

CRITICAL REVIEW ON *MAKARADHVAJA* — A HERBO-MINERAL FORMULATION

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(Received 17 September 2012 ; revised 04 January 2014)

Abstract

Makaradhvaja is a herbo-mineral *Rasāyana* (rejuvenator) formulation containing gold which has been historically developed since 13th AD onwards. It is composed of processed gold, mercury and sulphur in different ratios (1:8:16; 1:8:24 or 1:8:48). Coined in 13th century, its pharmaceutical method of preparation went on changing up to 15th century. It is a well known, *Kūpipakva* preparation (drugs prepared in glass bottles using gradual heating) in the field of ayurvedic pharmaceuticals. *Makaradhvaja* is a best example of combination of *Kūpipakva* and *Kharalīya Rasāyana* (drugs prepared by trituration using mortar and pestle), as the sublimed product procured from the bottle neck is to be mixed with herbal drugs in a particular ratio by trituration. It is being administered with suitable vehicle in different diseased conditions for a period of one month to maximum three years.

Key words: *Kharalīya, Kūpipakva, Makaradhvaja, Rasāyana*

1. INTRODUCTION

In 13th century AD, *Rasaratnākara* (in *Rasāyanakhaṇḍa*) is the foremost text to coin the word *Makaradhvaja*.¹ It is a *Kūpipakva* preparation i.e. drugs prepared in glass bottle using gradual heating process. The text *Rasendra Cintāmaṇi* in early 15th century AD had furnished its nomenclature as *Caṇdrodaya Rasa*.² The constituents are processed gold (*śodhita śvarṇa*), mercury (*pārada*) and sulphur (*gandhaka*).³ It is prepared using *vālukā yantrā* (electric muffle furnace-EMF).

It is classified as drug prepared using direct heat with the sulphur and mercury as main ingredients being sublimated at the neck after gradual expulsion of fumes from the mouth of glass bottle (*sāgni śagandha bahirdhuma rasā murcchanā*).⁴ It amplifies that mercury amid other herbo-mineral drugs is being transformed by this particular method in to a medicine under the term '*Rasauśadhi*' (medicinal formulations prepared using processed mercury as important component).⁵

The idiom *Makaradhvaja* is composed of two words i.e. *makara* and *dhvaja* which is also a synonym of *Kāmadeva*, the Hindu God of love or desire⁶. For the appreciation of the efficacy of *Makaradhvaja* it is said that, person using it will become as handsome as *Kāmadeva*. As per *Rāmāyana*⁷, *Makaradhvaja* is name of son of *Hanumāna*⁸ (monkey God). Sanskrit names, *Makara* and *Dhvaja* stands for crocodile and penis show the property. Acārya Caraka⁹ has quoted "*nakra reto vṛuśyanam*"¹⁰ which means sperm of crocodile having most aphrodisiac property. It is also well supported by the

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opinion of ancient Greek physicians where they claim that dried penis of crocodile is used as aphrodisiac agent^{11 12}. In recent era too, body parts of crocodile are used for their specific aphrodisiac properties.¹³ *Makaradhvaja* stress more on aphrodisiac property of it when used internally for therapeutic purposes. *Dhvaja* stands for the resultant as straight rod or flagpole. *Cañdrodaya Rasa* is constituted of two words viz. *candra* (moon) and *udaya* (glow of rising moon) indicating that the consumer may gain brilliant shining of the body and he will appear like rising moon.¹⁴

On the basis of methods of preparation *Makaradhvaja* or *Cañdrodaya* may be classified into two groups either *kūpipakva* or *kharalīya* preparation. Many ingredients in various proportions are used to prepare *Makaradhvaja*; among them the main drugs being gold, mercury, sulphur followed by secondary drugs like *muktā* (pearl), *tāmra* (copper), *rajata* (silver), *vaṅga* (tin), *naga* (lead) etc. In some references herbal drugs are also found as the *Bhāvana Dravya* (media for levigation) e.g. *Rakta karpāsa puṣpa svarasa* (*Gossypium arboreum* Linn.), *Ankola mūla tvaka svārasa* (*Alangium lamarckii* Thw.), *Kumari svarasa* (*Aloe barbadensis* Mill.), etc.

