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Pharmaceutico-analytical study of Amritamanjari Rasa

Safla V M[1], Rajesh V[2]
[1]PG Scholar, Department of Rasasatra and Bhaishajya Kalpana, Government Ayurveda college, Tripunithura.
[2]Associate Professor, Department of Rasasatra and Bhaishajya Kalpana Government Ayurveda college, Tripunithura.

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ABSTRACT
Infectious diseases constitute a major public health problem all over the world. Among them lower respiratory tract infections were ranked in the top ten causes of death worldwide in 2019 by the World Health Organization[1]. They cause a major health problem all over the world. Despite improved living conditions, hygienic practices, advancement in medical science, infectious diseases are still a major threat in developed as well as developing countries. Antibiotics or antimicrobial agents provide an effective way of treating, but the resistance of pathogens towards the antimicrobial agents has become a great challenge. Hence exploration and critical analysis of rasoushadhis, the herbo-mineral preparations of Ayurveda are essential as they have greater efficacy in lesser dose and can be used as an alternative for antimicrobial agents against human bacterial infections. In the present study Amritamanjari Rasa,a herbo-mineral preparation mentioned in Rasendra Sara Sangraha, Jwara chikitsa was prepared and subjected to organoleptic andvarious physicochemical analysis using different standardization methods.HPTLC profile was also obtained which could be used as a reference for further works.

I. INTRODUCTION

Infectious diseases constitute a major public health problem all over the world. Among these lower respiratory tract infections was ranked in the top ten causes of death worldwide in 2019 by world health organization. The revolutionary and incredible achievements in the field of medical science, awareness of hygienic practices and improved standards of living have helped to prevent and control infectious diseases to a remarkable extent. Nevertheless, these infectious diseases are still a major healthconcern. Antibiotics or antimicrobial agents have provided an effective way of treating infectious diseases. Still the increased resistance of pathogens towards the antimicrobial agents and the diagnosis of new strains of pathogens has increased the necessity for newer medications.

In such a scenario, it is highly necessary to have a closer evaluation and critical analysis of classical ayurvedic formulations, so that it can become beneficial in handling the challenge caused by the infectious disease. Here, the rasoushadhis have a significant role as they have greater efficacy in lesser dose[2.]

The development of highly advanced Alchemical and pharmaceutical techniques, procedures, processes and equipment have aided the popularization of Herbo-mineral drugs. This has made a phenomenal change in Ayurvedic treatments by reducing the time for recovery and lowering the dosage, all the while giving them a prolonged shelf life. Amritamanjari rasa is one of such classical Ayurvedic formulation mentioned in Jwarachikitsa of Rasendra Sara Sangraha[3]. Even though this herbo mineral preparation is mentioned under Jwara chikitsa it is also indicated in respiratory disorders like swasa and kasa. The experimental evaluation of rasoushadhis will provide a scientific base for its judicial administration. The aim and objective of the present study is toconduct the organoleptic evaluation and physico chemical tests of Amritamanjari rasa.

II. MATERIALS AND METHODS

Pharmaceutical study: Pharmaceutical study started from collection of genuine raw materials, its processing and conversion to final product-Amritamanjari Rasa.Genuinity of the raw drugs were authenticated by Department of Dravyaguna Vijnana and Department of Rasasastra and Bhaishajya Kalpana, Government Ayurveda College, Tripunithura

