



Research Article

COMPARATIVE PHARMACEUTICO CHARACTERIZATION OF KANSYA BHASMA PREPARED WITH TRADITIONAL (PUTA) METHOD AND ELECTRIC MUFFLE FURNACE METHOD

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ABSTRACT

Metals are known and used as therapeutic agent since ancient time. Kansya is an important Mishra Loha, an alloy of Tamra (Copper) and Vanga (Tin) known since the period of Samhita kala. It is known as Bell Metal or Bronze. Formulations of 'Kansya' are beneficial in diseases like Krimi, Kushta etc. Therapeutic doses given for 'Kansya bhasma' range from ½ to 1 ratti (62.5mg. to 125mg) This study is planned to establish the utility and viability of Electric muffle furnace heating in bhasma preparation and documentation of Physico-chemical characteristics by performing a comparative study between Puta and Electric muffle furnace method for the preparation of Kansya bhasma. The other notable perspective of this study is that there is no standardization for Kansya mentioned in API. This study is also an effort to contribute to standardization of Kansya. Raw Kansya has 78% Copper and 22 % of Tin. After Samanya Shodana it comes to 72% of Copper and 19.58% of Tin. Further after Vishesh shodhana done with Gomutra it comes to 69.79% in case of copper and Tin 17.58%. Bhasma was prepared with two different methods as classical putra method and Muffle furnace method. In both cases 7 putra were administered. In traditional putra method Copper % after 1st putra was 66% and tin was 17.24% but after 7th putra it comes to 64.71% of copper and 16.01% of Tin. While in muffle furnace method it was 66.75 % in case of Copper and Tin was 16.25% after first incineration. After 7th incineration (Furnace method) Copper comes to 62.87% and tin comes to 14.25%.

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INTRODUCTION

Kansya is an important *Mishra Loha*, an alloy of *Tamra* (Copper) and *Vanga* (Tin) known since the period of *Samhita kala*. It is known as Bell Metal or Bronze. Very few references of *Kansya* are mentioned in *Charaka Samhita* and they are *Kansya paatra* (containers of bronze), *Vasti netra karnika dravya* (nozzle of enema pot), *Kansya bhajan* (*Kansya* vessels). *Kansya* has been mentioned in classics like *Rasendra Chudamani*, *Rasaratan Samuchyaya*, *Ayurveda Prakasha*, *Rasa Tarangini* etc. Formulations of 'Kansya' are beneficial in diseases like *Krimi*, *Kushta* etc. According to the description given in *Ayurveda Prakasha*, there are two varieties of *Kansya* viz. *Pushpa* and *Tailika*, only the former being acceptable for therapeutic applications. Such preparations are held to be safe, efficacious even in minute doses when manufactured and used following specified classical guidelines, does not lead to any significant untoward effects (Bhatt, 1992).

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The past decade, however, has witnessed concerns by the western scientific community, regarding the safety of *Ayurvedic* Herbal, Herbo-mineral and metallic preparations, which is a major concern for the age-old *Ayurvedic* heritage (Saper et al., 2004). During the process of *marana*, temperature variations are observed in the routine *Putra* system of heating according to the seasons due to variations in humidity and temperature. As *Putra* system is an open method, there is every possibility of loss of heat by which it require more energy to meet the loss. With Electric muffle furnace heating, the temperature patterns can be maintained according to the need with precision and minimum loss of energy as it is a closed system and above all chances of contamination are also less. Standardization mainly aims at reproducibility. For standardization it is necessary to document and reproduce the fixed patterns.

Objectives

To prepare *Kansya bhasma* with two different methods. *Kansya Bhasma* according to traditional method will be prepared with reference of procedure mentioned in *Ayurveda Prakasha*.

Physico-chemical characterization of *Kansya bhasma*. Comparative analytical studies between both the bhasma prepared by Muffle and *Putra* method. This study is an effort to contribute to standardization of *Kansya*.

REVIEW OF LITERATURE

Samhita Kala: Dhatus

In Rasakala

Rasendra Chudamani - (14/ 174-179) (Acharya Somadeva, 2004)

Shreshta and *Nikrishta Kansya lakshana* has been mentioned along with the procedure of *shodhana* and *marana*.

