

THERAPEUTIC USES OF TAMRA (COPPER) BHASMA – A REVIEW THROUGH BHAISHAJYA RATNAVALI

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Abstract

Longer shelf life and efficacy in smaller doses make herbo-metallo-mineral preparation very popular among Ayurvedic physicians. Though these formulations are being used successfully since centuries; serious doubts has been raised from western researchers regarding their safety. Tamra Bhasma is one of such metallic preparations which are used for the treatment of wide array of diseases like Parinamashula (peptic ulcer), Pandu (anemia), Kushtha (skin disorders), Shwasa (dyspnoea) etc. In the present review, various formulations of Tamra were compiled from Bhaishajya Ratnavali and approximate percentage of copper in them has been calculated. In this review, total 221 formulations were screened out which directly or indirectly contained Tamra Bhasma in them. Out of them maximum formulations (65) were found in Jwara Rogadhikara. This effort will be helpful to Ayurvedic physicians, drug manufacturers and research scholars to understand the different uses of Tamra Bhasma along with its dose, Anupana etc.

Key words: Bhasma; Copper; Pandu; Tamra; Herbo-mineral formulations.

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INTRODUCTION

Science is a gradual evolution it is not a sudden invention. Rasashastra (Indian alchemy) as a science is not an exception for it. Importance of Rasashastra lies in the fact that it recognized the importance of metals and minerals in therapeutics much earlier than the Allopathic science. This contribution has created its own importance in the Indian system of medicine (ISM). In the medieval period, the Golden era of Rasashastra, Bhasmas were used very widely of the metallic elements, which are involved significantly in the anatomy and physiology of the body. Now in the present era we remain wondering the depth of Indian Alchemy, which turns the poisonous metals into human assimilable forms understanding the significance of these elements in the body. Being highly efficacious in small doses and having long shelf life, metallic preparation became very popular among Ayurvedic physicians within very short period of time.^[1] But, unfortunately, now-a-days these herbo-metallo-mineral formulations are suffering a lot and thus struggling to build their crumbling image. Serious doubts rose on safety and efficacy of these formulations in last decade, which have worldwide impact, are additions to the misery of indian alchemy.^{[2][3]} Moreover the number of practitioners of this science is decreasing day by day. Those who are entering into the practice are fascinated by the modern science. On the other hand those who are prescribing these formulations don't have the sufficient knowledge regarding the method of preparation, Matra (dose), appropriate Anupana (adjuvant), specific and other indications of the formulation etc. Their efficacy as well as indications change with the minor changes in the methods of preparation, ingredients etc.^[4] To overcome this embarrassing situation, systemic and conceptual research work in the field of uses of these formulations is highly essential at this hour.

Tamra (copper) is one of such metals which are being used in therapeutics in different forms since centuries. In ISM, Tamra Bhasma (TB) has been used in the treatment of different ailments like Parinamashula (peptic ulcer),

Pandu (anaemia), Udara shoola (abdominal pain), Arsha (Haemorrhoids), Kushtha (skin disorders), Shwasa (dyspnoea) etc.^[5] It is the ingredient of many profusely used herbo-mineral formulations like Arogyavardhini Vati, Hridayarava Rasa, Panchamrita Parpati etc.

Aim of the present study is to compile all the formulations from Bhaishajya Ratnavali which contain Tamra Bhasma as an ingredient with an intention to find out its approximate percentage in them. This exercise will provide its various therapeutic uses along with their doses and appropriate adjuvant and will establish the wide utility of Tamra Bhasma in wide array of diseases.

MATERIALS AND METHODS

Bhaishajya Ratnavali, being a comprehensive compilation of various formulations, is screened disease wise for different formulations. Percentage in each formulation is calculated by taking only solid constituents into consideration and excluding the other ingredients like Kwatha (decoction), Swarasa (expressed juice) and their Bhavana (wet trituration). Calculation of percentage is based on the raw ingredients taken initially for the preparation of formulation.

Method of calculation

Percentage of Tamra Bhasma = $\frac{\text{Weight of Tamra Bhasma}}{\text{weight of total solid ingredients (including Tamra Bhasma)}} \times 100$. For example, in Vidyadhara Rasa (Jwara Chikitsa), total weight of all ingredients (mineral and herbal) is 32 Tola (384 g) out of

which 1 Tola (12 g) is Tamra Bhasma. Bhavana Dravya, Snuhidugdha (latex of *Euphorbia nerifolia* Linn.) and Danti Kwatha (decoction of *Baliospermum montanum*) are not considered for calculation. Hence percentage of Tamra Bhasma is = $12/384 \times 100 = 3.13\%$.

