INTERNATIONAL
AYURVEDIC
MEDICAL JOURNAL

IAMJ

Review Article ISSN: 2320 5091 Impact Factor: 5.344

A SCIENTIFIC REVIEW OF RASAPUSHPA (NIRAGANDHA KUPIPAKVA RASAYANA) AND ITS MODERN ASPECT

Kamlakar K. Gowardhan

Associate Professor, Dept. of Rasshashtra & Bhaishajya Kalpana, Dr. Rajendra Gode Ayurveda College, Amravati, Maharashtra, India

Email: gkamlakar11963@gmail.com

ABSTRACT

Rasapushpa is a *Kupipakva* drug which is of *Nirgandha* type. References regarding *Nirgandha* type of *Kupipakva Kalpana* were not found upto 13th cent. A.D. Rasendra *Sara Sangraha* is the first text in which *Nirgandha* type of *Kupipakva Kalpana* described. Overall it can be said that the origin of *Nirgandha Yogas* is 1300 A.D. *Rasapushpa* has properties like *Pittahara, Mutrala* (Diuretic, *Vranadosahrta* (antiseptic), *Param Virecanakaram* (Strong Purgative) and *Bhutavisapaham* (Antibacterial toxine). *Rasapushpa* and *Rasakarpura* were controversial regarding their independent (individual) formation and their chemical composition as well as their toxicity.

Keywords: *Rasapushpa, Rasakarpura,* mercurous chloride, mercuric chloride.

INTRODUCTION

Rasashastra is an important branch of Ayurveda which includes deals with drugs prepared from metals and minerals in combination with various plants and animal products. *Rasayogas* are basically classified into *Kharaliya, Parpati, Kupipkwa* and *Pottali kalpanas*. Among these preparations *kupipakwa* are found to be highly effective due to the extensive use of *agni*. The terminology '*Kupipakwa'* itself denotes the pharmaceutical processing that is involved in these preparations by heating in glass bottle. It is first described by Acharya Sadananda Sharma in his text *Rasatarangini*. *Rasapushpa* is *kupipakwa Kalpana*, also it is a *sagni, nirgandha moorchana* (without sulphur) of Mercury prepared by adopting *bahirdhuma* procedure. Based on use of *Gandhaka* (sulphur) in the preparation of *Kupipakwa Rasayana*, they are called as *sagandha & nirgandha kalpanas*[1]. The two important *nirgandha* preparations mentioned in *Rasa* literature are *Rasapushpa* and *Rasakarpura*[2]. *Rasakarpura* and Rasapushpa are most controversial regarding their self existence. Most of the people supposed that both are same, but *Acharya* Sadananda Sharma was the first person who clearly differentiated them. He gave 3 different methods of preparation of *Rasapushpa*. But on careful study. those can be classified into two only viz. *Bahirdhuma* and *Antardhuma* Methods.

Synonyms: Synonyms of *Rasapushpa* are *Rasasuma, Rasakusuma* and *Sudhanidhirasa*.

Ingredients:

1. *Hinguottha Parad* (Mercury, Hg)
2. *Kasis* (Ferrous sulphate FeSO4)
3. *Suddha Sphatika* (Double potash of allum, K2SO4,

Al2O3, 24 H2O)

4. *Saindhav* (Rock Salt, NaCl)

First three ingredients are mentioned in the rasa-tarangini[3] which is a *Bahirdhuma* (*Kupipakva*) method of preparation while *Suddha Sphatika* (Five Tolas) is also an additional 4th ingreadient[4] mentioned in the which is *Antardhuma* (*Damaru Yantra*) method of preparation.

Methods of preparation:

First method: Equal quantity of *Hingulottha* Parada, purified *Kasisa* and *Saindhava* 5 Tolas each. Mix them together in mortor and triturate well till it becomes *Sumasrna*, fill up the powder (*Kajjali*) in a glass bottle (having 7 layers of clay smeared cloth). Placing that bottle in *Sikatayantra*, heat it for two *Yamas* (6 hours). After this collect Rasapushpa which is like snow/fog in the upper part of bottle. While giving heat, when watery vapors expelled out, corking should be done with a cork by moving aside the sand from neck of the bottle so that *Rasapushpa* can deposited there. As this drug obtains in the bottle neck like a flower so it is known as *Rasapushpa*.

