

A Pharmaceutico-analytical Study Of Rajarasayana

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Abstract: Rajarasayana is one of important Ayurvedic formulation mentioned by Vansgasena's Chikitsasara Samgraha for chronic sinusitis. Even after lots of successful clinical reortings, pharmaceutical and analytical studies were not observed. Physico-chemical parameters like ash values and extractive values were evaluated. Preliminary phytochemical tests revealed the secondary metabolites like glycosides, triterpenoids, flavonoids etc. Being jaggery an important portion of formulation, 23% sugar was observed in study. Thin layer chromatography exposed 5 and 4 spots respectively for alcoholic extracts and water extracts.

Keywords: Rajarasayana, Pharmaceutical, Analytical, Physico-chemical, Sugar, Thin Layer Chromatography.....

World Health Organization (WHO) traditional medicine strategy 2014-2023 continues to provide technical guidance to ensure the safety, quality and effectiveness of formulations/ medicines from traditional and complementary medicines⁴. They emphasize on quality raw materials and products based on modern parameters set through national and global policies for quality products. WHA61.21 aims to promote intellectual property related aspects of these medicines with objectives and priorities in research and development (R&D)⁵. Chemical analysis of these drugs are parts of R&D. Precedencies are based on successful clinical stories or with extraordinary results. Rajarasayana is one of Guda kalpana with similar clinical claims in *chronic sinusitis*.

The Times of India, dated on April 11, 2012 writes the severity of *chronic sinusitis* by mentioning one in eight Indians suffering from this². Hazardous occupational and environmental exposures vitiate the condition³. *Chronic sinusitis* resembles the *Pinasa* mentioned under *Nasa roga* in Ayurveda¹. In *Vangasena's Chikitsasara Samgraha* exposure to direct wind is suggested to avoid¹. Messaging of head and fomenting the nose is recommended¹. Number of formulations are mentioned as *Panchamulyadi yusa*, *Katurikadi churna*, *Rajarasayana* etc¹. A claim is made by author in this book that if the case of *Pinasa* is not cured by hundreds of medicines, even though, this medicine can cure the condition within three days¹. In spite of so strong claims, details in chemical analysis for this formulation is not done as per review of literatures, so an effort is made to analyze the formulation chemically based on pharmacopoeial standards.

Materials and Methods

Ingredients: Coarse powder of each of *Chitraka*, *Guduchi*, *Jati patra* and *Dashmoola* 4.8 kg; water 19.2 liters reduced to 4.8 liters for each Kashaya; old Guda (jaggery) 4.8 kg; honey 384 gm; fine powder *Haritaki* 3.072 gm; fine powder of each of *Ela*, *Twaka*, *Patra*, *Shunthi*, *Maricha* and *Pippali* 96 gm; *Yavakshara* 24 gm.

Procurement of Raw Materials: All herbs were procured Vashi, Mumbai market. Guda and honey from procured from local market of Koppa. The distilled water used for decoction was procured from *Quality Control Laboratories*, ALNRMAMC, Koppa.

Identification for Authenticity: The drugs procured were identified by Dr. Prashant Kumar Jha, Head, *Quality Control Laboratories*, ALNRMAMC, Koppa.

Preparation of Rajarasayana: First of all, individual kashaya (decoction) was prepared using *Chitraka*, *Guduchi*, *Jati patra* and *Dashmoola* using mentioned quantity of drug in given quantity of water. The quantity was reduced

4.8 liters in every case. Now these four prepared decoctions were mixed. Then, given quantities of old jaggery and fine powder of *Haritaki* were added to mixed decoctions and heat was given till avaleha paka siddhi lakshana appeared. Powder of *Ela*, *Twaka*, *Patra*, *Shunthi*, *Maricha*, *Pippali* and *Yavakshara* of referred quantities were added one after other, once the lashana of avaleha paka siddhi attained. They were mixed well. Honey was added after cooling the mixture. The prepared *Rajarasayana* was kept in amber colored bottle.

Chemical Analysis: Chemical analysis was done in *Quality Control Laboratories, ALNRMAMC, Koppa*.

Organoleptic characters: Colour, odour, taste and appearance were noted.

