



Research Article

“AYURVEDIC REVIEW OF TAMRA (COPPER- CU) AND ITS THERAPEUTIC IMPORTANCE.”

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ABSTRACT

Metals like iron, copper are being used by humans since the prehistoric period. Tamra (copper) is used in the form of vessels, medicine in day to day life since centuries. During the medieval period, with the advent of Rasashastra, Tamra Bhasma (Calcined ash) occupied a significant role in the ayurvedic therapeutics. It is the drug of choice in the treatment of many diseases like Udara(ascites), Yakritvikar(Hepatic Disorders), Kushtha(Skin disesses)etc. Recently many research works have been carried out on it. The present paper is a simple compilation focusing on the historic review, modern review, types, Grahyaagrahyatva, pharmacodynamics, properties, shodhana, Marana and Amritikaranprocedures, dose and formulations of Tamra Bhasma. This review is expected to refurbish the existing knowledge and give an insight to the researchers in this area of education and research.

Keywords: Tamra, Copper, Bhasma, Rasashastra, Medicinal uses of copper.

INTRODUCTION

The number of metals found in nature is abundant. But only a few of them are recognized to possess medicinal properties. According to ancient scholars all these metals were termed under Dhatu(metal). Dhatu is useful for the human beings to relieve the wrinkles on the face, graying of hair, baldness, emaciation, weakness, advancement of ageing, fever and other diseases. And one of these includes the Tamra(copper). The word Tamra indicates a substance which is capable of causing giddiness, when consumed in impure form. The word also implicates that it is desired by people for preparation of precious metals like gold i.e. „Dhatuvaada’. Being a Dhaatuit is TajyasiyaDravya i.e.it is mainly constituted from TejaMahabhoot.The word Dhatu is used synonymously with Lauha. It comes from root „dha“ meaning „to support“. Dhatu means a substance which is capable to removing vatee, palitya, khaalitya , kaarshya, jaraa and other diseases. Loha or lauha has been derived from the word „luh“ which denotes forcible extraction of a metalfrom it's ore. Lauhameans a substance which is capable of expelling or removing vitiated dosha and disease from the body. There is little difference between meanings of Dhatu and Loha. The ores from which metals are extracted, can be called as Loha whereas the word Dhaatu denotes a metal. Rasashatra is the branch of Ayurveda in which the unique feature of these metallic preparations has been mentioned.

Literally review is a process of gathering information from other sources and documenting it to know the concepts and theories relevant to the area of research. Literary study provides methods, strategies and significant controversies in the respective field of research. It also helps to reverse, refurbish and refine the existing knowledge.

With this sole aim this literary study was carried out on Tamra(copper) and its Bhasma(calcined ash). Tamra Bhasma is used in the treatment of wide array of diseases like Pandu(anaemia), udarashoola (abdominal pain), Arsha(Haemorrhoids), Kushtha(skin disorders), Shwasa(dyspnea), etc. it is the ingredient of many popular formulations, such as, Arogyavardhini vati, Panchamrut Parpati etc. Various research work has been carried out on



it.

This review article provides the comprehensive information of Tamra Bhasma, right from the prehistoric period to recent times, to the researchers in this area.

AIMS AND OBJECTIVES

Aim:To review tamra (copper- cu) and its therapeutic importance.

Objectives:

1. To study *Tamra* from various classical texts ayurveda.
2. To study therapeutic importance of Tamra.

MATERIAL AND METHOD

The data was collected from Ayurveda literatures and scientific journals.

Synonyms: In shulva Shastra, Vaidya Harishankar Sharma has compiled 81 synonyms for Tamra from different classics. Some of them are: Anuvindum, Bhaskaram, Lohitayasam, Mlechcham, Nagasya mardanaam, Nepaleeyam, Pavitrakam, Ravipriya, Rajivam, Shulvam, Suryalauham, Tapaneshtam, Trolochanam, TRyambakam, Udumbar, Vantikam, Vishanashana.

Vernacular names:

Sanskrita – Tamra, Shulva; English – Copper; Latin – cuprum; Hindi – Tamba ; Kannada – Tamra, Tambra, Konkani – Tambe, Gujarathi - Trambu, Tambu, Tamil – Tampra, Chembu, Shembu, Telugu – Ragi, Samba, Tamramu, Panjabi – Tama, Tam, tamba, Marathi – Tambe.