Makaradhvaja is to be prescribed in the dose of one to two *Ratti* (125 to 250 mg)¹⁵ including all the *prakṣepa dravyas* (ingredients); hence individually. *Makaradhvaja* comes up to 35 mg/day; excluding other ingredients. It is to be consumed in *prātaḥa kāla* (morning time). Most of the *rasa* classics mentioned the dose of *Makaradhvaja* as one *valla* (375 mg) with the exceptions of texts *Rasa Cintāmaṇi* where it is told to be 1 *śhana* (4 gm)¹⁶ and *Yogarātnākara* where it was advised in the dose of 1 *māṣā* (1 gm). Majority of texts have described *karpura*, *jaiphala*, *samudraśosa*, *lavaṅga*, *kasturi* and *kṛṣṇa marīca* etc. should be used as *sahapāna* (drugs to be taken with the medicine after uniform mixing). *Tambula svarasa* is to be used as *anupāna* (vehicle)¹⁷.

During the use of mercurial compound, after the herbs or organic products are considered to be of most assistance to make it as *Pathya* (indicated)¹⁸. Some of them are: *Vrintaka* (*Solanum melongena* Linn.), *Taṇḍula* (*Oryza sativa* Linn.), *Paṭola* (*Trichosanthes dioica* Roxb.), *Punarnavā* (*Boerhaavia diffusa* Linn.), *Uranaśāli*, *Godugdha*, *Dadhi*, *Goghrita*, *Godhuma* (*Triticum aestivum* Linn.), *Mudga* (*Phaseolus radiatus* Linn.), *Zīraka* (*Cuminum cyminum* Linn) etc. while certain herbs have been described as *āpathya* (contraindicated) in them of which *Kakraṣṭaka gana*¹⁹ is very illustrious.

Mainly two types of instruments are used in the preparation of *Makaradhvaja* according to various classics viz. *Vālukā Yantra* (*Sand Bath*) and *Khalva Yantra* (*Mortal & Pestle*). The three types of *agni* (heat) *Candāgni*, *Madhyamāgni* and *Tivrāgni* sequentially known as *krama vivardhita agni* i.e. gradually increasing heat are used. Minimum 6 *Yama* i.e. 18 hours to maximum 24 *Yama* i.e. 3 days *agni* is set up to prepare *Makaradhvaja*²⁰. It is generally prepared as per the reference of *Rasendra Ciñtāmaṇi* (15th AD)²¹ or *Bhaiṣajya Ratnāvali* (19th AD)²² and for *Balijāraṇa* (treatment of mercury with the specific amount of sulphur for the prescribed duration). Basic reference is considered from *Rasendra Ciñtāmaṇi Mūrchanādhyāya*²³. In these methods, processed mercury is treated with two, three or six times of processed sulphur which improves its therapeutic efficacy²⁴.

2. MATERIAL AND METHODS

Classics of *rasaśāstra* (Ayurvedic pharmaceutical science dealing with mercurials) from 13th century AD onwards had been critically reviewed. MD and PhD theses carried out on *Makaradhvaja* in various institutes throughout India from the basic material of research.

3. OBSERVATIONS AND RESULTS

3.1 Organoleptic properties of *Makaradhvaja* (Table 1) showed that it is *Tridoṣaṣāmaka* i.e. pacifying three *doṣās*.

Table 1: Organoleptic properties of *Makaradhvaja*²⁵

Property	Observation
<i>Rasa</i>	<i>Avyakta (Śādarasātmaka)</i>
<i>Vīrya</i>	<i>Uṣṇa</i>
<i>Doṣaghnata</i>	<i>Tridoṣaṣāmaka</i>
<i>Varṇa</i>	<i>Rakta</i>
<i>Guṇa</i>	<i>Vruṣya, Rasāyana, Madhumehahāra, Viṣaghnā, Grāhi, Rucīvardhaka, Krimināśaka, Balya.</i>

3.2 Levigating media and their properties have been clarified by *Bhāvaprakāśa Nighaṇṭu* (16th AD) in (Table 2) especially of *Gossypium arboreum* Linn. and *Aloe barbadensis* (L.) Burm. f.

