

## ***AN OVERVIEW OF KUPIPAKAVA KALPANA***

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### **ABSTRACT**

*Rasa Shastra* and *Bhaishajya Kalpana* are the two main parts of *Ayurvedic* pharmaceuticals. *Rasa Shastra* deals with the metallic and herbo-mineral preparations with their types, occurrence, physical properties, organoleptic characteristics and pharmaceuticals. Basically there are four varieties of *Rasaushadhis* mentioned in *Rasa Shastra* i.e. *Kupipakva Rasayana*, *Parpati Rasayana*, *Pottali Rasayana* and *Kharaliya Rasayana*. *Kupipakva Rasayana* follows a typical process and requires long duration for preparation. However, it bears a unique place in *Rasaushadhis* because of its mercurial preparation with quicker action and synergistic effect in the body at very low dose. This *Kalpna* includes a number of preparations like *Rasa Sindura*, *Makardhwaja*, *Malla Sindura*, *Rasa Karpura* and *Rasa Pushpa* etc. The name *Kupi* indicates that the preparation is made in *Kanch Kupi* (glass bottle) on mild to intense heat by using a special instrument known as *Baluka yantra*. Particular chemical processes are involved in these preparations which also bear testimony to the great chemical knowledge prevailing in ancient India. *Kupipakva Rasayanas* are very popular and commonly prescribed preparations among the *Ayurvedic* physicians and are looked upon as panacea. The motive of this article is to explore the research and therapeutic scopes of *Rasaushadhis* and *Parada yogas* like *Kupipakava Rasayana*. In present era, most of them show medical toxicity and common people hesitate to use these medicines due to awareness or lack of knowledge. This article narrates the details of *Kupipakava Rasayana* studying classical references and present day scientific work.

**Keywords:** *Rasa Shastra*, *Rasayanas*, *Kupi*, *Baluka Yantra*

### **INTRODUCTION**

At present, the new drug development process looks to be at a stagnant state. There is neither a good work on the chemistry point of *Rasaushadhis* nor are trials being made. To develop a new *Rasaushadhi* compound, work on the *Rasaushadhis* is limited to some classical formulations that too is not perfectly standardized. Present chemical labs identify purely prepared *Kajjali*, *Ras Parpati*, *Ras Sindoor* and *Hingula*, same as HgS. They have different pharmaceutical and therapeutic indication. Their chemical structure is still not identified like other chemical entities such as structure of benzene, diamond, graphite etc. Also there is huge scope for development of new drugs in *Rasa Shashtra*, like *Makardhwaz*, *Samir Pan-nag Rasa* etc. New *Kupipakava Rasa* compounds can be developed with combination of new metals and other elements. Working on some therapeutic specific isotopes of some elements can be a breakthrough in the field of medicine. To do all this as per present day requirements, the classical literature and text will have to be studied thoroughly. So this article primarily goes around the classical references of *Kupipakava Rasayana* and also some latest research works have been quoted. Chemistry in ancient India had its origin in the development of practical art to meet the demand for necessities of life, as also in the speculation about the nature and composition of matter. Since the beginning of civilization, the evolution of chemistry may be said to have proceeded in a more or less uninterrupted course in spite of numerous political and social changes in the country. Use of various metals and minerals and transformation of these into effective drugs in *Ayurvedic* system of medicine serve as evidence for this fact<sup>1</sup>.

The *Rasaushadhis* described in *Ayurveda* are well known for their rapid action. These are supposed to be superior to other drugs in many aspects. One of the most peculiar properties of *Rasaushadhis* is “Small drug dose, but having greater efficacy”. Enumerable formulations, small drug doses, rapid action, desired results, long lasting effect and palatability are some of the specialties of *Rasaushadhis*<sup>2</sup>. They can be used in *Asadhya vyadhis* (incurable diseases), while ancient *Acharyas* have concentrated only on treating the curable disease. It is also said that one doesn't have to look for *Dosha*, *Doosha*, *Desh*, *Kaal*, *Prakriti* etc. for the use of *Rasaushadhis*<sup>3</sup>. *Sinduras* are the mercurial compounds with or without Sulphur, which are prepared through *Kupipakva* method. *Rasa Sindura*, *Shila Sindura*, *Malla Sindura*, *Tala Sindura*, *Makardhwaja* and *Siddha Makardhawaja* etc. are examples of *Sindura*. It is important to mention that *Sinduras* are named on their red colour like that of *Sindura*. Because of the similarity in method of preparation, *Rasa Puspa* and *Rasa Karpura* are also included into this group, though these are not of red colour<sup>4</sup>.