Historical review:

It can be mainly classified into four chronological categories namely: The Vedic period, the period of Samhitas, Samgraha period and Tantric (Rasashastra) period. The Vedas, Brahmanas and Smritis: In Rigveda, there are references of word Ayas and it can be considered as copper because it represents reddish metal (Rigveda 1-11-68). The references are usually in context with various ornaments used like Kankana Dharana (Rigveda 5/58/2), Suvarnamala Dharana (5/53/4), Nishakah Bhushana (8/47/15) etc. The word Tamra is first found in the Samhitas of Yajurveda where it is also denoted by the name Shyamam or Sisam for its color (Shukla Yajurveda 23/37). Initially, Tamra and Lohitayas both words were used but gradually Tamra became more popular. While mentioning the use of copper ornaments it is also denoted as Ayas and Shyamam (Atharvaveda 1/34/6, 1/34/7, 20/8/31). In Atharvaveda 11/3/74, iron and copper are symbolized as blood and flesh respectively. In Shatapatha Brahmana (5/4/1/1/2), it is denoted as Lohayasam owing to its red color and was used in preparation of arrows. (2/3/4/5). Mythologically, it is said to be derived from umbilicus of lord Indra. It was believed that lord Prajapati had created all the ores (Apakva Dhatu Ayas) in the womb of the earth (Shatapatha Brahmana 6/1/1/13). Tamra is said to have originated from the semen of Kartikeya, which fell on the earth (Varaha Purana, Chaturvarna Diksha, Tamra Varnana, Adhyaya 126, Shloka 465). Also by one myth Tamra is the blood and fat of the Gudakesha Asur, a demon who was killed by lord Vishnu. According to Rasakamadhenu, Shulva (copper) had its origin from Surya (sun). In Guhya Sutras, use of bronze and copper is widely prescribed in the preparation of Yantras. In the Dharma Sutras, Acharya Gautama has quoted the use of Tamra utensils in all the religious pious Karmas. In the period of Smritis, copper was considered as a symbol of purity. Tamra is described for detrimental punishment, for making coins and pious pitchers with it, which used to be cleansed with acids and alkalis (Yagyavalkya Smriti Vyavhar, Manusmriti 8/31). There are evidences regarding extraction procedures of metals in Manusmriti (5/113-114).

The Samhitas: Use of metals in therapeutics was initiated in this period. In Charaka Samhita, Tamra is described as one of six metals (Ch. Su. 1/71) and also quoted as poison (Ch. Su 1/132). Tamra is indicated for the