Second method: First, heat *Puspakasisa* on mild fire (*Mandagni*) to evaporate watery portion present in it. Similarly convert *Sphatika* into its flower like form (i.e. Purify it) by heating it. Then mix this *Kasisa, Vanhibharjita Sphatika, Hingulottha Parada* and *Saindhava* in the quantity five Tolas each in a mortar and triturate effortfully to make it as *Slaksna* form *Churna*. Then keep this *Niscandra Churna* into the *Damaruyantra* and heat it on very mild fire (*Atimandanala*) for two *Yamas* (6 hours). When it becomes *Swangasita*, remove it below, open it and collect the white, shiny and *Saradindu* (moon in the season of Sarada) like Rasapushpa deposited in the upper pot of *Damaru Yantra*.

Properties of Rasapushpa: Rasapushpa has properties like *Pittahara, Mutrala* (Diuretic, *Vranadosahrta* (antiseptic), *Param Virecanakaram* (Strong Purgative) and *Bhutavisapaham* (Antibacterial toxin). *Swasthikaranamatyantam* (Health giving / good curing). *Jaliyansa-visosanam* (Dehydrating); *Malapittapasarakam* (Secretes conjugated bile by irritating the gallbladder). It kills bacteria's causing *Visuchika* and *Phiranga* (which are Vibrio cholare and Treponema pallidum respectively). Also, it curves *Hicca, Jalodara* etc. very quickly.

Dose of *Rasapushpa*: Generally, for internal use, *Rasapushpa* is given in the dose of ½-2½. *Ratti /Gunja* (60-300 mg). *Rasapushpa* should be given in the full dose of 2½ *Ratti*. i.e. 300 mg for *Virechana* purpose. For the treatment of *Hicca*, it should be given in the dose of 1/2th *Ratti* i.e. 15 mg. while for the treatment of *Phiranga* its dose is considered as 1/4th *Ratti* i.e. 30 mg. Its pediatric dose for *Virechana* is considered as 1/4 th *Ratti* i.e. 30 mg.

Therapeutic uses of *Rasapushpa*: *Rasapushpa* in the dose of 2½ Ratti (300 mg) when given with *Svarjika* starts purgation after two *Yamas* (6 hrs.) In the initial stage of *Visuchika*, if *Rasapushpa* is given with water in the dose of 1/4th Ratti i.e. 30 mg, kills the pathogenic bacteria of *Visuchika* which are Vibrio cholarae. *Bhisaja* who does not have thorough knowledge of *Rasasastra* should never prescribe *Rasapushpa* especially for longer duration.

Examination of *Rasapushpa*: To test/examine the Purity and genuinely of *Rasapushpa*, take a clean, shiny Iron pan and put a drop of water on it. Then add a pinch of *Rasapushpa* on that drop. After a moment throw away the water drop and it there is blackening at the drop site then the *Rasapushpa* sample should be known as pure.

Formulations (*Yogas*) of *Rasapushpa*: *Chandanadivatika*,[5] *Rasapushpamalahara*,[6] *Rasapushpadyamalahara*.[7] Other *Nirgandha Kupipakva* Kalpana described in Rasa classics is *Rasakarapura*. Rasakarpura is one of the mercurial preparations prepared with different ingredients and pharmaceutical procedures. On literary survey, 45 formulae are found described for its preparation. These formulae reveal that it may be prepared from Parada with sulphate compounds like *Gandhakamla, Kasisa, Tuttha, Sphatika* etc. on this basis, according to sir P. C. Ray, *Rasapushpa* and *Rarakarpura* preparatory methods are of mix compound.[8]

Confirmatory Test of *Rasapushpa*: A pinch of Rasapushpa was taken and dissolved in distilled water in a test tube. Then 3drops of ammonia was added to

this solution. Black precipitate was found at the bottom of the test tube. This confirms that the compound formed is Mercurous Chloride (HgCl/Hg2Cl2) and *Rasapushpa* is known as Calomel (Mercurous chloride)[9]

Mercurial salts in modern aspect: Rasapushpa is also a mercurial salt mercury forms two series of compounds, the mercurous compound and the mercuric compound. So, two varieties of mercury salts are there viz. mercurous chloride (HgCl/Hg2Cl2) and mercuric chloride ($HgCl_2$). These salts are prepared by the process of sublimation.

Mercurous Chloride: The word calomel is probably derived from the Greek word Koros. Calogreen subchloride of mercury.

Preparation: Whenever a soluble chloride is added to a soluble mercurous salt, mercurous chloride or calomel, Hg_2Cl_2 is precipitated. It is also prepared by heating mercuric chloride with right proportion of mercury.

