

A PHARMACEUTICAL & ANALYTICAL STUDY OF PUNARNAVA MANDURA

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ABSTRACT

Punarnava mandura is a much known Ayurvedic medicine which comprised iron and prescribed especially for anemia and common edema. *Mandura* notably increases the iron content of the body while *Punarnava* reduces the vascular load due to its diuretic¹ property. Other contents also help to break the pathogenesis of these conditions. Physician use *Punarnava mandura* in different illness with the change in *anupan*. During review of various available references of *Punarnava mandura* it was observed that authors have done somewhat changes in selection of drugs and their usable quantity due to some specific context. In this study every steps of pharmaceutical aspects of *Punarnava mandura* was explicated and after that by following a standard operative procedure, a suitable quantity of *Punarnava mandura* was prepared. Further the organoleptic character and physicochemical parameters of the medicine was also assessed. In this study it was found that nature of *Punarnava mandura* is slightly acidic and it comprised approximately 17.74% w/w of iron content.

Keywords: *Punarnava mandura*, *Mandura*, *Bhasma*.

INTRODUCTION

Ayurveda, the treasure of scientific knowledge of life, is the oldest system of medicine which has been nourishing the world with its empirical and scientifically established concepts since long. Ayurveda is a science of its kind which particularly promotes the healthy livings by dissemination of thousands of its impeccable and immortal ideas. It advocates following the natural phenomena of our *Panchabhautic* surroundings. The use of a natural remedy for the prevention and treatment of a variety of illnesses had started with the origin of life.

Punarnava mandura is a classical formulation comprises *Mandura bhasma* and many plants parts and

cow urine (*Gomutra*). Half of its whole contents comprise *Mandura bhasma* so it became popular as *Mandura kalpa*. It is used especially for Anemia (*Pandu roga*) and Swelling (*Sotha*).

Anemia is a condition that develops when your blood lacks enough healthy red blood cells or hemoglobin. There are many types of anemia and all are very different in causes and treatment. Iron deficiency anemia is the most common type and it is very treatable with diet changes and iron supplements².

Mandura is an ore of iron and chemically it is a mixture of ferrous & ferric oxide, carbon dioxide and oxygen. It may also contain basic ferrous & ferric car-

bonate. However for the practical purpose it may be considered as ferric oxide Fe_2O_3 ³.

First time *Agnivesh* mentioned this formulation in his book *Charaka samhita* in the treatment of *Pandu roga* (Anemia). It is prepared by taking 1 *Pal* (48 gm.) powder of every herbal drug separately i.e. *Punarnava*, *Trivrita*, *Vvyosha* (*Sunthi*, *Pippali*, *Marica*) *Vidanga*, *Devdaru*, *Citraka*, *Kustha*, *Haridra*, *Daruharidra*, *Triphala* (*Amalaki*, *Vibhitaki* & *Haritaki*) *Danti*, *Chavya*, *Indrayava*, *Pippali*, *Pippalimula*, *Musta* and *Mandura bhasma* two times of the total weight of powder; boiled in 1 *Adhaka* (6.4 lt.) of Cow urine. Other than *Pandu roga*, it is also indicated for various other conditions like Mal absorption syndrome (*Grahani*), Splenic diseases (*Pleeha roga*), Intermittent fever (*Vishamjwara*), Hemorrhoids (*Arsha*), Skin diseases (*Twaka roga*) and Worm infestation (*Krimi roga*)⁴.

Punarnava mandura is very useful in liver and kidney diseases also. It also helps to reduce edema (swelling) from various part of the body. By improving hemoglobin level in the blood and curing the different renal abnormalities, it cures chronic severe anemia generat-

ed edema also. It is very popular medicine for Ascities (*Jalodara*) also.

MATERIAL AND METHODS

Literary review:

A comprehensive review has been made to compile the various reference of *Punarnava mandura* to show diversity in formulary and therapeutic indications. The data available is presented in a systematic manner with reference to contents of the drug and their proportion.

Procurement of the ingredients:

For a standard finished product the raw materials should be of acceptable variety & standard. Except Cow urine every raw material either herbal or mineral (*Mandura*) was obtained from National Institute of Aurveda (NIA) pharmacy where certification of identity & purity are done by well-established standardization shell. Purification (*Sodhan*) & Incineration (*Marana*) of *Mandura* was also a part of this study and it was done in pharmacy of NIA. Fresh Cow urine was collected from nearby cowshed. Table 1 shows the ingredients, part and quantity used during preparation.