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removal of diseases, its powder is indicated for internal use as Rasayana (rejuvenation) and for the treatment of diseases (Ch. Chi. 1-3/46). The use of its vessels has been recommended for the skin diseases like Sidhma and Kilasa (Ch. Chi.7/117-118). Tamra powder is indicated for the treatment of Hikka (hiccough), Shwasa (Asthma) and Kasa (cough). Its Anjana (collyrium) is used for the treatment of Abhishyanda and Timira (Ch.Chi.17/125). Tamra along with other minerals and metals like gold is used for the treatment of the Visarpa and Gulma (Ch.Chi. 21/131). Anjana, Shankha Varti and Drishtiprada Varti are prepared with the powder of Tamra in combination of other drugs, to cure all eye diseases and also to improve the vision of the patient. Tamra pot is the most preferable pot (plate) for the In Sushruta Samhita, it is described in a Trapvaadi Gana (group) with other metals along with its pharmacological properties and actions, and it is therapeutically indicated for the treatment of Krimi (worm infestation), Pandu (anemia) and Prameha (diabetes), Hridroga (cardiac disorders) etc. (Su. Su. 38/62, 63; Su. Su. 46/ 327). Water stored in Tamra pots becomes free from all toxic effects and is recommended for drinking purposes, for the patients of Shwayathu (edema), Pandu (anemia), Twak Dosha (skin diseases), Shwasa (asthma), Kasa (cough), Pratishyaya (coryza) and Udarashula (pain in abdomen) (Su. Su. 45/13-16). Powder of Tamra with other metals and decoctions of Salasaradi Gana drugs have been prescribed for the treatment of all the types of Prameha (diabetes) (Su. Chi. 12/10). In Kaphaja Arbuda, powder of Tamra and other metals are used for the application of external plaster (Su. Chi. 18/38). Sprinkling of Tamra powder on the wounds of Upadamsha is indicated (Su. Chi. 16/47). Tamra pot is recommended for the preparation of fermentative preparation like Soma (Su. Chi. 26/ 13). Tamra is indicated for the preparation of Basti Netra (Su. Chi. 35/12). Other references include its use in Shirovirechana in the form of a pot, in Shleshmabhisnyanda and in Raktabhisnyanda in the form of Anjana (Su. Chi. 40/45, Su. Ut. 11/7, Su. Ut. 12/13, Su. Ut. 12/46, Su. Ut. 12/26, Su. Ut. 12/50, Su. Ut. 12/ 46, Su. Ut. 12/51). Its successful use is described for the treatment of corneal opacity (Su. Ut. 12/52). The Anjana prepared in Tamra pot is used to cure the Praklinnavartma (Su. Ut. 12/53). Other diseases of the eye like Pidaka (boils of the eye) and Arma (pterygium) are also treated with the copper (Su. Ut. 15/26). Preparation of Shalakas (Probe) for eye is recommended with Tamra (Su. Ut. 18/61). To make the eye stable Anjana of Tamra is indicated (Su. Ut. 18/85). Other uses of Tamra as collyrium and pill for external and internal use are indicated in Timir etc. for improving the eye sight (Su. Ut. 18/105, Su. Ut. 18/101). Water stored in Tamra vessels is said to be best for the treatment of preparation of Anjana (Ch.Chi. 26/254-255). Basti Netra (nozzles) and Jihva nirlekhaka (tongue cleaner) are said to be made up of Tamra and other metals Paittika disorders (Su. Ut. 42/105). Anjana prepared with Nepalaka Tamra and other drugs are used in treatment of pediatric eye diseases (Su. Ut. 16/14). Tamra does not seem to have been indicated for internal use, its various preparations are indicated to be used externally in eye diseases. In the Harita Samhita and Kashyapa Samhita, Tamra utensils and other equipments are believed to be working as coolants. The Samgrahas: In Ashtanga Sangraha, properties of Tamra along with its alloys are mentioned (A.S. Su.12/14). Pots made up of Tamra are used to store medicines. Its pharmacological action has also been described (A. S. Chi. 21/101). Tamra is included in the group of seven metals in the Sharangadhara Samhita with the description of its purification and incineration (Sha.Sam.M.K.11/1). It is included in the group of seven metals in Bhavaprakasha Nighantu (Dhatuvarga). Methods of its purification and pharmacological actions are also described in it. In Dhanvantari Nighantu and in Raj Nighantu (Suvarnadivarga 18-20), Tamra is placed on the third place in the group of seven metals. Its therapeutic property and toxic effects are also described by both authors. Tamra along with its pharmacological actions is described in the group of seven metals in Madhava Dravya Guna (Vividh Aushadhi Varga 1/161). In Madanpala Nighantu there is description of Tamra and its indications for different diseases. In Kautiliya Arthashastra (2/18) various references regarding the ores of copper, their availability, identification of copper mines, and list of items used in smelting the ore, standards of purity are mentioned. The Tantric literature: A review of Tantric literature reveals that the use of metals was known in that period but it was kept with strict secrecy like mantras till Nagarjuna lifted the curtain. He advocated the use of metals and minerals in various forms in Rasa texts and thus the secrecy of their use was brought to an end. Rasahridaya Tantra (10th century A.D.) gives



a good (Ch.Si.3/7) description of metals with special reference to Lohavedha. Different alloys of copper with lead, tin, silver etc are found mentioned in it at different places. Rasendra Chudamani (12th century A.D.) has described the method for the preparation of Somanathi Tamra Bhasma first for most, pharmacological actions of Tamra, its process of Shodhana, Marana and therapeutic uses of its Bhasma in Pandu (anemia), Arsha (piles) and in different Netraroga (eye disease) [(Ra. Chu. 14/45, 51-54, 61-62, 66)]. Rasa Prakasha Sudhakara by Yashodhara (13th century A.D.) described the varieties, methods of Shodhana, Marana and therapeutic uses (R.P.S. 4/35-45). Rasa Ratna Samuchchaya (14th century A.D.) described the varieties, qualities, difference between good and bad quality, methods for Shodhana and Marana (R.R.S. 5/42-58). Special method for the preparation of Somnathi Tamra Bhasma has also been described in it (R.R.S. 5/ 65-67). Rasendra Chintamani (14th century A.D.) described the methods of Shodhana, Marana, Amritikarana of Tamra (Ra. Chi. 6/10, 31-37). Special method for preparation of white Bhasma of Tamra is found in Rasa Chintamani (Rasa. Chi. 10/26-32). Rasa Paddhati gave details with special method of preparation of TB without mercury and its therapeutic indications (R. P. Shloka 26, 28). Rasakamdhenu has given detailed description of TB (R.K.D. 2/1/305-366). In 17th century and later, various Rasashastra texts like Ayurveda Praksaha (A.P. 3/44-60), Yogaratnakara (Y. R. page 170-171), Rasajalanidhi (part 2), Rasatarangini (17/1-124), Rasamritam (3/34-47) has given the details about Tamra Bhasma.

