



IJAPC

VOLUME 9 ISSUE 2 2018

www.ijapc.com

E ISSN 2350-0204

**GREENTREE GROUP
PUBLISHERS**





A Systematic Review on *Mandura* (Iron oxide)

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ABSTRACT

Ayurveda is a global science and well known holistic system of medicine. Acharya's of Ayurveda explained various materials of *Rasashastra* as *Rasa*, *Maharasa*, *Uparasa*, *Dhatu*, *Ratanas*, *Sudhavarga*, *Ksharavarga* etc. *Mandura* comes under the group of Metal. Chemically, it is iron oxide which contains two atoms of iron and three atoms of oxygen. Iron deficiency now a day is very common problem all over the globe. Iron is an important component of Hemoglobin, it represents about two-third of body's iron, so red blood cell deficiency leads to iron deficiency anemia. *Mandura* is used in Ayurvedic treatment especially for *Pandu* (Anemia). There are various types of *Mandura* formulations explained in Ayurvedic text which are useful in various diseases like *Pandu* (Anemia), *Kamala* (jaundice), *Shotha* (Inflammation) etc.

KEYWORDS

Mandura, Iron, Metal, *Pandu*, Iron oxide



Greentree Group Publishers

Received 14/08/18 Accepted 08/09/18 Published 10/09/18



INTRODUCTION

Since *Samhita* period *mandura* is being utilized for various ayurvedic preparations. *Mandura* and its therapeutic was first mentioned in *Charaka Samhita* in 15th century B.C. Acharya *charaka* has described *mandura* in the treatment of *Panduroga* (Anemia). In *Ashtanga Hridayam* Acharya *Vagbhata* mentioned *mandura* in *Panduroga & Kushtharoga adhyaya*. When red hot iron is beaten, it leaves some unwanted pieces which over the period of time get structure of *mandura*. *Mandura* is either formed on the earth or beneath of earth. When red hot iron is heated and hammered, small pieces are thrown and scattered on the earth. These particles get rusted as iron slag, which is use as *mandura*. *Mandura* formed as a result of rusting of any iron material due to the effect of air and moisture on iron. Chemically *mandura* is a metallic oxide cum silicate of iron which is formed when iron exposed to the air, water and sun. According to Ayurveda 80-100 years old *mandura* is considered to be superior and best for formulations. In various ayurvedic formulations *Madura* is used as main content because of its important medicinal properties. In different types of *mandura* *Munda Mandura* is ten times effective as *mandura*. *Tikshna mandur* is

hundreds times effective than *munda*, *Kanta mandura* is thousand times as effective as *tiksna*. For medicinal purpose *kanta mandura* is mainly used to destroy various diseases and senility. In absence of *kantamandura*, gold or silver is to serve as substitute¹.

DISCRIPTION OF MANDURA:

Mandura is iron oxide (Fe_2O_3) also known as *Lohakitta*, *Lohamala*, *Lohasinghanaka*, *Kitta* etc. *Mandura* is the mixture of iron and oxygen, containing 2 atoms of iron and 3 atoms of oxygen. Hundered years old *mandura* is considered best and very useful for medicinal use, *mandura* which is 80 years old considered medium and 60 years old *mandura* shows low therapeutic value. Chemically, *mandura* is the combination of ferric oxide (59.14%), ferrous oxide (26.7%), chlorides (4.4%), magnesium (3.9%), sodium (1.9%) and few other trace elements².

TYPE OF MANDURA:

As per *Ayurved Prakasha* *mandura* consist 3 types-

1. *Mundalohakitta manduara*
2. *Tikshnalohakitta mandura*
3. *Kantaloha mandura*

1. MUNDALOHAKITTA MANDURA:

- Reddish in color
- Heavy & unctuous
- Also known as *mundakitta*

2. TIKSHNALOHAKITTA MANDURA



-Blackish in color

- Heavy

- Non porous

3. KANTALOHA MANDURA:

-Yellowish in color

-Heaviest

- Non porous

-It gives silver shine after cut

GRAYHYA LAKSHANA OF MANDURA: (SUITABLE MANDURA)

It should be smooth, heavy, hard, unctuous, and blackish in color, non porous and more than 100 year old, collected from old places.

