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REVIEW ON SWARNARAJVANGESHWAR – A MERCURIAL PREPARATION

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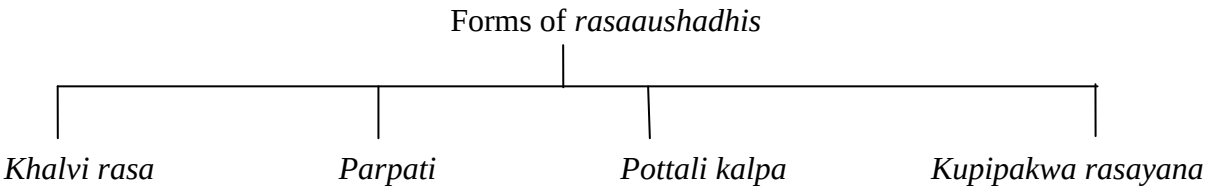
ABSTRACT

In *Rasashastra*, *Kupipakwa rasayana* holds its unique importance as compared to other formulations due to its miraculous effects on chronic ailments, rapid action and low dose. *Rasaushadhies* especially, *Kupipakwa rasayana Nirman* is considered as one of the tedious procedure. Particular processes are involved in these preparations which also bear testimony to the great chemical knowledge prevailing in ancient Indian science. Sublimation is the chemical process involved in most of the *Kupipakwa rasayana* preparation. *SWARNARAJVANGESHWAR* (SV) is a well known *Kupipakwa rasayana f*or its wide panacea with different *anupanas*. *Parada* acts as a catalyst in preparation of SV. In this study, SV is elaborated and its various pharmaceutical procedures, synonyms and properties are discussed. Different text references shows varying proportion of its drugs used and different time duration. Newer manufacturing techniques of SV have been explored in recent researches. SV is an excellent *Rasayana*, *Pramehahar*, *Medhya*, *Balya* and *Netraya*. The present review deals with practical work performed, its temperature pattern, precautions to be taken and probable chemistry of SV. This study will definitely prove to be helpful in conceptual understanding of SV and encourage scholars in its preparation.

KEYWORDS: *Kupipakwa rasayana*, *Swarnavanga*, References, Properties, Procedure, Temperature pattern.

❖ INTRODUCTION

The *Rasaaushadhis* are back bone of Ayurvedic therapeutics. Ayurveda give more importance to promotion of health and prevention of disease rather than cure of disease. *Rasaaushadhis* are chiefly based on metals and minerals, small doses, tastelessness, quick action, effectiveness and *rasayana* like properties make them more popular and superior over the other medicines and due to this, these are main focus of patients as well as pharmaceutical manufacturers.



Among the *Rasaaushadhis*, *Kupipakwa rasayana*s are more unique due to their specific method of preparation and long shelf life, less toxic in therapeutic dosages. Thus these are medicinally more valuable for physicians and patients too. It is very popular among Ayurvedic physicians and is looked upon as panacea. The preceptors of Indian *Rasashastra* were initially indulged very much in the achievement of a disease free body (*dehavada*) and the conversion of a lower metal to a higher metal i.e. a metal having higher economic value (*loha vada*) simultaneously. *Acharyas* found mercury and few other metals, minerals are very useful. They observed that some toxic and harmful effects are likely to be produced in the body if such metals,minerals are consumed directly. Hence to minimize it *shodhana*, *marana, gandhak jarana* etc. processes are carried out. *Gandhak* is considered as an essential element for various purposes of mercury. *Kupipakwa* method is developed with mercury in different proportions and burns it with the help of fire in glass bottle (*Kupi*).

Kupipakwa rasayana

Importance- *Kupipakwa rasayana* has importance among the *kalpanas* because of having following properties.