Rasa Prakasha Sudhakara- (4/ 112-115) (Bhatt Yashodhara, 1998)

Kansya Nirmana- Kansya is prepared by melting four parts of Copper in one part of Tin.

Rasaratan Samuchyaya- (5 /205-212) (Acharya Vagbhatt, 2011)

Kansya Nirmana Vidhi- Eight parts of *Tamra* and two parts of *Vanga* are heated and melted together to obtain *Kansya*. *Grahya Kansya-* Sample of *Kansya* having *Teekshana Shabdham* (sharp sound), *Mridu* (soft), *Snigdha* (smooth to touch), *Eshat Shayamalam* (slightly grayish), *Shubhram/Nirmalam* (without impurities), *Dahe raktam*(turns red on heating) is preferred for therapeutic purposes.

Ayurveda Prakasha- (4 /64-65, 75-80) (Shree Madhava et al., 2007)

Kansya Properties

Kashaya (astringent), *Tikata* (bitter), *Ushna* (hot), *Lekhana* (scrapping), *Vishada* (non-slimy), *Saram* (mobile), *Guru* (heavy), *Netrahitam* (useful foreyes), *Ruksham* (dry), *Kaphapittahara* (alleviates *Kapha* and *Pitta*).

Pushpa and *Tailika* are the two varieties of *Kansya*. *Pushpa Kansya* is *Shwetatam* (white) and *Grahya*. *Samanya Shodhana* of *Kansya- Kansya patra* are heated on fire and quenched thrice in the following media *Taila*, *Takra*, *Gomutra*, *Kanji* and *Kulattha kwatha*. *Vishesh Shodhana* of *Kansya - Kansya patras* are heated at a high temperature in cow's urine for one *prahara*. *Kansya Marana* – *Gandhak* is grinded in *Arka* milk and this paste is applied on *Kansya patras*. The heat of *Gaja Putra* is supplied and *Kansya bhasma* is obtained after two *Putra*.

METHODOLOGY

Requirement of the analytical procedures in *Ayurvedic* drug is at three stages

- Analysis of the raw material
- Analysis of the material in process
- Analysis of the end product

Samples taken

- Raw *Kansya*
- *Shuddha Kansya* –

Samanya Shodhita

Vishesha Shodhita

Marita Kansya

- *Kansya Bhasma* by *Putra*
- *Kansya Bhasma* by Muffle furnace

Analysis of media before and after the process of *Shodhana*.

Methods Opted For Analysis

- Organoleptic methods
- *Niruttha Pariksha*
- *Apunarbhava Pariksha*
- Physico-chemical parameters of three samples of *Bhasma*
 - Loss on drying,
 - Ash value
 - Acid insoluble ash
 - Water soluble extract
 - Carbon disulphide soluble extractive
- Physico-chemical changes in the liquid media before and after the process of *Shodhana*
- Namburi Phased spot test
- Estimation of copper content
- Estimation of Tin content
- Particle size distribution
- FTIR

Samanya Shodhana

Ashuddha Kansya - 2 kg, *Tila Taila* -20.5 ltr (for 3 times), *Takra* -20.5 ltr (for 3 times), *Gomutra* -20.5 ltr (for 3 times), *Kanji* - 20.5 ltr (for 3 times), *Kulattha Kwatha* -20.5 ltr (for 3 times) and *Nirvapa Vidhi* was used for this procedure. Iron vessels, steel vessels, charcoal burner, cow dung cakes, electric blower, measure glass, pyrometer, weighing balance, holder etc were used.

Ashuddha Kansya and other ingredients used for *shodhana* were procured from the Pharmacy Desh Bhagat Ayurvedic Pharmacy Mandi Gobindgarh. *Ashuddha Kansya Patra* was kept in iron vessels and heated till it gets red hot. Then it was plunged into water and after washing it was dried. *Ashuddha Kansya Patra* were cut into small pieces of 2" -3". 1 kg of *Kansya Patra* was kept in iron vessel and heated in charcoal burner till red-hot. On becoming red-hot it was quenched in vessel containing *Tila Taila* and was collected on cooling for another processing. Likewise the process of heating and dipping was repeated for 3 times by using fresh oil in each process. Remaining quantity of *Tila Taila* was measured in every *Nirvapa*. Temperature of fuel and *Kansya* were noted by using pyrometer. The same procedure was followed in *Takra*, *Gomutra*, *Kanji* and *Kulattha Kwatha* 5gm of *Samanya Shodhita Kansya Patra* were kept as sample and remaining portion was subjected for further processing of *Vishesha Shodhana*.