Table 2: Levigating media and their properties used in preparation of *Makaradhvaja*¹:

Properties	<i>Rakta Kārpāsa</i>	<i>Kumāri</i>
Latin Name	<i>Gossypium arboreum</i> Linn.	<i>Aloe barbadensis</i> (L.) Burm.f.
Family	Malvaceae	Liliaceae
English Name	-	Common Indian Aloe
Colour	Red	Green
Rasa	<i>Tikta</i> (Bitter), <i>Kaṣāya</i> (Astringent)	<i>Tikta</i>
Vipāka	<i>Madhura</i> (Sweet)	<i>Madhura</i>
Vīrya	<i>Śīta</i> (Cold)	<i>Śīta</i>
Guṇa(Qualities)	<i>Laghu</i> (Light), <i>Tikṣṇa</i> (Strong)	<i>Tikṣṇa</i>
Odour	Odourless	Odourless
Chemical Constituents	Calcium, Phosphorus, Iron, Riboflavin, etc.	Aloin, Berbalion, Isobarbalion, Aloe emodin, etc.

3.3 Indications and contraindications for consumption of *Makaradhvaja* have been enlisted in (Table 3 & 4) where *Kakarāṣṭaka* i.e. group of eight drugs whose name starts from ‘Ka’) drugs are contraindicated.

Table 3: Indications for use of *Makaradhvaja*²

<i>Sānipāta Jvara</i> (Chronic fever)	<i>Tvakroga</i> (Skin diseases)	<i>Raktadoṣa</i> (Blood born diseases)
<i>Vranasrāva</i> (Oozing wounds)	<i>Arucī</i> (Tastelessness)	<i>Atisāra</i> (Diarrhea)
<i>Pravāhikā</i> (Dysentery)	<i>Sphoma</i> (Pustules)	<i>Mandānala</i> (Loss of appetite)
<i>Āmśūla</i> (Chronic body Ache)	<i>Vātavikāra</i> (Diseases due to vitiated <i>Vata</i>)	<i>Dhvajabhāṅga</i> (Male infertility/ Ejaculating dysfunction)
<i>Rasāyana</i> (Rejuvenator)	<i>Vājīkarana</i> (Aphrodisiac)	<i>Prameha</i> (Diabetes)
<i>Kuṣṭa</i> (Skin Disorders)	<i>Upadaṅṣa</i> (Gonorrhoea)	<i>Rajyakṣmā</i> (Koch’s)
<i>Śūla</i> (Pain)	<i>Ślepada</i> (Fialeriasis)	<i>Nāivraṇa</i> (Fistulas)
<i>Arśa</i> (Piles)	<i>Bhagandara</i> (Multiple fistulas of Anus)	<i>Pamā</i> (Skin disease)
<i>Kaṭiśūla</i> (Back Ache)	<i>Hṣuda śūla</i> (Angina pectoris)	
<i>Kāśa</i> (Cough)	<i>Śvāsa</i> (Asthama)	

Table 4: Contraindication³:

1.	<i>Kuśmāṇḍa</i>	<i>Benincasa hispida</i> Cogn.
2.	<i>Kolā</i>	<i>Zizyphus jujuba</i> Mill.
3.	<i>Kaliṅga Phala</i>	<i>Holarrhena pubescens</i> Wall. ex Don
4.	<i>Karkoṭi</i>	<i>Luffa echinata</i> Roxb.
5.	<i>Kamatha</i>	<i>Kachhapa</i>
6.	<i>Kulattha</i>	<i>Vigna unguiculata</i> Linn
7.	<i>Kadali</i>	<i>Musa paradisiacal</i> Linn.
8.	<i>Karavellakā</i>	<i>Momordia charantia</i> Linn.

3.4 References of the *Makaradhvaja/ Caṅdrodaya Rasa* have been listed according to various *Rasa* classics in (Table 5) which are around 27 in number.

Table 5: Different references of the *Makaradhvaja* and *Caṅdrodaya Rasa*:

Sr. No.	Formulation by the Name of <i>Makaradhvaja</i> or <i>Cāndrodaya</i>	<i>Rogaādhikāra</i>	Reference
1	<i>Karpūra Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Vāhaṭa</i> ⁴
2	<i>Makaradhvaja Rasa</i>	<i>Rasāyana</i>	<i>Rasa Ratnākara</i> ⁵
3	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasendra Cintāmaṇi</i> 8/20-28
4	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Cintāmaṇi</i> 11/4-7
5	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Cāndanśu</i>
6	<i>Makaradhvaja Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Maṅjīrī</i> 276-286
7	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasendra Sāra Saṅgraha</i> 5/65-74
8	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Kāmadhenu</i> 14/105-110
9	<i>Poorna Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Kaumudi</i>
10	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasa Pradīp</i>
11	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Vasvrajīyam</i>
12	<i>Pūrṇa Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Vasvrajīyam</i>
13	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Todarananda</i>
14	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Rasendra Kalpadruma</i>
15	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Yogaciñtāmaṇi</i>
16	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Brh Yoga Tarāṅginī</i>
17	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana Vājīkaraṇa</i>	<i>Yoga Ratnākara</i>
18	<i>Caṅdrodaya Rasa</i>	<i>Vājīkaraṇa</i>	<i>Bhaiśajya Ratnāvali</i> 74/137-142
19	<i>Makaradhvaja Rasa (svarna Ghaṭita Śadguṇa Balijārīta)</i>	<i>Jvara Cikitsā</i>	<i>Bhaiśajya Ratnāvali</i> 5/1237-1244
20	<i>Makaradhvaja Rasa</i>	<i>Vājīkaraṇa</i>	<i>Bhaiśajya Ratnāvali</i> 74/114-123
21	<i>Śrī Siddha Makaradhvaja Rasa</i>	<i>Rasāyana</i>	<i>Bhaiśajya Ratnāvali</i> 73/1110-1130
22	<i>Siddha Makaradhvaja Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Rasa Tarāṅginī</i> 6/245-247
23	<i>Makaradhvaja Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Rasa Ratna Manimālā</i>
24	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Ratnākara Auśadha Yoga</i>
25	<i>Caṅdrodaya Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Rasa Ratna Dīpikā</i>
26	<i>Pūrṇa Caṅdrodaya Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Rasāyana Saṅgraha</i>
27	<i>Makaradhvaja Rasa</i>	<i>Rasāyana, Vājīkaraṇa</i>	<i>Rasāmṛitam</i> 1/40-45

3.5 Pharmaceutical preparatory methods of *Makaradhvaja* by *Kūpipaka* techniques are elaborated in (Table 6).

Table 6: Methods of preparation of *Makaradhvaja* by *Kūpipaka* with its ingredients:

No.	Name of preparation with their references	Ingredients with their quantity	Method of preparation	Dose	<i>Sahapāna</i>
1.	<i>Cañdrodaya Rasa</i> Ref: Ra. Ci. (8/20-28) Ref: Ra. Ci. (11/4-7) Ref. R. S. S. (5/67-76) Ref. B.Y.T. –T. 147 (49-57) Ref. Y. Cñi .264 (1-6) Ref. Y.R. 2nd part, (1-6) <i>Makaradhvaja Rasa</i> Ref. Ra .M.(6/277-287) Ref. B.R. (74/137-142) Ref. R.T. (6/238-244)	<i>S. svarṇa</i> (1 Pala) <i>S. Pārada</i> (8 Pala) <i>S. gandhaka</i> (16 Pala) <i>Bhāvana Dravyas</i> : <i>Rakta Kārpāsa</i> <i>Puṣpa svarasa</i> and <i>Kumārī svarasa</i>	The small pieces of <i>svaṇa patra</i> are triturated with <i>Parada</i> till the formation of <i>Piṣṭi</i> then <i>suddha andhaka</i> is added in the <i>Khalva Yantra</i> and triturated till the formation of <i>Kajjālī</i> which is treated with the <i>Rakta Kārpāsa Puṣpa</i> and <i>Kumārī svarasa</i> for each one time. <i>Bhavita Kajjālī</i> is subjected for <i>Kūpipaka</i> .	1 Valla	<i>Karpūra</i> (1 Pala), <i>Jaiphala</i> (1 Pala), <i>Marica</i> (1Pala) <i>Lavaṅga</i> (1 Pala) <i>Kasturi</i> (1 śana) <i>Tambula Patra</i> as <i>anupāna</i>
2.	<i>Makaradhvaja Rasa</i> Ref. B.R. (74/114-123)	<i>S. svarṇa Patra</i> (1Pala), <i>S. Pārada</i> (8 Pala), <i>S. gandhaka</i> (24 Pala) <i>Bhāvana Dravyas</i> : <i>Rakta Kārpāsa</i> <i>Puṣpa svarasa</i> & <i>Kumārī svarasa</i>	Same as <i>Rasendra Ciñtāmaṇi</i>	1-2 Valla	<i>Karpūra</i> (4 Tola), <i>Lavaṅga</i> (4 Tola), <i>Marica</i> (4 Tolā), <i>Jaiphala</i> (4 Tolā), <i>Kasturi</i> (6 Māśa) <i>Tāmbula Patra</i> as <i>anupāna</i>
3.	<i>Makaradhvaja</i> (<i>Svarnaghathita śadguṇa Bālijārīta</i>) B. R (5/1237-1244)	<i>S. svarṇa</i> (1 Pala), <i>S. Pārada</i> (8 Pala), <i>S. gandhaka</i> (16 Pala) <i>Bhāvana Dravyas</i> : <i>Kumārī svarasa</i>	Same as <i>Rasendra Ciñtāmaṇi</i> . But, in this preparation the amount of <i>andhaka</i> should be taken six times in place of <i>Dvigūṇa</i> .	1 Ratti	<i>Tāmbula Patra</i> as <i>anupāna</i>
4.	<i>Śrī Siddha Makaradhvaja</i> Ref.(B.R. 73/110-130) <i>Siddha Makaradhvaja</i> Ref. R. T. (6/245-247)	<i>S. svarṇa</i> (2 Karṣa), <i>S. Pārada</i> (1 Pala), <i>S. gandhaka</i> (2 Pala) <i>Bhāvana Dravyas</i> : <i>Rakta Kārpāsa</i> <i>Puṣpa Svarasa</i> , <i>Śvet Aṅkola mūla</i> <i>Svarasa</i> & <i>Kumārī svarasa</i>	Same as <i>Rasendra Ciñtāmaṇi</i> . But here heating pattern is 2-2 <i>prahara</i> for <i>Mṣudu</i> , <i>Madhya</i> and <i>Tivrāgni</i> . The final prepared compound is again triturated with <i>Dvigūṇa gandhaka</i> and repeats the previous process.	As per diseases	As per diseases