1. Potency of these drugs remains for longer.
2. Easy for administration
3. More potent as compared to other herbal preparations
4. When mixed with other drugs , it reduces the dose of other drugs due to its augmenting effect
5. Due to quicker action with minimal dose

Types - *Kupipakwa rasayana* are divided into three divisions

1. According to ingredients
2. According to the manufacturing methods
3. According to the place of finished product

Table 1: Types of *kupipakwa rasayana.*

Ingredients		**Manufacturing methods**		**Place of finished product**		
Sangandha	***Nirgandha***	***Antaradhuma***	***Bahirdhuma***	***Kanthasta***	***Talastha***	***Ubhaysatha***
Prepared with the use of *gandhak* eg: *Makardhwaj*	Prepared without the use of *gandhak* eg: *Rasakarpura*	Cork is applied in the beginning and vapours are not allowed to escape eg: *Rasasindura*	Cork is applied after burning of sulphur	The finished product is deposited at the neck eg: *Makardhwaj*	The product is obtained from the bottom of *Kupi* eg : *swarnavanga*	Final products obtained from both sites eg: *Samirpannag*

Table 2: Historical background of *Kupipakwa rasayana*.

Author	**Book**	**Description**
Govinda bhagvatapada	*Rasahridyatantra*	Described *Gandhak* jarana vidhi
Bhairavananda	*Rasarnava*	Mentioned the process of *Gandhak jarana vidhi*
Manthana bhairava	*Anandakanda*	Writes same under heading *Rasa murchna vidhi*
Sri Dundukanath	*Rasendra chintamani*	1st to introduce *Kupipakwa rasayana* preparations in Ayurvedic therapeutics
Rasa vagbhata	*Rasaratnasamucchya*	Mentioned some preparations by combining *Parad* with such as *Agnikumar rasa*
Acharya Yashodhara	*Rasa prakash sudhakar*	1st time coated *Rasa Sindura Kalpana* by the name *Udayabhaskara Rasa* which was prepared by using *kachkupi* and *Sikata yantra.* He has given the method of *Rasa karpoora* preparation by the name *Ghanasaar Rasa* Also mentioned *talastha rasabhasma*

Properties of *parada* with different dhatus

हेम्ना हन्ति युतस्त्रिदोषजरुजो रौप्येण पित्तामयांस्ताम्रेणापि

कफानिलौ च विविधान शूलामयान लोहयुक ।

नागेनाम्ल गदांस्तथा त्रपुयुतो मेहं च वङ्गैमृतिं

व्योमग्रासनिकृष्ट्चञ्चलगुणः सिद्धि प्रदत्ते रसः ॥ र.चु.१/३४

Swarna – *Tridosha nasha*

Rajata - *Pitta rog nashak*

Tamra – *Kapha* and *vatrog nashak*

Loha – Various types of *shul*

Naag – *Amla rog* and *rakta rog nashak*

Vanga – *Prameha nashak*

Hirak – Conquers death

Abraka grass – *Chanchalta* decreases

❖ **Review of *swarnavanga***

Swarnavanga is one of the examples of *Kupipakwa rasayana* . It is basically named due to the appearance, which is bright golden yellow in colour as similar to that of gold. It contains mainly *Parada, Vanga, Gandhaka* and *Navasagara*. It is indicated in some of the major diseases like *Prameha*, disorders of *Shukra, Shweta pradara, Viryahani*. etc. *Swarnavanga* is *talastha* so *kupi* is breaked at middle and collected from bottom of bottle.

For the first time *Swarnavanga* was explained by the *Rasaprakash sudhakar* by the name *Rasavanga*. It is one of the types of *Vanga bhasma* prepared by *Kupipakwa* method. In 18 AD century Govind Das Sen writer of *Bhaishajya Ratnavali* mentioned this *Rasakalpa* by the name *Swarnavanga* for the first time.

Previous work done

1. *Swarnavanga* ka nirman evam prameha ka adhyayan – by Dr. Ram Krishna Patala, 1978.
2. With a view to standardize the preparation of the best quality of *Swarnavanga*, research work has been done in the department of *Rasashastra*, IMS, BHU 1984. In this study to assess the role of Mercury in the preparation of *Swarnavanga*, Mercury was used in four proportions i.e. eqal to tin, ½ to tin, ¼ to tin, 1/6 to tin.
3. Pharmacological and experimental study of *Swarnavanga* with special references of toxicity and testicular regeneration property- by Dr. Sharma G BHU 1984.
4. Analytical study of *Swarnavanga* and its therapeutic efficacy in Oligozoospermia- by Dr. Vijendra P. Taranath Ayurved College, Bellary, 2004.
5. Pharmaceutical Clinical study of *Swarnavanga* with special reference to Vajeekaran effect, by Dr. R. P. Sharma NIA, Jaipur.

