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COMPARATIVE PHARMACOCEUTICO-ANALYTICAL AND ANTIMICROBIAL ACTIVITY OF KASHIS BHASMA PREPARED ACCORDING TO TRADITIONAL METHOD AND FURNACE METHOD

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ABSTRACT

Ayurveda has been the greatest emphasis to comprehensive knowledge of drugs including identification, procurement, processing preservation, dispensing of prepared drugs under a board heading known as *Rasashashtra* and *Bhaishajya Kalpana*. *Kasis* is used in various preparation such *Rajpravartini vati*, *Hingwadi taila*, *Jatyadi ghruta*, *Bruhat Chintamani Rasa*. In modern science *Kasis* is Ferrous Sulphate [FeSO4,7H2O] and also known as Green Vitriol, Copper as a melantrite mineral. The research work entitled, Comparative Pharmaceutico-analytical and antimicrobial activity of *Kasis bhasma* prepared according to traditional method and furnace method. These preparations are unique in nature. *Rasashastra* deals with mostly *Khanija dravyas* i.e Metals and Minerals and *Bhaishjaya kalpana* deals with mostly Herbal Medicinal plant. Among this *Kasis* is a *Uparasa* and it was known to India long back. In modern science Kasis is Ferrous Sulphate [FeSO4,7H2O] and also known as Green Vitriol,

Copper as a melantrite mineral. In ayurveda kasis is classified into two types:-i] Valuka kasis. ii] Pushpa kasis.Valuka kasis is like sand, with greenish and slightly yellowish in colour, while the pushpa kasis is in small crystalline form with bright green colour, according to the reference the pushpa kasis is of ghrahya type and used for medical purpose. Hence pushpa kasis is selected to prepare bhasma.

KEYWORDS: Kasis Bhasma, Traditional Method, Furnace Method.

AIMS AND OBJECTIVES

a) To prepare kasis bhasma according to traditional method following standard operating procedure.

b) To prepare *Kasis bhasma* in furnace method under controlled conditions like same batch, size, temperature, *bhavana sanskara* etc.

c) To compare physio-chemical properties of *Kasis bhasma* prepared by traditional method and from furnace method.

d) To compare the Anti-microbial activity of the *Kasis bhasma* prepared by both methods.

INTRODUCTION

Ayurveda is an ancient time tested indigenous system of medicine. In ayurveda now a days *Rasashastra* and *Bhaishajaya kalpana* is known for the Herbo-mineral preparation. *Bhasmas* are prepared from purified minerals, metals and marine and animal products. Properly incinerated metals may be absorbed and assimilated by body easily. Their proper uses eradicate all types of chronic ailments and their prolonged uses in proper dose provide strength and immunity to body.

According to *Acharya Charaka* and *Sushruta, Kasis* was used in several diseases as a therapeutic agent such as *Keshya, Netrya, Kandughna, Vishpranuta, Mutraashmari, Kshvitra* etc. *Kasis* is used in various preparation such *Rajpravartini vati, Hingwadi taila, Jatyadi Ghruta, Bruhata Chintamani Rasa*. In modern science *Kasis* is Ferrous Sulphate [FeSO4,7H2O] and also known as Green Vitriol, Copper as a melantrite mineral.

In *Ayurveda Kasis* is classified into two types; i] *Valuka Kasis* & ii] *Pushpa Kasis. Valuka Kasis* is like sand, with greenish and slightly yellowish in colour, while the *Pushpa Kasis* is in small crystalline form with bright green colour, according to the reference the *Pushpa Kasis* is of *Ghrahya* type and used for medical purpose. Hence *Pushpa Kasis* is selected to

prepare *bhasma*. In "*puta*" process "*Supakarm*" makes the medicine acceptable form for better assimilation of drug. The crude form of *Kasis* contains iron along with various other metals and minerals which if taken without purification may produce various toxic effects within the body like palpitation, insomnia, burning sensation etc.

Here, *Kasis* is used to observe the changes taking place during Marana process by changing the source of heat i.e. traditional method and Muffle Furnace method. It is helpful for better understanding of the process and the state of final product and further to know antimicrobial activity.

MATERIAL AND METHODS

Study includes preparation of *Kasis bhasma* by traditional method and by muffle furnace method. Shuddha Kasis, Bhringaraja Swarasa, Nimbu Swarasa was procured from GMP certified pharmacy. In preparation of *Bhringaraja Swarasa* 1000 ml of *Bhringaraja Swarasa* was obtained from of 1 kg fresh *Bhringaraja Panchanga*. In *Kasis Shodhana*, according to *Rasatarangini* 21 / 230, total 50 gm weight loss was found in Traditional method and 50 gm weight loss was found in Furnace method and *Marana* of *Kasis*, according to Rasatarangini 21 / 255-258 was done. Present study was conducted by following 3 steps -

A) Raw material Standardization

B) Process Standardization

C) Finished Product Standardization

A) Raw Material Standardization

1. Authentication of Raw *Kasis*.
2. Authentication Of *Bhringraja* (Eclipta alba)

B) Process Standardization

1. Pilot Study
2. Main Process (For this study) - It includes following steps,

a) Kasis Shodhana by *Rasatarangini*.

b) Kasis Marana by *Puta* (Traditional) method, *Rasatarangini*.

c) Kasis Marana by Muffle Furnace method.