In *vishesha shodhita* procedure *Samanya Shodhita Kansya* was taken 1800 gm, Fresh *Gomutra* - 3 liters and process followed was *Swedana Vidhi* and after 2 days of *swedana* 1.750gm of *vishesha Shodhit Kansya* was recovered.



Figure 3. Top Container- *Kansya Bhasma* prepared by Muffle Furnace Bottom - *Kansya Bhasma* prepared by *Puta*

Observational Results

Table 1. Organoleptic features of *Kansya* before and after *Shodhana*

Before <i>shodhana</i>	After <i>shodhana</i>	Loss in weight
2kg	1.8kg	0.20kg

Table 2. *Puta* Method (*Puta* 1)

SR.No.	PARAMETER	UNIT
1	Copper	66%
2	Tin	17.24%

Table 3. *Puta* 1(Particle size)

SR.No.	Particle Size (µm)	Results (µm)
1	d(10)	29.92
2	d(50)	376.5
3	d(90)	1002
4	Average	443.0

Table 4. *Puta* 7

SR.No.	Particle Size (µm)	Results (µm)
1	d(10)	1.759
2	d(50)	10.71
3	d(90)	64.30
4	Average	22.23

Sample B: Muffle Furnace Method

Table 5. Muffle 1

SR.NO.	PARAMETER	UNIT
1	Copper	66.75%
2	Tin	16.25%

Table 6. Muffle 1 (Particle Size)

SR.No.	Particle Size (µm)	Results (µm)
1	d(10)	1.876
2	d(50)	8.615
3	d(90)	22.32
4	Average	10.15

Table 7. Muffle 7 (Particle Size)

SR.No.	Particle Size (µm)	Results (µm)
1	d(10)	1.736
2	d(50)	9.161
3	d(90)	34.23
4	Average	12.18

Table 8. Organoleptic features of *Kansya* before and after *Shodhana*

SR. No.	Features	Before <i>Shodhana</i>	After <i>Shodhana</i>
1	Colour	Golden Brown	Pale Black
2	Odour	Metallic	Smoky
3	Appearance	Hard and Solid	Crusty

Table 9. Comparative physicochemical analysis between *Kansya Bhasma Puta* Method and *Kansya Bhasma* Muffle Method

Sr.no.	Parameters	Puta Method	Muffle Method
1.	LOD	1.28	1.98
2.	Ash Value	92.15%	87.45%
3.	Acid Insoluble Ash	6.11%	7.10%
4.	Water Soluble Ash	17.46%	18.95%
5.	pH	5.62	5.69
6.	Specific gravity	1.001	1.052
7.	Carbon disulphide soluble extractive	1.119%	1.008%

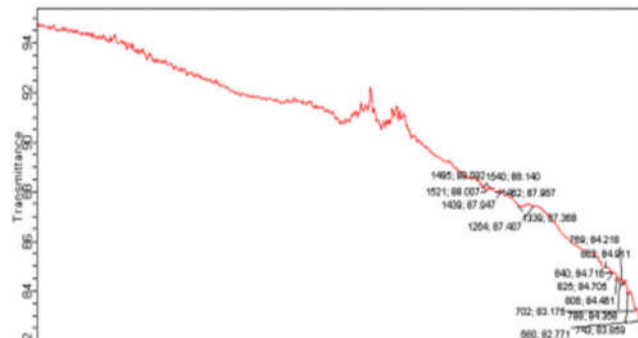
Table 10. Average pH value of media utilized for *Shodhana*

Media	Before	After
<i>Til Taila</i>	6.65	6.07
<i>Takra</i>	3.9	4.1
<i>Gomutra</i>	7.9	8.4
<i>Kanji</i>	2.6	3.9
<i>Kulattha kwatha</i>	6.7	7.7

