

A scientific review of gold containing herbo-mineral preparation: Makaradhwaja

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Abstract

Makaradhwaja is a popular medicine of Ayurveda used for vigor and vitality. It is mentioned in classical texts of *Rasashastra* that *Makaradhwaja* increases longevity of life and contest aging process. It is used internally for wide range of disorders like *Jwara* (fever), *Prameha* (diabetes mellitus), *Agnimandya* (loss of appetite) etc. *Makaradhwaja* is gold containing mercurial preparation. As it is prepared by using metals like *Swarna* (gold), *Gandhaka* (sulfur) and heavy metal like *Parada* (mercury) with adopting typical procedure of *Kupipakwa Rasayana*. As it is containing heavy metal like mercury, different issues arises regarding its safety and toxicity. Here an attempt made to review work carried out on *Makaradhwaja* for its different aspects like literary, pharmaceutical, analytical experimental and clinical studies. By screening all the relevant classical texts of *Rasashastra* and scientific work available it was found that *Makaradhwaja* not only safe but also therapeutically effective in disorders like diabetes mellitus, rheumatoid arthritis etc.

Key words: Chandrodaya rasa, Makaradhwaja, mercury sulfide

INTRODUCTION

Long years ago in search of emancipation (*Moksha*); Indian Sages were practicing alchemical procedures to achieve it. For the immortality, thousands of medicines were prepared and used. Alchemical science was one of the branches, which were advocated for this purpose too. The Indian Alchemy was monitored for two purposes Dehavaad and Dhātuvaad. Dehavaad mainly practiced for immortality to achieve *Moksha*. But later on, it has given birth to Medicinal Alchemy. A number of Alchemical medicinal preparations were prepared to increase longevity of life and rejuvenation. *Makaradhwaja* was one of them. It is the perfect blend of herbo-mineral drugs.

Though it was named in different in different texts, but the preparation method was same that is *Kupipakwa Rasayana*. One or two references also quoted its preparation as a *Khalviya Rasayana*.

It is very much popular drug in the Indian system of medicine. Physicians use it as a main aphrodisiac agent and rejuvenator and treating a number of disorders. Many patent proprietary medicines contain it as a main ingredient. From

centuries, it is a drug of choice for many diseases.^[1] Like *Makaradhwaja* is mainly used in disorders such as *Sannipata Jwara* (fever), *Twakroga* (skin diseases), *Rakta dosha* (blood disorders), *Vranasrava* (wounds), *Aruchi* (anorexia), *Atisara* (diarrhea), *Pravahika* (dysentery), *Sphota* (boils), *Mandaanala* (loss of appetite), *Aamshoola* (abdominal pain), *Vata vikara* (nervous system disorders), *Dhwajabhanga* (Impotency), *Rasayana* (rejuvenation), *Vajikarana* (aphrodisiac agent), *Prameha* (diabetes mellitus), *Kushta* (skin diseases), *Upadansha* (gonorrhea), *Rajayakshma* (tuberculosis), *Shula* (abdominal Pain), *Shleepada* (filariasis), *Arsha* (piles), *Bhagandara* (fistula), *Katishoola* (low back ache), *Hruda shula* (cardiac Pain), *Kasa* (cough), and *Shwasa* (asthma).^[2,3]

It is prepared by purified *Swarna* (gold), *Parada* (mercury), and *Gandhaka* (sulfur) in different ratios by adopting specialized equipment like *Valuka Yantra* and unique heat pattern in increasing manner, i.e., *Kupipakwa Rasayana*. In

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Received: 30-04-2015

Revised: 24-10-2015

Accepted: 15-11-2015

short, gold containing mercurial preparation is prepared by sublimation procedure. However, it is potent medicine, but it is a heavy metal containing medicine. Its safety and toxicity are a major concern.

MATERIALS AND METHODS

Relevant scattered material collected from manuscripts of Rasashastra such as Bhaishajya Ratnavali, Rasendra Chintamani, and Rasatarangini. Scientific material collected from PG dissertation and Ph.D. thesis. Different research articles published in journals and internet. Here, in this study, bird eye view of different detailed studies is carried out. We searched out all the studies regarding Makaradhwaja in the aspects of literary, pharmaceutical, analytical, experimental, and clinical studies.

RESULTS AND DISCUSSION

The term Makaradhwaja is composed of two words, i.e., Makara and Dhwaja that is also a synonym of Kamadeva, the God of beauty. When used internally for therapeutic purposes, the Makara stands for the drug having aphrodisiac property and Dhwaja stands for the resultant as a straight rod or flagpole. Chandrodaya is also known as Makaradhwaja in later Rasa classics. It is constituted of two words, i.e., - Chandra (Moon) and Udaya (Glow of rising moon).

As quoted in Bhaishajya Ratnavali for the efficacy of Makaradhwaja, the person using it will become as handsome as Kamadeva.^[3] Probably there can be the similar meaning of Chandrodaya also, indicating that the user may gain brilliant shining of the body and look like rising Moon.