Thus, *Rasa Shastra* has a unique importance in the field of *Ayurveda*. It basically deals with the pharmaceuticals of drugs of mineral and metallic origin, along with their occurrence, varieties, organoleptic characteristics and physical properties. The *Rasa* preparations can be classified in different classes such as *Kupipakva Rasayana*, *Parpati Rasayana*, *Pottali Rasayana* and *Kharaliya Rasayana*. The drug prepared from *Parada* (Mercury) and other compounds in a glass bottle by applying heat is termed as *Kupipakva Rasayana*. Preparation of *Kupipakva Rasayana* is characteristic pro-

cedure in *Rasa Shastra* as it requires *Kanch Kupi* (a special type of glass bottle), *Bhrasthri* (furnace) and *Baluka yantra* (a specially constructed instrument), *Kramagni* (a specific heating pattern), *Shalaka sanchalana* (insertion of hot and cold rod during preparation), *Mukha bandhana* (corking of a bottle), *Swanga sheetikarana* (allowed to cool by own) and *Kupi bhedana* (breaking of glass bottle)<sup>5</sup>.

The word *Kupipakva Rasayana* is made up of four words i.e. *Kupi* (glass bottle), *Pakva* (heating or *paka*), *Rasa* (*Parada*) and *Aayana* (*Sthana*). *Kupipakva Kalpana* is a special procedure of drug preparation, in which *Kajjali* is the main ingredient. The role of temperature is very important to get the desired and beneficial effect in the final product. Many observations and precautions are involved in the process of preparation of *Kupipakva Rasayana*<sup>6</sup>.

#### Definitions related to *Kupipakva Kalpana*

- *Jarana*: It is a process, in which *Gandhaka* is heated in different proportions with *Parada* (mercury) in specially designed apparatus<sup>7</sup>.
- *Murcchana*: It is a process in which *Parada* with or without *Gandhaka*, is converted into a suitable compound, which could be used internally without being reduced to ash<sup>8</sup>.
- *Kanch Kupi*: Glass bottle coated with seven layers of mud smeared cloth strips<sup>9</sup>.

- *Baluka Yantra*: Earthen pot filled with sand, at the center of which the *Kupi* is immersed for heating<sup>9</sup>.
- *Kupipakva Rasayana*: The *Rasayana* or formulation prepared using *Kupi* and *Baluka Yantra*<sup>10</sup>.

#### HISTORICAL REVIEW

In 8<sup>th</sup> century A.D. *Govinda Bhagvatpacharya* described *Gandhaka Jarana* procedures in his text *Rasa Hridaya Tantra* which finally developed as *Kupipakva Rasayana*<sup>11</sup>. *Rasa Prakasha Sudhakar* of *Acharya Yoshodhara Bhatt* is the first text to describe the *Kupipakva Rasayana* in the context of *Rasa Bhasma*. In this, *Sindura Kalpana* is mentioned as the name of *Udaya Bhaskar Rasa*. He also described the method of preparation of *Rasa Karpura* as the name of *Ghanasara Rasa*. *Kachaghati* (*Kupi*) and *Sikata yantra* are used for the preparation of *Udaya Bhaskar Rasa*<sup>12</sup>. *Acharya Dundukanatha*, the author of *Rasendra Chintamani*, has firstly introduced the preparation of *Kupipakva Rasayana* during 12<sup>th</sup> century A.D. He mentioned *Kramagni paka* i.e. increasing of heat (*Mrudu*, *Madhya* and *Tivragni*)<sup>13</sup>. From 13<sup>th</sup> century, the *Siddha Sampradaya* started to develop the *Kupipakva Rasayana*. In 15<sup>th</sup>, 16<sup>th</sup> and 17<sup>th</sup> century, *Kupipakva Rasayana* is explained in the name of *Sindura Rasa*.

