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# Therapeutic uses of *Tamra* (copper) *Bhasma* - A review through *Ayurved Samgraha* and other texts

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## ABSTRACT

Materia Medica of Ayurveda is using best scientific and applied *Rasa Chikitsa* and *Rasa Ausadhi* occupied an important place in the field of Ayurvedic practice. It deals with metal, minerals and poisonous drug. Starting from 9<sup>th</sup> century AD to 16<sup>th</sup> century AD was the sunshine period of *Rasa Chikitsa*, then gradually decline probably due to introduction of western medicine. It's efficacy is superior than plant formulation due to its unlimited expiry, effective in small dose, abundant resource and quickly effective on the target tissue even it can handle emergency situations also but the most important background of *Rasa Ausadhi* received highly technical processing (*Shodhan, Marana, Jarana*<sup>[1]</sup>) for the treatment of diseases. In this content liver function test and estimation of renal profile (before and after) will help for gaining confidence both in patient and physician prior to use compound formulations containing *Tamra Bhasma*. *Tamra Bhasma* is a metal compound which is used for treatment of various disease like *Jwara, Bala Roga, Grahani Roga, Pandu, Visarpa, Brishya, Yakrit Roga, Pliha Roga* etc.

**Key words:** *Bhasma, Copper, Jwara, Pandu, Tamra Bhasma, Ayurved Samgraha.*

## INTRODUCTION

Science is an experiment with the truth. The credit of developing *Rasa Shastara* as a stream of classical Ayurveda, especially in fulfilling its healthcare-related goals, goes to Nāgārjuna<sup>[2]</sup> (5<sup>th</sup> Century CE). Ayurvedic medicine, the compilation of traditional ancient Indian medicine practice is in *Rasa Shastra*, which details processes by which various metals, minerals and other substances, including mercury, are purified and

combined with herbs in an attempt to treat illnesses. Integrated approach of Modern medicine and Ayurvedic Medicine is the advance way of healing and it is the futuristic medicine.<sup>[3]</sup> Ayurveda tradition, Siddha tradition and tantra tradition<sup>[4]</sup> using *Rasa Shasta* in there day to day practice. According to the principles of 'Ayurveda', there is not a single substance in the Universe which does not have a potential to be used as a drug,<sup>[5]</sup> provided it is used judiciously by the physician where it is required. In this reference Charaka - one of the foremost figures of Ayurveda says "*Anenopadeshen Na Anaushadhi Bhootam Jagati Kincit Dravyam Upalabhyate*".<sup>[6]</sup> According to the source of origin, the substances in the Universe are classified as '*Jangama*' i.e. animal sourced e.g. milk, meat, blood, urine etc., '*Audbhida*' i.e. plant sourced e.g. leaves, root, stem etc., and '*Paarthiwa*' or '*Khanija*' i.e. mineral sourced e.g. gold, silver, copper, sulphur etc. In 19<sup>th</sup> century, Acharya Prafulla Chandra Roy, a famous Bengal alchemist has written the evolution of *Rasa Shastra* in his book "The History of Hindu Chemistry".<sup>[7]</sup> Due to industrialization

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of Ayurveda the preparation of *Rasausadhi* has been varies because the traditional method of preparation has been reduced. Safety and efficacy are the major factors for drug designing. Safety of a drug is defined as quality of being risk free,<sup>[8]</sup> although no drug in the world is risk free, i.e. in appropriate dose and form even poison can be nectar. In this context liver function test and estimation of renal profile (before and after) will help for gaining confidence both in patient and physician prior to use compound formulations containing *Tamra Bhasma*.

*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), *Jwara* (Fever), *Vrishya* (Aphrodisiac), *Udara Shoola* (abdominal pain), *Arsha* (Haemorrhoids), *Kushtha* (skin disorders), *Shwasa* (dyspnoea), *Yakrit* and *Pleeha Rogah* (Liver and Spleen Disorder)<sup>[9]</sup>etc.