Mythological Origin – According to ancient view copper is said to have its origin from the semen of ‘Kartikeya’ (son of Lord Shiva) which fell on the earth.

As per ‘Rasa Kama Dhenu’ Sulba had its origin from ‘surya’(sun).

Varieties –

As per ‘Rasarnava’ – 1. Rakta(Red) – Best

2. Krushna(Black) – Inferior

As per Source - 1. Nepalaja – Best

2. Mlecchaja – Inferior

Copper having red colour and softness is considered the best as it is claimed to be pure and free from impurities. The blackish and hard copper is considered inferior as it may contain iron, lead etc. as impurities which make it hard also and as such it is considered inferior and not recommended for internal use.

The other texts like ‘Rasendra Chudamani’ and ‘Rasa Prakasha- sudhakar’ have described its varieties on the basis of its places of origin and as such copper obtained from the mines of ‘Nepal’ is considered best and that which is obtained from the mines other than ‘Nepal’ is considered inferior and not recommended for therapeutic uses.

Modern Description of Copper –

In nature copper is found in Native form as well as in the form of Sulphides, oxides and carbonates. Native copper is rare. Generally, copper is obtained in the form of its ores. Nearly 200-300 copper ores are seen in nature, of which sulphide group of minerals are more common. In sulphides Chalcocite, Chalcopyrite, Covallite, cuprite and Bornite are commonest, of the oxides Cuprite, and of the Carbonate Malachite and Azurite deserve mention.

Native copper is found in the forms of crystals and cubes but scales, grains, plates and masses are also not uncommon.

Its hardness is 2.6- 3, specific Gravity – 8.5- 9, has metallic luster, hackly fracture. Also malleable and ductile, colour- copper red. Due to Tarnish and decomposition products may be superficially black, red, green or blue. Streak-copper red, metallic and shiny. Excellent conductor of heat and electricity.

Native copper is generally almost pure, but sometimes contains small amount of silver, arsenic, bismuth and antimony. It occurs principally in volcanic rocks, in veins, in dark coloured igneous rocks. It is hard to mine.

The sulphides and carbonates are easier to handle. The sulphides are black, purple and yellow. The oxides and native copper are dull red. The carbonates blue and green. The common associates are calcite, quartz and silver.



America, Chile, Peru, Cyprus, Africa, Japan, Australia, Northern Rodesia, Canada, Congo and Russia have large deposits of copper. The percentage copper in its ores depends on the nature of the place from which it is obtained. In very thin plates it is translucent with a green colour. It melts at 1085⁰ C, and usually dissolves in acids. The most characteristic chemical reaction is its solubility in nitric acid with the evolution of brownish red fumes of nitric oxide gas. Its boiling point is 2300⁰C. It is an important constituent of the valuable alloys like Brass, Bronze, bell-metal and german silver. Blue Vitriol (copper sulphate) is its important compound and is used as a fungicide. Some compounds of copper are used as insecticides.

Copper and its compounds when put on fire yield a bluish green flame which is suggestive of the presence of copper in the compound. The flame test of copper is mentioned in ancient text also.

Physical Properties –

For Good Variety – That copper is considered good which is deep red or red like a beak of Parrot (Suka Chanchunibha or ‘Atyanta Sonita’ or red like ‘Japapushpa’, which looks red on cutting or fracture, heavy(Guru), Smooth(Snigdha), Mrudu(Soft), malleable and ductile and which could be made into thin sheets, wires, should not turn black on heating. Free from impurities like iron, lead etc. and that which is obtained from the mines of ‘Nepal’ is considered the best and recommended for use.

Inferior variety – That which is grey/pale(Pandura), blackish red in colour, hard, light in weight, breakable or brittle, with scales, associated with impurities. Remains black even after washing, may cause vomiting sensation and purgation when used internally and which is obtained from the mines other than ‘Nepal’ is known as Mleccha- Tamra and considered inferior and not recommended for use.

It is also mentioned that if copper obtained from ‘Nepal’ is not available then the copper obtained from tuttha as its Satva is also considered good and may be used.