6. Pharmaceutical standardization of *Swarṇavaṅga*, *by* Dr. Rohit Ajith Gokarn, Maharashtra, India, 2013.

Table 3: Different references of *swarnavanga rasa*.

Sr.	Name	Ref.	Agni in Prahara	Contents
1	*Vangeshwar*	*Rasayogsagar*		*Parad*a,*Vanga* – 1 Part each
2	*Vangeshwar*	*Rasayogsagar*	*4*	*Parad*a,*Vanga*, *Gandhak*a – 1 Part each
3	*Mrugankarasa*	*Rasayogsagar*	*12*	*Parad*a-1 part, *Vanga*- 1 part, *Gandhak* 1 part, *Navasagar* 1 part ,Saindhava
4	*Peetamriganka rasa*	*Rasayogsagar*	*1*	*Parad*a 1 part, *Vanga* 1 part, *Gandhak*a 1 part, *Navasagar* 1 part
5	*Vangeshwar rasa*	*Bha.Bh.R*		*Parad*a,*Vanga*, *Gandhak*a – 1 Part each
6	*Swarnavanga*	*Bhartiya rasashastra*		*Parad*a-6 part *Vanga* 12 part, *Gandhak*a 7 part, *Navasagar* 6 part
7	*Swarnarajvangeshwar*	*Rasayogasagar*		*Parad*a 1 part, *Gandhak*a 4 part,Swarna bhasma ½ part, Mukta bhasma ½ part , Naag bhasma 1 part, Kant bhasma 1 part , Marich 1 part, *Vanga* 2 parts
8	*Swarnarajvangeshwar*	*Bhaishajya ratnavali*	*4*	*Parad*a,*Vanga*,*Gandhak*a,*Navasagar* 1 part each
9	*Swarnavanga*	*Rastarangini*	*4*	*Parad*a,*Vanga*,*Gandhak*a,*Navasagar* 1 part each
10	*Swarnavanga*	*Rastarangini*	*4*	*Parad*a-6 part *Vanga* 12 part, *Gandhak*a 8 part, *Navasagar* 6 part
11	*Swarnavanga*	*Rasatntrasar* and *siddha prayog sangraha*	*4*	*Parad*a-5 part *Vanga* 5 part, *Gandhak*a 5 part, *Navasagar* 4 part, *Kalmisora* 1 part

Table 4: Various names of swarana*vanga* mentioned in rasagranthas.

No.	Name of *rasagranthas*	Name of yog	Period
1	*Rasaprakash Sudhakar*	*Rasavanga*	13 AD
2	*Bhaishajya Ratnavali*	*Swarnavanga*	18 AD
3	*Brihat Rasarajsundara*	*Maskamruganka Rasa*	19 AD
4	*Rasatarangini*	*Swarnavanga*	20 AD
5	*Rasayog sara*	*1.Mruganka rasa* *2. Pita Mruganka rasa*	20 AD
6	*Bharat Bhaishajya Ratnakar*	*1.Maskamruganka Rasa* *2.Swarnrajvangeshwar*	20 AD
7	*Rasa tantra sara*	*Swarnavanga*	20 AD
8	*Siddha Bhaishajya manimala*	*Lagu mruganka rasa*	20 AD
9	*Kupipakwa rasa nirman vidnyam*	*Swarnavanga*	20 AD
10	*Rasamruta*	*Swaravanga*	20 AD

11	*Rasendra sampradaya*	*Swaravanga*	20 AD
12	*Rasendra vidnyan*	*Swaravanga*	20 AD
13	*Ayurveda saar sangraha*	*Swaravanga*	20 AD
14	*Ayurvediya Rasashastra*	*Swaravanga*	20 AD