### AIM AND OBJECTIVE

1. To compile all the formulations from *Ayurveda Samgraha* which contain *Tamra Bhasma* as an ingredient.
2. The study will deliver its various medicinal uses with an intention to find out its approximate percentage in them.

### MATERIALS AND METHODS

*Ayurveda Samgraha*<sup>[10]</sup> and the texts related to *Rasa Shasta* 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* = Weight of *Tamra Bhasma*/weight of total solid ingredients (including

*Tamra Bhasma*) × 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*, *Snuhi Dugdha* (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

*Ayurveda Samgraha* is a compiled text written by Kaviraj Devendranath Sengupta and Kaviraj Upendranath Sengupta in 19<sup>th</sup> century. *Acharya* has not only compiled the different formulations but also systematically categorized them according to the methods of preparation. Hence there are various texts were followed in the various part of the India, like "Chikitsa Manjari" and "Sahasrayoga" followed in South India (Kerala), "Bhaisajya Ratnavali" followed in North India and "Chakradutta" and "Ayurveda Samgraha" was followed in Bengal. Due to the importance of "*Ayurveda Samgraha*", it was selected to find out various therapeutic attributes of *Tamra Bhasma*.

The metal, *Tamra* though mentioned in Ayurveda with a wide range of therapeutic utilities; is attributed with *Ashta Maha Dosha*.<sup>[11]</sup> Hence, one should be cautious while using *Tamra Bhasma*. *Tamra* is under *Suddha Dhatu Varga*. It was used in the form of powder since no *Sodhana*, *Marana*, *Jarana* of *Bhasma* preparation is available in Samhitas. *Churna*<sup>[12]</sup> (powder) form was used in Charaka Samhita for the treatment of *Visha* (poison), *Hikka* (hiccough), *Shwasa* (dyspnoea) etc. In this, the procedure of conversion of raw *Tamra* into therapeutically usable form is described in *Lauhadi Rasayana*. Post Nagarjuna period has been described systematically in different texts of *Rasashastra* in the form of its types, *Grahyagrahytva*, *Shodhana*, *Marana* methods, pharmacological actions, therapeutic uses<sup>[13]</sup> etc.

In this review various formulations were screened out which directly or indirectly having *Tamra Bhasma* in them. Out of them maximum formulations (50) were found in *Jwara Rogadhikara*. Numbers of formulations

in other indications are shown in this study. It was found that *Tamra Bhasma* is being used singly and mostly used as compound formulation or yoga along with other herbo-mineral substances. These formulations can be classified as follows: *Churna Kalpa, Lauha Kalpa, Mandura Kalpa, Parpati Kalpa, Putapaka Kalpa, Kupipaka, Avaleha, Vati Kalpa, Pottali Kalpa, Guggulu Kalpa, Taila Kalpa, Anjana Kalpa, Varti Kalpa*. (Figure 1)

**Table 1: Disease wise compilation of some important formulations of Tamra Bhasma in Ayurveda Samgraha which are also mentioned in AFI.**

SN	Formulation Name and reference	Rogadhikara	Dose	Anupana	% of Copper
1.	Swachhanda Vairab	Jwara	1/2 Rati	Jinger Juice or Sugar or Saindhav Salt	50%
2.	Nabaiarav Singha	Jwara	2 Rati	Ginger Juice	11.76 %
3.	Chandeshwara Rasa	Jwara	1 Rati	Ginger Juice	25%
4.	Tripur Vairab Rasa	Jwara	2 Rati	Ginger Juice	26.66 %
5.	Raj Ballav	Grahani	2 Rati	-	5%
6.	Dugdha Vati	Grahani	1/2 Yava	Dugdha	10%
7.	Panchamrita Parpati	Grahani	2 Rati	Gritha, Madhu	3,22 %
8.	Chakraksha Rasa	Arsha	2 Kuch	As per diseases	20%
9.	Krabyat Rasa	Agnimandya	-	Butter milk with Saindhav Salt	36.36 %
10.	Panchamrita Lauha Mandur	Pandu	-	Kulakhara Swaras	3.17 %