3.6 Pharmaceutical preparatory methods of *Makaradhvaja* by *Kharalīya* techniques are elaborated in (Table 7).

Table 7: Methods of preparation of *Makaradhvaja* by *Kharalīya* method with its ingredients:

Name of the Ingredients	Name of the compound and references					
	<i>Pūrṇa Cāndrodaya rasa</i> (R.S.S. 2/2-5, B.R.7/132-135)	<i>Pūrṇa Cañdra Rasa</i> (Ref.R.S.S. 5/17,B.R. 74/71)	<i>Brihat Pūrṇa Cañdrodaya Rasa</i> (Ref.R.S.S.5/52-66, B.R. 73/78-88)	<i>Makaradhvaja Rasa</i> (Ref.R.S.S. 5/77-79, B.R. 73/75-77)	<i>Makaradhvaja Vaṭi</i> (B.R. 74/89-95)	<i>Cañdrodaya Makaradhvaja</i> (74/134-136)
Metal & Mineral	Quantity	Quantity	Quantity	Quantity	Quantity	Quantity
<i>Śuddha Pārada</i>	8 Māśa		2 Karṣa			
<i>Śuddha gandhaka</i>	8 Māśa		2 Karṣa			
<i>Svarṇa Bhasma</i>			1 Tolā	2 Part	1 Tolā	1 Māśa
<i>Rajata Bhasma</i>			2 Tolā	1 Part	1 Tolā	
<i>Tāmra Bhasma</i>			1 Tolā			
<i>Lauha Bhasma</i>	1 Pala	1 Māśa	1 Pala	1 Part	1 Tolā	
<i>Kamsya Bhasma</i>			1 Tola	1 Part		
<i>Vaiṅga Bhasma</i>			2 Karṣa	1 Part		
<i>Abhraka Bhasma</i>	1 Pala	1 Māśa	1 Pala	1 Part	4 Tolā	
<i>S.Makṣika Bhasma</i>		1 Māśa				
<i>Śuddha Haratāla</i>	1 Pala					
<i>Śuddha silājita</i>		1 Māśa				
<i>Svarṇa Sindura</i>				4 Part	16 Tolā	
<i>Rasa Sindura</i>		1 Māśa		1 Part	2 Tolā	4 Tolā
Animals						
<i>Pravāla Bhasma</i>				1 Part	2 Tolā	
<i>Mukṣa Bhasma</i>				1 part	1 Tolā	
<i>Kasturi</i>				1 Part	1 Tolā	1 Māśa
Herbals						
<i>Karpūra</i>	8 Māśa		1 Karṣa	1 Part	2 Tolā	1 Tolā
<i>Javitri</i>				1 Part		
<i>Jaṭamañsi</i>	1 Karṣa					
<i>Tejapatra</i>	1 Karṣa					
<i>Dalhcini</i>			1 Karṣa			
<i>Ela</i>			1 Karṣa			
<i>Kali</i>						
<i>Marica</i>	1 Karṣa					1 Tolā
<i>Śuñthi</i>	1 Karṣa					
<i>Pippali</i>	1 Karṣa					
<i>Jīraka</i>			1 Karṣa			
<i>Kacūra</i>	1 Karṣa					
<i>Taliśa Patra</i>	1 Karṣa					
<i>Nāgakeśar</i>	1 Karṣa					
<i>Motha</i>			1 Māśa			
<i>Pippali Mūla</i>	1 Karṣa					
<i>Lavaṅga</i>	1 Karṣa		1 Karṣa			1 Tolā
<i>Vyavidṅga</i>		1 Māśa	1 Karṣa			
<i>Jāyāphala</i>				1 Part	1 Tolā	1 Tolā
<i>Priyṅgu</i>			1 Karṣa			
<i>Bhrīṅgarāja</i>			1 Karṣa			
Bhavanā dravyas	Jala		<i>Kumārī svarasa,</i> <i>Triphalā Kvātha,</i> <i>Kebuka Svarasa</i>			Jala
Rogādhikāra	<i>Atisāra</i>	<i>Rasāyana</i> <i>Vājikaraṇa</i>	<i>Sarvarognāśaka</i>	<i>Sarvaroga nāśaka</i>	<i>Vājikaraṇa</i>	<i>Vājikaraṇa</i>
Dose (Māśa)	2 Ratti 1-2 Ratti	1 Māśa 2 Ratti	1 Canak 2 Guñjā			

