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Kupipakwa Rasayana: Unique Metalo-Mineral preparation

Kishor Khedekar,[1] Mayur Barve,[2] Sanjay Khedekar,[3] S. Chondikar.[4]

[1]Post Graduate Scholar, [2]Assistant Professor, [3]Associate Professor, [4]Professor, Dept. of Rasashastra and Bhaishajya Kalpana, SSAM and H, Hirawadi, Nashik, Maharastra, India.

ABSTRACT

Kupipakwa Rasayana is used as therapeutic agents in the Indian system of Medicine, Ayurveda. It is unique due to its method of preparation. *Kupipakwa Rasayana* are prepared in the specially designed device *Valuka Yantra*. *Parada* (Mercury) and *Gandhaka* (Sulphur) are the chief ingredients in this medicine along with other metals and minerals. These *Kupipakwa Rasayana* are used in the different disorders like *Rajyakshma, Kushtha, Prameha, Arsha, Vatvikara* etc. Here in the present study it was decided to screen and review its reported experimental efficacy studies. On screening, it was revealed that numerous *Kupipakwa Rasayana* showed significant anti-microbial, anti-diabetic, anti-oxidant, immune-modulatory, anti-hyperglycemic properties. The observed encouraging results shows the further scope for broad spectrum research era in *Kupipakwa Rasayana*.

Key words: *Kupipakwa Rasayana, Mercury sulfide, Sindura Kalpana, Valuka Yantra.*

INTRODUCTION

The word *Kupipakwa Rasayana* is made by four words – *Kupi*, *Pakwa*, *Rasa* and *Ayana*. The mercurial compound which is prepared in specific type of glass bottle by specific type of heat treatment is known as *Kupipakwa Rasayana*.[1]*Rasayana* – by which the human being can retain *Bala*, *Oja*, *Medha*, etc. and become ever health, is known as *Rasayana*. *Sindura Kalpana*: By this process, the final product is *Sindura* (red) in color and so, is also known as *Sindura Kalpana*.

Rasa Prakasha Sudhakar is the first text to describe about the *Kupipakwa Rasayana* in the context of *Rasa Bhasma*; the *Udayabhaskar Rasa* is prepared through *Sikta Yantra* (*ValukaYantra*) method.[2] Though the description of *Sikta Yantra* was found in the text *Rasarnava*, its use for the preparation of *Kupipakwa Rasayana* was first time mentioned by *Acharya Yashodhara Bhatta* in his text in 12th century AD. There is clear cut description available regarding the use of *KachaKupi* as the container, but not mentioned about the heating pattern. *Acharya Anantadeva Suri* mentions "*Rasaparthiva Rasa*" in his *Rasachintamani* book. He uses '*Kachaghati*' word for *Kupi*. *Rasakaumudi*, *Rasakalpa Yoga* (16th century) and *Ayurveda Prakash* (17th century) mention "*Sinduranam Rasa*" for *Rasa Sindura*.

In *Rasendra Chintamani* there is clear cut specific heating pattern named as *Kramagni* i.e. increasing manner of heat (*Mrudu*, *Madhya* and *Tivragni*), with intermediate heating for a specific period has been mentioned.[3] The same method is used in practice now days with some modifications, for *Kupipakwa* preparation generally beer bottles are used in place of *Kacha Kupi* due to their comfortable shape and size. Modified heating device i.e. Electric Muffle furnace is developed instead of traditional *Valuka Yantra*, due to

Address for correspondence:
Dr. Kishor Khedekar
Post Graduate Scholar, Department of Rasashastra and Bhaishajya Kalapana, Shree Saptashrungi Ayurveda Mahavidyalaya and Hospital, Hirawadi, Nashik.
E-mail: chatrapati85@gmail.com

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easy maintenance of the heating pattern for specific period along with recording of the temperature pattern.[4],[5],[6]

Types of *Kupipakwa Rasayana*

Kupipakwa Rasayana can be classified into three divisions viz. according to the ingredients, manufacturing method, place of finished product.[7],[8] (Table 1)

Table 1: Types of *Kupipakwa Rasayana*

Ingredients	***Sagandha***	Prepared with the use of *Gandhaka* e.g. *Makaradhwaja*, Manikyarasa, Rasasindura
	Nirgandha	Prepared without the use of *Gandhaka* e.g. *Rasakarpura*, *Rasapushpa*
Manufacturing method	***Antaradhuma***	Cork is applied in the beginning and the vapors are not allowed to escape e.g. *Rasasindura*
	Bahirdhuma	Cork is applied after burning of sulphur e.g. *Hinguliya Manikya rasa, Silasindura*
Place of finished product	***Kanthastha***	The finished product is deposited at the neck e.g. *Makaradhwaja*, *Rasasindura*
	Talastha	The product is obtained from the bottom of the *Kupi* e.g. *Samirapannaga-Rasa, Swarna Vanga*
	Ubhayastha	Final products obtained from both the sites e.g. *Samirpannagarasa, Hinguliya Manikyarasa*