Ingredients for *Punarnava mandura*:

Table 1: Shows ingredients used in the preparation of *Punarnava mandura*

| S.No. | Ingredients | Part used | State of ingredients | Quantity |
|-------|--|------------|----------------------|----------|
| 1. | <i>Punarnava</i> (<i>Boerhavia diffusa</i>) | Root | Powder | 10 gm. |
| 2. | <i>Trivrita</i> (<i>Operculina turpethum</i>) | Root | Powder | 10 gm. |
| 3. | <i>Sunthi</i> (<i>Zingiber officinale</i>) | Rhizome | Powder | 10 gm. |
| 4. | <i>Pippali</i> (<i>Piper longum</i>) | Fruit | Powder | 20 gm. |
| 5. | <i>Marica</i> (<i>Piper nigrum</i>) | Fruit | Powder | 10 gm. |
| 6. | <i>Vidanga</i> (<i>Embelia ribes</i>) | Fruit | Powder | 10 gm. |
| 7. | <i>Devadaru</i> (<i>Cedrus deodara</i>) | Stem | Powder | 10 gm. |
| 8. | <i>Chitraka</i> (<i>Plumbago zeylanica</i>) | Root | Powder | 10 gm. |
| 9. | <i>Kustha</i> (<i>Saussurea lappa</i>) | Root | Powder | 10 gm. |
| 10. | <i>Haridra</i> (<i>Curcuma longa</i>) | Rhizome | Powder | 10 gm. |
| 11. | <i>Daru haridra</i> (<i>Berberis aristata</i>) | Stem | Powder | 10 gm. |
| 12. | <i>Amalaki</i> (<i>Phyllanthus emblica</i>) | Fruit rind | Powder | 10 gm. |
| 13. | <i>Haritaki</i> (<i>Terminalia chebula</i>) | Fruit rind | Powder | 10 gm. |
| 14. | <i>Vibhitaki</i> (<i>Terminalia bellirica</i>) | Fruit rind | Powder | 10 gm. |
| 15. | <i>Danti</i> (<i>Baliospermum Montanum</i>) | Root | Powder | 10 gm. |
| 16. | <i>Chavya</i> (<i>Piper chaba</i>) | Stem | Powder | 10 gm. |
| 17. | <i>Indrayava</i> (<i>Holorrhena antidysenterica</i>) | Bark | Powder | 10 gm. |

| | | | | |
|-----|-----------------------------------|--------------------------|----------|-----------|
| 18. | <i>Pippalimula</i> (Piper longum) | Root | Powder | 10 gm. |
| 19. | <i>Musta</i> (Cyperus rotundus) | Root | Powder | 10 gm. |
| 20. | <i>Mandura</i> | Bhasma (Incinerated ash) | Powder | 400 gm |
| 21. | <i>Gomutra</i> (Cow urine) | Cow's urine | Purified | 1.280 lt. |

Preparation of *Punarnava mandura*:

Procedure reference: AFI-1, Section19/1(Ch.S.-Chi.St.16/93-96)

Fresh and dried part of usable parts of every plant were powdered and sieved through 100 mesh sieve separately. Fine powder of usable parts of all plants were taken in big steel utensil in equal quantity i.e.10gm, *pippali* was taken in 20gm and mixed together properly. Thorough and continuous mixing of all ingredients is usually important to attain homogeneous mixture. A big iron utensil was taken and put it on flame. Exact quantity of fresh cow urine was poured in iron pot very safely. It was subjected to mild flame. After some time when cow urine got hot and vapors started, purified and incinerated *Mandura bhasma* was dredged in cow urine slowly. Stirring and mixing was done simultaneously to avoid the formation of lumps. This was continued till it became semisolid like a paste (*rasakriya*). This condition of *Pak* is called *Mandura paka*. At this stage of *Mandura paka*, utensil was taken down from flame; there after all fine powder of plants parts were mixed slowly. Stirring process was done continue to blend the whole powder in the paste of *Mandura* properly. After completion of mixing, the homogenous mixture was dried and thereafter sieved. Dried powder was collected and stored.

Organoleptic and Physicochemical study:

The finished product was evaluated for organoleptic and various physicochemical characters. Organoleptic characters such as color, odor, taste, and texture were analyzed and recorded. Physicochemical characteristics were analyzed by quantitative analysis of total ash, water soluble ash, acid-insoluble ash, pH and iron content as per the standard techniques.