Effects of Ashodhita and Asamyaka Marita Tamra –

Unpurified and unreduced copper to ashes is considered highly poisonous. It is said to be more poisonous than poison itself because poison possess only one dosa(harmful effect) while such copper may cause following eight dosas(bad effects in the body) such as – Bhrama(vertigo), Murccha(unconsciousness), Vidaha(Burning sensation), Sweda(sweating), Kleda(wetness sensation), Vanti(Nausea and vomiting), Aruchi(Anorexia), and Chitta santapa(Mental uneasiness). Besides these it is likely to produce following diseases i.e. kushtha, severe purgation, vatarakta, kamala, kanti virya and balanasha, dhatu kshaya, shosha, shula and Ayunasha. Hence it is highly essential to purify it with general and specific purification methods.

Ashtamadoshas (eight major ill effects) have been quoted. After screening different classics, forty two Tamra Doshas have been found. Some of them are listed in Table

Sr.no.	Doshas	A.P.	R.T.	Y.R.	R.C.	B.P.	R.R.S.	R.J.N.	B.R.	R.S.S.
1	Aruchi	+		+		+				+
2	Ayuraghnam						+	+		
3	Balapahatva						+	+		
4	Bhrama	+		+	+	+	+	+	+	+
5	Chittasantapa	+							+	+
6	Daha	+		+	+	+	+		+	+
7	Kushtham			+			+	+		
8	Murcha	+	+	+		+	+	+	+	+
9	Shoola						+	+		
10	Shosha		+						+	+



11	Sweda	+		+		+				
12	Utkleda				+	+	+	+	+	+
13	Vami	+	+	+		+	+	+	+	+
14	Vireka		+		+	+			+	
15	Viryaphatva						+	+		

Tamra Shodhana:

Tamra Shodhana has been given utmost importance because of its highly toxic nature. There are many references of Samanya (general) Shodhana of Dhatus (metals) in different classics. The procedure of Nirvapa (heating and quenching) of Dhatus in Taila (sesame oil), Takra (buttermilk), Gomutra (cow urine), Aranala (sour gruel) and Kulattha Kwatha (decoction of seeds of *Dolichos biflorus* Linn.), seven times in each, is the commonest method of Samanya Shodhana. Rasapaddhati followed the same procedure but altered the sequence as Takra, Kanji, Gomutra, Tila Taila and Kulattha Kwatha. Rasaratnakara suggested Arkadughdha (latex of *Calotropis procera* Linn) instead of Kulattha Kwatha in same procedure. Kadalimoola Swarasa (extracted juice of tuber of *Musa paradisiaca*) is the only media given for Nirvapa in A. P. and R.K.D.

Vishesh Shodhana:

Most of the Acharya opine that, even after Samanya Shodhana, it is necessary to subject it for Vishesh Shodhana to reduce the toxicity and enhance its potency. Different methods of Vishesh Shodhana by processing with specific media have been described in different texts. B.R.R.S., Ra.Pu. and Ra. Sam. have prescribed different drugs to nullify the specific Dosha of Tamra .

Different methods of Vishesh Shodhana of Tamra as per different classics

Sr. no.	Reference	Drugs used	Procedure
1.	Rasarnava 7/106	Snuhi Ksheera, Arka Ksheera, Lavana, Kshara, Amla - Lepa	Nirvapa in Nirgundi Swarasa (expressed juice of <i>Vitex negundo</i> Linn.)
2	R.H.T. 9/13	Lavana, Kshara, Amlavarga, Snuhi and Arka Ksheera – Lepa	Nirvapa in Nirgundi Swarasa
3	R.R.S. 5/49	Ksharamla	Nirvapa in Mahisha Takra (7 times)
4	R.R.S. 5/51	Saindhava, Nimbu Rasa – Lepa.	Nirvapa in Nirgundi Swarasa
5	R.R.S. 5/52	Gomutra	Swedana (boiling) for 1 Yama (3 hours)
6	R.S.S.1/280	Gomutra	Swedana for 1 Yama
7	R.S.S. 1/279	Saindhava, Arka Dugdha – Lepa	Nirvapa in Nirgundi Swarasa
8	R.C. 14/45	Kshaaratraya and Nimbura Lepana	Melt in Moosha and add Gairika. Nirvapa in Mahishi Takra mixed with Gomaya. Repeated for 7