*Kupipakwa Rasayana*s are used as a therapeutic agent in the Indian system of medicine from centuries. In different disorders like *Jwara, Madhumeha, Shwasa, Kustha, Arsha, Grahani* etc.[7], [9],[10] Due to low dose and higher efficacy they are most popular therapeutic agents. These *Kupipakwa Rasayana*s are widely used in the current Ayurveda system. To know their therapeutic properties, scholars reported few experimental studies. Here available few studies were screened and reviewed.

Materials and Methods

For thorough review of experimental efficacy studies of *Kupipakwa Rasayana* available written literature, text books of Rasashastra, dissertations, thesis's, published research, online available research article were collected, screened, and studied.

Anti-bacterial activity

Shilasindura was confirmed against pseudomonas aeruginosa, Escherichia coli, staphylococcus aureus, streptococcus mutans and candida albicans. Whereas Klebsiella pneumoniae,Acinetobacter baumanni were found resistant to *Shilasindura*. Authors reported that *Shilasindura* found to be effective antimicrobial agent against different gram positive, gram negative bacteria and fungus.[11]

Rasasindura also showed moderate antibacterial and antifungal activity but is less in compared to standard drugs.[12]

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Antifungal activity

Another study regarding different *Kupipakwa Rasayana*, *Hinguliya Manikya Rasa* was found significant sensitive against candida albicans at the dose level of 8mg/ml. In this cited study action of *Hinguliya Manikya Rasa* was assessed at different dose levels.[13]

Immuno-modulatory activity

Dwiguna Balijarita Makaradhwaja was assessed by the scholars for Immuno-modulatory action. At the dose level of 16 mg/kg for 10 consecutive days, *Makaradhwaja* was fed to experimental animals. Study suggested that the test drug has significant CMI (cell mediated immunity) enhancing effect but has no significant effect on humoral anti-body formation.[14]

In continuation to this work Immuno-modulatory activity of *Triguna Balijarita Makaradhwaja* was evaluated by researchers in experimental animals. Researchers reported that *Makaradhwaja* apparently enhanced antibody formation and cellularity of immunological organs, while it failed to show any significant impact on immunologically induced paw oedema. This study shows that *Triguna Makaradhwaja* is having marked immunostimulant effect and weak effect on cell mediated immunity (CMI).[15]

Antimicrobial

Udayabhaskar Rasa showed significant antimicrobial activity against different Pathogens. Scholars reported that *Udaybhaskar Rasa* assessed by well and disc diffusion method for antimicrobial assay, the former gave maximum inhibition against all pathogens. In case of disc diffusion method, the test formulation was least sensitive against S. pyogenes at all concentrations. S. aureuswas highly resistant against all formulations of *Udayabhaskar Rasa.*[16]

Talsindoor was tested in 2 methods i.e. Gradient plate technique and Kirby-bauer method for its anti-microbial activity against 7 micro-organisms. *Talsindoor* showed effective anti-microbial activity against Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus, Streptococcus mutans and Candida albicans. But K. pneumoniae and A. Baumannii were resistant to *Talsindoor* like they are with another anti-biotics.[17]

Broncho-dilating activity

Different samples of *Rasasindura* showed significant to moderate Broncho-dilating effect in experimental animals. Scholars studied four test drug samples i.e *Samaguna Rasasindura*, *Shadguna Rasasindura*, *Vasa Bhavita Samaguna Rasasindura* and *Vasa Bhavita Shadguna Rasasindura* for their bronchodilating effect in the isolated guinea pig tracheal spirals. The tissue responses to drug and its modifying effect on the histamine induced contractile response in guinea pig were studied. *Shadguna Rasasindura* and *Samaguna Rasasindura* samples without *Vasa Bhavana* did not affect histamine induced contraction whereas *Vasa Bhavita Samaguna Rasasindura* and *Vasa Bhavita Shadguna Rasasindura* showed mild and moderate anti-spasmodic effect.[18]

Mallsindura also showed interesting results regarding lowering plasma triglycerides. Scholars concluded that the ayurvedic drug *Mallasindura* may be used for the treatment of bronchial asthma without any toxic effect and it can be a positive addition to treat bronchial asthma in patients with CHD.[19]

Anti-oxidant activity

A study reported on the anti-oxidant status of mice fed with *Rasamanikya* has shown that the superoxide dismutase, GSH, and glutathione peroxidase (GPx) levels had shown an increase in the liver and showed a significant decrease in liver TBARS thus ensuring cell protection. In the case of the kidney, the GPx levels were much reduced at the double dose level as well as elevation in the kidney TBARS levels indicated that at double dose levels the kidneys could be impaired.[20]