$HgCl_2 + Hg = Hg_2Cl_2$

A salt obtained as a sublimate when as mixture of mercurous sulphate and sodium chloride is heated.

$$Hg_2SO_4 + 2Nacl - Na_2SO_4 + Hg_2Cl_2$$

Properties:

Appearance	: Amorphous heavy powder
Taste	: Tasteless
Colour	: White
Solubility	: Sparingly soluble in water (0.0001%) and in Hot water (0.0007%) and in dilute acids. Insoluble in alcohol.
Molecular Wt.	: 472.09
Sublimating Point	: 400°C - 500°C

Toxicological Information[10]: Orally LD 50 in rats 210 mg/kg

Inhalation: Causes irritation to the respiratory tract symptoms include sore throat, coughing, pain, tightness is chest, breathing difficulties, shortness of breath and headache. Pneumonitis may develop. Can be absorbed through inhalation with symptoms to parallel ingestion.

Ingestion: Toxic Average lethal dose for inorganic mercury salts is about 1 gm may cause burning of mouth and pharynx, abdominal pain, vomiting, bloody diarrhoea. May be followed by a rapid and weak pulse, shallow breathing, pallorness, exhaustion, tremors and collapse, delayed death may occur from renal failure.

Skin contact: Causes irritation symptoms include redness and pain. May cause burns and sensitization. Can be absorbed through the skin with symptoms to parallel ingestion.

Eye Contact: Causes irritation to eyes, may cause burns and eye damage.

Chronic exposure: Chronic exposure through any route can produce CNS damage. May cause tremors, personality and behavioural changes, memory loss, metallic taste, loosening of the teeth, digestive disorders, skin rashes, brain damage and kidney damage, can cause skin allergies and accumulate in the body. Repeated skin contact can cause the skin to turn grey in colour.

Aggravation of Pre-existing conditions: Persons with nervous disorders or impaired kidney or respiratory function, or history of allergies or a know sensitization to mercury may be more susceptible to the effects of the substance.

Mercuric Chloride (Corrosive Sublimate)

The violet poison sublimate, mercuric chloride, first mentioned by Geber, were used by Paravcelsus (1493-1541) and Iatrochemists.

Preparation: When mercury is heated in chlorine, mercuric chloride, $HgCl_2$ is obtained. It is also prepared by heating a mixture of mercury, common salt, potash nitrate and ferrous sulphate (calcined). The reaction probably is that ferrous sulphate with nitrate gives nitrogen oxides which oxidise mercurous chloride (from common salt and mercury) to mercuric chloride. Nowadays, it is obtained commercially by heating dry NaCl and sulphate in presence of manganese dioxide to prevent the formation of calomel.

$HgSO_4 + 2\ NaCl = HgCl_2 + Na_2SO_4$

Properties:

Appearance	:	Needle like rhombic prisms. Translucent mass.
Colour	:	White
Solubility	:	In water, 100 parts of which at 100°C dissolve in 54 parts of this saltAlso dissolves in 3

parts of alcohol and in 4 parts of ether

Molecular wt. : 271.52 and Composition Hg 73.88% CL 26.12%

Melting Point 275°C

Boiling Point : 301°C

Specific gravity: 5.41

pH of aqueous solution of $HgCl_2$: 4.7

Absorption: Readily absorbed from GIT and its effects are evident usually within 10-15 minutes.

Distribution: It is readily gain assess to the circulation on oral administration although a considerable portion of ingested Hg may remain fixed to the alimentary mucosa and the intestinal contents. In blood, it is first fixed to globulins and erythrocytes but later shifts to albumin, from which redistributed to each tissue with a half time about 15 days. There are some evidences that it can be stored in bones.

Excretion: Excretion of mercuric salts takes place immediately after absorption mainly by way of kidney and colon and to a lesser extent via the bile and saliva.

Toxicity: It is highly toxic, corrosive to mucous membranes. Ingestion may cause severe nausea, vomiting, haematemesis, abdominal pain, diarrhoea, malena, renal damage, prostration. 1-2 gms is frequent by fatal poisoning and death also have occurred from intra uterine douches and application of alcoholic solution to large areas of skin.

DISCUSSION

Rasakarpura and Rasapushpa are *Nirganda kupipakva* products of *Parada*. They are closely related to each other. A controversy exists regarding the chemical nature of *Rasakarpura* and *Rasapushpa*. It was believed that both the products have chemical mixture of mercuric and mercurous chloride. So, a lot of controversy with regards to the chemical nature and composition of *Rasakarpura* and *Rasapushpa*. According to Vd. Shri V. M. Dwivedi[11], R. K. prepared by ancient method is mercurous chloride (Calomel) while by recent methods it is mercuric chloride. In *Parada Vigyanium*. Dr. Dwivedi has also mentioned few tests for the differential identification of *Rasapushpa* and *Rasakarpura*. Out of these colour test could not be said as significant in the differential identification point of view. Because when we look at the words mentioned to express the colour of *Rasapushpa* and *Rasakarpura*.