Properties of *swarnavanga*

सुवर्णवंग शिशिरश्च रुशं सरं सतिक्तं लवणश्च साम्लम ।

रसायनं मेहहश्च मेध्यं बल्यश्च नेत्र्यं परमं प्रद्ष्ठिमं॥

लावण्यदं वन्हिविवर्धनश्च श्लेष्मामयघ्नं परमश्च वृष्यम।।

मेदोहरं शुक्रकरं निकामं सुवर्णवंग कथितं रसज्ञैः॥ र.तरं.१८/८१-८२

Swaroopa – *Swarnabha pita,* light in weight

Rasa – *Tikta, lavana, amla*

Veerya - *Sheeta*

Vipaka - *Katu*

Guna - *Sheeta, ruksha, sara, guru*

Doshaghanata - *Pitta, vata*

Dhatu - *Rakta, mamsa shukra*

Mala - *Sara, mutral*

Table 5: Functions of *swarnavanga*.

No.	***Karma* (functions)**	**BR**	**RT**	**RYS**	**RTS**	**ASS**
1	*Rasayana*	-	+	-	+	+
2	*Balya*	+	+	-	+	+
3	*Medhya*	+	+	-	+	+
4	*Kantivardhaka*	+	+	-	+	+
5	*Vrusha*	-	+	+	+	+
6	*Viryavardhaka*	+	-	-	+	+
7	*Shukrakar*	+	+	-	+	+
8	*Kamvruddhi*	-	-	+	-	-
9	*Aayuprad*	-	-	+	+	+
10	*Agnivardhaka*	+	+	-	+	+
11	*Netraya*	-	+	-	-	+
12	*Pushitakaraka*	-	-	-	-	+

***Swarnavanga* useful in various diseases**

1. *Prameha*
2. *Madhumeha*

3. *Medohara*
4. *Vataroga*
5. *Kaphaja roga*
6. *Svara roga*
7. *Swapnadosha*
8. *Kasa*
9. *Shwasa*
10. *Puyameha*
11. *Vranameha*
12. *Mutrakrucha*
13. *Mandagni*

Dose of *swarnavanga*

1-2 *Ratti* (125mg-250mg)

Anupana

Swarnavanga when used with different *anupanas* of *Vanga bhasma*, it shows effects similar to that of *Vanga* bhasma.

Table 6: *Anupana.*

No.	Diseases	Anupana
1	*Shweta pradara*	*Jatamansi churna + Yashad bhasma with Ashoka kwatha or Bala kwatha*
2	*Shukrameha*	*Sheetal chini churna + jala or Bala swarasa*
3	*Vranameha*	*Aam haldi swarasa + Madhu*
4	*Swapnadosha*	*Sheetal chini churna*
5	*Balavirya vridhi*	*Laghu shalmali churna*
6	*Shukra taralya*	*Yashada bhasma*
7	*Shukra dorbalya(Shukrapata,Shukradushti)*	*Rasasindoor + Madhu*
8	*Prameha*	*Madhu*
9	*Madhumeha*	*Madhu + Yela churna*
10	*Kasa*	*Yashtimadhu, Bibhitaka*

Swarnavanga panchaka rasayana

Swarnavanga - 2 parts
Shuddha shilajeeta - 2 parts
Tikshna Loha bhasma - 1 part
Vajrabhrak bhasma - ½ part

Shadaguna balijarit Makardhwaja - ½ part

The mixture of above substance in given proportion forms *Swarnavanga panchaka rasayana*.
It is useful in *Shukra meha*
It gives nourishment to *Shukravaha sansthan*
Helpful to reduce *Shuka taralata*
It is also helpful to improve memory

❖ **Pharmaceutical study**

Drugs cannot be used in their crude form whether they are herbal, mineral or metallic in origin. They need proper processing before administration. There are various methods of drug manufacturing mentioned in Ayurveda. *Rasashastra* mainly deals with therapeutic usage of minerals and metals. Minerals have to undergo various processes to attain therapeutic value. Aim is to prepare *Swarnavanga* and note the observations during all the stages of preparatory procedures.