Neurological activity

Rasasindura along with *Amalaki Rasayana* showed suppressing inherited neurodegenerative disorders. Researchers reported that, studies on fly models for diverse human neurodegenerative diseases have contributed significantly to our understanding of the

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genetic and cellular bases of these inherited disorders, it is expected that further studies on the Ayurvedic formulations in other model systems will be useful in developing them as convenient therapeutic formulations for combating the increasing burden of neurodegenerative disorders.[21]

Anti-diabetic

Promising anti-diabetic activity in streptozotacin induced diabetic rats was observed in *Shadguna Balijarita Makaradhwaja*. Significant reduction glycated hemoglobin and elevated blood glucose was reported by the authors. Pancreo-protective, hepatoprotective and nephro-protective action of *Shadguna Balijarita Makaradhwaja* was observed in the experimental study.[22]

Anti-hyperglycemic

Efficacy study of *Triguna Balijarita Makaradhwaja* reported that *Makaradhwaja* showed specific anti-hyperglycemic activity against streptozotocin induced diabetic rats. *Triguna Balijarita Makaradhwaja* prepared by *Swarna Varkha* significantly reduced diabetic hyperglycemia in the experimental rats. Along with the anti-hyperglycemic effect *Makaradhwaja* restored the other elevated biochemical parameters with adjuvant *Guduchi Ghana* and *honey*.[23]

DISCUSSION

Kupipakwa Rasayana are prepared in the specially designed instrument i.e. *Valuka Yantra*. Now a day few researches showed that modified electrical muffle furnace found more suitable than traditional *Valuka Yantra*.[7] In this procedure glass bottle is wrapped with seven layers of mud smeared cotton cloth which makes it more heat stable. The *Valuka Yantra* provides gradual and homogeneous heat for the preparation as mentioned earlier by *Kramaagni* method.

Physico-chemical studies of *Kupipakwa Rasayana* mentioned that finished product is a mercury sulfide having imperial formula HgS.[5] Fourier transforms Infrared Spectroscopy of these product showed presence of large amount of functional group.[8] As all metals and minerals used in the *Kupipakwa Rasayana* are processed with different herbals in the *Shodhana*, *Bhavana* procedures. May be *Shodhana* and *Bhavana* plays a major role in the *Kupipakwa* procedures which shows presence of functional organic moiety's in the finished product. Few trace elements like gold, arsenic, iron, lead was also found in the finished product. [8]

Several *Kupipakwa Rasayana* were mentioned in the classical texts of *Rasashastra*. Due to higher therapeutic efficacy, they are much popular among all *Rasaauashadhis*. In the texts, unique manufacturing procedure was mentioned. *Kupipakwa Rasayana*'s therapeutic efficacy depends on this unique operating procedure. Different types of *Kupipakwa Rasayana* were narrated in the texts like *Rasasindura*, *Samirpannaga*, *Makaradhwaja*, *Mallasindura* etc. Therapeutic uses of *Kupipakwa Rasayana* were mentioned in the number of disorders like *Shawasa, Kasa, Prameha, Madhumehaa, Raktapitta, Atisara, Jwaraa, Grahani, Arsha, Kustha* etc. Here in present article review of experimental efficacy study was carried out.

As classical texts of *Rasashastra* narrated that *Kupipakwa Rasayana* are useful in many disorders here in present article different researches shows the wide area of efficacy. Few researches showed that *Kupipakwa Rasayana* like *Rasasindura*, *Talasindura* having definite anti-microbial property which provides further leads for research and shows the confirmation of classical texts. *Makaradhwaja* was found effective in the diabetes which gives new dimensions for the research in diabetes. Along with this *Makaradhwaja* found effective immune-modualtor. Augmenting effect of *Rasasindura* was also derived by scholars which shows that incorporation of *Kupipakwa Rasayana* to the herbals might more effective rather than single use.

Rasamanikya was found effective anti-oxidant, the ancient claims of *Rasashastra* again proved. *Rasamanikya* is chemically As2O3, recent researches showed that As2O3 is useful in leukemia. Experimental study of *Mallasinura* showed the

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significant anti-tussive activity. *Rasasindura* showed suppressing inherited neurodegenerative disorders, which will be beneficial in disorders like Alzimers, Hashmint syndrome.

Conclusion

Reviewing all above data shows that *Kupipakwa Rasayana* is a unique and effective therapeutic agent in the traditional medicines. The reported studies show definite role of *Kupipakwa Rasayana* in the health system. It provides leads for further expanded research.

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