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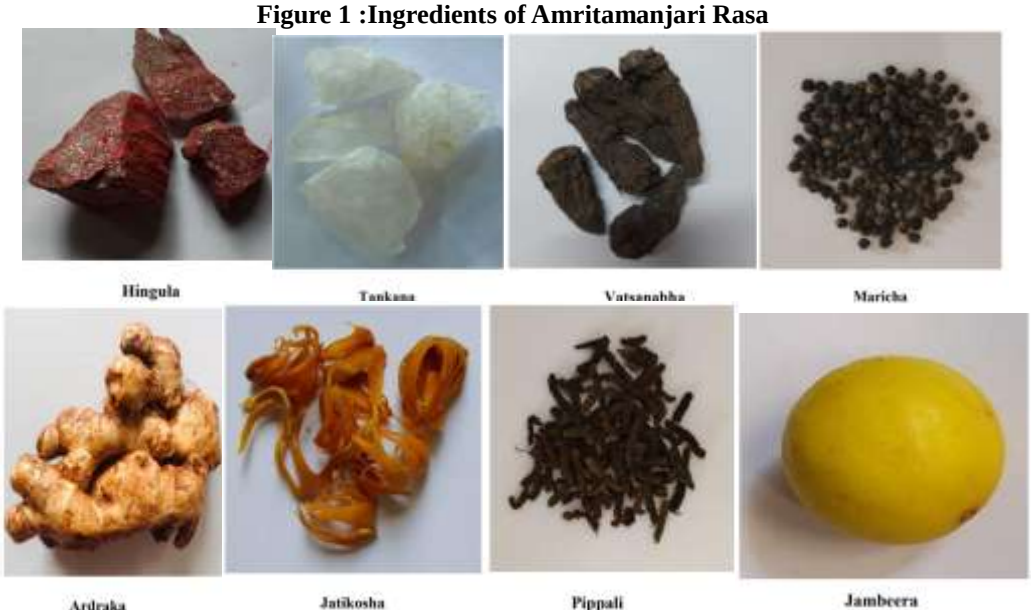
Ingredients of Amritamanjari Rasa

Serial no	Sanskrit name	Botanical/Chemical Name	Family name/Chemical Formula	Part used / English name	Composition
1	Shoditha Hingula	Sulphide of mercury	HgS	Cinnabar	1 Part
2	Shoditha Tankana	Sodium pyroborate	$Na_2B_4O_7.10H_2O$	Borax	1 Part
3	Shoditha Vatsanabha	Aconitum ferox	Ranunculaceae	Root	1 Part
4	Maricha	Piper Nigrum	Piperaceae	Fruit	1 Part
5	Pippali	Piper Longum	Piperaceae	Fruit	1 Part
6	Jatikosha	Myristica fragrance	Myristicaceae	Aril	1 Part
7	Nimbu	Citrus limon	Rutaceae	Fruit juice	Quantity sufficient for Bhavana

Figure 1 :Ingredients of Amritamanjari Rasa



Pharmaceutical processes involved in the preparation of Amritamanjari Rasa:

1. Hingula shodana by bhavana in Ardraka swarasa
2. Tankana shodana by method of utphullikarana
3. Vatsanabha shodana by method of bhavana in gomutra
4. Pulverisation(churnikarana) of maricha, pippali, jatikosha and shoditha vatsanabha
5. Preparation of Amritamanjari Rasa

Hingula shodana: Hingula shodana was done as per reference in Rasatarangini 9/12. For purification net 101 gmof Hingula was grinded to fine powder form using mortar and pestle and then triturated with sufficient quantity of ardraka swarasa(quantity to immerse the powder) till the mixture got completely dried up. The process was repeated 6 more times to obtain shoditha Hingula.

Vatsanabha Shodana: Vatsanabha Shodana was done as per reference in Rasatarangini 24/19.100 gms of vatsanabha was made into small pieces and soaked in gomutra and exposed to sunlight consecutively for 3 days. Each day fresh gomutra was used. On the 4th day vatsanabha was peeled off, dried, and powdered.

Tankana shodana: Tankana shodana was done as per reference in Rasatarangini 13/77.90 gms of tankana was finely powdered and heated in a pan and fried until all the water gets evaporated.

