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Pharmaceutico Analytical Study of Panchanana Rasa

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Abstract: ***Rasasastra is an important branch of Ayurveda which deals with the use of metallic and mineral drugs which are pharmaceutically processed and rendered fit for internal administration. The Rasa medicines are known for their faster action in smaller doses, quicker assimilation, excellent therapeutic values & longer shelf life. The present study is concerned with the pharmaceutico analytical study of the formulation called Panchanana rasa mentioned in Brihat rasa raja sundara which has indication in Hridroga. Till now, no scientific studies have been carried out on this formulation. Panchanana rasa is a khalviya rasayana. Ingredients are Sodhita parada, sodhita gandhaka, amalaki rasa, gosthani rasa, yasti kvatha and kharjura kvatha. Anupana as per the reference is dhatri churna and sitha. Physico chemical analysis, NPST and instrumental analysis like XRD & SEM-EDAX were done to ensure the quality of the medicine prepared.***

Keywords: *Panchanana rasa*, physico chemical analysis, XRD, SEM-EDAX

1. Introduction

Rasasastra has innumerable *khalviya rasayanas* aiming at achieving various therapeutic effects. These preparations became acceptable due to their quick absorption in minute dosages. *Panchanana rasa* is such a formulation in which *kajjali* is given *mardana* with *swarasas* and *kvathas* of *hridya guna dravyas*. There are formulations in the same name in other *rasa* classics. But the ingredients & indications are entirely different. In the present study the formulation is taken from *Brihat rasaraja sundara Hridroga adhikara*. Analytical study of any drug is essential to standardize it & is carried out to check drug quality. In *Ayurveda* esp in *Rasasastra* several parameters and tests have been given for standardization of raw materials-herbal and mineral origin. Single herbal drugs are standardized by its description of name and form, habitat, period of collection-when it can be obtained in its best quality. Prepared herbal medicines are standardized by several tests ie tests described for *snehapaka kalina laksanas, avaleha kalina laksanas* etc. Raw mineral drugs are standardized by characters like colour, size, shape, shining, weight etc. Prepared *rasoushadhis* are standardized by parameters like its colour, fineness and its different tests i.e. *bhasma* examination like *rekhapurnatwa, varitaratwa* etc. Even without analytical study the research of a drug is incomplete. The important aims of analytical study are to know the particular chemical configuration and the physico chemical changes which occurred after different procedures and also to know the probable role of media during the pharmaceutical processing. It helps us to conduct the comparative study among various samples and also gives an objective parameter to judge the best quality among them. It not only gives the standards of the product but indirectly gives suggestions for further advancement if required. The drugs, should be analyzed with the help of different analytical methods like organoleptic tests, chemical and instrumental methods. *Panchanana rasa* is analysed for the organoleptic characters, Physico-chemical parameters like loss on drying, total ash, acid insoluble ash, water soluble ash, pH, Namburi phased spot test, instrumental analysis like XRD, SEM-EDAX.

2. Aims and Objectives

To prepare *Panchanana rasa* according to *Brihat rasaraja sundara* and analyse the sample by employing various organoleptic, physico chemical and instrumental methods.

3. Materials and Methods

Pharmaceutical stride involved in preparation of *Panchanana rasa:*

1. *Parada sodhana* according to the reference in *Ayurveda prakasha*
2. *Gandhaka Sodhana* by *kurmaputa* method
3. Preparation of *kajjali*
4. Preparation of *Dhatriswarasa, yasthi kvatha, gosthani swarasa, kharjura kvatha*
5. Mardana of *kajjali* in each *swarasa* for 24 hours

Ingredients with quantity taken here: *Sudha parada*-170 gm, *Sudha gandhaka*-170 gm, *Dhatri swarasa*-100 ml, *Gosthani swarasa*-100 ml, *Yashti kvatha*-100 ml, *Kharjura kvatha*-100 ml.

Procedure

Method of Preparation

In *khalva yantra* add 170 gm each of *parada* and *gandhaka* and do *mardana* till *kajjali siddha lakshana* is attained. Later add *dhatri swarasa, gosthani swarasa, yashti kvatha & kharjura kvatha* and do *mardana* for 24 hours each.