International Research Journal Of Integrated Medicine & Surgery

			times.
9	R.C. 14/46-47	Saindhava Lavana and Nimburasa – Lepana	Nirvapa in Nirgundi Swarasa and Kanji (8 times)
10	R.C. 14/48-50	Ksheera and Tintidi Phala Kalka, Lavana, Nimbu Rasa.	Swedana for 1 Yama. Nirvapa in Nirgundi Swarasa (7 times)
11	B. P. 3/118	Snuhi and Arka Ksheera, Saindhava – Lepana.	Nirvapa in Nirgundi Swarasa (3 times)
12	R.mr. 3/39	Lavana and Arka Dugdha Lepa	Nirvapa in Nirgundi Swarasa
13	R.mr. 3/39	Gomutra	Swedana for 1 Yam
14	R. P. 3/11	Taila, Takra	Nirvapa
15	R. P.3/14	Snuhi – Arka Dugdha	Nirvapa
16	R. P.3/15	Chincha, Saindhava, Gomutra	Swedana for 3 hours
17	R.T.17/12	Changeri Patra Swarasa	Nirvapa for 21 times
18	R.T.17/13	Nirgundi Swarasa	Swedana for 1 day
19	R.T.17/14	Saindhava and Kanji	Swedana for 1 day
20	R.T.17/18	Trikshara and Kanji – Lepana	Nirvapa in Nirgundi Swarasa (7 times)

Tamra Marana:

After the Shodhana process, Tamra has to be subjected to the process of Marana, to make it suitable for internal use. Various methods of have been advocated which can be classified on the basis of the media used for the Marana procedure

Different methods of preparation of Tamra Bhasma

Sr no.	Text	Media	Procedure
1	Y.R., (Dhatu Varga)	Kashthaushadhi	Tamra Patras - smeared with Tilaparni Swarasa - Puta. [Shweta (white) Bhasma].
2	R.T. 17/25	Kajjali	Shuddha Tamra Patra – smeared with paste of Kajjali with Nimbu Rasa - Gajaputa (3).
3	R.J.N. (Tamra Prakarana)	Ardhamsha (half) Parada	Shuddha Tamra (1 part), Shuddha Gandhaka (1 part), Shuddha Parada (1/2 part) – trituration with



International Research Journal Of Integrated Medicine & Surgery

			Nimbu Swarasa –Paka by Kupipakwa method for 1 Ahoratra (24 hours). Talastha product is TB.
4	Sha. Sa. M. K. 11	Padamsha (quarter) Parada	Shuddha Tamra (1 part), Shuddha Gandhaka (2 part), Shuddha Parada (1/4 part) – trituration with Kanji – Golaka (round bolus) prepared – paste of Changeri and Punarnava applied over it – Moosha (crucible) – Pachana in Valuka Yantra for 8 Prahara (24 hours). 5
5	R.J.N. (Tamra Prakarana)	Dwiguna (double) Parada	Nirgandha (without sulphur) method] Shuddha Tamra (1 part), Shuddha Parada (2 parts) – trituration with Nimbu Rasa –Putra (3).
6	R.T. 17/ 19-22	Hingula (cinnabar	Shuddha Tamra Churna (1 part), Shuddha Hingula (1 part) – trituration with Nimbu Rasa – Urdhva Patana Yantra (3 Prahara heating). TB is collected from the lower pot. Same procedure repeated for 2 times. To this, equal Gandhaka is added – Gajaputa
7	R.T. 17/26-29	Dwiguna Gandhaka	Paste of Gandhaka (2 parts) prepared in Nimbu Rasa is layered on Shuddha Tamra Patras (1 part)-dried-Sharava Samputa -Pachana in Valuka Yantra (24 hours) -mixed with equal Gandhaka-Gajaputa
8	R.J.N. (Tamra Prakarana)	Haratala	Shodhita Tamra (1 part) – trituration with Shodhita Haratala (1 part) along with Nimbu Rasa – Gajaputa.
9	R.J.N. (Tamra Prakarana)	Kajjali	[Anagni (without heat) method] Paste of Kajjali in Nimbu Rasa – smeared on Kantakavedhi Tamra Patra – kept in sunlight.

Amrutikarana:

It is the process to be done after Marana process to nullify the remaining Doshas or Tikshnata (sharpness) of Tamra thus making it free from toxic or bad effects

Different procedures of Amrutikarana of Tamra Bhasma

Sr.no.	Reference	Procedure
1	R.T. 17/37-39	Tamra Bhasma – 1 part, Shuddha Gandhaka – ½ part – triturated with Panchamruta – Chakrikas prepared – Sharava Samputa – Gajaputa
2	R.T. 17/40-42	Tamra Bhasma – 1 part, Shuddha Gandhaka – ½ part – triturated with Nimbu Swarasa – Golaka prepared, dried – kept in cavity made in Surana Kanda – Kapadmitti – dried – Gajaputa.
3	R.T. 17/43-44	Tamra Bhasma – Kumari Swarasa Bhavana (7) – Chakrikas prepared, dried – Gajaputa. Whole process is repeated for 3 times.