Table 2: Shows description on *Punarnava mandura* in different classics

| S. No. | Name of Text | Ingredient | Formulary | Remarks |
|--------|--------------|--|-------------------|---------------------|
| 1. | Ag. | <i>Punarnava, Trivrit, Vyosh, Vidanga,</i> | Total quantity of | A.F.I. follows this |

Namboori Phased Spot Test (NPST)

Namboori Phased Spot Test is a qualitative analytical method that is used to identify the metals and minerals in their *bhasma* or in any herbo mineral preparations. For this evaluation a chemical treated whatman papers are exposed to the solution of subjects and the reaction between them are observed. In this reaction a picture or a spot of a color on the paper is emerged at different time interval successively. This emerging pattern is specific and particular. The study of this spot at different time intervals is known as the phased spot test⁵. Through this method presence of *Mandura bhasma* in the *Punarnava mandura* was shown in this study.

Preparation of Chemical Reacting Papers & *Punarnava Mandura* solution:

In the text, 2.5% potassium ferrocyanide solution treated whatman paper is recommended for identification of *Mandura bhasma* in any *Mandura bhasma* containing *Rasaoshadhi* (Herbo-mineral preparations). To prepare a *Punarnava mandura* solution, 0.25gm of *Punarnava mandura* sample was mixed with .5ml of 5% hydrochloric acid (HCl) reagent in test tube. Under specific conditions this solution are made.

RESULTS AND DISCUSSION

Review on *Punarnava mandura*:

Punarnava mandura, Punarnavadi mandura and *Mandura vataka* these are some name that have been given to this formulation by their authors in different classical text⁶. It was observed during review of literatures that authors have done some minimal changes in herbal drugs, their quantity and its therapeutic indications. Table No. 2 shows various references of *Punarnava mandura* and their formulary.

| | | | | |
|----|--------------------|---|---|---|
| | | <i>Devdaru, Chitraka, Kustha, Haridra, Daruharidra, Triphala, Danti, Chavya, Indrayava, Pippali, Pippalimula, Musta, Mandura, Gomutra.</i> | Herbal drugs- 20 Pal Mandura- 40 Pal Gomutra- 128 Pal | formulary ⁷ . |
| 2. | V.S. ⁸ | <i>Katuki</i> in place of <i>Pippali</i> (in place of one part) while other contents are as above. | Total quantity of Herbal drugs- 20 Part Mandura- 40 Part Gomutra- 1.6 Part | The authors of R.K. ⁹ , Sy. Y.S. ¹⁰ , also wrote this formulary. |
| 3. | V.M. ¹¹ | <i>Pushkaramula & Katuki</i> in place of <i>Kustha & Pippali</i> (in place of one part) while other contents are as above. | Total quantity of Herbal drugs- 20 Part Mandura-40 Part Gomutra- 160 Part | The authors of G.N. ¹² , Cd.N. ¹³ , B.R. ¹⁴ and A.S .S. ¹⁵ also wrote this formulary. |
| 4. | B.P. ¹⁶ | <i>Katuki, Shringii, Karvi, Yavani, Kataphala</i> are added in place of <i>Pippali</i> (in place of one part) & <i>Daruharidra</i> while other contents are as above. | Total quantity of Herbal drugs- 24 Part Mandura-48 Part Gomutra- 192 Part | The authors of V.C. ¹⁷ , V. N. R. ¹⁸ , R.R.Su. ¹⁹ and R.T.S. ²⁰ also wrote this formulary. |
| 5. | V.V. ²¹ | <i>Katuki</i> and <i>Karvi</i> are added in place of <i>Pippali</i> (in place of one part) & <i>Kustha</i> . <i>Punarnava</i> is doubled while other contents are as above. | Total quantity of Herbal drugs- 21 Part Mandura-42 Part Gomutra- 168 Part | |

Ag.- *Agnivesha*, V.M.- *Vrinda Madhava*, V.S.- *Vangasena*, G.N.- *Gada Nigraha*, Cd.N.- *Chakradatta-Nischalkara*, B.P.- *Bhav Prakasha*, R.K.- *Rasa Kamdhenu*, B.R.- *Bhaishajya Ratnavali*, V.C.- *Vaidya Chintamani*, N.R.- *Nighantu Ratnakara*, V. N.R.- *Vrihata Nighantu Ratnakara*, R.R.Su.- *Rasa Raja Sundera*, Rm.- *Rasa Manjari*, Sy. Y.S.- *Sidha Yoga Sangraha*, V.V.- *Vridhya Vaidyaka*, AFI- Ayurvedic formulary of India, PSAF.- Pharmacopial Standard of Ayurvedic Formulation A.S.S.- *Ayurveda Sara Sangraha*, R.T.S.- *Rasa Tantra Sara*.