THERAPEUTIC PROPERTIES OF MANDURA: -as shown in table no. 1

Table 1 Therapeutic properties of Mandura

1. Ras (taste)	Kashaya (astringent), madhura (Sweet)
2. Virya (potency)	Sheeta (Cool)
3. Vipaka (post metabolic effect)	Katu (pungent)
4. Guna (quality)	Ruksha(dry), Laghu (light), Dipana(improve appetite & digestion)
5. Doshghnta	Pitta-kaphagna (pacifies pitta &kapha)

PHYSICAL PROPERTIES OF MANDURA³: (as per AFI)

Nature- Rough lumpy masses, exhibiting voids

Color- Black

Streak- Black

Cleavage- None

Fracture- Conchoidal

Luster-Dull

Tenacity-Brittle but hard

Transparency-Opaque

Magnetism-Non magnetism

Hardness- 6 to 6.5

Specific gravity- 3 to 3.8

CHEMICAL PROPERTIES OF MANDURA:

1) Assay-

▪ Mandura should contain not less than 30% iron (Fe) when analyzed by gravimetric method. (appendix- 3.1.4)

▪ Mandura should contain not less than 30% silica when analyzed by gravimetric method. (appendix- 3.1.3)

▪ Mandura should not show less than 80% faylite (Fe₂SiO₄) when studied through XRD method (appendix 1.13)

2) Heavy Metals & Arsenic- Mandura should not contain more than the stated limits for the following (appendix- 3.2)

▪ Arsenic- 6 ppm

▪ Cadmium- 8 ppm

3) Other elements-

May contain the following within +_ 20% of stated limits: (appendix- 3.2)

▪ Copper- 0.45%

▪ Zinc- 50 ppm

▪ Silver – 7 ppm

HARMFULL EFFECTS OF ASHUDDHA (IMPURE) MANDURA:

Use of ashuddhamandura causes Panduta (anemia), Kustha (Skin diseases), Hridayaroga (Heart diseases), Shoola (Pain), Ashmari (Renal stone), Hridayas



(Uneasyness), *Mrityu* (Death) etc are the *ashuddhamandurasevanjanyavyadhi* (Diseases).

**SHODHAN OF MANDURA:
(PURIFICATION METHODS)-
SAMANYASHODHAN-**

Raw Mandura was heated till red hot and dipped into five different liquid media such as sesame oil, butter milk, cow urine, kanji and horse gram decoction respectively.

VISHESH SHODHAN⁴-

Different views of Mandura *Shodhana* by various *Acharyas* as Shown in table no. 2

Table 2 Process & Media of *Mandura Shodhana*

No of Process	Drug & Media	Type	Procedure	Repetition	Reference
1	Gomutra	Vishesh	Pachana	-	Charaka Samhita
2	Gomutra	Vishesh	Nirvapa	8 7 8 8 7 21	Chakraduttah Rasaratnasamuc chaya Rasendra Sara Sangraha Ayurveda Prakasha Rasa Tarangini Siddha Yoga sangraha
3	Triphala Kwatha prepared by Gomutra	Vishesh	Nirvapa	-	Rasa Ratna Samucchaya
4	Gomutra triphala kwatha	Vishesh	Abhisheka Pachana	7	Sharangdhar Samhita
5	Taila Takra Gomutra Kanjika Kulotha Kwatha	Samanya	Nirvapa	7 in each	Rasendra Sara sangraha