4	Rasamritam 3/45,46	Tamra Bhasma – Nimbu Swarasa Bhavana – Golaka prepared – kept in Surana Kanda – Gajaputa. Whole process is repeated for 7 times.
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Tamra Bhasma Varna: Krushna Varna

Test for Tamra Bhasma :

- (1) Varitar, Nishchandra, Rekhapurnatva etc. Bhasma's common tests.
- (2) It should not produce any nauseating sensation, vomiting, purgation and vertigo etc. toxic effect on internal use
- (3) It must be kept in contact with any Amla(Acidic liquid) lemon juice or sour curd piece for some time or for 24 hours and should not produce then the bhasma may not be taken as good quality and should be processed further.

Pharmaceutical and Therapeutic Properties –

Rasa – Kashaya, Tikta, Madhura and Amla.

Guna – Sita, Laghu, Sara, Snigdha.

Virya – Ushna

Vipaka – Katu

Karma – Lekhana, Alpa Brimhana, Ksutkara, Hrudya, Visodhana, Krimighna, Rasayana, Ropana, Netrya, Garavishahara, Shodhana.

Doshaprabhav – Vata Kaphahara, Pitta Kaphahara.

Vyadhi Prabhava – Pandu, Udara rog, Arsha, Gulma, Pliharoga, Yakrutavikar, Krimi, Shotha, Shula, Udarshula, Parinamashula, Astavidha Shula, Amlapitta, Jwara, Kasa, Kshaya, Kushtha, Pinasa, Agnimandhya, Kshayajaprameha, Grahanirog, Mutrakricchahar, Jirna Jwara, arovhaka, Amavata, Vriddhi, Vishadosha
Tamra bhasma is considered highly useful in Shwasa, Kasa, jwara, Shula and Hridroga.

Formulations of Tamra:

Aarogyavardhini Vati, Kanchnabhra Rasa, Gulmakalana Rasa, Chandramruta Rasa, Tamra Parpati, Trivikrama Rasa, Nityananda Rasa, Panchamruta Parpati, Laxmivilas Rasa, Hrudayarnava Rasa etc.

Tamra Bhasma Matra (Dose) :

1/8 – 1 ratti (15.63 – 125 mg)

Anupana:

Tamra Bhasma Should be consumed with Honey, Swarasa, Choorna, Kwath of particular drugs according to diseases.

Antidose:

- (1) Dhanyaka Swarasa with mishri (sugar) for three days.

Research works on Tamra Bhasma:

Till date many research works have been carried out on TB in the form of post graduate dissertation and Ph.D. thesis ranging from its pharmaceutical, pharmacological, analytical and clinical aspect. Pandey BL et al. (1983) have studied the action of TB on experimental models of gastric ulcer and found an anti ulcerogenic effect and reduction in peptic activity. [19] Tripathi YB et al (2003) ruled out the toxicity of TB and also proved its antioxidant activity in animals when given in a dose of 5 mg/kg body weight.[20] Prajapati PK et al. (2005) concluded that at higher dose level (five times of therapeutic effective dose) TB has tendency of producing



toxicity.[21] Rajiv Rai et al. (2008) established in animal experimentation that anti hyperlipidemic activity of TB prepared using herb media is best, and TB prepared using Kajjali is of second grade whereas TB prepared by using Gandhaka is not effective.[22] Vahalia MK et al. (2011) proved that TB is safe at its therapeutic and two times its therapeutic effect dose level since no toxicity since no toxicity symptoms of serious cause were observed in any of the parameters analyzed.[23] Morbale MS et al (2009) carried out the toxicological studies of TB and concluded that it is quite safe for single dose administration 175 mg/kg for 30 days.[24] Sharma DC et al (2009) studied its effect red cell indices, iron parameters and essential elements in chicks and propounded that TB gets absorbed through gut and is responsible for increase in tissue iron.[25] Wadekar M et al carried out thermal analysis of the samples of TB prepared by different Ayurvedic pharmacies.[26] Chitnis KS et al (2011) performed chemical evaluation and advanced analyses like Atomic Absorption Spectroscopy, spectrophotometric and X – Ray diffraction analysis to estimate the amount of copper present in TB of different batches, different manufacturers and formulations containing TB.[27]