MATERIALS

*Shuddha Parad*a
*Shuddha Gandhak*a
Shuddha Vanga
Shuddha Navasagara

Methods

A. Preparation of *kachkupi*
B. Preparation of *Swarnavanga*

A. Preparation of *kachkupi*

Powdered *Multani mitti* was first soaked in water to form fine paste.

In Cotton cloth was cut into pieces fitting to base, body and neck parts of the glass bottle.
The pieces were smeared in *Multani mitti* paste and applied on the parts of the glass bottle to form one layer of the matkapad.

The layer was allowed to dry completely and a new layer was applied over the previous one the same procedure was repeated for 7 times.

4 *kupi*s were prepared in the same way.

Kapadmitti

To enhance heat stability of *kupi*, also to strengthen the glass bottle so that it can not break even when inside vapour pressure increases.

Precautions

The layers of cloth were applied carefully to avoid air bubbles getting trapped in the layers.
Next layer of cloth was applied after complete drying of previous one.

B. Preparation of *Swarnavanga*

1. *Shuddha Parad*a
2. *Shuddha Gandhak*a
3. *Shuddha Vanga*
4. *Shuddha Navasagara*

▶ **Mixing of *Parad*a and *Vanga***

*Shuddha Parad*a taken into khalva *yantra*.

Vishesh shodhit *Vanga* was taken and heated till it melts.

Shuddha vanga is mixed with *Shuddha Parad*a in khalva *yantra* and rubbed together so as to form amalgam, after ½ hr of continuous trituration an uniform semisolid silver coloured mixture is formed called amalgam of *Parad*a and *Vanga*. Further trituration was carried out for 4 hrs.

Trituration should be done immediately and vigorously.

After washing, *Vanga* – *Parad*a mixture should be dried properly.

▶ **Preparation of *kajjali***

Shuddha Gandhak and *Shuddha Navasagara* are added to the amalgam and the whole are triturated for several hours until the mixture is converted to lustereless, fine, homogenous powder.
Initially the colour of mixture becomes greyish.
After about 4 hrs of continous trituration the mixture turns to complete black colour.
Until 36 hr of trituration shining particles were observed.

Complete *lakshanas* of *kajjali* were observed only after 45 hr of *Mardana*.

Final colour of mixture was *kajjalabha* without shining particles and was soft in consistency.

Clean and dry *khalva yantra* was used.

Uniformity of *maradana* was maintained through out the procedure

Mardana was done carefully to avoid spillage of fine powder of *kajjali*

Procedure

1. Poorva karma

A. Preparation of *kachkupi*

B. Preparation of *kajjali*

C. Filling of *kajjali* into *kachkupi*

D. Placing of *kachkupi* in valuka *yantra*

The lower 1/3rd of *kupi* was marked with the help of the scale and *kajjali* was slowly filled with the help of a funnel.

The bottle was properly cleaned and dried before filling *kajjali*

Any tilting or shaking of *kupi* was avoided.

The *valuka yantra* was placed exactly at the centre.

About 1 angula of sand was spread uniformly within the *valuka yantra Kupi* filled with *kajjali* is kept over sand at the centre and a rod was kept over sand for putting rod of pyrometer to measure the temperature.

Remaining part of the *yantra* was filled with sand up to the neck of the *kupi*.

Care was taken while putting the sand as it may contaminate the ingredients inside *kupi*.

2. Pradhana karma

The Pooja was performed and then *valuka yantra* subjected to *agni*.

Heating was carried out in gradually rising manner of *mridu* (room temp. – 250^{o}C), *Madhya* (250-450^{o}C) and *tikshna* (450^{o}C- till siddhi *lakshanas*).

The temperature was recorded with the help of digital pyrometer by inserting thermocouple in the rod placed near original *kupi*, by keeping the tip in the bottom of the rod.

Heat was increased gradually and regulated as per requirement. Temperature was recorded.

Frequent cleaning of neck of bottle with *tapta shalaka* was done.

Agni given until fumes stopped coming.

After complete cessation of fumes, heating was stopped and *kupi* kept for self cooling.