OBSERVATIONS AND DISCUSSION

Bhaishajya Ratnavali is a classic text written by Acharya Govindadas Sen in 19th century.^[6] In this, Acharya has not only compiled the different formulations but also systematically categorized them according to the methods of preparation. Hence it can be called the first Ayurvedic formulary. Due to this importance, it was selected to find out various therapeutic attributes of Tamra Bhasma.

Tamra is a metal described in Shuddha Dhatu Varga used by Rasavaidyas in therapeutics since Samhita period.^[7] In this period, it was used in the form of powder since no pharmaceutical processing of Bhasma preparation is available in Samhitas. In Charaka Samhita, it has been described in Churna (powder) form for the treatment of Visha (poison), Hikka (hiccough), Shwasa (dyspnoea) etc.^[8] In this, the procedure of conversion of raw Tamra into therapeutically usable form is described in Lauhadi Rasayana,^[9] which further advanced in form of Ayaskriti during the period of Sushruta.^[10] But after 10th Century A.D. (post Nagarjuna period) it has been described systematically in different texts of Rasashastra in the form of its types, Grahyagrahytva, Shodhana, Marana methods, pharmacological actions, therapeutic uses etc. Since then it is a well known material, successfully used to treat various diseases in the form of Bhasma as single or compound preparation with other herbo-mineral drugs.

In this review, total 221 formulations were screened out which directly or indirectly contained Tamra Bhasma in them. Out of

them maximum formulations (65) were found in Jwara Rogadhikara. Numbers of formulations in other indications are shown in Figure 1.

In this study, it was found that Tamra Bhasma is merely used singly and mostly used as compound formulation along with other herbo-mineral substances. These formulations can be classified as follows: Churna Kalpa (Jwaranagamayura Churna), Lauha Kalpa (Pittantaka Lauha, Vadavagni Lauha, Chitrakadi Lauha, Yakridari Lauha etc), Mandura Kalpa (Panchamrita Mandura, Panchamrita Lauha Mandura), Parpati Kalpa (Panchamrita Parapati, Vijaya Parpati etc), Putapaka Kalpa (Jwarakalketu Rasa, Vishamajwarantaka Lauha, Vadavamukha Rasa, Arkeshwara Rasa etc), Kupipaka (Mritasanjivan Rasa, Ashtavakra Rasa), Avaleha (Mopharva), Vati Kalpa (Anandabhairavi Vati, Mahabhra Vati, Panchanana Vati etc), Pottali Kalpa (Hemagarbha Pottali, Ratnagarbha Pottali), Guggulu Kalpa (Shirashooladivajra Rasa), Taila Kalpa (Vranarakshasa Taila), Anjana Kalpa (Nagarjunadyanjan), Varti Kalpa (Rasanjanadi Varti).

The percentage of TB varies from as less as 0.09% [Chitrakadi Lauha (Pleeha-Yakridroga Chikitsa)] to as maximum as 85.56% [Sarveshwari Rasa (Gulma Chikitsa)]. In Sarveshwari Rasa dose and Anupana are not mentioned. Thus it has to be used cautiously in appropriate dose. The formulations which contain around 50% of TB are Swacchandabhairava Rasa, Suryavarta Rasa, Sarvangakampari Rasa, Mahataaleshwara Rasa, Shoolagajakesari Rasa, Chitravibhandaka Rasa [total = 06].