Physico-chemical Parameters^{7,8}: Total ash, acid insoluble ash, water insoluble ash, water soluble extractives and alcohol soluble extractives were measured following the methods given in *Ayurvedic Pharmacopoeia of India*. Ashless filter papers were used of 4T grade, 125 mm size from S.D. Fine chemical limited. The HCl used was from HIMEDIA laboratories limited. The used distilled water was prepared in *Quality Control Laboratories, ALNRMAMC, Koppa*. Labtronics' LT-50 microprocessor pH meter was used for pH determination. The buffer tablets of pH 4.2 and pH 9.2 were from Merck India limited.

Preliminary phytochemical tests were done for carbohydrate, protein, alkaloids, glycosides, saponin, phytosteroid, triterpenoid, phenolic compounds and flavonoids using hydro-alcoholic extracts of formulations^{8,9,10}. Fluorescent test was done using, alcohol, 10% acids (HCl, H₂SO₄ and HNO₃) and alkalies (NaOH, and NH₃). Observations were made under visible light and long UV light.

Quantitative estimation of sugar was done using Fehling's solution. It was done both before and after hydrolysis according to methods mentioned in *Pharmacopoeial Standards For Ayurvedic Formulations*¹¹.

Thin Layer Chromatography was done using solvent systems Toluene: Ethyl Acetate: 9:1 (Plate Number: 1: alcoholic extract and Plate Number: 2: water extract) and Chloroform: Methanol: 8:2 (Plate Number: 3: alcoholic extract). Observations were done under long UV.

Result

Organoleptic Characters

Colour	Brown
Odour	Characteristic (aromatic)
Taste	Sweet, astringent
Appearance	Linctus

Physico-chemical Parameters

Total ash	: 6.76 %
Acid insoluble ash	: 0.61 %
Water insoluble ash	: 2.38%
Water soluble extractives	: 66.02%
Alcohol soluble extractives	: 55.54%
pH	: 4.21 ± 0.10

Preliminary Phytochemical Test

Carbohydrate	Present
Protein	Present
Alkaloid	Present

Glycoside	Present
Saponin	Present
Phytosteroid	Present
Triterpenoid	Present
Phenolic compounds	Present
Flavonoids	Present

Fluorescent Test

	Under visible light	Under Long UV
Material + Water	Light yellow	Fluorescent green
Material + Alcohol	Yellowish-green	Fluorescent yellow
Material + 10% NaOH	Reddish-brown	Brown
Material + 10% HCl	Yellowish-green	Fluorescent green
Material + 10% HNO ₃	Light orange	Fluorescent green
Material + 10% H ₂ SO ₄	Light yellow	Fluorescent creamish-yellow
Material + 10% NH ₃	Pale yellow	Fluorescent cream

Quantitative Assessment

Reducing Sugar	: 14.08%
Non-reducing sugar	: 8.92%

Plate Number: 1



Plate Number: 2



Plate Number: 3



Thin Layer Chromatography

Rf Value	Plate Number: 1	Plate Number: 2	Plate Number: 3
0.07	Light fluorescent green	—	—
0.09	—	Green	Fluorescent green
0.11	—	Green	—
0.17	—	—	Fluorescent blue
0.27	—	Light fluorescent blue	Light fluorescent blue
0.37	—	Light fluorescent blue	—
0.14	Light fluorescent green	—	—
0.24	Fluorescent green	—	—
0.33	Light fluorescent blue	—	—
0.52	Light fluorescent blue	—	—

Discussion: The formulation is characteristic odour due to many of essential oil containing drugs added to formulation. Jaggery incorporated the sweet taste while astringent taste was to good amount of tannin in added Haritaki¹². Ash values are inorganic salts present with formulation, noted as 6.76%. Out of total ash, 0.61% was insoluble in HCl while 2.38% was insoluble in distilled water. Sugar and tannin, both are soluble in water and alcohol. Tannin and bitters are soluble in both and water^{13,14}, the reason behind the more extractive values. Comparative higher extractive values in water is observed. Preliminary phytochemical test exhibited the presence of absence of given metabolites in formulation while fluorescent test revealed the specific characteristics of formulation in acids and alkalis. Due to added jaggery and honey the sugar percentage reached higher.

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Conflicts of Interest: No conflict of interest

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