3.8 Nomenclature of *Makaradhvaja* on the basis of *Balijāraṇa* has been listed in (Table 8).

Table 8: Nomenclature of *Makaradhvaja* on the basis of *Balijāraṇa*

Nomenclature	Ratio of <i>Svarṇa</i> : <i>Pārada</i> : <i>Gandhaka</i>	References
<i>Dvigūṇa Balijārīta Makaradhvaja</i>	1:8:16	<i>Caṅdrodaya Rasa</i> Reference: <i>Rasendra Ciñtāmaṇi</i> (8/20-28) Ref.: <i>Rasa Ciñtāmaṇi</i> . (11/4-7) Ref.: <i>Rasendra Sāra śiddha Prayoga Saṅgraha</i> (5/67-76) Ref.: <i>Bṛahat Yoga Tarāṅgini</i> –T. 147 (49-57) Ref.: <i>Y. Ciñtāmaṇi</i> 264 (1-6) Ref.: <i>Yoga Ratnakara</i> II part, (1-6) <i>Makaradhvaja Rasa</i> Ref.: <i>Rasāmṛutam</i> (6/277-287) Ref.: <i>B.R.</i> (74/137-142) Ref.: <i>Rasa Tarāṅgini</i> (6/238-244), <i>B. R.</i> (5/1237-1244)
	1:2:4	<i>Śiddha Makaradhvaja</i> Ref.: <i>Rasa Tarāṅgini</i> (6/245-247)
<i>Trigūṇa Balijārīta Makaradhvaja</i>	1:8:24	<i>Makaradhvaja Rasa</i> Ref.: <i>Bhaiṣajya Ratnāvali</i> (74/114-123)
<i>Śaḍgūṇa Balijārīta Makaradhvaja</i>	1:8:48	<i>Makaradhvaja</i> <i>Svarṇaghatita Śaḍgūṇa Balijārīta</i> Ref.: <i>Bhaiṣajya Ratnāvali</i> (5/1237-1244)
	1:2:4+4+4	<i>Śrī Śiddha Makaradhvaja</i> Ref.(<i>B.R.</i> 73/110-130)

4. DISCUSSION

Svarṇa, *Pārada* and *Gandhaka* were set in the ratio of 1:8:16 as main ingredients, where as ratio like 1:8:24 and 1:8:48 are also described by *Bhaiṣajya Ratnāvali* (19th AD). The quantity of *svarṇa* is increased up to four parts instead of one part in the preparation of *Śiddha Makaradhvaja*. The ratio concept is the process of *Gandhaka Jāraṇa* in different proportions of sulphur. In the ratio 1:8:16 and 1:2:4, quantity of *Gandhaka* is double of *Pārada* while in 1:8:24 it is tripled and in 1:8:48 it is six times of *Pārada*. The nomenclature has been done on the basis of *Gandhaka Jaraṇā* it might be possible to remove controversies regarding preparation of *Makaradhvaja*. So in 1:8:16, the ratios may be called as *Dvigūṇa Balijārīta Makaradhvaja*; (1:8:24) as *Trigūṇa Balijārīta Makaradhvaja*, (1:8:48) *Śaḍgūṇa Balijārīta Makaradhvaja*, (1:2:4) *Dvigūṇa Balijārīta Śiddha Makaradhvaja*.