11.	Mahadadhi	Kasa	Chana k Matra	As per diseases	4.54 %
12.	Pran Ballav	Pandu	4 Rati	Honey	6.66 %
13.	Rajmriganka Rasa	Rajyaksha	4 Rati	Marich+Gritha	9.09 %
14.	Plihintako Rasa	YakritPliha	1 Rati	As per diseases	5%
15.	Plihashardul Rasa	YakritPliha	1 Rati	Honey Pippalichurna	15.78 %
16.	Panchanan Gulika	Amlapittta	1 Masa	Milk or Meat Juice	2.56 %
17.	Trailakya Chintamani	Rasayana	1/2 Masa	-	7.69 %
18.	Maheshwar Rasa	Bajjaran	1 Rati	-	3.57 %
19.	Brihatvatagajankush Rasa	Vatavyadhi	2 Rati	As per diseases	5.55 %
20.	Bangastakam	Prameha	2 Rati	Honey or turmeric powder	14.28 %

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

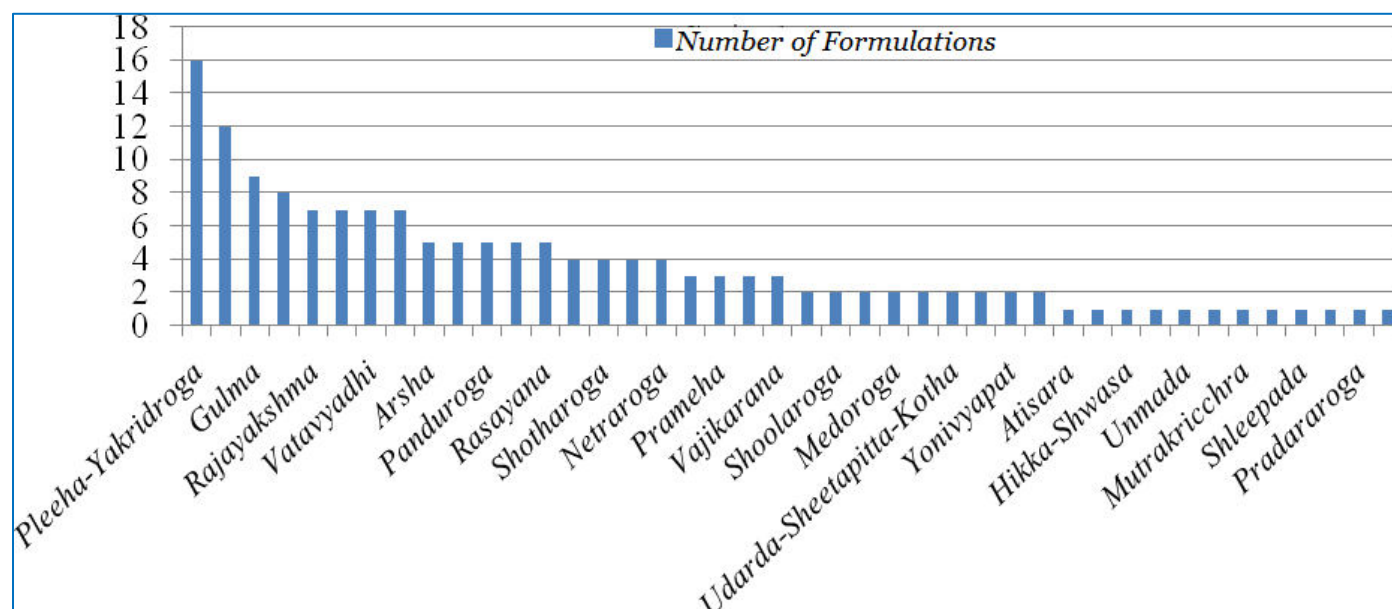
As per our study the formulation which contain less amount of *Tamra Bhasma* (3.17%) is "*Panchamrita Lauha Mandura*" and the other medicine is "*Panchanangulika*" which contains lowest amount of TB, i.e. 2.56%. Study reveal highest *Tamra Bhasma* containing medicine is *Swachhanda Vairab* (50%). *Tamra 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, Desha, Kala, Agni, Satma, Satwa* 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* × Dose of formulation / 100. For example, in *Ratnagiri Rasa (Jwara Rogadhikar)* percentage of *Tamra Bhasma* is 17,39 and its dose is 1 Rati (121.5 mg). Hence amount of *Tamra Bhasma* in 1 rati is  $17.39 \times 121.5/100 = 21.12$  mg. When amount of