There are many references found in different Rasa literature by the name of Makaradhwaja and Chandrodaya [Table 1]. Based on methods of preparation, the formulation may be classified into two groups either Khalviya preparation or Kupipakwa preparation. Kupipakwa Rasayana is most popular in therapeutic purposes. Furthermore, it is divided into many types according to its ingredients and ratio. Like Dwiguna Balijarita, Triguna Balijarita, and Shadguna Balijarita Makaradhwaja. In this preparations ratio of sulfur to mercury increases, respectively. In Dwiguna Balijarita Makaradhwaja (DBM) ratio of purified gold, mercury, and sulfur it is 1:8:16. In Triguna Balijarita Makaradhwaja (TBM), it is 1:8:24 and in Shadguna Balijarita Makaradhwaja (SBM) it is 1:8:48.^[2,3] It is a consideration in Rasashastra classics that increase in the quantity of sulfur in the Kupipakwa Rasyanas increases its potency, i.e., Gandhaka Jarana. According to this consideration, Shadguna Balijarita Makaradhwaja is more potent than Triguna Balijarita and Dwiguna Balijarita.^[4]

Many ingredients in various proportions are used to prepare Makaradhwaja. The main drugs are Swarna (gold), Parada

(mercury), Gandhaka (sulfur), Mukta (pearl), Tamra (copper), Rajata (silver), Vanga (Stannum), Naga (Lead), etc. In some references, herbal drugs are also found as the Bhavana Dravya, e.g., Rakta Karpasa Pushpa (*Gossypium herbaceum*), Ankola Mula Twaka, (*Alangium salvifolium pannel*) Kumari (*Aloe barbadensis*), etc.

According to its manufacturing procedure, scholars followed different procedures and standardized. As per the concentration of sulfur to mercury, its DBM TBM and SBM were prepared in an electrical muffle furnace. In these studies, three different forms of mercury that are simple purified mercury, *Hingulotha parada*, and *Astasanskarita parada*. Continuation of this work three different forms of gold were also used to prepare it by using a gold leaf (Patra), foils (Varkha), and calcinated gold (Bhasma). In all of these studies, different temperature pattern were standardized.^[5-15]

Some scholars chemically characterized it by adopting modern scientific parameters. Researchers tried to establish its pharmaceutical standardization by adopting the metallographic technique. It was stated that samples of Makaradhwaja contain mercury and sulfur as major constituents. The metallographic study has shown the nature of growth pattern of the columnar crystals of mercuric sulfide without gold.^[5,6,16] As Makaradhwaja is prepared by gold, it was first time revealed that Makaradhwaja contains gold. The study reported that ICP spectrometry analysis showed Makaradhwaja (DBM) contains 7.6 mcg of Gold.^[8,11] Another study reported that ICP AES showed Makaradhwaja contained 130 ppm, 270 ppm, and 19 ppm of gold along with 82.95%, 80.1%, and 81.5% total mercury as Hg in TBM prepared by swarna patra, swarna varkha, and swarna bhasma, respectively. XRD pattern of Triguna and Shadguna Makaradhwaja showed peaks only due to mercury sulfide with an empirical formula of HgS and hexagonal crystal structure.^[9,15] One of intellectual revealed the presence of 7.2 ppm Gold in Triguna Makaradhwaja, whereas 663.1 ppm in Shadguna Makaradhwaja prepared by Ashtasanskarita Parada on ICPOES analysis.^[12,13] In continuation to this ICPOES analyzed Triguna Makaradhwaja contains 300 ppm while Shadguna Makaradhwaja contains 12131 ppm of Gold.^[10] Scholars reported Chemical Characterization of Poorna Chandrodayam Rasa a Siddha Medicine likewise Makaradhwaja. In this study, it was observed that Poorna Chandrodayam contains mercuric sulfide and trace amounts of oxides of gold. Several organic compounds were detected too.^[17]

In experimental studies, research scholars tried up to some extent to find out its absorption and distribution in the body. In the early experimental study on dog and guinea pigs, it was found that Makaradhwaja having poor absorption through stomach and gut intestines. During experimentation, it was observed that traces of Makaradhwaja (mercury sulfide) were observed in the liver of animals. Some amount

Table 1: Different references of the Makaradhwaja and chandraodaya rasa^[7]