**Table 1:** Classification of *Kupi Pakva* preparation:

|                      |                   |   |  |
|----------------------|-------------------|---|--|
| Ingredients          | <i>Sagandha</i>   | <i>Gandhaka</i> is used.                              | <i>Makaradhwaja</i> and <i>Rasa Sindura</i>          |
|                      | <i>Nirgandha</i>  | <i>Gandhaka</i> is absent.                            | <i>Rasa Manikya</i> and <i>Vyadhiharana Ras</i>      |
| Manufacturing Method | <i>Antardhuma</i> | Process is done in a closed container ( <i>Kupi</i> ) | <i>Sameer Pannaga Rasa</i> and <i>Rasa Sindura</i> . |
|                      | <i>Bahirdhuma</i> | Initially opened <i>Kupi</i>                          | <i>Rasa Sindura</i> and <i>Makaradhwaja</i>          |

|                                 |                   |  |  |
|---------------------------------|-------------------|--|--|
| Accumulation of desired product | <i>Galastha</i>   | The product is obtained from the neck of bottle              | <i>Makaradhwaja</i> and <i>Rasa Sindura</i>                  |
|                                 | <i>Talastha</i>   | The product is obtained from the bottom of bottle            | <i>Sameer Pannaga Rasa</i> and <i>Swarna Vanga</i>           |
|                                 | <i>Ubhayastha</i> | The product is obtained from both neck and bottom of bottle. | <i>Hinguliya Manikya Rasa</i> and <i>Sameer Pannaga Rasa</i> |

## METHOD OF PREPARATION OF KUPI-PAKAVA RASAYANA

In *Rasa Shastra*, the practical experience with the preparation of every medicine is more important. Preparation of *Kupipakva Rasayana* is one of the typical procedures to adopt. The text *Rasa Ratna Samuchhaya* gives clear cut indication regarding the method of preparation of *Kupipakva Kalpana*. The colour of finished product is resembled like *Sindura* (red). So it is considered that *Kupipakva Kalpana* is a *Sindura Kalpana*. In ancient times, it was being prepared through *Baluka yantra* and the heat was being applied in increasing order. The idea of using *Baluka yantra* was to apply uniform heat to the *Kanch Kupi*. The total period of heat prescribed for the preparation of *Rasa Sindura* is 8 *yamas* (24 hours). This time period should be divided into three categories, i.e. *Mridu agni* should be given in the first 8 hours, then *Madhyama agni* for next 8 hours and then *Teevragni* for last 8 hours<sup>14</sup>. Other formulations require variables time period and sometimes, it may be more than 24 hours.

**Equipments required:** *Kanch Kupi*, *Baluka Yantra*, Burner/furnace, *Khalva Yantra* (mor-

tar and pestle), *Shalaka* (Iron Rod), Copper coin or plate, Cork or sealing material.

**Materials:** The materials required for preparation of *Kupipakva Rasayana* may be-

1. *Parada* (Mercury)
2. *Gandhaka* (Sulphur)
3. Metal
4. Mineral
5. *Bhavana Dravya* (liquid for levigation)

### Procedure

The procedure of preparation of *Kupipakva Rasayana* is mainly divided into three phases:

1. ***Purva Karma* (Pre heating phase)<sup>15</sup>:** This includes
  - Collection of equipments
  - *Shodhana* of ingredient according to the specified classical methods
  - Preparation of *Kajjali*
  - Preparation of *Kanch Kupi*
  - Filling of *Kajjali* into *Kanch Kupi*
  - Fixing of *Kanch Kupi* in the *Baluka Yantra*.
2. ***Pradhan Karma* (Heating phase)<sup>15</sup>:** Heat is given in three stages with gradual increase in temperature.