By looking the above description, it is found that some herbal drugs that have been used in preparation of *Punarnava mandura* are different in some groups. In the reference of *Acharya Agnivesh*, the relative proportion of *Pippali* in the drug was double to other herbal ingredients. Some authors used *Katuki* in place of extra amount of *Pippali*, while some other

authors used some more other herbal drug in place of the extra amount of *Pippali* for making this drug. One more drug by this name but with different formulary is available in *Shool rogadohikara* of *Rasa Kamdhenu*²².

The quantity of cow urine used for preparation of *Punarnava mandura* is also different. In these different formularies the relative proportion of Cow urine was 6 times (approx.), 8 times and 1.5 times (approx.) to the total quantity of herbal drug.

Preparation of *Punarnava Mandura*:

It was observed that the whole mixture of *Punarnava mandura* was soft and brown in color. There was no any lump in the mixture. Dried powder of *Punarnava mandura* was smelled with cow urine intensively. Table 3 shows the measurements of *Punarnava mandura* during the preparation.

Table 3: Shows measurements during preparation of *Punarnava mandura*

| S.No. | Detail | Measurement | Remark |
|-------|-------------------------|-------------|---|
| 1. | Weight of final product | 720 gm | Process & handling loss is also included |
| 2. | Weight gain | 120 gm | |

Analytical, organoleptic and physico-chemical characterization:

Some preliminary and basic quality controlling parameters are important to assess the quality & genuineness of the formulation. General organoleptic character and other physico-chemical parameters such

as loss on drying, total ash, acid insoluble ash, water insoluble ash, pH and iron content was assessed. Namboori phased spot test was also used for their characterization. Standard methods were used during analysis. Table No. 4 shows results of organoleptic and physico-chemical assessment.

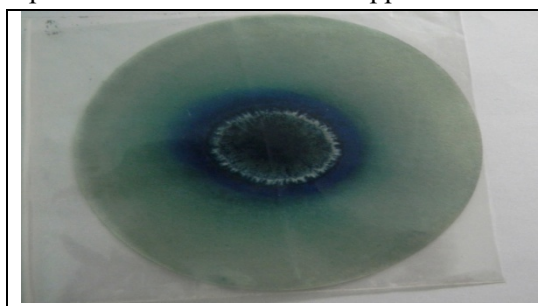
Table 4: Organoleptic and Physico-chemical properties of prepared *Punarnava mandura*

| S.No. | Character | Finding |
|-------|-----------------------|----------------|
| 1. | Colour | Brown |
| 2. | Odour | Like Urine |
| 3. | Taste | <i>Kashaya</i> |
| 4. | Texture | Soft |
| 5. | Moisture Content | 5.09% w/w |
| 6. | Ash | 53.42% w/w |
| 7. | Acid Insoluble Ash | 33.26% w/w |
| 8. | Water Soluble Ash | 2.96% w/w |
| 9. | pH of 5.0% W/V Slurry | 5.89 |
| 10. | iron content | 17.74% w/w |

Observation of reactions between solution of *Punarnava mandura* and chemical reacting paper:-

When a drop of clear solution of *Punarnava mandura* was put on the chemical reacting paper, a spot with a series of changes in colour and pattern appeared. Events are summarized below-

1. Dark center blue spot was found on the paper.
2. Like *Mandura bhasma*, sky blue or light blue colored serrated margin was seen in *Punarnava mandura* that was coalescing with dark center. Picture No. 1 shows the emerging spot of *Punarnava mandura* on chemical paper.

Picture 1: Shows the spot of *Punarnava mandura* appeared on chemically treated paper**Spot of *Punarnava mandura* appeared on chemically treated paper during NPST****CONCLUSION**

In Iron deficiency anemia (IDA) and any condition of swelling in the body, *Punarnava mandura* is a drug of choice. By studying every references of this formulation, it is apparent that whatever the name has

been assigned to all these preparations by the authors of different books, all are more or less similar in composition and therapeutic indications. One reference of *Punarnava mandura* that is depicted by the author of *Rasa kamdhenu* in *Shoola rogaadhikar*

is entirely different in composition. *Mandura bhasma* is the only ingredient used in largest quantity during the preparation of this drug so the name of this drug has been coined *Punarnava mandura*. Good quality of *Mandura* provides adequate percentage of iron to this drug. In this study it has been evaluated that approximately 17% w/w of iron content was present in *Punarnava mandura*. Appeared pattern on chemical reacting paper during Namboori phase spot test was similar to *Mandura bhasma*.

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