CONCLUSION

The term 'Lauha' is derived from the 'Looh' root which means a substance obtained from mineral by extraction. According to other meaning 'Lauha' means a substance which is capable to expelling or removing vitiated Dosha and disease from the body. All the metals were collected under a group called as Lauha. The term 'Dhatu' is identical with Lauha and Dhatu means a substance capable of removing Valee, Palita, Khalitya, Karshya, Jara and other diseases. Tamra Dhatu comes under the group of Shuddha Lauha which is described by most of the texts of Rasashastra. During the prehistoric Chalcolithic period, societies discovered how to extract and use copper to produce ornaments, implements etc. Various references are found in Atharvaveda also. Tamra is considered pious since this period. It denotes the importance of copper regarding its use in religious rituals and also in other areas owing to its lasting qualities. Acharya Charaka first described the use of Tamra in Churna (powder) form. Various Rasashastra classics dealt with Tamra in details. Copper in view of modern science is a transition metal which is placed in 11/IB row of periodic table of elements. Most of the copper metal is extracted from its sulphide ores. Many of copper alloys are of considerable importance technically. Classics have described the varieties of Tamra on the basis of the mines or place from which it is obtained. Tamra obtained from the mines of Nepal is considered Shreshtha (superior), Grahya and used for medicinal purposes. Mlechchha Tamra is obtained from the mines of other places is considered Heena (inferior), Agrahya and not recommended for therapeutic use. Ashta Mahadoshas quoted in Ayurveda Prakasha indicate towards the toxic potential of improperly prepared TB. The toxic nature of copper may be mainly attributed to its salts like copper sulphate (blue vitriol) and copper subacetate (verdigris). Due to high toxic potential, high emphasis has been given to its Shodhana procedure which eliminates the Dosha (impurity/ toxicity/ flaw) in a drug. Nirvapa is the commonest amongst the many Samanya Shodhana procedures of metals. In this process hardness of the metal gets reduced and it becomes more brittle due to repeated heating and quenching. RT describes six methods of Vishesh Shodhana of Tamra. These procedures have specific action at the microscopic level of metal. Honwad et al. 2012 have concluded that the hexagonal cell type in raw Tamra is converted to monoclinic after Vishesh Shodhana. In 'Shulva Shastra', Harishankarji Sharma has compiled around eighty methods of Tamra Marana from thirty different classics. In most of the methods Gandhaka (Sulphur) along with Parada (Mercury) is used. In this process it is converted to such a light and fine state of subdivisions that when used internally it is easily digested, absorbed and assimilated. Different media used for the preparation of Bhasma play a key role on the nature and efficacy of the final product. Wadodkar et al. (1991) have established that TB prepared by sulphur media shows better results than mulika media in the patients of Tamaka Shwasa (Bronchial asthma).⁴³ Procedure of Amrutikarana is essential in case of TB to make it free from its Utklesha (nausea), Vanti



(vomitting) and Bhranti (giddiness) Doshas. Black color of TB is may be due to presence of black compounds of copper - cupric oxide (CuO) and copper (I) sulphide (CuS). In some studies, XRD pattern of TB showed the presence of CuS, Cu₂S and Cu₇S₄. Since sulphur is an accompaniment to the metal in the Bhasma preparation, copper is converted to its sulphide form in major. Some sulphides may get converted to oxide during the heat treatment for multiple times (Putra), because metallic sulphides when heated in air get converted to oxide of the metal and sulphur dioxide. Therefore, some oxides of copper are also found in the TB. In a nutshell, TB is the combination of sulphides and oxides of copper which give black color to it. Avami, Niramla and Dadhi pariksha of TB are very important because they simply state the proper Bhasma formation and rule out the presence of free copper and/or toxic salts of copper like copper sulphate and copper sub acetate. Formulations of TB in the forms of Parpati, Sindura Kalpana, Kharaliya Rasayana etc. are being successfully used in treatment of various diseases since centuries. To name a few are Panchamrita Parpati in Grahani, Tamra Parpati in Kushtha (skin diseases), Tamra Sindura in Shwasa (Ashtma), Arogyavardhini Rasa in Yakridvikaras (liver disorders), Hridayarna Rasa in Hridroga (cardiac disorders) etc. Recent studies carried out on experimental models have proved the free radical scavenging, anti-oxidant, hepatoprotective and antihyperlipidemic activities of TB. In toxicity studies carried out by different researchers its safety has been established by showing its well tolerance at therapeutic effective dose level. Though it has shown tendency of producing toxicity at higher dose levels, it has to be kept in mind that higher doses have definite predilection of producing toxicity (Nayak SV et al. 2005). To conclude, Tamra is the inseparable part of Indian culture since thousands of years either in the form of utensils, ornaments or in medicines. Many researchers have established its safety for internal use, hence it should be used fearlessly in the treatment of diseases as mentioned by our great seers.

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