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Preparation of Amritamanjari Rasa: Amritamanjari rasa was prepared as per reference in Rasendra sara Sangraha Jwara chikitsa/44-45.20 gms each of shodita vatsanabha ,shoditahingula, Shodita tankana, Marichachoorna, pippali choorna, Jatikosha choorna were triturated with sufficient quantity of jambeera swarasausing a mortar and pestle for 24 hours. The mixture was then made into a bolus and expelled through a manual pill making machine to obtain mass in the form of cylindrical threads and were then cut into pills of desired weight and rolled into pills of 125mg each and then dried in shade.

Results of Pharmaceutical study

Weight	Hingula	Tankana	Vatsanabha
Before shodana	101 gms	90 gms	100 gms
After shodana	102 gms	50 gms	70 gms
Weight variation	1 gms	40 gms	30 gms

Weight variation of Maricha, Pippali, Jatikosha and Shoditha Vatsanabha after pulverization

Weight variation	Maricha	Pippali	Jatikosham	Vatsanabha
Weight before powdering	50 gms	50 gms	50 gms	70 gms
Weight after powdering	40 gms	43 gms	45 gms	60 gms
Weight loss	10 gms	7 gms	5 gms	10 gms

Preparation of Amrithamanjari Rasa:
Total quantity of raw drugs taken :120 gms
Quantity of final product :130 gms
Weight gain :10 gms
Total pills made :839

ANALYTICAL STUDY

Analysis of a drug is essential for estimation of purity and quality of drugs used in pharmaceutical preparations. To evaluate the quality of finished products it is necessary to do its analytical study and interpret it in the prospect of science.

Study setting: Quality assurance lab, R&DDepartment, Arya Vaidya Sala Kottakkal.Analytical lab, Department of Rasasastra and Bhaishajya Kalpana,Government Ayurveda college Tripunithura.

III. OBSERVATION AND RESULTS

Results of organoleptic analysis:

Colour	Reddish brown
Taste	Katu, Amla, Tikta
Odour	Smell of Gomutra
Appearance	Spherical pills

Results of Physico Chemical analysis:

Uniformity of weight	Within the limits of ± 7.5%
Disintegration time	28 minutes
Tablet Hardness	3 Kg/cm^2
Loss on drying	4.09%
pH	6.14
Friability	0.7%
Total Ash	14.5%
Acid Insoluble Ash	5.68%
Alcohol Soluble Extractive	13.197%
Water Soluble Extractive	16.028%
Petroleum Ether soluble Extractive	2.96%

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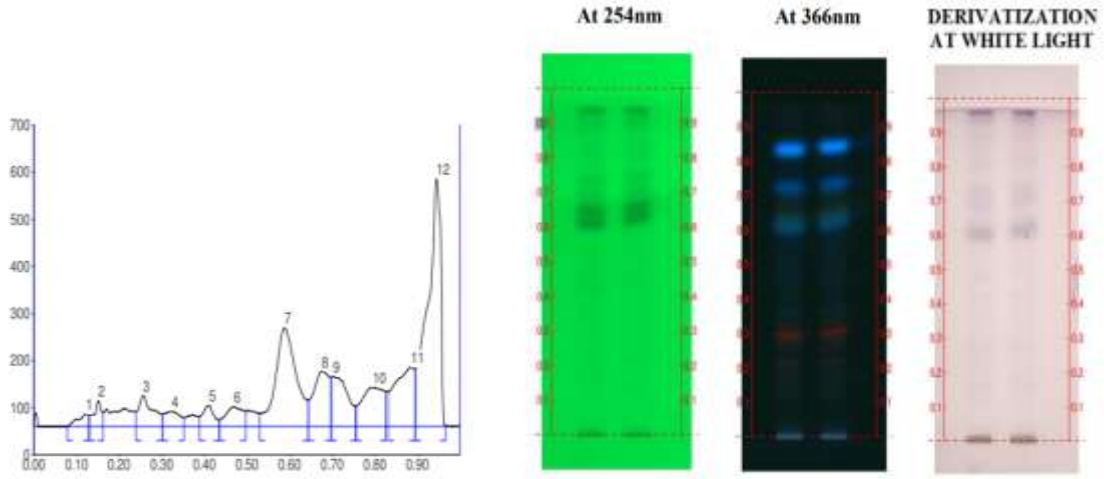
HPTLC profile of Amritamanjari RasaTLC plate view of Amritamanjari rasa



