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SCIENTIFIC VALIDATED APPROACH FOR APPLICATION OF MANDURA BHASMA: A REVIEW

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Abstract: *Mandura (iron rust) is abundantly found in nature. The rational pharmaceutical and therapeutically approach of Ayurveda in general and Rasa Shastra in particular has transformed Mandura into medicinal form. The processes of Shodhan (purification/potentiation) and Maran (incineration/calcinations – treatment with that quantum of energy which is needed for physico-chemical conversion of raw materials to Bhasma: a therapeutic form) which are very individualized in terms of material, media, method and absolute medicinal form. Mandura Bhasma has been described useful in the treatment of Pleeha vriddhi (spleen enlargement); Yakrit vriddhi (liver enlargement); Kamala, Pandu (jaundice); Shotha (oedema); Raktaksaya (anemia). However, dose schedule of Mandura Bhasma for certain disease are not very rational. We studied various commercially available proprietary Ayurvedic medicines containing Mandura Bhasma. Prak-20 was found to meet up with the classical standard of dose schedule of Mandura bhasma.*

Key words: Mandura bhasma, Ayurveda

INTRODUCTION

There may not be second opinion on notion that since last two decades acceptability of Ayurveda among common public is significantly enhanced across the globe. This is also true that many legal recognitions by law of land had been already notified or being discussed in form of draft consultation at proper forum, national as well as international viz. FDA of USA, MHRA of UK, Health Australia etc., courtesy initiation of WHO for promotion of indigenous system of medicine and inner strength of Ayurveda [1].

Medicines of any system provide a lion share in its basic doctrines and in Ayurveda herbo-mineral

formulations were incorporated in practice in beginning of 5-6 A.D. and completely amalgamated in therapeutics up to 11 A.D. on virtue of its wide range of application, palatability, biocompatibility and greater shelf life period. But, unfortunately these groups are under scan and being considered toughest rider in quality, safety and efficacy of Ayurvedic formulations by all stakeholders.

With all energy, potency and wisdom of our ancient scholars, we submit that these groups of medicines are as superior as it was, even today. This is compromise in fundamental pharmaceutical process with unwarranted variation and irrational dose schedule which is responsible for

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No of Process	Drug and Media	Type	Procedure	Repetition	Reference
1	Gomutra	Vishesha	Pachana	-	Charaka Samhita
2	Gomutra	Vishesha	Nirvapa	8 7 8 8 7 21	Chakraduttah Rasa Ratna Samucchaya Rasendra Sara Samgraha Ayurveda Prakasha Rasa Tarangini Siddha Yoga Samgraha
3	Triphala Kwatha prepared by Gomutra	Vishesha	Nirvapa	-	Rasa Ratna Samucchaya
4	Gomutra Triphala Kwatha	Vishesha	Abhisheka Pachana	7	Sharangadhar Samhita
5	Taila Takra Gomutra Kanjika Kulottha Kwatha	Samanya	Nirvapa	7 in each	Rasendra Sara Samgraha

Table 1: Process and media for Mandura Shodhana

No of Process	Drug and Media	Procedure	Putap Specification	Repetition	Reference
1	Triphala Kwatha	Putapaka	-	30	Rasatarangini
2	Lauha Maraka Gana	Putapaka	-	-	Rasatarangini
3	Gomutra Triphala Kwatha Kumari Swarasa	Putapaka	Ardha -Gajaputa	7 7 7 21	Siddha Yoga Samgraha

Table 2: Drug, media, type and process of Marana of Mandura

any side/adverse effect of these which are being debated currently.

In this review, we put forth our scientifically validated approach for application of Mandura Bhasma [2] which will substantiate pragmatic and rational advancement of herbomineral formulations, consists of mainly metallic/minerallic and mercurial preparation of Ayurveda.