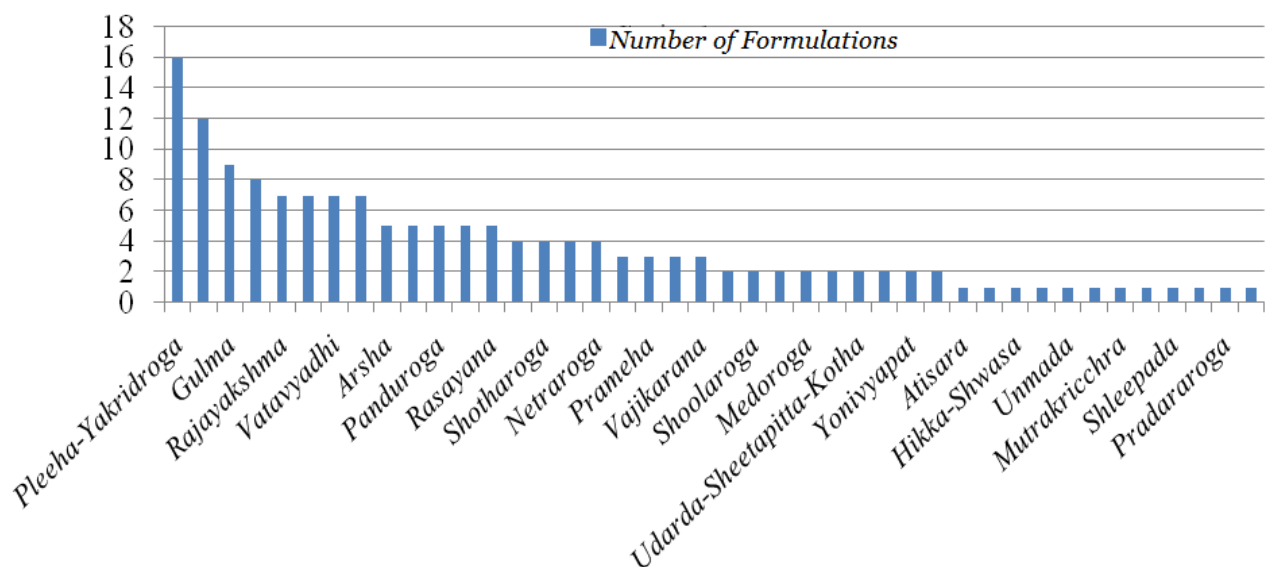
The formulations which contain around 25% of TB are Chandeshwara Rasa, Arkeshwara Rasa, Sheetapittaprabhanjana Rasa, Takravati, Vasukibhushana Rasa, Vadavagni Lauha and Rasa, Mahagulmakalanala Rasa [total = 08].

Table 1: Disease wise compilation of some important formulations of Tamra Bhasma in Bhaishajya Ratnavali which are also mentioned in AFI

Sr. No.	Formulation Name and reference	Rogadhikara	Dose	Anupana	% of Copper
1	Jwararyabhram [5/1135-39]	Jwara	2 Ratti	As per Dosha	8.33
2	Ratnagiri Rasa [5/562-67]	Jwara	1 Ratti	Pippali, Dhanyaka Churna	17.39
3	Sarvajwarahara Lauha (Brihat Dwitiya) [5/1180-92]	Jwara	1-2 Ratti	Pippali Churna (3 Ratti), Guda (6 Masha)	8.33
4	Shree Jayamangala Rasa [5/1061-65]	Jwara	2 Ratti	Jeeraka Churna, Madhu	8.33
5	Maharajanripativallabha Rasa (Sarvatobhadra Rasa) [8/371-80]	Grahani	2 Ratti	As per disease	0.55
6	Kravyada Rasa [10/215-20]	Agnimandya	2 Masha	Saindhavayukta Takra	2.27
7	Lakshmilasa Rasa [14/222-25]	Rajayakshma	--	--	5.55
8	Pittantaka Lauha [27/60-63]	Vatarakta	2 Ratti	Patola and Dhanyaka Kwatha	6.25
9	Gulmakalanala Rasa [32/91-96]	Gulma	4 Gunja	Haritaki	10.0
10	Yakritpleehari Lauha [41/123-28]	Pleeha-Yakridroga	Badarasthisammita Vati	--	18.18
11	Vranarakshasa Taila [47/71-73]	Vranashotha	Q.S.	--	--
12	Manikya Rasa [54/124-32]	Kushtha	2 Gunja	Sheeta Jala, Dugdha Ghrita, Madhu, Narikela Jala, Dugdha	7.27
13	Amritankura Lauha [54/186-94]	Kushtha	1 Ratti	--	1.75
14	Nagarjunadyanjana [64/176-80]	Netraroga	Anjanartha	--	10.0
15	Muktadi Mahanjanam [64/213-15]	Netraroga	Anjanartha	--	3.13
16	Garbhachintamani Rasa (Dwitiya) [68/87-90]	Garbhiniroga	2 Gunja	--	7.14
17	Purnachandra Rasa [73/78-88]	Rasayana	Chanakamatra	Parnakhanda	3.69

[Masha = 1 g, Gunja/Ratti = 125 mg, 1 Tola = 12 g, Karsha = 12 g, Nishka = 3 g.]

Figure 1: Number of formulations indicated in different diseases



The formulations which contain around 33.3% of TB are Jwarankusha Rasa, Sheetari Rasa, Sheetabhanji Rasa, Pittakasantaka Rasa, Hridayarnava Rasa, Trivikrama Rasa [total = 06]. The formulations which contain around 66.6% of TB in whole formulations are Kumudeshwara Rasa, Jwarankusha Rasa (Ravisundarakhya) [total = 02]. Tamra Bhasma can be given in different dosage forms and thus it fulfills the criteria of ideal medicine (Bahukalpam). This fact clears the intention of Acharyas behind formulating the different dosage forms for the treatment of patients of different Prakriti, Vaya, Bala etc.

