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PREPERATION AND EVALUATION OF CONVENTIONALLY PREPARED KALANTAK RASA FOR *KASA VYADHI*.

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ABSTRACT:
Rasashastra mainly deals with preparations of herbomineral origin in which Mercury is prime important mineral. Aim of present work was to study pharmaceutico- analytical aspects of kalantak rasa prepared by conventional method. In the pharmaceutical aspect observations on shodhana of raw materials and preparation procedure for kalantak rasa by *Kharaliya rasayana* method was considered. In the analytical study pharmaceutical tests, analytical aspects, crystallographic study and in vitro drug release were considered. Results obtained were as Kalantak rasa requires 3 hrs constant trituration and 24 hrs shade drying for preparation. Wavelength was found at 272nm by UV- spectroscopy. Vati disintegrates within 45 minutes and releases drug up to 4 hrs. In crystallographic study it was observed that preparation contains combination of sulphur and mercury sulfide.
Keywords: Kharaliya, Crystallography, wavelength, spectroscopy

INTRODUCTION:

Ayurvedic pharmaceutics, *Rasashastra* deals mainly with drugs of mineral origin, which mainly involves processing and therapeutic utilization of mercury. Initialy herbal preperations were used as a remedy but limitations of herbal preparations were covered by *rasaushadhi's*. *Rasausadhi's* are appreciated for their smaller dosages, quick effectiveness and long durability. Since then this branch of Ayurveda has been playing an important and major role in curing the human being.[1]

Kharaliya rasayanas are the combinations of herbal, mineral and/or animal products so that we can have the effect of all collectively in a single formula. These are administered in smaller doses to get faster relief and combating many ailments by proper *Anupana* and *Sahapana*. It is a simple procedure to convert crude drugs i.e. macro to micro level and also gives specific samskara to a drug. In *Kharaliya Rasayanas* trituration is done, as a result of this it leads to size reduction, increases the surface area and accelerates the therapeutic action which helps in better absorption and easily dispersible, because of which *Kharaliya Rasaushadhi*,s occupies greater portion in therapeutics.[2]

Kalantak rasa is one of the *Kharaliya rasayana* containing Hingula as a main ingredient with combination of other herbal drugs, used in the treatment of *kasa, swasa, atisara* and *sangrahan*i.

In the present study attempt is done to find out simple, efficacious and economic drug. In the study kalantak rasa is prepared by conventional method and evaluated.

Aim and objectives: To study pharmaceutical and analytical aspects of kalantak rasa.

MATERIALS AND METHODS:

Materials:

Ashuddha Hingula, ashuddha Gandhaka and ashuddha Tankana were purchased from Acharya aushadhalaya, Nashik. Herbal ingredients which are suntha, maricha, pippali, Jambira were purchased from the local market of Nashik, Maharashtra, and all the ingredients were thoroughly screened by Rasashastra experts based on *grahyalakshana* criteria.

Methods:

Method was divided into two parts

1. Shodhana of raw materials.
2. Preparation of Kalantak rasa.

1. Rasendrasarsangraha 1/230 was used as a reference for hingula Shodhana. 7 bhavnas of adraka swarasa were given for purification of hingula. Gandhak Shodhana was done according to the procedure given in the classical texts of Ayurved Prakash 2/21-24 using godugdha and goghrita as Shodhana dravyas. Tankana Shodhana was performed according to the procedure given in Rasatarangini 13/78 by bharjan process.