FTIR OF KANSYA BHASMA

Report 1

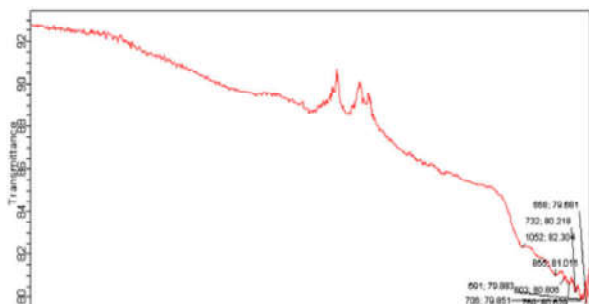
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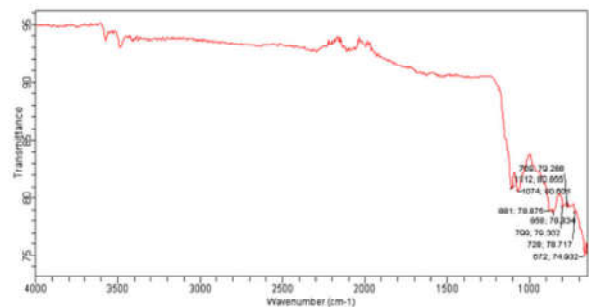
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 Sample Scans: 32 Resolution: 8 cm-1
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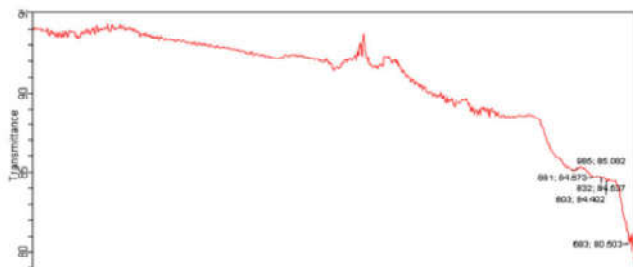
Report 3

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 Range: 4,000.00 - 650.00 Apodization: Happ-Genzel
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Report 4

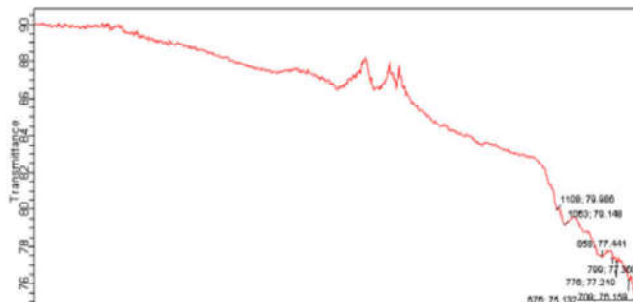
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 Sample Scans: 32 Resolution: 8 cm-1
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Report 5

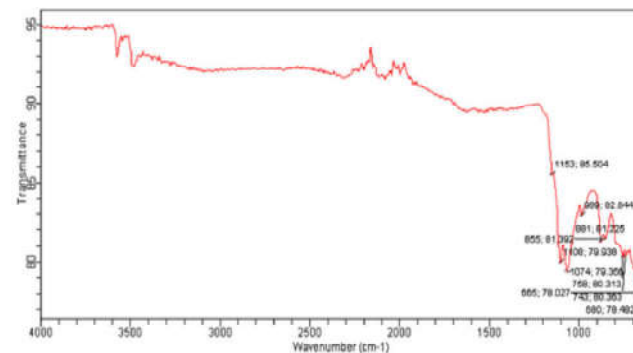
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File Location: C:\Program Files\Agilent\MicroLab
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Report 6

Sample ID: Kansya Bhasma Muffle 7
 Sample Scans: 32 Resolution: 8 cm-1
 System Status: Good User: admin
 Date/Time: 8/12/2015 02:45:12 PM Background Scans: 32
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Summary

- The present study entitles - "Comparative Pharmaceutico Characterization of Kansya Bhasma prepared with Traditional (Putra) method and Electric Muffle Furnace method"
- Raw materials required for the study were procured from the local market and authenticated from the institution, K.L.E.s University. The procedure like *Shodhana* and *Marana* are carried out in *Rasashala* of P. G. department & at our college pharmacy.
- Preparation of *Kansya Bhasma* done as per textual reference of *Ayurveda Prakasha*.
- The necessary qualitative & quantitative analysis during procedure was done at International Testing Centre and HHRC Amritsar.
- A comparative study between traditional and modern method has been documented

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