MATERIALS AND METHODS

Literary work on Mandura viz. identification, method of Shodhan, Marana of the mineral, dose schedule etc., was collected from the available literature. The quantity of Mandura bhasma present in various commercially available proprietary Ayurvedic medicines viz. Liv-52, Kamalahar Forte, Amlycure, Prak-20 [3] etc. were collected. Attempts were made to compare the Mandura Bhasma present in different

formulations along with the dose pattern. The proprietary Ayurvedic medicine Prak-20 is manufactured by Bharat Bhaishajya Shala Private Limited at Dehradun and marketed by Ipca Traditional Remedies Pvt. Ltd. Mumbai.

RESULTS

Debut mentions of Mandura: The word Lohakitta, Mandura and its use in therapeutics was first mentioned in Charaka Samhita (15th century B.C.) [4]. Examination of Lohakitta was mentioned first by Kautilya (4th century B.C.) [4]. Shodhana of Mandura was first mentioned in Charaka Samhita (15th century B.C.) [4]. Importance of Shodhana of Mandura was first mentioned in Rasendra Chudamani (12th century A.D.) [5]. Preparation of Mandura Bhasma was firstly mentioned in Rasatarangini (20th century A.D.) [6]. These references regarding Mandura established many facts about its acceptability in therapeutics since the period of Charak Samhita.

Table 3: Dose Schedule of Mandura Bhasma in classic Ayurvedic formulations.

Formulation	Ref. Book	Rogadhikar	Total ingredient	Mandura	Mandura %	Shastrokta Dose of Formulation	Daily intake of Mandura
Panchamrit Mandura	B.R.	Pandu	41.5 Tola	12.5 Tola	30%	2 – 4 Ratti O.D.	0.6 Ratti-1.2 Ratti
Panchamrit Mandura	B.R.	Pandu	41.5 Tola	12.5 Tola	30%	2 – 4 Ratti O.D.	0.6 Ratti-1.2 Ratti
Vajravatak Mandoor	B.R.	Pandu	9 Pal	6 Pal	66.66%	0.5 Masha = 3 Ratti	Not Available
Punarnavadi Mandura *	B.R.	Pandu	60 Tola	40 Tola	66.66%	1-4 Masha	Not Available
Punarnavadi Mandura	S.Y.S.	Pandu	160 Tola	80 Tola	50%	4-8 Ratti T.D.S.	6-12 Ratti
Triushanadi Mandura	B.R.	Pandu	360 Tola	240 Tola	66.66%	3-9 Ratti B.D.	1.98-5.94 Ratti
Pandupanchanan Ras	B.R.	Pandu	93 Tola	62 Tola	66.66%	Not Available	Not Available
Triktrayadi Loha	B.R.	Pandu	26 Tola	4 Tola	15%	4Ratti T.D.S.	1.8 Ratti
Kamlantak Loha	B.R.	Pandu	24 Tola	2 Tola	8%	2 Ratti-4Ratti	Not Available
Navayas Churna	S.Y.S.	Pandu	18 Tola	9 Tola	50%	2 – 4 Ratti T.D.S	1-2 Ratti
Kalmegha navayas	S.Y.S.	Pandu	27 Tola	9 Tola	33%	3 Ratti T.D.S	2.97 Ratti
Dhatri Loha II	B.R.	Shool	10 Pal 3 Tola	6 Pal	55.8%	1 Tola x6	3.348 Tola
Ras Mandura	B.R.	Shool	34 Tola	8 Tola	23.5%	4-6 Ratti	Not Available
Chatuhsam Mandura	B.R.	Shool	16 Tola	4 Tola	25%	4 Masha x 6	6 Masha
Koladi Mandura	B.R.	Shool	10 Tola	5 Tola	50%	3-6 Ratti T.D.S.	4.5-9 Ratti
Bheemvatak Mandura	B.R.	Shool	1 Prasth aur 5 Pal	1 Prasth	76%	0.5 Tola x 6	2.28 Tola
Tara Mandura Gud	B.R.	Shool	18 Tola	9 Tola	50%	1 Kol x6	3 Kol
Shatavari Mandura	B.R.	Shool	39 Pal	8 Pal	20.5%	Not Available	Not Available
Triphala Mandura	B.R.	Amla Pitta	2 Pal 8 Tola	4 Tola	50%	1 Masha	Not Available
Seeta Mandura	B.R.	Amla Pitta	36 Tola	4 Tola	11%	1 Karsha B.D	0.22 Karsha
Trikatvadi Mandura	B.R.	Shotha	38 Tola	19 Tola	50%	1 Shukti x O.D	0.5 Shukti
Sudhanidhi	B.R.	Shotha	15 Tola	10 Tola	66%	1 Nishk	Not Available
Agnimukh Mandura	B.R.	Shotha	124Tola	48 Tola	39%	1 Karsha	
Shothari Mandura	B.R.	Shotha	34 Tola				
Takra Mandura	B.R.	Shotha	16Tola	16 Tola	100%	10 Ratti	10 Ratti
Rasabhra Mandura	B.R.	Shotha	6 Pal	2 Pal	33%	2 Masha – 4 Masha	