2. Kalantak rasa was prepared with ingredients using formula mentioned in the table-1. All the ingredients were triturated in khalva yantra, bhavana of jambeera swarasa was given upto 3 hrs. When the mass was properly grounded then whole mixture was spread on the plastic cover and allowed to dry in the shadow for 24 hrs and vatis were prepared. [3]

Characterization of formulation:

- **Organoleptic properties:** Formulation was tested for color, odor and taste.
- **Physicochemical standards**: Melting point, solubility, LOD, total ash, acid insoluble ash, water soluble extractive, and alcohol soluble extractive was determined for the formula. [4]
- **UV- Spectroscopy:** Wavelength of Hingula was determined on UV- Vis spectrophotometer using 10 ppm(parts per million) solution. The solution was scanned from 200-400 nm and the spectrum was recorded to obtain the value of maximum wavelength.UV spectrum was obtained at 272 nm.[5]
- **Preliminary phytochemical investigations:**

The qualitative chemical tests were carried out for the identification of phytoconstituents present in these formulations.[6]

- **Chemical standards determination:** Atomic absorption spectroscopy technique was utilized to determine concentration of chemical elements present in the formulations.
- **Pharmaceutical standards determination:**[7]

I. **Weight variation**: Ten tablets were taken and weighed individually. Average weight was calculated.

II. **Thickness test**: The tablets were evaluated for their thickness using a micrometer.

III. **Hardness test**: The tablets were evaluated for their hardness using Pfizer hardness tester. Average of three reading were taken and tabulated.

IV. **Surface pH**:

Preparation of phosphate buffer pH 7.4: Dissolved 2.38 gm of disodium hydrogen phosphate, 0.19 gm of potassium dihydrogen phosphate and 8.0 gm of sodium chloride in distilled water. Diluted upto 1000 ml with same solvent.

Three tablets were allowed to swell for four hour in phosphate buffer pH 7.4. pH was found out by placing the electrode of pH meter just in contact with the surface of the tablets. Average of three readings was computed.

V. **Content uniformity:**

From each batch three randomly selected tablets were weighed accurately and powdered in a glass mortar with pestle. Powder equivalent to 100was transferred into 100 ml volumetric flask containing 100 ml of phosphate buffer pH 7.4 and kept aside with constant shaking for 12 h to extract the total drug present in the tablet. Then the solution was filtered and the volume was made with distilled water and analyzed for drug content at λmax of 272 nm against drug devoid of phosphate buffer pH 7.4 as blank. The content of drug was calculated.

VI. **Disintegration time:** Six vatis having uniform weight (125 mg) were taken and kept individually in six glass tubes of disintegrator apparatus (USP).Plastic discs were placed on each pill, which does not allow the pill to float and also imparts slight pressure

on the pills. The disintegration medium was phosphate buffer pH 7.4. 900 ml in the 1000 ml beakers and water temperature was 37 - 38°C.The glass tubes were allowed to move up and down till the complete disintegration of pills occurs. The disintegration time was noted, when all the pills were disintegrated completely and passed through the sieve's.

VII. **In vitro drug release method for Kalantak rasa:**

The drug release profile was studied using USP 24 dissolution testing apparatus method II using a paddle at 100 rpm. 900ml dissolution fluid, Phosphate buffer solution pH 7.4 was used and a temperature of 37 ± 0.5°C was maintained. 5ml aliquots at 0.0, 0.25, 0.5, 1, 2, 3, 4hr respectively were pippeted out and the same volume was replaced with Phosphate buffer solution pH7.4. A drug free tablet was taken as blank. Absorbance was measured at λmax 272 nm and from which percentage of kalantak rasa was calculated using calibration curve. [8]

RESULTS:

- **Organoleptic properties:** Organoleptic properties of formulation were tested and mentioned in table no-2
- **Physicochemical standards:** Physicochemical standards which are important standardization parameters are mentioned in table no-3.

Physicochemical standards of the formulation were found within the textual limits. These standards can be used as identification or standardization tool of the sample.

- **UV- spectroscopy:** UV spectrum λ_{max} of hingula was obtained at 272 nm shown in fig-1. This λ_{max} is utilized for determination of drug content and in vitro drug release.
- **Preliminary phytochemical investigations:** Phytochemical tests were performed for the formulation using different reagents, results are mentioned in table no-4.