Rasakarpura: *Karpurasannibham; Kundaendusannibham; Galadraupyanibham and Hirakavat* etc.

Rasapushpa*: Niharprabham; Kundavat; Saradindumanoharam; Puspavata* etc.

These words are not very much distinguishing. Other important tests are as follows

According to Dr. Shri V. M. Dwivedi

No.	Test	*Rasapushpa*	*Rasakarpura*
1.	Soluble in	• Nitric acid only	• 1/16th part in cold water • More than this in hot water • Alcohol • Either
2.	Precipitation in liquid ammonia	Mix 120 mg of Rasapushpa with distilled water and later few drops of liquid ammonia, it starts boiling slowly and blackish precipitation occurs.	Mix 120 mg of Rasakarpura with distilled water and later on add few drops of liquid ammonia, it starts boiling quickly and white precipitate occurs.
3.	Chemical composition	Hg_2Cl_2 or HgCl	$HgCl_2$
According to Vd. V. M. Desai[12]			
1.	Soluble in	• Distilled water • Ammonium chloride water • Alcohol • Ether	• Conc-sulphuric acid • Conc. Nitric acid

2.	Lime water test	RP when added in lime water gives yellow colour	RK when added in lime water gives black colour.
3.	Precipitation in liquid ammonia	White coloured precipitate	Ash coloured or Kapish coloured precipitate
4.	Shape of crystals	Octangular crystals	Crystals of various shapes
5.	Chemical composition	$HgCl_2$	HgCl or Hg_2Cl_2

CONCLUSION

The process in which a *Rasayana* product is prepared in a glass bottle by applying heat is known as *Kupipakva Rasayana Kalpana*. It is *Bahirdhuma* as well as *Antardhuma* type of *Jarana* process. Rasakarpura can be considered as Mercuric chloride (HgCl2) chemically. Whereas *Rasapushpa* another *Nirgandha kupipakva rasayana* of *Parada* is Mercurous chloride (Hg_2Cl_2). Classical preparation *Rasapushpa* was found to be Hg_2Cl_2 which is almost insoluble in water.

REFERENCES

1. Acharya Madhava. Ayurved Prakash, Chaukhambha Bharati Academy; Varanasi: 3rded.1987. p. 80
2. Shastri Kashinath. Rasatarangini,: Motilal Banarasidas;Delhi11thed.1979.Chapter 6, p.103
3. Kasinathsastri editor, Sadananda Sharma. Rasatarangini, 6/29-31., 11th ed. New Delhi: Motilal Banarasidas; 2004. Pg 116
4. Kasinathsastri editor, Sadananda Sharma. Rasatarangini, 6/32-36., 11th ed. New Delhi: Motilal Banarasidas; 2004. Pg 116
5. Kasinathsastri editor, Sadananda Sharma. Rasatarangini, 6/50-51., 11th ed. New Delhi: Motilal Banarasidas; 2004. Pg 118
6. Kasinathsastri editor, Sadananda Sharma. Rasatarangini, 6/52-53., 11th ed. New Delhi: Motilal Banarasidas; 2004. Pg 118
7. Kasinathsastri editor, Sadananda Sharma. Rasatarangini, 6/54-55., 11th ed. New Delhi: Motilal Banarasidas; 2004. Pg 119
8. Harsha, N & Nagaraja, T. (2010). 'The History of Hindu Chemistry' A Critical Review. Ancient science of life. 30. 58-61.
9. Dwivedi Vishwanath, Bhartiya Rasashastra, 1st.ed. M.P: Sharma Ayurved Mandir;1977.p.231.
10. Mehta NJ, et al. Pharmaceutical standardization of Rasakarpura & Rasakarpura Drava, its safety profile & therapeutic effect on Kshudra Kustha (MD Dissertation). Jamnagar: I.P.G.T. & R.A., Gujarat Ayurved University; 2007.
11. Dwivedi VM. Parada Vigyaniyam. 3rd ed. Datia: Sharma Ayurveda Mandir; 1997.p.275.
12. Desai Vaman Ganesh (2000) Bharatiya Rasashatra, Mumbai: Rajendra Raghuvanshi Yadavji Trikamji Acharya. Rasamritam English translation by Dr. Damodar Joshi, (2ndedn). Varanasi: Choukhambha Sanskrit Bhavan; 2000

Source of Support: Nil
Conflict of Interest: None Declared

How to cite this URL: Kamlakar K. Gowardhan: A Scientific Review Of Rasapushpa (Niragandha Kupipakva Rasayana) And Its Modern Aspect . International Ayurvedic Medical Journal {online} 2020 {cited February, 2020} Available from: http://www.iamj.in/posts/images/upload/2768_2772.pdf