Peak No	Rf value	Area (AU)	% Area (AU)
1	0.12	616.6	1.25
2	0.15	888.5	1.80
3	0.26	2039.4	4.14
4	0.32	1122.9	2.28
5	0.41	1115.9	2.26
6	0.95	1618.1	3.28
7	0.47	9555.7	19.38
8	0.69	4111.6	8.34
9	0.58	3812.5	7.73
10	0.70	3997.4	8.11
11	0.80	5328.5	10.80
12	0.89	15109.6	30.64

IV. DISCUSSION

Pharmaceutical study: Genuine raw drugs were procured as an initial step of preparing Amritamanjari rasa. The degree of perfection during the pharmaceutical processing assures quality, safety, and efficacy of the final formulation. Raw Hingula procured from known supplier was observed and genuineness was confirmed using the parameters mentioned as Sreshta Hingula Swaroopa[4]. Colour like Japakusuma varna (red colour), shining appearance and heaviness were present in the sample collected. The mineralogical identification features for cinnabar like scarlet streak, rhombohedral crystal structure, perfect cleavage[5] further supported to the authenticity of the sample. A weight gain of 1 gm after shodananwas observed which indicates the addition of some organic part from ardraka swarasa. Raw tankana was collected from known supplier was compared with the chemical properties mentioned in API[6]. The sample when heated on burner bubbled up and fused to a clear glassy bead. It also coloured the flame yellow. The sample on reaction with hydrochloric acid and sulphuric acid gave yellow colour solution and a colourless solution respectively. On dissolving the sample in water, it produced an alkaline solution which was proved by a red litmus turning blue. These pyrognostic and chemical characters supported the authenticity of the sample. A significant loss in weight of 40gms was observed due to loss in water of crystallisation by heating.Shodhana of vatsanabha was done by soaking in gomutra and keeping in sunlight consecutively for 3 days. As per research works the chemical constituentsof vatsanabha pseudo aconitine and aconitine were converted into far fewer toxic substances veratroyl pseudoaconine and benzoylaconine respectively after shodana[7] .Maricha pippali jathikosham and shoditha vatsanabha were then pulverized separately and

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filtered through sieve no:85. Reduction in weight loss was observed after pulverization and filtering.

Analytical study:

Sample of Amritamanjari rasa was analyzed for various physico chemical parameters like uniformity of weight, disintegration time, tablet hardness, loss on drying, ash value acid insoluble ash, water soluble extractive, ethanol soluble extractive, petroleum ether soluble extractive, pH value and HPTLC study. Uniformity of weight within the limits of ±7.5% suggests that all pills have nearly uniform weight. The disintegration test is performed to find out the time taken for a solid oral dosage form to completely disintegrate. The disintegration time of the sample was found to be 28 minutes. Tablet hardness was tested using Monsanto hardness tester and was found to be3 Kg/cm^2. Loss on drying, which indicates the measure of water and volatile matters when dried under specified condition was found to be 4.09%. The ash value represents the inorganic salts naturallyoccurring in the drugs or adhering to it or gets added to it during the pharmaceutical process. The Ash value of Amritamanjari rasa was14.5% and acid insoluble ash was 5.68%. HPTLC gives an idea about the number of components present in the samples soluble in the solvent system.12 components were identified in the sample of Amritamanjari rasa. HPTLC obtained can be used for further reference.

V. CONCLUSION

Amritamanjari rasa is easy to prepare with few ingredients and is cost effective. A weight gain of 10 gm in the preparation of Amritamanjari rasawas observed which indicates the addition of some organic part from jambeera Rasa.Resultsof physicochemical parameters and HPTLC can be used as a preliminary standard for further studies.

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