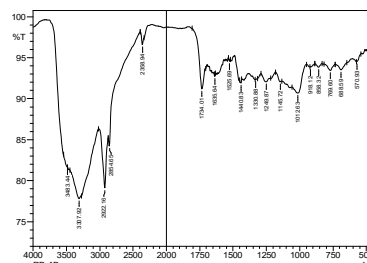
FTIR:

FTIR analysis shows that RB-BB contains functional groups like alcohol, amines, amide, phenol, acid, carboxylic acid, azide, carbodimide, isothiocyanate, aldehyde, aromatic groups, and conjugated anhydride.

FTIR analysis shows that RB-AB contains functional groups like alcohol, amine, amide, phenols, alkynes, acid, carbonyl, aldehyde, aliphatic, aromatics, nitro compounds, alkane, sulfone, fluoro.



RB-BB



RB-AB

Particle Size Results

Table 3: Showing result of Particle Size of kajjali, R.B-B.B, RB-AB

Sample	Mean diameter(nm)	Standard error	Effective diameter(nm)
Kajjali	339.1	9.7	338.1
RB-BB	533.1	19.2	527.5
RB-AB	628.0	35.4	622.1

HPTLC

Table 4: Showing R_f Values Of Samples RB-AB, RB-BB At 254nm & 366 nm

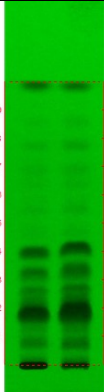


Short UV		Long UV	
RB-AB	RB-BB	RB-AB	RB-BB
-	-	-	-
0.08 (D. green)	0.08 (D. green)	0.08 (F. blue)	0.08 (F. blue)
-	-	0.18 (F. blue)	0.18 (F. blue)
0.21 (D. green)	0.21 (D. green)	-	-
-	-	0.24 (F. blue)	0.24 (F. blue)
0.29 (D. green)	0.29 (D. green)	0.28 (F. green)	0.28 (F. green)
0.35 (D. green)	0.35 (D. green)	-	-

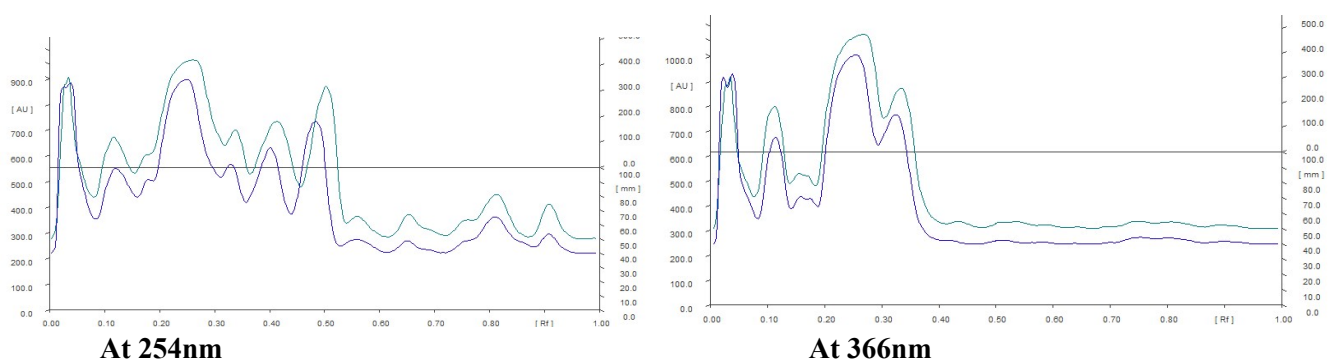
-	-	0.39 (F. blue)	0.39 (F. blue)
0.42 (D. green)	0.42 (D. green)	0.43 (F. blue)	0.43 (F. blue)
-	-	0.49 (F. blue)	0.49 (F. blue)
0.55 (Green)	0.55 (Green)	0.54 (F. blue)	0.54 (F. blue)
-	-	0.59 (F. red)	0.59 (F. red)
0.64 (Green)	0.64 (Green)	0.63 (F. blue)	0.63 (F. blue)
-	-	0.66 (F. red)	0.66 (F. red)
0.71 (Green)	0.71 (Green)	-	-
-	-	0.77 (F. green)	0.77 (F. green)
0.79 (Green)	0.79 (Green)	-	-
0.87 (Green)	0.87 (Green)	0.87 (F. blue)	0.87 (F. blue)