**Table 2:** Pattern of Heating during Kupi Pakwa preparation:

| S. No. | Type of Agni   | Temperature      |
|--------|--|------------------|
| 1.     | Stage of <i>Mridu</i> heat/liquefaction of <i>Kajjali</i>      | upto to 250 °C   |
| 2.     | Stage of <i>Madhyama</i> heat/ <i>Jarana</i> of <i>Kajjali</i> | 250 °C to 450 °C |
| 3.     | Stage of <i>Tivra</i> heat/formation of compound               | 450 °C to 650 °C |

- *Mridu Agni*: This is the stage where *Kajjali* starts melting and sulphur fumes are emitted. This is tested with the help of a *Shita Shalaka* (cold rod). The temperature at this stage ranges upto 250°C.
  - *Madhyama Agni*: In this stage, melting of *Gandhaka* results in profuse fuming. At this stage, clearing of the mouth of glass bottle by *Tapta Shalaka* (hot rod) is done. The temperature ranges between 250 – 450 °C.
  - *Teevra Agni*: The emission of fumes is stopped and flame is seen at the mouth of *Kanch Kupi*. This stage is ideal to do *Mudrana* (Corking) for *Bahirdhoom Kupipakva Rasayana*. At this stage, temperature ranged between 450 - 650°C.
- 3. Paschat Karma (Post heating phase)<sup>16</sup>:**
- Removal of *Kanch Kupi*- After self-cooling, *Kanch Kupi* is gently removed from *Baluka yantra*.
  - Breaking of *Kanch Kupi*- Mud smeared cloth is scrapped off carefully with a knife. A strip of cotton cloth or a thick thread is soaked in spirit/kerosene. This is strapped around the center of the bottle. It is ignited to burn out. A wet cloth is then wrapped around the hot surface, which facilitates breaking of the bottle.
  - Collection of product- After breaking of the bottle, the product is removed from the *Kanch Kupi* carefully and stored in an air tight glass container.

### Sub processes

#### 1. Preparation of *Kajjali*<sup>17</sup>

- Trituration should be done without using any liquid, until it becomes lusterless. If

*Bhavana* is mentioned, it is to be done after *Kajjali* becomes lusterless.

- When metals like *Suvarna* (Gold) and *Roupya* (Silver) are to be added, then thin flakes of these metals are made and triturated to dissolve in *Parada*.
- When metals like *Naga* (Lead), *Vanga* (Tin) are to be added, they are melted and mixed with *Parada* to form amalgam and then *Gandhaka* is added to prepare *Kajjali*.

#### 2. Preparation of *Kanch Kupi*<sup>18</sup>

- The *Kanch Kupi* is wrapped with 7 layers of cotton cloth smeared with *Multani* clay.
- Each layer is done only after drying of the previous one.
- The bottle should be filled to 1/3<sup>rd</sup> of its capacity.

#### 3. *Baluka Yantra*<sup>18</sup>

- *Baluka Yantra* is filled with sand up to approximately 3 inches.
- *Kanch Kupi* is fixed exactly in the centre of *Baluka Yantra*.
- Sand is then filled around the *Kanch Kupi* up to its neck.

#### 4. *Shalaka Sanchalana*<sup>18</sup>: Iron rod with a wooden handle is kept for *Shalaka sanchalana*. Two types of *Shalakas* are used for this-

- *Shita Shalaka*: It is used to check the stage of *Kajjali*. At the beginning, *Shita Shalaka Sanchalana* is done to see whether *Kajjali* started melting or not. At the end, it is done to confirm total evaporation of Sulphur before corking.
- *Tapta Shalaka*: It is done to clear the mouth of the *Kanch Kupi* blocked by Sulphur particles during fuming.

5. **Copper coin test<sup>18</sup>**: It is done before corking to check the presence of *Parada* in *Bahirdhooma* method.