Figure 1.

Figure 2.

Observations

After 2hr. 15min. of starting the fire, whitish yellow fumes started coming out of *kupi*.

After 2hr. 45min. vigorously fumes started coming out of *kupi*. So *shalaka* sanchalan started to avoid choking of bottle neck by *Navasagara* and *Gandhak*a fumes.

After 5hr. dense yellow fumes of *Gandhak*a was seen coming out of the bottle. Later only mild fumes started coming out.

After 5.30 hr white fumes started coming out. White particles started settling at the top and neck of the bottle. Inside the bottle

When hot *shalaka* was inserted, dense white fumes adhered to the *shalaka*.

After 8 hrs the white particles of *Navasagara* slowly started depositing at the neck of the bottle. This had to be continously cleared by means of hot *shalaka* to avoid blocking of the bottle.

At the end of 12.30hr. the side part of bottom started appearind red.

At the end of 13 hrs. a red ring formed at the bottom of the *kupi*. Mild white fumes were still coming out of the bottle.

After 13.45hrs. the bottom of *kupi* was converted completely in Red colour, also complete cessation of white fumes observed. The bottom was looking like colour of rising sun.

Thus after 14hr. heat stopped and *kupi* kept for self cooling.

Precautions

The maintenance of temp. was done carefully with the help of pyrometer, steady rise in temp. is maintained.

Kantha shodhana was done continuously with help of *tapta shalaka* to prevent blocking of neck of the bottle.

After observing siddhi *lakshanas*, heating was stopped and *kupi* allowed for self cooling.

3. Paschat karma

The layer of *matkapada* was removed by scrapping with knife and the external surface of *kupi* was tied with thread dipped in spirit above the level of the *Swarnavanga*. The thread was ignited. On the hot part of the *kupi* surface was sprinkled.

Kupi was broken into halves with a breaking sound.

Now the lower portion of the bottle was taken and all the dust and black powder over the medicine was removed carefully.

Swarnavanga was removed with the help of knife from the lower part and from all the sides of bottle.

Figure 3

Figure 4

❖ Chemistry invoved[2]

Swarnavanga is obtained as golden yellow scales of crystalline SnS_2 better known as mosaic gold. Possibly these reactions may be formed by heating a mixture of tin, sulphur and ammonium chloride in glass bottle, a stannate and thiostannate is formed.

$Sn + 4Nh_4Cl = (Nh_4)_2\,SnCl_4 + H_2 + 2Nh3$

$2(Nh4)_2SnCl_4 + 2S = SnS_2 + (Nh4)_2\,SnCl_6 + 2Nh_4Cl$

In *Rasamritam*, it has been mentioned that the higher proportion of *Mercury* mixed with Tin divides it into very fine particles and thus exposes its max. surface area to react with Sulphur

and convert it into higher % of Tin sulphide compound in the presence of Ammonium chloride. The findings of the chemical study also supports this view i.e. where the mercury proportion is higher the percentage of Tin will be less. It is very much proportionate to mercury to tin i.e. lesser the mercury higher the percentage of tin in the compound.[4]

Table 7

Sr. no	Sample of *Swarnavanga*	Tin %	Mercury %
1.	A(Sn : Hg=1:1)	46.41	1.03
2.	B(Sn : Hg= 1:1/2)	53.25	0.81
3.	C(Sn : Hg=1:1/4)	58.82	0.63
4.	D(Sn : Hg=1:1/6)	61.56	Not estimable

Table 8: Temperature pattern observed in *swarnavanga* preparation.