*According to study done at Jamnagar matra of Punarnava Mandura is 1-10gm/day Note : 1 Tola = 11g 664 mg which is equivalent to 12g. B. R. = Bhaishjaya Ratnawali ^[12], S. Y. S = Siddha Yoga Sangrah [13].

Origin of Mandura: After severe heating of Loha, when it is hammered some parts are separated. These separated parts after many years turn into Mandura.

Properties of Mandura: In accordance of Ayurvedic pharmacology- Rasa=Kashaya; Virya=Sheeta; Vipaka = Katu; Guna =Ruksha; Laghu = Doshaghnata; Pittakapha = Prashamana [7].

Types of Mandura: Mandura is divided into 3 types [7] viz., 1.Mundakitta: It is reddish, heavy and unctuous. 2. Tikshnakitta: It has shining like collyrium, it is heavy and solid (non porous) and 3. Kantakitta: The heaviest, small, solid, ununctuous and yellowish Kitta is termed as Kantakitta. It gives silvery shining on cut.

Suitable Mandura for pharmaceutical processing: i.) It should be non porous, heavy,

unctuous, hard and more than 100 years old. ii.) 100 and more years of old Mandura is considered as best. iii.) 70-80 to 100 years of old Mandura is taken as medium quality. iv.) 60 to 70 years of old Mandura is considered as inferior quality. v.) Less than 60 years of old Mandura is taken as Visha (poisonous).

Shodhana of Mandura: Shodhana is a process of purification and detoxification by which physical and chemical blemishes and toxic materials are eliminated and substances are subjected for further processing.

For Shodhan of Mandura following techniques are used in general approach. i.) Mostly Nirvapa (heating up to red hot and quenching in liquid media) process is followed for Shodhana of Mandura. ii.) Commonly Gomutra is used as liquid media for Mandura Shodhana. iii.)

Table 4: Comparative quantity of Mandura Bhasma in different Proprietary Ayurvedic medicines.

Name of Products	Form	Package of each unit	Quantity of Mandura Bhasma	Recommended Daily Dosage	Daily Dose of Mandura Bhasma
Liv. 52	Tablet	275 mg	33 mg	2 to 3 tablets thrice a day	66 to 99 mg
Liv. 52 DS	Tablet	550 mg	66 mg		
Kamalahar Forte	Capsule	250mg	20 mg	1 to 2 capsules thrice daily for minimum of 10 days	60 – 120 mg
	Liquid	Each 10 ml	20 mg	10 – 20 ml thrice daily for adults.5 – 10 ml for children	
Amlycure DS	Capsule	500 mg	30 mg	1- 2 capsules twice or thrice a day	60 – 180 mg
Prak-20	Capsule	500 mg	250 mg	3 – 6 capsules a day	750 – 1500 mg

Interestingly Mandura can be used in therapeutics after Shodhana by making it in Churna form. All details about Shodhan of Mandura are shown in table 1.