**MARANA OF MANDURA⁴
(INCINERATION PROCESS):**

Marana is a process of transformation by which purified and detoxified materials are transformed into absorbable, adaptable and assimilable form following certain pharmaceutical processing as per *PUTA* system of quantum heating in *Rasashastra*. Drug, media, type and process of maran of *mandurais* shown in table no. 3

**FITNESS OF MANDURA FOR USE IN
MEDICINES⁵:**

- The *mandura* which is used in ayurvedic medicines should be of following descriptions: It should be devoid of hallows heavy, soothing, strong, 100 years old and collected from remote places

**FORMULATIONS OF MANDURA
(MANDURA KALPA):
MANDUR BHASMA-**

**Table 3** DRUGS, MEDIA, TYPE AND PROCESS OF *MARANA* OF *MANDURA*:

No of process	DrugandMedia	Procedure	Putaspecification	Repetition	References
1	<i>Triphala kwath</i>	<i>Putapaka</i>	-	30	<i>Rasatarangini</i>
2	<i>Loha marak gana</i>	<i>Putapaka</i>	-	-	<i>Rasatarangini</i>
3	<i>Gomutra</i>	<i>Putapaka</i>	<i>Ardha- Gajaputa</i>	7	<i>Siddha yoga sangraha</i>
	<i>Triphala</i>			7	
	<i>Kwatha</i>			7	
	<i>Kumari</i>			21	
	<i>Swaras</i>				

Ingredients –*Mandura*(Ferric oxide)

Gomutra (Cow Urine)

Kumariswaras (Aloevera juice)

TriphalaKwath(Decoction)

Method of Preparation –A fine powder of *Mandura* and *TriphalaKwatha* is taken in the ratio of 1:4, respectively and mixed. The mixture is then boiled till the water evaporates and only the powder remains. The remaining powder is then mixed and triturated with *triphala kwath* or *kumara swaras* and cow urine. When it achieves a paste like consistency, made *chakrika* (petels) of this paste, dried *chakrikas* are then placed in *sharava* (saucer) *samputa* (tied with mud smeared cloth) and placed over dried *sharavashamputa* in *Gajaputa*. This process is repeated for thirty times to obtained *mandura bhasma*.

PHARMACOLOGICAL ACTION OF MB-

It acts as *Deepana*, *Pittashamana*, *Raktavridhikaran*, *Vrishya*, *Ruchikaraka* etc

THERAPEUTIC INDICATIONS OF MB-

It is indicated in *Shotha* (Imflammation), *Kamala*(Jaundice), *Pandu* (Anemia), *Krimi* (Worms), *Arsha* (Hemorrhoids), *Grahani*(IBS), *Pliha shotha* (Sleepomegaly) etc with specific *anupana*. (Vehicle)

THERAPEUTIC DOSASES OF MB⁶ - as shown in table no. 4

Table 4Therapeutic doses of *Mandura bhasma*

Infant	Not recommended
Children	25 to 50 mg*
Adults	125 to 375 mg*
Pregnancy	25 mg*
Old age	50 to 125mg*
Maximum possible dose	750 mg**

*Twice a day with appropriate adjuvant,

**Total daily doses in divided doses.

Doses as per *Rasatarangini*⁷-

Matra(doses) of *mandura bhasma*- ¼ *ratti* to 2 *ratti* (30mg to 240mg)

ANUPANA (VHEHICLE): Commonly used with *Madhu* (Honey) and also given with suitable *anupanas* according to diseases.