Observations: On adding *dhatri swarasa, kajjali* appeared like a paste form. After 24 hours while mixing with *gosthani swarasa* it turned to light black colour. After 24 hours *mardana* in *Yashti kvatha* it attained characteristic

smell and on adding *kharjura kvatha* the medicine attained black colour.

Analysis

Organoleptic parameters & *Bhasmapareeksha*: This part of the study was carried out at *Rasasala*, attached to the Department of RSBK, MVR Ayurveda Medical College, Parassinikadavu, Kannur, Kerala.

Physico-chemical parameters: This part of the study was carried out Quality control Laboratory, SDM centre for research in Ayurveda and allied sciences attached to SDM Ayurveda medical college, Kuthpady, Udupi, Karnataka.

NPST: The test was done at *Rasasala* of MVR Ayurveda Medical college, Parassinikkadavu, Kannur, Kerala.

Instrumental Analysis: X ray diffraction method for crystallographic study & Study of SEM-EDAX of *Panchanana rasa* was done at Manipal Institute of Technology, Manipal, Karnataka.

1. Organoleptic Characters:

- *Varna*-Black
- *Rupa*-Fine powder
- *Gandha*-Resembles *amlagandha*
- *Rasa*-Amla rasa
- *Sparsa*-Fine
- *Sabda*-Not applicable

Bhasma pareekshas

Characteristics	Observations
Varna	Black
Varitaratwa	+
Rekhapurnatwa	+
Unnama	+
Mrudu	+
Nischandratwa	+
Kachakachaabhaava	+

+present

2. Physico Chemical Analysis

Modern parameters (n=3%w/w, Avg±SD)

Parameters	Results
Ph	7.0
LOD	2.81±0.01
Total ash	2.59±0.14
Water soluble ash	0.78±0.00
Acid insoluble ash	1.39±0.00

3. NPST

NPST for *Panchanana rasa* is done according to the protocol told for *Parada* compounds (group VIII).

Observations for *panchanana rasa* prepared in 5N HNO_3 on 10% potassium iodide paper

Changes in pattern and colour

Phase 1-silvery coloured spot with brown ring and orange periphery.

Phase 2-A wide silvery spot begins to appear surrounded by a dark brown ring and an orange periphery.

Phase 3-A well defined round silver coloured spot surrounded by dark brown ring and orange periphery.

Observations for panchanana rasa prepared in 5N HNO_3 on 5% potassium ferrocyanide paper

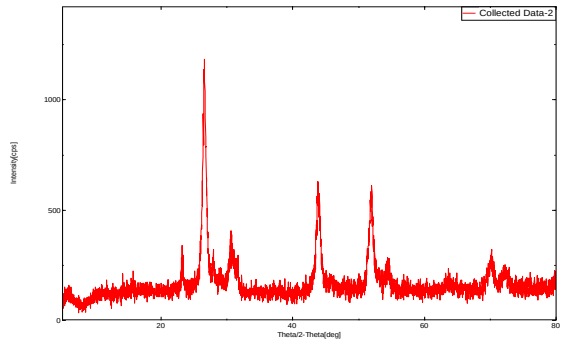
Changes in pattern and colour

Phase 1-A blue spot surrounded by cowdung green colour ring.

Phase 2-Blue wide spot surrounded by green ring and then brown ring with yellow periphery.

Phase 3-dark blue spot surrounded bylight blue ring, green ring, yellow periphery.

4. XRD Graph Pattern



Power diffraction of the samples were done using coupled 2 Θ/Θ scan type in continuous scan mode from 2 Θ angle of 3.000 º to 80.002 º, sample rotation 15.0001 per minute, using copper anode, wavelength for display at 1.54060 A using Lynx eye detector and crystallinity from 3.000 to 80.002.