*Tamra Bhasma* in each unit dose of different formulations were 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.

Figure 1: Number of formulations indicated in different diseases



The copper which looks like a *Japa Pushpa Varna Visistha* (Hibiscus flower), Soft which is without *Louha* (iron) and *Sisa* (lead) is the best quality and which is black or white, rough, mixed with iron and lead is counted as bad quality. *Tamra Bhasma* is *Kshaya*, *Madhur*, *Tikta*, *Amla* in taste, *Katu* in *Vipaka*, reduce pitta and *Sleshma*, *Shitavirya* i.e. Cold in potency, it is *Vranaropak*, *Laghu*, *Lekhan* in nature and mild *Brinhaniya*. General *Anupana* of *Tamra* containing medicine is honey.

It is well known fact that copper and its salts are toxic in nature and produce gastric intolerance.<sup>[14]</sup> Hence *Acharyas* have used copper in *Bhasma* form and as a part in compound formulations or *Yoga*. It's 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), *Agni* (digestive fire) etc. with different *Anupana* (adjuvants). When searched for different *Anupana* was observed in various number of formulations followed by *Adraka Swarasa* [juice of

*Zingiber officinale* R., *Ghrita* [cow ghee], *Tambulapatra*, *Pippali Churna* [powder of *Piper longum* L., *Sita* [sugar], *Ushna Jala* [hot water]. 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*, 1 *Masha* 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.

In some formulation *Tamra* has been used indirectly in a form of preparation medium (*Khalva Yantra*, *Utensil*) where *Tamra Bhasma* are not directly used.

**Table 2: Some important formulations of Tamra Bhasma which are mentioned in Ayurveda Samgraha AFI and also available in the market**

SN	Formulation Name and reference	Rogad hikara	Dose	Anupana	% of Copper
1.	Ratnagiri Rasa	Jwara	2 Rati	Pippali and Dhanyak Kwath	17.39 %
2.	Arshakuthar Rasa	Arsha	2 Mash a	As per disease	2.73 %
3.	Lilavilas Rasa	Amlapitta	2 Rati	Amalaki Swarasa	20%
4.	Maharaja Nripatiballav Rasa	Grahani	4 Rati	As per disease	0.55 %
5.	Panchamrita Vati	Agnimandya	1 Rati	Luke warm water	20%
6.	Gulmokanal Rasa	Gulmo	4 Rati	Haritakyadaka	7.14 %
7.	Manikya Rasa	Kushtha	2 Rati	Cold water or luke warm got milk	4%
8.	Brihatpurnachandra Rasa	Rasayana	Chanakpraman	Tambul Patra Swaras	2.04 %
9.	Hemagarbhapottali Rasa	Rajyasha	4 Rati	As per disease	16.66 %
10.	Jalodarari Rasa	Udararoga	4 Mash a	Mudgayasa	12.50 %
11.	Vidyadhar Rasa	Plihodara	2 Ratti	Cow milk or Honey	16.66 %
12.	Nityananda Rasa	Shleepada	5 Rati	Sheeta Jala	3.84 %
13.	Chandrakanta Rasa	Shiroroga	1 Mash a	As per disease	20%