Time	Temperature	Time	Temperature	Time	Temperature
11 am	36	4:30pm	380	10 pm	475
11:15	45	4:45	384	10:15	482
11:30	60	5 pm	388	10:30	488
11:45	72	5:15	391	10:45	494
12 pm	100	5:30	394	11 pm	498
12:15	128	5:45	396	11:15	502
12:30	145	6 pm	400	11:30	507
12:45	176	6:15	409	11:45	510
1 pm	195	6:30	415	1 2 am	514
1:15	205	6:45	423	12:15	518
1:30	225	7 pm	430	12:30	522
1:45	242	7:15	435	12:45	528
2 pm	252	7:30	438	1 am	531
2:15	269	7:45	441	1:15	534
2:30	288	8 pm	444	1:30	538
2:45	315	8:15	448	1:45	545
3 pm	328	8:30	450	2 am	550
3:15	339	8:45	455	2:15	556
3:30	349	9 pm	461	2:30	565
3:45	363	9:15	465	2:45	570
4 pm	372	9:30	468	3 am	570
4:15	378	9:45	471		

❖ CONCLUSION

- References of *Swarnavanga* present in recent *Rasashastra* books.
- The literary review reveals that primitive forms of *Swarnavanga* came into light since 13th century onwards.

- Differences of proportion of its contents and duration of preparation. All the references of *Swarnavanga* contain almost same ingredients. Some have mentioned *bhavana* of *nimbu swarasa* or *Kanji* or with the help of *Gajaputa*.
- When hot *shalaka* introduced into the *kupi*, it is felt like *shalaka* is passing through sand and after removal golden yellow material stick to the *shalaka*. This test confirms the siddha *lakshanas* of *Swarnavanga*.

Table 9: Observations.

Observation	Temperature	Duration
***Kupi*sthapana**	**Room temp.**	**00**
Whitish yellow coloured fumes started	205	2.15 hrs
Dark yellow coloured fumes increases	378	5.15 hrs
Tivra agni started	450	9.30 hrs
Side part of the bottle becomes red	538	14.30 hrs
Red coloured ring formed at the bottom of the bottle	550	15 hrs
Fumes disappeared completely. Red hot picture at the bottom	570	16.45 hrs
Agni stopped	570	17 hrs

Table 10: Organoleptic characters.

Sr.	Parameters	Sample
1	*Rupa*	Golden yellow and shiny
2	*Rasa*	Not specific
3	*Gandha*	Faint smell
4	*Sparsha*	Soft (light wt.)
5	*Nirdhumatva*	*Nirdhuma* on heating
6	*Varitaratva*	Powdered sample floats on water on sprinkling

Discussion on the importance of ingredients in the preparation of *Swarnavanga*

1. *Vanga*

It is the important ingredient of *Swarnavanga*. As the final product formed is Tin sulphide. If we consider the rasa, guna, panchabhautika constitution during the *Kupipakwa* procedure, they are dominated with agni and vayu mahabhuta which must have been helpful in breaking down the compact molecular structure of the *Vanga* dhatu resulting in decreasing the hardness.

2. *Parad*a

*Parad*a plays the roll of catalyst in the preparation of *Swarnavanga*.

As Rasaacharyas mentioned –

*Parad*a has property to amalgamate all metals in it. And it has capacity to divide the metal into fine particles, so that the metal gets favourable condition to react with other components. Similarly in *Swarnavanga*, mercury mixed with tin divides it into very fine particles. Thus it is exposed to maximum surface area to react with sulphur and get converted into tin sulphide compound.

3. *Gandhak*a

It is also important ingredient of *Swarnavanga* along with *Vanga*.

It is useful for *Parad*a bandhana, *vanga* marana and colouration of final product.

4. *Navasagara*

Similar to *Parad*a, *Navasagara* also act as catalyst in the preparation *Swarnavanga*.

It helps to motivates chemical reaction necessary to convert tin into tin sulphide.

Also plays roll in maintaining the temp. inside *kupi*.

Preparation of Swarana*vanga* took 17 hr and 570^{O}C.

❖ **Scope for further studies**

Clinical study can be conducted to find out clinical efficacy of *Swarnavanga* prepared by different formulations.

Proportion of drugs in *Swarnavanga* according to other references can be taken for study.

Comparative analysis of *Swarnavanga* prepared by classical method and by using muffle furnace can be studied.

Use of modern techniques to know what is the actual process undergoing inside the *kupi* can be studied.

To analyze *Swarnavanga* and its structure, mass spectroscopy analysis can be taken for study.

Indication of *Swarnavanga* along with different anupanas may be clinically studied.

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