From the calculation of percentage in formulation one can find out the approximate amount of Tamra Bhasma in its each unit dose by the formula: Amount of Tamra Bhasma in each unit dose = Percentage of Tamra Bhasma \times Dose of formulation / 100. For example, in Hemagarbha Pottali Rasa (Rajayakshma Chikitsa), percentage of Tamra Bhasma is 16.66 and its dose is 1 Gunja (125 mg). Hence amount of Tamra Bhasma in 1 Gunja is = $16.66 \times 125 / 100 = 20.825$ mg. When amount of Tamra Bhasma in each unit dose of different formulations was calculated it was found ranging from 10 mg to 80 mg. In formulations where the dose is not mentioned physician can adjust the dose as per the need of patient by calculating the amount of Tamra Bhasma in it.

Nowhere in Bhaishajya Ratnavali Tamra Bhasma is given as a single drug. In Bhagandara Chikitsa (51/25-27), special method of Tamra Shodhana is described first and then Tamra Bhasma preparation is quoted with the use of mercury and sulphur as media of Marana along with Nimbu Swarasa (juice of *Citrus lemon*) by giving Puta (heating grade). Bhasma thus prepared is given in a dose of one Ratti (125 mg) with Anupana of honey and ghee. In second instance, it has been advocated for Garbhashaya Shodhana (Yonivyapat Chikitsa 67/36) along with Suvarna (gold) and Rajata (silver) Churna.

Here dose is not mentioned but ghee as Anupana is told. In all other formulations it is combined with different herbs and minerals.

It is well known fact that copper and its salts are toxic in nature and produce gastric intolerance.^[11] Hence Acharyas have used copper in Bhasma form and as a part in compound formulations. Though it is not used singly anywhere in this text; in Rasatarangini, its internal administration is advocated in the dose ranging from 1/8 Ratti to 1/2 Ratti (15 – 60 mg) as per Bala (power), Kala (time) etc with different Anupana (adjuvants).^[12] When scrutinized for different Anupana, honey was observed in maximum number of formulations (approximately 50) followed by Ardraka Swarasa [juice of *Zingiber officinale* R. (22)], Ghrita [cow ghee (17)], Tambulapatra [leaf of *Piper betle* L. (14), Pippali Churna [powder of *Piper longum* L. (14), Sita [sugar (11)], Ushna Jala [hot water (07)]. Importance of these specific adjuvants, especially honey and ghee, is that they enhance the potency of the ingredients as well as facilitate their journey to the intended destination due to their Yogavahi (carrier) property.

In some formulations dose is mentioned precisely (e.g. One Ratti/Gunja, 1Masha etc.). But in some formulations it is mentioned in the form of Tandula, Sarshapa, Rajika, Kalaya, Chanaka, Badarasthi etc. which cannot be measured precisely. Scientific establishment of these dosages in gravimetric form is urgently needed for the exact dosing of such formulations.

Other than as a direct ingredient of a formulation, Tamra has been used indirectly in form of vessel for the preparation of some formulations like Malatadya Ghrita (Mukharoga), Lauha Rasayana (Sthaulya), Vidangadi Lauha (Amavata), Samasharkara Lauha (Raktapitta) etc. In some formulations like Achintyashakti Rasa (Jwara), Paniya Vatika (Jwara) etc pestle made from Tamra is used for trituration of the formulation.

Table 2: Some important formulations of Tamra Bhasma which are mentioned in Bhaishajya Ratnavali, AFI and also available in the market