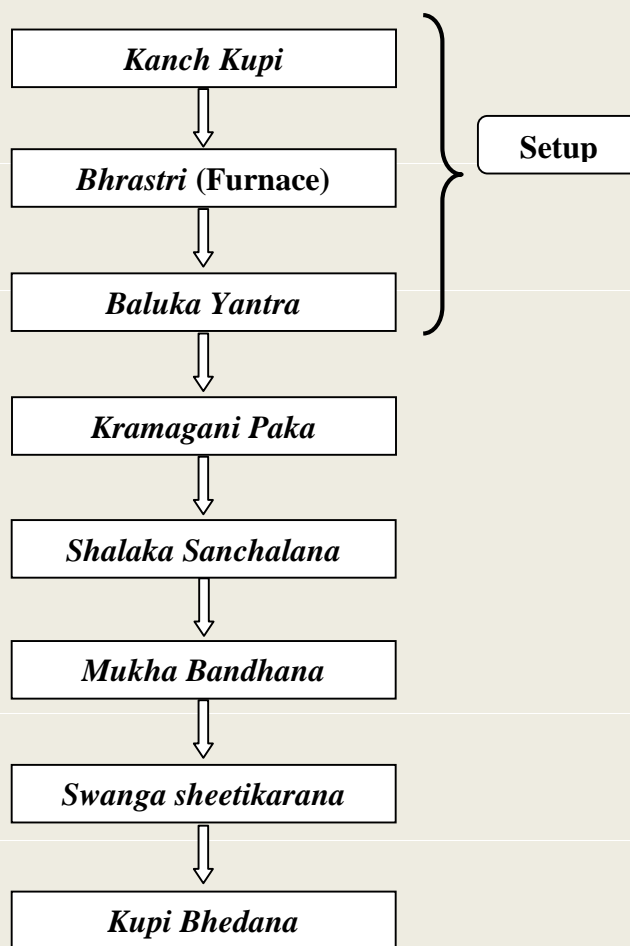
6. **Corking<sup>18</sup>**:Corking is done when-

- Fumes are stopped completely in *Antardhoom* method.
- Flames are stopped completely in *Bahirdhoom* method.
- Bottom of the bottle appears red.

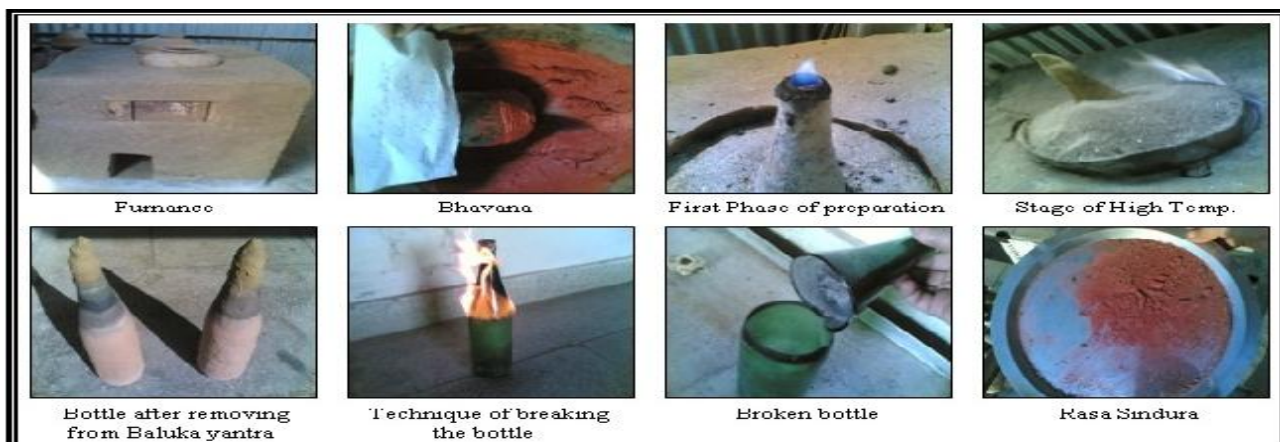
- Particles do not stick even on *Shita Shalaka*.

When these characters are appeared during *Kupipakva* preparation, then mouth of *Kanch Kupi* is sealed with cork and a piece of cotton cloth smeared with *Multani* clay is wrapped over it. After corking, 2-3 inch of sand surrounding the neck of the bottle is moved aside. Heating is then stopped.