MANDURA RASAKRIYA KALPA²–The formulations prepared by the boiling of primary liquid dosage forms till the



attainment of semisolid consistency is known as *Rasakriya*. The *Raskriya Kalpaas* shown in table no. 5

Table 5 Formulations prepared by *Rasakriya*

Sr NO	Name of formulations	Mineral Ingredients	Harbal Ingredients	Processing Drug
1	<i>Mandura vatak-1</i>	MB(67%), SMB	<i>Trikatraya, Chavya, Devdaru, Pippalimula, Darvi</i>	Cow urine
2	<i>Mandura vatak-2</i>	MB (67%)	<i>Trikatraya, Chavya, Devdaru, Kutaja</i>	Cow urine
3	<i>Mandura vataka-3</i>	MB (67%), SMB	<i>Trikatraya, Twaka, Chavya, Granthika, Devdaru, Trikatu</i>	Cow urine
4	<i>Vajra vataka mandura</i>	MB (67%)	<i>Trikatraya, Chavya, Devdaru, Pippalimula,</i>	Cow Urine
5	<i>Triphaldi mandura</i>	MB (50%)	<i>Trikatraya, Chaturjata, kalajaji, Ajmoda, Yashti, Dhanyaka</i>	<i>Triphala, Neeli, Guduchi, Bringraja, Kesharaja, Vasa, Shatavari, Mundi, Bala, Patol, Parpata, Bharangi, Kitata, Bramhi Swarasas</i>
6	<i>Punarnavadi mandura</i>	MB (67%)	<i>Punarnava, Trivrit, Trikatraya, Ushna, Pippalimula, Chavya, Chitraka, Devdaru, Pushkara, Katuki, Indrayava, Haridra, Darvi</i>	Cow Urine
7	<i>Thrayushanadi mandur</i>	MB (67%), SMB	<i>Trikatrya, Chavya, Darvi, Dalchini, Pippalimula, Devdaru</i>	Cow Urine
8	<i>Koladi mandura</i>	MB (50%), YK	<i>Chavya, Pippalimula, Shunthi, Pippali</i>	Cow Urine
9	<i>Agnimukha mandura</i>	MB (46%)	<i>Panchkola, Devdaru, Musta, Vidanga, Triphala</i>	Cow urine
10	<i>Amritadi mandura</i>	MB (67%)	<i>Guduchi, Nimba, Bhumiminba, Brihati, Pippali, Haridra, Yashti, Murva, Manjishta, Shatavari, Lavanga, Patola, jalapippali</i>	Cow Urine
11	<i>Shothari mandura</i>	MB (67%)	<i>Triphala, Trikatu, Chavya</i>	<i>Nirgundi, Manakanda, Ardraka, SuranKanda Swaras, Triphala, Trikatu, Chavya</i>



				Kwath-Bhavana, Cow urine Kwathan (boiling)
12	<i>Sita mandura</i>	<i>MB (27%)</i>	<i>Triphala, Trikatu, Ela, Devdaru, Vidanga, Kushta, Vidanga</i>	Sugar, Cow milk, Honey, Cow ghee
13	<i>Shatavari mandura</i>	<i>MB (50%)</i>	<i>Shatavari</i>	Shatavari swaras, Curd, Cow milk
14	<i>Sharavari mandura brihat-1</i>	<i>MB</i>	<i>Jiraka, Musta, Dhanyaka, Trijatak</i>	Shatavari swaras, Amalaki swaras, Cowt milk, Cow ghee, Curd
15	<i>Sharavari mandura brihat-2</i>	<i>MB (53%), LB, AB</i>	<i>Vidanga, Triphala, Trikatu, Jeerak Dwaya, Yavani, Gajapippali, Muata</i>	<i>Shatavari swaras, Amalaki swaras, Cow urine, goat milk, Sugar candy, Cow ghee</i>

KHALVIYAMANDURAKALPA²–
Khalaviya formulations as shown in table no. 6

Miscellaneous preparation and their method of preparation as shown in table no.7.