Marana of Mandura [8]: 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 Rasa Shastra.

For Marana of Mandura following techniques are used in general approach. i.) Same methods and drugs for processing of Loha may be used for Marana of Mandura. ii.) Drugs of Loha Maraka Gana are used for Mandura Marana. iii.) Triphala Kwatha is the most commonly used liquid media for Bhavana. iv.) Ardha Gajaputa is used mostly as heating grade for Mandura Marana. All details about Marana of Mandura are shown in table 2.

Pharmacological action of Mandura bhasma [9]: Mandura Bhasma causes Deepana, Pittashamana, Raktavridhikaran, Vrishya, Ruchikaraka etc.

Therapeutic indications of Mandura Bhasma [10]: Mandura Bhasma is indicated in Shopha, Kamala, Pandu, Krimi, Arsha, Grahani, Pliha, Shosha etc. with specific Anupana or Sahapana.

Computation of Dose Schedule of Mandura Bhasma: Mandura Bhasma is mixed with substances of plant and animal origin in variable quantity before administration. After a close

scrutiny of literature we found 25 formulations (kalpas) containing Mandura Bhasma. These are used in treatment of *Pandu, Shool, Amlapitta* and *Shotha roga* which are depicted in table 3.

There is no clear information regarding the quantity and frequency to use these formulations in human body. Out of twenty five formulations, the daily dose schedule is available for fourteen formulations. There is no information about the daily dose schedule for the rest eleven formulations. Classical references of daily dose schedule for Mandura Bhasma in different proprietary Ayurvedic Medicine is shown in table 4.

DISCUSSION

Impact of Shodhan: Mandura is considered as rusted iron, its chemical formula is $Fe_2O_3 \cdot H_2O$. During Shodhan process water portion of the hydrated ferric oxide may evaporate and only ferric oxide remains. When Mandura was heated, it gets attached with the ladle, because water portion from the surface of heating gets evaporated and remaining part gets attached with the ladle.

Colour of Mandura became brown and black after Shodhana. During heating Mandura breaks into coarse particles and metallic iron part may be exposed. This iron part becomes black ferrous-ferric oxide during heating to red hot. On heating water part of the hydrated ferric oxide gets evaporated and only ferric oxide part remains, which is reddish brown in colour.

Mandura pieces became coarse powder after

Shodhana, because during Shodhana on heating, Mandura bursts and becomes into coarse powder.

Impact of Marana: Industrious Mandura is converted in to form of medicinal Mandura Bhasma which is brown (Rakta Chandana Varna) in colour. Mandura Bhasma may be considered as a mixture of ferric oxide (Fe_2O_3) and other traces. Ferroso-ferric oxide was formed from the metallic iron part of Mandura during Marana which contribute a minute portion of Mandura Bhasma. Whereas, presence of maximum portion of ferric oxide (red in colour) makes the Bhasma brown in colour.

Apparent absorption criteria: Probable absorption criteria may include acid insolubility pattern of Bhasma along with other many physico-chemical characters. Basis of test for acid insoluble ash was carried out to evaluate the percentage of insoluble inorganic content of the Mandura Bhasma in dilute acid.

Since a drug must first pass into solution before it can be absorbed, so the acid insoluble ash test of Bhasma is therapeutically very important. It is intended to provide a step towards the evaluation of the physiological availability of the Bhasma. Loha Bhasma contains comparatively more acid insoluble ash (27.80%) than that of Mandura Bhasma (16.23%). So it may be inferred that Mandura Bhasma should be physiologically more available in the body than Loha Bhasma.

Luminous dose: After a close scrutiny of formulations quoted in table 3, the daily intake of Mandura Bhasma falls within the range of 750mg/day to 40gm/day. Such vast variations create a big question regarding the minimum and maximum therapeutic dose of Mandura Bhasma.