Though there are so many references about the heating pattern, for the *Dvigūṇa Balijārīta Makaradhvaja*, it is eighteen hrs, two days, three days . But there is only one reference of 1:8:24 and 1:8:48 given by *Bhaiṣajya Ratnāvali* (19th AD) where text has not mentioned the heating pattern for preparation. In recent researches standard manufacturing process for preparation of *Trigūṇa Balijārīta Makaradhvaja* prepared by *Svarṇa Varkha*, it has been mentioned that *Trigūṇa Balijārīta Makaradhvaja* was prepared in 12 hrs following increasing manner of heating pattern⁶ and the *Trigūṇa* and *Śaḍgūṇa Balijārīta Makaradhvaja* in 18 and 36 hrs has also been prepared in most recent research work respectively⁷.

Reviewing all the references of *Makaradhvaja* it was observed that *Gandhaka* was given twice, thrice or six times of *Pārada*. Definite role of *Gandhaka Jāraṇa* should be behind it as not a single reference was found in which equal parts of *Gandhaka* and *Pārada* is mentioned. As per *Rasa* classics vital importance has been given to the *Gandhaka Jāraṇa* which is directly proportional to therapeutic activity i.e. as the number of *Gandhaka Jāraṇa*⁸ increases, there is increase in the potency and efficacy of the product on the therapeutic level.

The *Rakṭa Kārpāsa Puṣpa* and *Kumārī svarasa* are described as *Bhāvanā Dravyas* in this preparation, but in later period, *Aṅkola mūla svarasa* (*Alangium lamarckii* Thw.), *Śālmali* (*Bombax ceiba* Linn) *Kvātha*, *Musali Kvātha* (*Curculigo orchoides* Gaertn.), *Snuhi* (*Euphorbia neriifolia* Linn.), *Arka*⁹ (*Calotropis procera* R.Br.), *Nāgavallipatra svarasa* (*Piper betel* Linn.)¹⁰ *Triphalā Kvātha* (*Terminalia chebula* Retz., *Terminalia bellirica* Roxb., *Emblica officinalis* Gaertn.) & *Ekṣurasa*¹¹ (*Saccharum officinarum* Linn.) are also included as *Bhāvanā Dravyas* (Levigating media).

Makaradhvaja Siddhilakṣaṇa are described by *Bhaiṣajya Ratnāvali* and termed as early sun rays (*Navārṅkākirnopamam*)¹² and *Rasendra Ciñtāmaṇi* specify the colour as tender leaf (Pallavarāgaramyaḥ)¹³ whereas *Rasa Taraṅgini* (20th AD) appreciate the final consistency of formulation as mango juice (*Sahakarārasaprabham*) red after breaking (*Bhangeraktapratikāśam*) and like red lotus (*Raktotpalopamam*).¹⁴

In the renowned *Rasa* text *Śiddhabheṣajamaṇimālā* (19th AD), Acharya Krishnārāma Bhaṭṭa appreciated seven qualities of *Makaradhvaja* (*Cañdrodaya*¹⁵ *Rasa*)— it should have gold as a constituent, it should be enlightened or shining in night, it should be of colour of rising sun, which settles in the bottom of *Kūpi*, which is very pleasant, soft and should possess all the qualities for which it is appreciated. According to many scholars these specific qualities are considered for *Makaradhvaja* prepared by *Antardhūma* method of preparation of *Kūpipakva Rasa*.

Chief desired characters (*śiddhi parikṣā*) of *Makaradhvaja* are that it should be brittle, look like blood red color or color like immature leaves of mango before trituration and after trituration color like *Punica granatum* flowers. It is very much popular Ayurvedic *rasauśadhis* by the name of *Makaradhvaja*, *Śiddha Makaradhvaja*, *Cañdrodaya Rasa*, *Pūrṇa Cañdrodaya Rasa*, *Bhruhata Cañdrodaya Rasa*, and *Karpūra Cañdrodaya Rasa* etc.