Serial number	Formulation by the name of Makaradhwaja or chandraodaya	Rogadhikara (mentioned in disorder)	Classical text
1	<i>Br. Chandraodaya rasa</i>		<i>Kakshaputa tantra</i>
2	<i>Karpooora chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Vahata</i>
3	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Vahata</i>
4	<i>Makaradhwaja rasa</i>	<i>Rasayana</i>	<i>Rasa ratnakara</i>
5	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasendra chintamani</i>
6	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa chintamani</i>
7	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa chandansh</i>
8	<i>Makaradhwaja rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa manjiri</i>
9	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasendra sara sanghraha</i>
10	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa kamadhenu</i>
11	<i>Poorna chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa kaumudi</i>
12	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa pradeep</i>
13	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Vasvrajeeyam</i>
14	<i>Poorna chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Vasvrajeeyam</i>
15	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Todarananda</i>
16	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasendra kalpadruma</i>
17	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Yoga chintamani</i>
18	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Br. Yoga tarangini</i>
19	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Yoga ratnakara</i>
21	<i>Chandraodaya rasa</i>	<i>Vajikarana</i>	<i>Bhaishajya ratnavali</i>
22	<i>Makaradhwaja rasa (swarna ghatita shadguna balijarita)</i>	<i>Jwara chikitsa</i>	<i>Bhaishajya ratnavali</i>
23	<i>Makaradhwaja rasa</i>	<i>Vajikarana</i>	<i>Bhaishajya ratnavali</i>
24	<i>Shree siddha makaradhwaja rasa</i>	<i>Rasayana</i>	<i>Bhaishajya ratnavali</i>
25	<i>Siddha makaradhwaja rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa tarangini</i>
26	<i>Makaradhwaja rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa ratna manimala</i>
27	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Ratnakra aushadha yoga</i>
28	<i>Chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasa ratna dipika</i>
29	<i>Purna chandraodaya rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasayana sangraha</i>
30	<i>Makaradhwaja rasa</i>	<i>Rasayana, vajikarana</i>	<i>Rasamritam</i>

of mercury sulfide was found excreted in feces matter of animals.^[18,19]

Regarding its safety and toxicity studies, some scholars concluded that it is safe and non-toxic. No toxic effect on rabbits was found in a therapeutic dose of 3 mg/100 mg of body weight after administration for 6 weeks. Findings of histopathological study and biochemical indicators were not up to significant levels, which had been proved statistically, therapeutic doses the drug is non-toxic to body tissue and stimulates the body for better activity.^[5,6,20,21]

Another study revealed that Makaradhwaja did not produce any mortality up to the dose of 480 mg/kg orally in mice, suggesting the LD50 is >480 mg/kg. The dose is 42.65 times higher than the therapeutically equivalent dose in mice

and found significant modulator effect on cell-mediated immunity.^[22]

In the perspective of immune-modulatory effect, TBM is having better immunomodulatory activity profile. Dwiguna Makaradhwaja has a significant modulatory effect on cell-mediated immunity.^[23,24]

Researchers assessed antidiabetic effect Makaradhwaja. It was concluded that Makaradhwaja having a better antidiabetic effect. TBM prepared by the swarna varkha having a maximum antidiabetic effect than by swarna bhasma and swarna patra.^[9,25] sbm showed better experimental results in diabetes than tbm prepared by swarna varkha.^[10,12,26] One of the research intellectual tried to establish Makaradhwaja's pharmacological action on the modern science account.^[27]

In the context of the antioxidant property of Makaradhwaja, reported that it is inhibiting oxidation of Ascorbic acid and Tyrosin. Makaradhwaja was found to inhibit catalase activity of rat liver homogenate enzymes.^[28-30] For experimental evaluation of rejuvenation and longevity of life, a study was conducted. It was concluded that Makaradhwaja prevents the contraction in blood volume brought about by the aging process, may increase lifespan.^[31]

Makaradhwaja was found cardiac stimulant when assessed for it. Makaradhwaja administered in rabbits for the 2 weeks showed an increase in the force of contraction of ventricles indicating its positive effect on the heart.^[20]

When it was evaluated for antioxidant study encouraging results were scrutinized. The experiment showed a significant increase in lipid peroxides which illustrates its antioxidant activity.^[32] Recent investigators stated its safety. Pondral and biochemical parameters were examined on brain cerebrum, liver, and kidney in rats. Finally, reported that its safe and no any toxic effects proved.^[33]

Classical texts of Ayurveda prescribed Makaradhwaja for many disorders.^[34,35] Few of these indications were assessed therapeutically in clinical trials. Its efficacy in certain diseases is a new hope in the medicinal system. Effect of Makaradhwaja on the immune system of healthy individuals and patients of chronic renal failure was evaluated. Clinically, the drug is having a mild renoprotective effect. The study showed a significant increase in Hb% and serum creatinine with an appreciable change in body weight, physical, behavioral as well as a change in the quality of life. No any side effects of Makaradhwaja were observed in any circumstances.^[7]

In the context of Type 2 diabetes mellitus Makaradhwaja, it was reported that TBM prepared by swarna varkha having better results than prepared by swarna patra and swarna bhasma.^[9] Whereas SBM having better therapeutic effect in Type 2 diabetes mellitus than TBM prepared by swarna varkha. The overall study concluded that Makaradhwaja not only reduces the symptoms of diabetes but also biochemical parameters like blood sugar too.^[10,12,36]

Sidh Makaradhwaja with Ashwagandha powder was found therapeutically effective in rheumatoid arthritis.^[37]

CONCLUSION

All the research works carried out showing that Makaradhwaja is safe for therapeutic purposes. Scholars tried to establish its pharmacological action like absorption and distribution. On the experimental studies, Makaradhwaja proved immunomodulator, antidiabetic, and antioxidant drug. Clinical studies concluded its effective renoprotective action, efficacy in diabetes mellitus and rheumatoid arthritis.

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Source of Support: Nil. **Conflict of Interest:** None declared.