**Flow chart for method of preparation of *Kupipakava Rasayana***



## IMAGES OF PHARMACEUTICAL STUDY OF KUPIPAKAVA RASAYANA



### OBSERVATIONS<sup>19</sup>

#### 1. Observations of fumes

- Colour, odour and time of the fumes are noted.
- Fumes may be mild, moderate or profuse.
- Colour of fumes may vary from yellow, orange to white.
- Odour of fumes may be sulphuric or arsenical according to the ingredients.

#### 2. Observation of Flame

- Time of appearance of flame, its height, colour, odour and duration are noted.
- Flame does not appear in *Nirgandha* preparations.

#### 3. Observation of *Shalaka sanchalana*

- *Shita Shalaka*: Particles of ingredients are seen on the rod at the stage of melting of *Kajjali*. This is the first end point.
- *Tapta Shalaka*: Material present at the mouth of *Kanch Kupi* burns with a blue flame on insertion of *Tapta Shalaka*.

### DIFFERENT VARIETIES OF KUPIPAKVA PREPARATIONS

There are various types of *Kupipakva* preparations available to cure and control the diseases like *Makaradhwaja*<sup>21</sup>, *Malla Sindura*, *Tala Sindura*, *Shila Sindura*, *Rasa Karpura*, *Rasa Pushpa*, *Swarna Vanga* and *Rasa Sindura*<sup>22</sup>

**Table-3:** Details of some *Kupi Pakva* preparations:

| Name of preparation | Ingredients   | Chemical changes expected                   | Dose        | Indication  |
|---------------------|---|---|-------------|---|
| <i>Rasa Sindura</i> | <i>Shuddha Parada</i> and <i>Shuddha Gandhaka</i>   | $Hg + S = HgS$                              | 1-2 Ratti   | <i>Rasayana</i> , <i>Vajikarana</i> , <i>Kushtha</i> , <i>Varna</i> |
| <i>Makaradhwaja</i> | Eight parts of <i>Shuddha Parada</i> , One part of <i>Shuddha Swarna</i> , Sixteen parts of <i>Shuddha Gandhaka</i> | $Hg + S = HgS$                              | 1/2-2 Ratti | <i>Kantikar</i> , <i>Aayushya</i> , <i>Vajikarana</i>               |
| <i>Rasa Karpura</i> | Specified quantity of <i>Shudd-</i>   | $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O =$ | 1/64-1/32   | <i>Vrana ropana</i> , <i>grahi</i> ,                                |

|                     |   |   |                        |  |
|---------------------|---|---|------------------------|--|
|                     | <i>ha Parada, Shuddha Sphatika, Shuddha Kasisa, Saidhava Lavana, Gairika</i> (red ochre)                                    | $K_2O+4H_2SO_4+ Al_2O_3+ 20H_2O$<br>$Hg + 2H_2SO_4= HgSO_4 +2H_2O+ SO_2$<br>$Hg_2SO_4+2NaCl+Hg =Na_2SO_4+ Hg_2Cl_2$ | <i>Ratti</i>           | <i>Kushtha, Atisarana-sak</i>                    |
| <i>Rasa Pushpa</i>  | Equal quantity of <i>Shuddha Parada</i> and <i>Shuddha Kasisa</i> , equal part of <i>Saindhava Lavana</i>                   | $Hg_2SO_4+2NaCl+Hg =Na_2SO_4+ Hg_2Cl_2$   | <i>1/2-2-1/2 Ratti</i> | <i>Visuchika nasaka, Pittahara, Vishana-saka</i> |
| <i>Swarna Vanga</i> | <i>Shuddha Vanga</i> , equal quantity of <i>Shuddha Parada</i> , Equal parts of <i>Shuddha, Gandhaka, Shuddha Nausadara</i> | $Sn+4NH_4Cl=(NH_4)_2SnCl_4+H_2+ 2NH_3$<br>$2(NH_4)_2SnCl_4+2S= SnS_2+(NH_4)_2SnCl_6+ 2NH_4Cl$                       | <i>1-2 Ratti</i>       | <i>Rasayana, Vajikarana, Kushtha nashaka</i>     |