Prepared formulation was subjected to phytochemical investigations and found the presence of alkaloids, steroids, glycosides and terpenoids.

- **Chemical standards determination:** Mineral concentrations were found out by AAS testing and listed in a table no-5.

Chemical standards were determined using AAS Technique to know the concentration of minerals present and found within limits.

- **Pharmaceutical standards determination**: All pharmaceutical standards determined are mentioned in table no-6.
- **Crystallographic study:** X-ray crystallographic study was performed for the prepared kalantak rasa. Results are stated in figure-2

DISCUSSION:

Development of pharmaceutical dosage form traces back its history in classical texts. Physicochemical standards can be used as standardization tool of the sample. Melting point and pH can change properties of formulation hence important to determine. Solubility of a drug is most important parameter for drug absorption and bioavailability. Total ash is a combination of physiological and non physiological (residue of extraneous matter) ash which is used to determine total amount of material remaining after incineration. Acid insoluble ash measures the amount of silica present, Results of ash value signifies content of inorganic material present in sample. Preliminery phytochemical screening revealed presence of major secondary metabolites viz glycosides, alkaloids which are responsible for therapeutic activity. Determination of chemical standards by

AAS was done to determine toxic level of potent minerals which found within limits. Pharmaceutical standards like drug content, content uniformity, disintegration time and drug release are important parameters to determine successful formulation of dosage form and patient complience. X-ray powder diffraction study was performed for kalantak rasa showed the several XRD peaks corresponding to HgS (Metacinnabar), Sulphur (S). The strongest peaks 50% of HgS were present at 2-Theta scale between 26-29, 30-31 degrees. Free sulphur also observed in the 2-Theta scale between 23, 28. The crystal structure of Sulphur is cubic and orthorhombic structure is HgS.

CONCLUSION:

Kalantak Rasa is considered to be effective in view of its combination in a disease like kasa, swasa, Atisara, sangrahani etc. Aim of present work was to find out best formulation for the treatment. The crystallographic studies suggest that prepared compound is a mixture of mercuric sulfide (metacinnabar) and sulphur. All the tests performed for the formulation was within textual limits hence it can be concluded that prepared kalantak rasa is pure and safe.