Cañdrodaya (15th AD)¹⁶ is synonymous to *Makaradhvaja* (13th AD)¹⁷ which is implied from the fact that the method of preparation, components, the proportion of main ingredients, levigating medias, duration of gradual heating gradient and the clinical efficacy elaborated in classics for both the formulations run identically.

There are some controversies about the use of raw material i.e. *Svarṇa*. Some scholar says that the *Svarṇa Patra*¹⁸ (thin gold foils) should be used as a whole; some say *Svarṇa Varkhā*¹⁹ (thin papery sheets of gold), and other say *Svarṇa Bhasma* should be used on the basis of the hypothesis of the particle size of the compound. Minimum the particle size of *Svarṇa*, amalgamation with the *Pārada* increases, the *Svarṇa* content in the sublimed *Makaradhvaja* (final product) increases the therapeutic efficacy and potency of the *Makaradhvaja*. But previous study of Khedekar S. et al. revealed that *Makaradhvaja* prepared by *Svarṇa Varkhā* was found more potent than prepared by *Svarṇa Patra* and *Bhasma*.

The dose of *Makaradhvaja* is to be between one *Valla* to one *Māśa*. But, whatever doses are mentioned in different texts it includes *Sahapāna* too. *Tāmbula Patra Svarasa* is used as vehicle (*anupāna*) by majority of Acharya. Only *Rasa Cikitsā* by Parabhakara Chaterji has mentioned the dose of *Galastha Makaradhvaja Cūrṇa* as half to one *Ratti* (60 to 125 mg)²⁰.

The actually *Makaradhvaja* is a compound preparation. *Galastha* part of *Kūpipakva* prepared from by *Svarṇa*, *Pārada* and *gandhaka* is again triturated with *Sahapāna Dravyas* like *Jatiphala*, *Karpūra* etc and then it is called as *Makaradhvaja Rasa*. In all the text the use of *Sahapāna* with *Makaradhvaja* are common because the main objective behind its preparation is to obtain aphrodisiac (*Vājīkaraṇa*) action. Actual dose of *Makaradhvaja* with its *Sahapāna Dravya* as mentioned above is 250 mg twice daily in which only *Galastha Makaradhvaja* is 14.63 mg. Some glimpses about *Makaradhvaja* absorption and distribution were found in Indian Materia Medica as (Chemically *Makaradhvaja* is identical with the red sulphide of mercury)²¹. It is a preparation of processed mercury and sulphur, sublimed in the form of red sulphide; the gold may possibly exercise some catalytic influence during the process of sublimation.

5. CONCLUDING REMARKS

Rasaratnākara in 13th century AD is the first text to coin the word, *Makaradhvaja*. The pharmaceutical method of preparation of *Makaradhvaja* is first described in 15th century by *Rasendra Cintāmani* whereas seven peculiar *Siddhi Lakṣaṇas of Caṅdrodaya Rasa* are first enlisted in 19th AD by *Siddhabeṣajamanimālā*. It is a *Kūpipakva* or *Kharalīya Rasayāna*. The main levigation medias are: *Gossypium arboreum* Linn., *Aloe barbadensis* Mill. It is to be consumed in morning time. Of the various types, the *Dvigūṇa Balijārīta Makaradhvaja* (1:8:16), *Trigūṇa Balijārīta Makaradhvaja* (1:8:24), *śadgūṇa Balijārīta Makaradhvaja* (1:8:48), *śiddha Makaradhvaja* (1:4:4) and *Dvigūṇa Balijārīta Śiddha Makaradhvaja* (1:2:4) are widely known in Ayurvedic medicine and had different therapeutic properties.

6. ACKNOWLEDGEMENT

Authors express their sincere gratitude to Prof. M.S. Baghel, Director, IPGT&RA, Dr. BJ Patgiri; Associate professor. Dr. Galib and Dr. Prashanth Bedarkar; Assistant professor, Dept. of Rasaśāstra and Bhaiśajya Kalpanā including drug research, IPGT&RA, Gujarat Ayurved University, Jamnagar and Dr. Sanjay Khedekar, Assistant professor, Dept of Rasaśāstra and Bhaiśajya Kalpanā Saptasruṅgi Ayurved Mahavidyālaya Nasik, for their technical inputs and constant encouragement.

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