14.	Nastapuspanak Rasa	Yonivyapat	-	As per disease	10.25 %
15.	Hridayarnab Rasa	HridRoga	ChanakPraman	As per disease	50%

On the other way copper is essential for brain development during fetal and post-natal growth and maintenance of brain health throughout life including effective anti-oxidative defenses. Copper has efficient role to communicate between nerve and cells and also maintain healthy skin and connective tissue. It is helping to heal wound. It is essential for structural integrity and function of heart and blood vessels, growth of new blood vessels, proper structure and function of circulating blood cells formation of the blood cells of our immune system, maintenance of healthy and effective immune response. It is useful for generation and storage of energy in the power plants of our selves (Mitochondria).<sup>[15]</sup> That's why ancient *Acharya* have used copper vessels for the preparation of different formulation for both external as well as internal use, by keeping the sterility in mind.

Except the formulations from Bhaishajya Ratnavali and Ayurveda Samgraha 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. 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.

A resurgent Ayurveda is sought after as a safer alternative to chemical medicines. In fact, the adverse effects of modern drugs have triggered a search for medicines from natural and safer sources, thus bringing traditional systems of medicine into the limelight. The perception is that medicines derived from plants processed in crude form without the isolation of the active molecules would be safer.

*Agada Tantra* deals with poisoning by bites of venomous creatures and also poisoning from other sources. Ayurveda distinguishes between two types of poison - the one of animal origin (*Jangama*) and the one of plant origin (*Sthāvara*). Sometimes, a third category of artificial poison (*Kṛtrima*) is also enumerated. The time is ripe to revisit the *Agada Tantra* of Ayurveda variously known as *Viśacikitsā* and *Garacikitsā* to face the challenges posed by the growing concern of the toxicity of Ayurvedic medicines.

Study showed mild anti spermatogenic effect, suggestive of contradiction for long term use. However, the studies were conducted by administering drug without adjuvant mentioned in classics, hence further study is required to confirm above remarks which showed mild toxicity, but in clinical study it had shown a very good result. Here regarding observed toxicity, further repetition of study is suggestive to withdraw definite conclusion. In the histopathological study of, mild fatty changes were observed in liver, but were not significant enough to suggest hepato-toxicity. However, to avoid risk, caution can be taken in treating patients with hepatic diseases.

Safety pharmacology is to investigate the effect of new chemical study for further studies, but in case of drugs it's the other way. Reverse pharmacology i.e. establishing safety data for clinically proven age old medicaments. All metals are present in the earth's crust and enter our bodies continuously at low levels. The studies mentioned above help to establish the fact that frequently used Ayurvedic metallic preparations which contain Lead, Mercury, Copper and Arsenic as ingredient are not only safe but also effective in treating various ailments. Here noteworthy point is that, use of these medicaments is with different adjuvant which reduces the risk of toxicity.

## CONCLUSION

Metal and Minerals are integral parts of therapeutics in Ayurveda. *Tamra*, one of such metals been advocated in different forms in the management of

various disease. Classical texts emphasize on following classical guideline (Such as *Sodhana* and *Marana*) while preparing *Bhasmas* of the metals. Actually, *Tamra Bhasma* is reported to be either sulphide or oxide of copper. The clinical efficacy of *Tamra Bhasma* has been studied in *Swasa*, *Kasa*, *Yakrit*, *Pleeha* *Vridddhi*, *Grahani*, *Jwara* etc. the dose of *Tamra Bhasma* administered was ranging from 65-250 mg and duration was up to 45 days. Positive results with decrease in the intensity of the sign and symptoms were reported in all the study. The dose of *Tamra Bhasma* administered was ranging from 65-250 mg and duration was up to 45 days. Positive results with a decrease in the intensity of the sign and symptoms were reported in all the study. During the course of treatment with compound formulations (*Yoga*) containing *Tamra Bhasma*, estimation of LFT and renal profile is necessary at the beginning and end of therapy which will help in going confidence both in patient and physician. It will also prove that *Rasa Ausadhi's* are tissue friendly and not disturbed the body chemistry.<sup>[16]</sup>

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