Sr. No.	Formulation Name and reference	Rogadhikara	Dose	Anupana	% of Copper
1	Vishamajwarantaka Lauha (Putapakwa) [5/1162-69]	Jwara	2 Ratti	Pippali Churna and Ghritabharjita Hingu (2 Ratti each), Saindhava (1/4 Tola), and Madhu	19.04
2	Panchamrita Parpati [8/458-60]	Grahani	2-8 Ratti (for 21 days)	Madhu and Ghrita	3.22
3	ShreeNrupativallabha Rasa [8/351-65]	Grahani	2 Ratti	As per disease	5.55
4	Vijaya Parpati [8/485-92]	Grahani	2 Ratti	As per disease	7.14
5	Arshakuthara Rasa [9/238-40]	Arsha	2 Masha	As per disease	2.73
6	Lakshmivilasa Rasa [14/222-25]	Rajayakshma	--	--	5.55
7	Mahavatagajankusha Rasa [26/124-25]	Vatavyadhi	1 Nishka	--	7.69
8	Hridayarnava Rasa [33/39-40]	Hridroga	Chanakamatra	--	33.3
9	Chandrakala Rasa [34/47-55]	Mutrakricchra	Chanakopama	--	8.33
10	Trivikrama Rasa [36/41-43]	Ashmari	½ Gunja	Beejapura Moola with water	33.3
11	Varishoshana Rasa [40/100-115]	Udararoga	2 Ratti	Maricha Churna, Triphala and Trikatu Kwatha, Kakodumbara Kwatha	6.00
12	Vridhivadhika Vati [43/76-80]	Vridhhiroga	4 Masha	Water	3.70
13	Nityananda Rasa [45/30-38]	Shleepada	10 Ratti	Sheetala Jala	3.33
14	Kushthakuthara Rasa [54/145-48]	Kushtha	2 Nishka	Madhu, Ghrita	5.88
15	Sheetapittabhanjana Rasa [55/29-33]	Udarda-Sheetapitta-Kotha	2 Gunja	Guda	25.0
16	Leelavilasa Rasa [56/30-32]	Amlapitta	1 Ratti	Dugdha, Kushmanda Swarasa, Amalaki Swarasa with Sita	20.0
17	Shirashooladivajra Rasa [65/55-59]	Shiroroga	1 Masha	Ajadugdha, Madhu	7.14
18	Pradarantaka Lauha [66/79-83]	Pradararoga	--	Sharkara, Madhu, Ghrita	3.84
19	Nashtapushpantaka Rasa [67/51-57]	Yonivyapat	--	--	10.25
20	Sootikabharana Rasa [69/112-16]	Sootikaroga	½ Gunja	As per disease	7.69
21	Mahalakshmivilasa Rasa [73/89-101]	Rasayana	2 Gunja	--	3.03
22	Manmathabhra Rasa [74/96-104]	Vajikarana	2 Gunja	Koshna Ksheera	3.57

[Masha = 1 g, Gunja/Ratti = 125 mg, 1 Tola = 12 g, Karsha = 12 g, Nishka = 3 g.]

In preparation of various Anjana (Drishtiprada Varti, Bilwanjanam etc) for the treatment Netraroga copper plate has been used. It is a well known fact that copper is a naturally hygienic metal that slows down the growth of germs such as *E-coli*, methicillin resistant *S. aureus* (MRSA), *Staphylococcus*, *Clostridium difficile*, influenza A virus, adenovirus, and fungi.^[13] Also Copper alloy surfaces have intrinsic properties to destroy a wide range of microorganisms.^{[14][15]} That's why ancient Acharyas have used copper vessels for the preparation of different formulations for both external as well as internal use by keeping the sterility in mind.

Except the formulations from Bhaishajya Ratnavali some other formulations of Tamra Bhasma available in market are Arogyavardhini Rasa, Ekangaveera Rasa, Smritisagara Rasa, Sutashekhara Rasa, Tamra Parpati, Pushpadhanva Rasa, Somnathi Tamra Bhasma, Kaphakuthara Rasa etc. (Table 2) From this review, it is clear that inspite of their wide utility; many formulations of Tamra Bhasma are not available in the market. It will be very encouraging if pharmaceutical companies show their interest in preparing these formulations and make them available to Ayurvedic physicians.

Till date Tamra Bhasma have been tested for its anti ulcerogenic, anti oxidant, anti hyperlipidemic activities.^{[16][17][18][19]} Its toxicity studies have also been carried from time to time in which it has proved to be safe at the therapeutic drug dose level.^{[20][21][22]} But very few formulations of Tamra Bhasma have been screened for their efficacy in different disease conditions. Each and every ingredient in the formulation has its own specific role in the body. The research can be directed towards assessing the role of Tamra Bhasma in particular formulation in a specific disease condition. This may provide a guideline for further research to explore Ayurveda.

CONCLUSION

It can be concluded that when Tamra Bhasma is formulated with other herbo-mineral substances and given along with different Anupana it has the potential to cure the wide array of diseases like Jwara (fever), Agnimandya (digestive impairment), Rajayakshma (tuberculosis), Vatavyadhi (diseases due to Vata Dosha), Yakrit-Pleeharoga (Liver and Spleen disorders), Udara (ascitis), Gulma (Lump in abdomen), Kushtha (Skin diseases), Hridroga (cardiac disorders), Amlapitta (dyspepsia), Medoroga (lipid disorders), Shiroroga (diseases of head), Netraroga (eye diseases) etc. It can also be inferred that Tamra Bhasma is safe for internal usage as it is one of the ingredients of hundreds of herbo-mineral preparations used effectively for the treatment of various diseases since many centuries.

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