Elements present in *Panchanana rasa* & concentration

Element	Concentration level
Sulphur	Major
Mercury	Major
Oxygen & Carbon	Minor

Crystal size present in *panchanana rasa*

140.2 Å
84.34Å
139.15Å
116.6Å
140.03Å
107.23Å

5. SEM-EDAX

Processing option-all elements analysed (normalized), Number of iterations-2

EDAX results

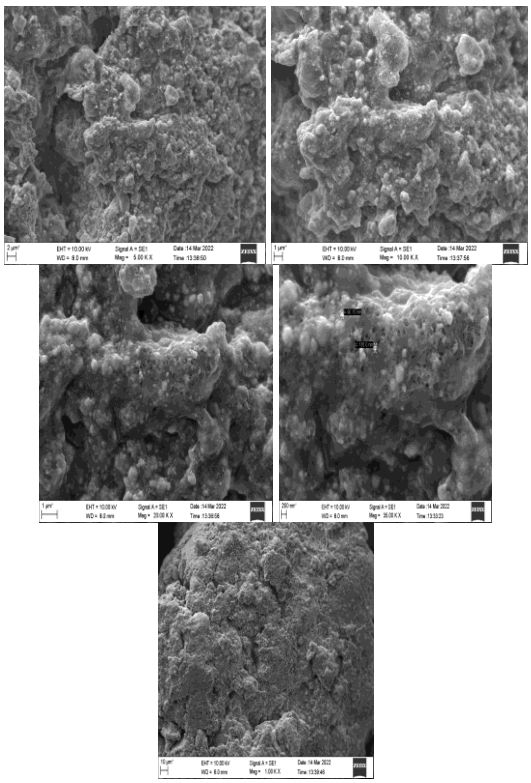
Element	No peaks omitted	Peaks possibly omitted: 0.705keV
C	+	+
O	+	+
S	+	+
Hg	+	+

+Present

SEM results

Magnification	Particle size
1.00 KX	10µm
5.00 KX	2µm
10.00 KX	1µm
20.00 KX	1µm
35.00 KX	200nm

Pictures showing results of SEM



4. Discussion

Panchanana rasa is prepared with *sodhita parada* obtained through *swedana, mardana, taptakhalwa mardana, murchana* & *urdhwapatana samskaras* mentioned in *Ayurveda prakasha* and *sodhita gandhaka* obtained through *kurmaputa* mentioned in *Rasa tarangini*. *Kajjali* prepared and it has undergone 24 hours *mardana* with each of *dhathri swarasa, gostani swarasa, yashti kvatha* and *kharjura kvatha*. Safety and efficacy of a drug/product depends on its composition which is assessed with various analytical parameters. Here an attempt was done to follow various analytical parameters to figure out the exact nature of the drug within the limitations of study. Analytical study include- Organoleptic analysis**,** Physico-chemical analysis and finally instrumental analysis-XRD and SEM-EDX. Organoleptic analysis showed the sample is fine powder and has black colour with a characteristic odour of *amlagandha* and *amlarasa* & is fine on touch. Physico-chemical analysis assessed both classical and modern parameters**.** The sample satisfied *Varitaratwa, Rekhapuranatwa, Unnama, Mrudu, Nischandratwa & Dantagre Kacha Kacha Abhava*. Other parameters like pH, Total Ash, Acid insoluble Ash, Water soluble ash and LOD were also determined to assess the quality of the sample. pH is 7; LOD value 2.81±0.01; Total ash 2.59±0.14; Acid insoluble ash value1.39±0.00 and Water soluble ash value 0.78±0.00. pH shows that *Panchanana rasa* is neutral in nature. Next section of Analytical study is NPST. The sole aim of doing this procedure was to observe and develop a pattern for NPST of *Panchanana rasa* that may be used as a standard in related studies in future. Instrumental analysis carried out in present study was XRD and SEM-EDAX. Xray Diffraction was done for material structural analysis. Maximum relative intensity was at 2Ɵ angle of 100. The SEM reveals that *Panchanana rasa* particle size lies in micro sized range and has an average size of 200nm at 35.00KX. Particle size is one of the factors affecting dissolution and absorption of the drug. Particle size and surface area are inversely proportional to each other, as the particle size decreases surface area increases. This leads to increase in dissolution of drug and bteere absorption along with bioavailability. The elements present in *panchanana rasa* are C, O, S, Hg.

5. Conclusion

Panchanana rasa is one among the *khalviya rasayanas*, there are preparations with same name with variations in the ingredients and indications in various *rasa* classics, among them the reference of *Panchanana rasa* mentioned in *Brihat rasaraja sundara hridroga adhikara* is taken for the present study. It is black coloured, fine powder having specific *amla gandha* & *amla rasa* and contains elements such as carbon, oxygen, sulphur and mercury with crystal size ranging from 84.34 Å-140.03Å and particle size lies in micro sized range and has an average size of 200nm at 35.00KX. Physico chemical parameters and NPST were done to ensure the quality of the drug.

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