### IMPORTANCE OF KUPIPAKVARASAYANA

*Kupipakva Rasayana* is a kind of metallic preparations which is commonly prescribed by *Ayurvedic* physicians. It has disease curing properties due to *Parada murchana*. Sometimes many chemical reactions involved during preparation of *Kupipakva Rasayana* are responsible to give a synergistic effect in the body. Different minerals and metals are transformed into effective bio-compatible form by this procedure. The actions of *Kupipakva Rasayana* remain for longer period of time which indicates its greater potency and efficacy. It is very effective even at minimum dose with ease of administration. When *Kupipakva Rasayanas* are mixed with other medicines, it minimizes their dose. As compared to other *Rasaushadhis* like *Kajjali, Parpati, Pottali*, the chemical bonding of *Kupipakva Rasayana* is stronger among these three. It is more potent than any of other herbal preparations<sup>20</sup>.

### DISCUSSION

In *Rasa Chikitsa*, a lot of *Rasaushadhi* are used for the management of diseases. Among all, *Kupipakva Rasayana* is very potent and effective for the management of various complicated diseases. Due to ease of palatability, long lasting effects, rapid onset of action and desired result shows greater efficacy of this preparation. When procedure, ingredients, *Bhavana* drugs, types of heating pattern are changed, then name and indication of preparation will also be changed like *Rasa Sindura, Makardhwaja, Malla Sindura, Tala Sindura, Rasa Karpura, Rasa Pushpa* etc. When mercury is processed with metals, it forms an amalgam which is responsible for formation of an intermediate product. The main promoters for chemical reactions are *Gandhaka* and *Parada* in which *Gandhak* is responsible for formation of sulphide. Mercury reacts with sulphur and forms mercuric sulphide (HgS). The preparations of *Kupipakva Rasayana* bear a unique importance in *Rasa Shastra*. When it is compared with other *Rasaushadhis* like *Kajjali, Parpati* and *Pottali*, its chemical bonding



is stronger among these three. It is more potent than any of other herbal preparations due to its quicker action on minimum dose. Heating pattern and preparation of *Kajjali* is most important to achieve maximal yield and increase effectiveness of preparation without any side effects or unwanted effects. The *Kramagni* are the best heating pattern for the *Kupipakva* preparation which is clearly mentioned in classical texts. Heating pattern should be always in increasing order like *Mridu Agni* at 120-250°C temperature for 6 hours, *Madhyama Agni* at 250-450°C temperature for 6 hours and *Tivra Agni* at 450-650°C temperature for 6 hours, but heating should be intermediate during the preparations. In pharmaceutical studies various instruments required, preparatory procedure have been described in detail which prove to be helpful for *Ayurvedic* scholars when they prepare this formulation of their own preparation.

## CONCLUSION

*Kupipakva Rasayana* holds its specialty in many aspects. The properties like Small drug dose, rapid action, desired results, long lasting effects and palatability make this formulation popular in *Rasa vaidyas*. While reviewing the *Rasa granthas* various references of *Kupipakva Rasayana* were found. Variations are found especially with respect to preparatory procedure, *Bhavana dravyas* used, instruments used in the procedure, medium of heat provided in the procedure, type of heating pattern, corking of the *Kupi*, materials used in the corking. The characteristic procedures like *Murcchana*, *Bandha*, types of *Kupipakva Rasayana* are discussed in detail which is helpful in proper understanding of the concept. In pharmaceuti-

cal studies various instruments required, preparatory procedure have been described in detail which prove to be helpful for *Ayurvedic* scholars when they prepare this formulation of their own. This study will definitely help scholars to understand *Kupipakva Rasayana* and encourage them in its preparation.

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**Source of Support: Nil**

**Conflict Of Interest: None Declared**

How to cite this URL: Nisha Bajaj Et Al: An Overview Of Kupipakav Kalpana. International Ayurvedic Medical Journal {online} 2017 {cited September, 2017} Available from:

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