Prak-20 [3] is a modified form of classical Punarnava Mandur [11]. In pre-clinical and clinical studies, Prak-20 is best effective in liver disorders at the dose of 30 mg/kg/day and it can be given at the maximum dose of three grams

each day for long duration. Thus the therapeutic dose of Mandura Bhasma in Prak-20 (750 mg/day to 1500mg/day), which is compatible with the classical reference of the daily doses of Mandura Bhasma.

On the contrary, there are few commercially available Ayurvedic formulations that contain Mandura Bhasma and these formulations are able to provide merely 60mg/day to 180mg/day Mandura Bhasma in therapeutic doses raising big question about its rationality (Table 4).

CONCLUSION

Application of Mandura Bhasma alone or in compound form is very rational since centuries. Of all the formulations studied Prak-20 found to meet up with the classical standard of dose schedule of Mandura bhasma. This formulation has shows potent hepato-protective, anti-fibrotic, anti-inflammatory, detoxifying and anti viral properties in various pre-clinical and clinical studies [3]. However, further studies are required to understand the complexity of daily dose schedule and to rationalize Minimum Required Dose (MRD) and Maximum Tolerant Dose (MTD) of Mandura Bhasma. Work on Prak-20 is just a curtain raiser of complexity of dose schedule of Mandura Bhasma.

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Conflict of Interest: We have compared the various proprietary Ayurvedic medicines containing Mandura Bhasma with academic interest not for any commercial purpose. We are not posing any question on their claim.

REFERENCES

- [1] Sarkar, P. K.: *A comparative pharmaceutico-pharmaco-clinical study of lauha bhasma and mandura bhasma w.s.r. to its pandu-hara effect*. MD (Ay) dissertation of IPGTRA, Gujarat Ayurveda University, Jamnagar, (2005).
- [2] Mandura Bhasma. In: *The Ayurvedic Formulary of India - Part I*. Government of India, Ministry of Health and Family Welfare, Department of Indian Systems of Medicine & Homeopathy, New Delhi. 237-238 (2003).
- [3] Prakash, V.B. and Mukherjee, A.: *Inter. J. Pharmaceut. Clin. Res.*, 2: 23-27 (2010).
- [4] Sharma, R.K. and Dash, B., Agnivesa, *Charaka Samhita*, English Translation, Chaukhamba Sanskrit Series Office, Varanasi, Vol. IV: 101 (2000).
- [5] Soma dev, Chunamani, R. and Mishra, S.N.: *Commentary*, Chaukhamba Orientalia, Varanasi, 262 (2004).
- [6] Sharma S.: *Rasa tarangini*, Hindi Commentary, Shastri Kashinath, Motilal Banarasidas, Delhi. 517 (2000).
- [7] Upadhyay M.: *Ayurveda Prakasha*. Sanskrit-Hindi Commentary, Mishra, G.S., Chaukhamba Bharati Academy, Varanasi, 404 (1999).
- [8] Upadhyay M.: *Ayurveda Prakasha*, Sanskrit-Hindi Commentary, Mishra, G.S., Chaukhamba Bharati Academy, Varanasi, 405 (1999).
- [9] Rasa Vagbhata: *Rasa Ratna Samuchhaya*, Hindi Commentary, Shastri, A.D., Chaukhamba Sanskrit Series Office, 113 (1978).
- [10] Sharma S.: *Rasa tarangini*, Hindi Commentary, Shastri Kashinath. Motilal Banarasidas, Delhi. 518 (2000).
- [11] Punarnavadi M.: In: *The Ayurvedic Formulary of India - Part I*. Government of India, Ministry of Health and Family Welfare, Department of Indian Systems of Medicine & Homeopathy, New Delhi, 251-252 (2003).
- [12] Govind Das Sen: *Bhaishjya Ratnawali*, Chaukhamba Sanskrita Bhawan, (2006).
- [13] Acharya Jadavji Trikramji: *Siddha Yogya Sangrah [Hindi]*. Jhansi, India: Baidyanath Bhawan, XIIIth edition, (1935).