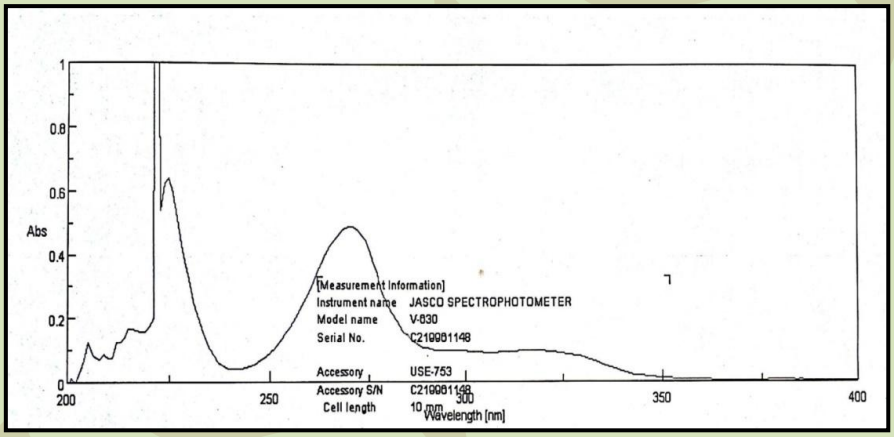

Figure1: UV spectra of formulation

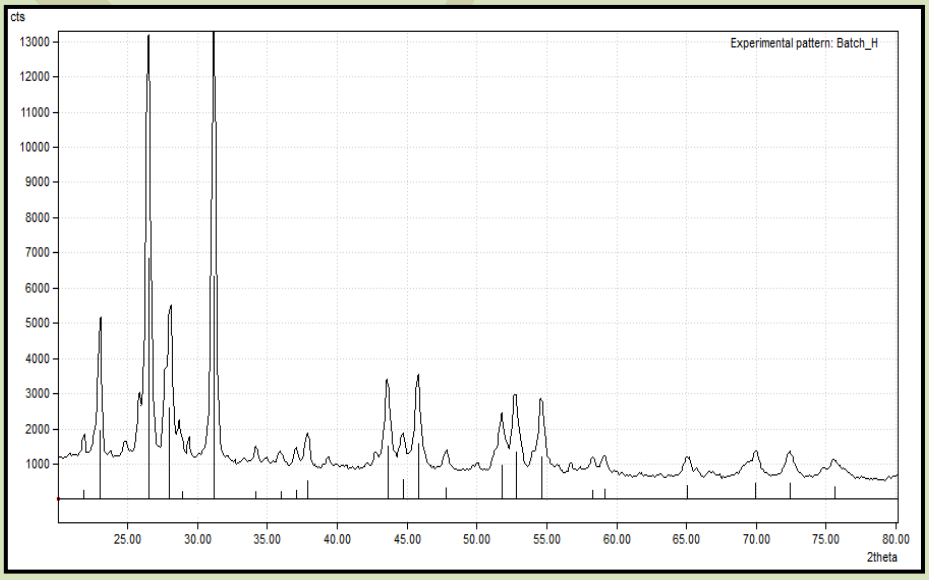

Figure2: Powder X-ray diffraction pattern of formulation

TABLE 1: INGREDIENTS OF KALANTAK RASA

Sr. No	Ingredient	Quantity
1	Shodhita Hingula [Cinnabar]	100 gms
2	Maricha [Piper Nigrum]	100 gms
3	Vyosha [sunthi, maricha, pimpali)	100 gms
4	Shodhita Tankana [Borax]	100 gms
5	Shodhita Gandhaka [Sulphur]	100 gms
6	Jumbeer Swarasa	q.s.

TABLE NO-2: ORGANOLEPTIC PROPERTIES OF FORMULATION.

Sr. no.	characteristic	Observations
1	Colour	Reddish brown.
2	Odour	Strong (Lemon)
3	Taste	Pungent
4	Appearance	Glossy

TABLE NO-3: PHYSICOCHEMICAL STANDARDS OF FORMULATION.

Sr no.	Parameter	Result
1	Melting point	255^0C
2	Solubility	Insoluble indistilled water, Sparingly soluble in methanol. Soluble in aquaregia solution.
3	Loss on drying	6.99%
4	total ash, ,	15.56 %
5	acid insoluble ash	0.22 %
6	water soluble extractive,	15.81%
7	alcohol soluble extractive	5.43%

TABLE NO-4: PRELIMINERY PHYTOCHEMICAL INVESTIGATIONS:

Sr. no.	Test parameter	Test name	Test results
1	Content of Alkaloids	Dragandroff's test	Orange – red precipitate
2	Content of Steroids	Libberman Burchard's test	Formation of a green or green-blue colour
3	Content of Glycosides	Libberman Burchard's test	Formation of a green or green-blue colour
4	Content of Terpenoids	Modified anthraquinone test	A rose pink to red colour is produced in the ammonical layer

TABLE NO-5:CHEMICAL STANDARDS DETERMINATION

Sr no.	Sample	Conc. Of minerals		
		Mercury(Hg)	Sulphur(S)	Boron(B)
1	Batch-H	15.89	16.93	16.30

TABLE NO-6:PHARMACEUTICAL STANDARDS DETERMINATION

S.No	Tests	Batch-H
1.	weight variation test (Wt. in mg)	124.5mg
2.	Thickness (in mm)	5
3.	Hardness (kg/ $cm^{2)}$	4.5
4.	Surface pH	8.9
5.	Content uniformity(mg)	95.14
6.	Disintegration time	45 min
7.	In vitro drug release	83.33% at 4^{th} hr.

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