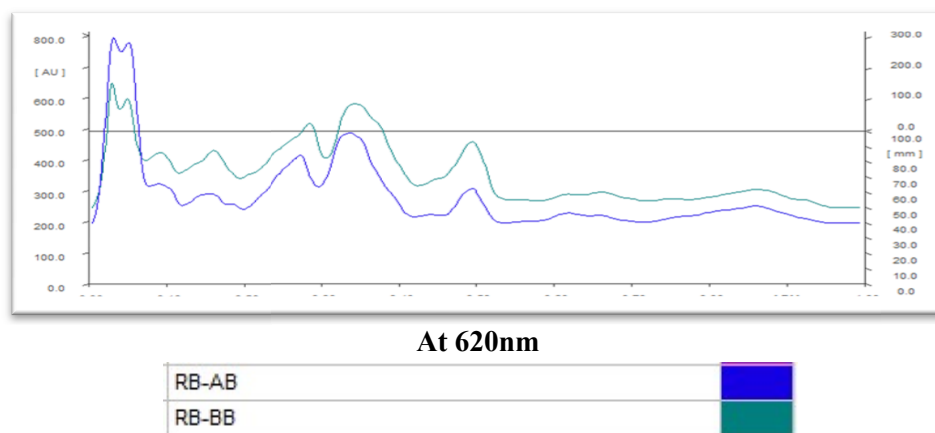
Table 5: Showing R_f Values of Samples RB-AB, RB-BB after derivatisation

Post derivatisation	
RB-AB	RB-BB
0.06 (Purple)	0.06 (Purple)
0.11 (Purple)	0.11 (Purple)
0.21 (Yellow)	0.21 (Yellow)
0.28 (D. purple)	0.28 (D. purple)
0.41 (D. purple)	0.41 (D. purple)
0.56 (Purple)	0.56 (Purple)
0.74 (Purple)	0.74 (Purple)

HPTLC photo documentation of Ethanol extract of sample of RB-AB and RB-BB

		
Short UV at 254nm	Long UV at 366nm	Post derivatization At 620nm

Track 1: RB-AB - 5 μ lTrack 2: RB-BB - 5 μ l**Solvent system- Toluene: Ethyl acetate (7.0: 1.0)****3-D Display of sample**



DISCUSSION

- ★ Discussion on XRD of RB-BB Angle 2θ of Metacinnabar (26.36, 30.53, 43.74, 51.77, 54.26, 63.56, 70.03) is approximately matching with Angle 2θ of R.B-B.B. (26.6227, 30.7271, 43.8691, 52.0043, 54.3606, 63.7273, 70.1002) respectively.
- ★ Discussion on XRD of RB-AB Angle 2θ of Metacinnabar (26.36,30.53,43.74,51.77,54.26,70.03,72.13) is approximately matching with the Angle 2θ of RB-AB. (26.2498,30.3912,43.5929,51.6931,54.03,70.0624,72.064) respectively.
- ★ DISCUSSION ON SEM-EDX- The reduction in major elements S, Hg and increase in C, O due to the addition of organic matter during *bhavana*, Apart from that these may be due to organic compounds which were used for pharmaceutical procedure or these elements might have got imparted due to the minor contaminations during various processes like *Shodhana* and *Bhavana*. The additional elements are in trace level i.e. below permissible limits. Hence the drug can be considered as safe.

Discussion on FTIR:

- ❖ FT-IR Analysis of RB-BB and RB-AB Shows that they contains Organic Compounds with functional groups like Alcohol, Phenols, Primary -secondary amines and amides, Carboxylic acids, Alkanes, Alkenes, Ester, Anhydride, Sulfones, sulphates, Sulfonamides, Aromatics, Chloride, Fluoride.
- ❖ Aromatics are present due to the usage of *Lavanga*, *Jatiphala* in pharmaceutical procedure.
- ❖ All other functional groups might be present in the herbal ingredients of the formulation.

Discussion On Particle Size by ZETAPALS:

Particle size is one of the factors which will affect dissolution and absorption of drug. Particle size and surface area are inversely proportional to each other, as particle size decreases surface area increases. This leads to increase in dissolution of drug and rapid absorption is measure of rate of solution.

Even though the particle size is more in RB-AB but when it comes in contact with salivary and gastric juices its particle size in vivo may be changed, and increase in size is because of *bhavana dravya* which will be dissolved when it comes in contact with *gastrium*. As reduction in particle size will lead to better absorption and bioavailability of the drug.

Discussion on HPTLC:

HPTLC is the sophisticated analytical parameter for the evaluation of the herbal drugs. HPTLC also serves as Fingerprinting technique for identification and quantification of the herbal and herbo-mineral formulations. Through HPTLC technique major phytochemical present in the drug or formulation can be estimated. It helps to find out the adulteration in the formulation and is used as a standard for the herbal compounds.

The Rf values at 254nm 10 peaks were identified at RB.BB which are exactly matching with 10peaks of RB.AB & at 366 nm 13 peaks were identified at RB.BB which are exactly matching with 13peaks of RB.AB which indicates that the drugs which were present before *bhavana* are present even after *bhavana* with added *swarasa* and even the colours are matching.

CONCLUSION

Shri ramban rasa is one of the *karaliya rasayana*, there are many references with variations in the ingredients method of preparation and dosage, among them *Bhai-*

shajya ratnavali reference was taken for the preparation. Chemically *Shri ramban Rasa* is considered as a compound of meta-cinnabar, sulfur with organic compounds with their functional groups like alcohol, amine, amide, acid etc, HPTLC was also followed to get unique finger printing technology.

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