Table 6 *Khalviya* Formulations

S.No.	Name of <i>kalpa</i>	Mineral Ingredients	Herbal Ingredients	Processing (Bhavana) drug
1.	<i>Takra Mandura-1</i>	<i>MB (10%), Samudra phena, saindhava lavana</i>	<i>Vijara, vamsa, kaliyaka, nimbi, vishatinduka, mula, tejpatra, lavanga, ela, shatapushpa, madhurika, marich, guduchi, yasti, jayaphala, shunthi</i>	Punarnava swaras
2.	<i>Takra Mandura-2</i>	<i>MB</i>	Nil	Bilva patra, Shweta& Krishna Bhringaraja, agnimantha, punarnava, kokilakshaswaras, cow urine
3.	<i>Chatushama Mandura</i>	<i>MB (25%)</i>	Nil	Sugar, Honey, Cow Ghee
4.	<i>Guda Mandura</i>	<i>MB (50%)</i>	<i>Amalaki, Haritaki</i>	Old Jaggery, Honey, Cow Ghee
5.	<i>Mandura Vataka</i>	<i>MB (67%), SMB</i>	<i>Trikatu, Devdaru, Chitrak, Ardraka, Bringaraja</i>	Cow Urine
6.	<i>Tapyadi Mandura</i>	<i>MB(20%), Shilajit, SMB, RB</i>	<i>Triphala, Trikatu, Vidanga, CHitrakmula</i>	Sugar, Honey



7.	<i>Rasabhra Mandura</i>	<i>Kajjali, AB, MB(34%), shilajit, KLB</i>	<i>Trikatu, Triphala, Chavya, Musta</i>	<i>Bringaraja, keshraja, Nirgundi kwatha, Mankanda, Ardraka swarasa</i>
8.	<i>Rasa Mandura</i>	<i>Kajjali, MB (24%)</i>	<i>Haritaki</i>	<i>Bringaraja, Keshraja Swarasa, unequal parts of honey, cow ghee</i>

Table 7 Miscellaneous preparations and their method of preparation-

Method of Preparation	Name of the formulations	Mineral ingredients	Herbal ingredients	Processing drug
<i>Churna</i>	<i>Triphala mandura</i>	<i>MB (50%),</i>	<i>Triphala</i>	<i>Nil</i>
<i>Putapaka</i>	<i>Trikatwarada mandura</i>	<i>MB (50%), LB (2.6%)</i>	<i>Trikatu, Triphala, Draksha, Pushkara, Shati, Vacha, Lavanga, Shringi, Twaka, Shatapushpa, Vidanga, Dhataki, Pushpa, Kutaj Kwath</i>	<i>Gajaputa</i>

Abbreviations & Terms-

MB- Mandura Bhasama, LB- Loha Bhasma, SMB- Swarna makshik bhasma, KLB- Kant aloha Bhasma, RB- Rajat Bhasma, AB- Abhraka Bhasma

Trikatraya- formulations processing Triphala, Trikatu, Trimala, YK- Yava kshara

CONCLUSION

Mandura comes under the group of *Lauha* or *Dhatuvarga* which has three types in which *kantalauhaMandura* has more therapeutic value and commonly used for the ayurvedic formulations. It is ayurvedic iron source and chemically it is an iron oxide. The suitable *mandura* should be smooth, heavy, hard, unctuous, and blackish in color, non porous and 100 year old. In Ayurveda *Ayaskriti* or *LauhaRasayana* are the primary source of Iron and *mandura* is *Lauhamala*. *Shodhana* (Purification) of *mandura* with the help of *Gomutra* and *triphalakwathahelps* to

alleviates *doshas* and increases the quality of *mandura*. *ManduraBhasma* cool in potency, Sweet in taste, *Pittashamak* and shows *deepan&Ruchikarak* property. It helps to increase hemoglobin level hence it is used in iron deficiency anemia. *Mandura bhasma* is a traditional medicine against hepatitis and useful in various liver and spleen disorders. *Mandura Bhasma* also useful in *Shosha, Shotha, Plihavidhi* and “*BALANAM ATISHASYATE*” means as per *Rasamrut samhita mandura bhasma* is very useful in child because of its mildness and cool potency. *Mandura* is among oldest known metal, used in therapeutics and it is



safer, cost effective and acceptable than other haematinics.



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