C) Finished Product Standardization

1] *Ayurvedic Bhasma Parikshas*

1. Kasis Bhasma (Traditional method)

2. Kasis Bhasma (Furnace method)

2] Organoleptic test

a) Raw *Kasis* by *Shoddhit Kasis*

b) Kasis Bhasma (Traditional method)

c) Kasis Bhasma (Furnace method).

3] PH test

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

4] Total Ash Value

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

5] Water Soluble Ash

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

6] Acid Insoluble Ash

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

7] Scanning of Electron Microscope

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

8] X-Ray Diffraction

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

9] Thermo Gravimetric Analysis

a) Raw *Kasis*

b) Shoddhit Kasis

c) Kasis Bhasma (Traditional method)

d) Kasis Bhasma (Furnace method)

OBSERVATION AND RESULT

A) Analysis of Raw (*Ashuddha) Kasis*

1) Organoleptic test: (Physical analysis) - Raw material procured from local market. It was found in small crystals having greenish colour. It was having typical *Loha Gandha* which indicates the compound of Iron and Sulphur. Water gets evaporated while giving heat, light weighted which can be broken into pieces with a light touch.

Sr. No.	Organoleptic characters of *Kasis*	Result by Traditional method	Result by Furnace method
1	Colour	Reddish brown	Reddish brown
2	Smell	Odourless	Odourless
3	Consistency	Fine	Fine
4	Taste	Tasteless	Tasteless

2) PH of *Kasis Bhasma*

	Kasis Bhasma by Traditional method	*Kasis Bhasma* by Furnace method
PH	3.53	3.56

3) Ash Values & Iron content of *Kasis Bhasma*

	Result by Traditional method % w/w	Result by Furnace method % w/w
Total Ash value	89.38%	92.38%
Acid insoluble Ash	21.42%	24.22%
Iron content	74.47%	57.68%

4) *Rekhapurnatvam Bhasma Pareeksha* of *Kasis Bhasma*

	Result by Traditional method	Result by Furnace method
Rekhapurnatvam	When a *Bhasma* is spread between the index finger and thumb and rubbed, it is so fine as to get easily into the lines and crevices of the fingers and is not be washed out from the lines of the fingers.	When a *Bhasma* is spread between the index finger and thumb and rubbed, it is so fine as to get easily into the lines and crevices of the fingers and is not be washed out from the lines of the fingers.

5) Antimicrobial analysis of *Kasis Bhasma*

Traditional method	
E. coli	13 mm
Furnace method	
E. coli	12 mm

DISCUSSION

A) Traditional method - According to *Rasatarangini, Kasis* should be triturated with *Nimbu Swarasa* & *Kanji* & prepared its *Chakrika* and let them dry. Close these in *Sharava Samputa* and apply *Puta* heat using *Vanyotpalas*. Repeat the *Puta* heating till its *Bhasma* becomes free from sour taste and develops red colour like *Gairika*.

In this process, *Kasis* was triturated with *Nimbu Swarasa* & *Kanji* for about 6 hours, before every *Puta* process, till it became thick paste to prepare *Chakrika*, *Chakrika* having 2 cm in diameter and 1 cm in thickness approximately. Because every particle should get adequate heat for incineration. Then *Chakrikas* were allowed to dry under sunlight, for drying of *Chakrikas*, it took long time. It may be because *Kasis* i.e. Ferous Sulphate contains water of crystallization and it has tendency to absorb moisture and *Chakrika* should be dried well, because wet *Chakrika* after subjecting to *Puta* causes blackening of *Bhasma*. In *Kasis Bhasma vishishta Varna (Gairika)* is the main test. After drying of *Chakrika, Sharava Samputa* was done and subjected 10 *Puta*. *Vanyotpala* was taken for the *Puta*.

Kasis Bhasma (Traditional method) required 4 *Putas* to pass the *Bhasma Pareekshas* completely or satisfactorily.

B) Furnace method - For *Kasis Marana* by Furnace method, *Shodhana* process was done same as of done in Traditional method. In this process, out of 1000 gm of *Ashuddha Kasis*, it was observed eat 30 gm loss found after *Shodhana* of *Kasis*. Total 1 litre of *Bhringaraja Swarasa* was used for three *Bhavana* to *Kasis*. The loss may be due to some amount of material was lost during trituration in *Khalvayantra* and was also sticked in the surface of the *Kalvayantra*. It may also be due to evaporation of water content from the *Kasis*, when it was subjected to sunlight for drying.

For *Marana* process (furnace method). *Kasis* was triturated with *Nimbu Swarasa* for about 6 hours, before every puta process, till it became thick paste to prepare *Chakrika*. Chakrika having 2 cm in diameter and 1 cm thickness approximately. Because every particle should get adequate heat for incineration. Then *Chakrikas* were allowed to dry under sunlight, for drying of *Chakrikas*, it took long time. It may be because *Kasis* i.e. Ferrous Sulphate contains water of crystallization and it has tendency to absorb moisture from air.

After drying of *Chakrika*, it was placed in *Musha* i.e. crucible. While putting *Chakrikas* inside the crucible, it was left 1/3 portion empty on the top. Crucible containing *Chakrikas* placed inside the Muffle Furnace. The door of Muffle furnace then closed tightly.

Kasis Bhasma (Furnace method) required 2 *Putas* to pass the *Bhasma Pareekshas* completely or satisfactorily.

CONCLUSION: On the basis of Observations and Discussion, conclusion was drawn as follows

1. Kasis Bhasma Preparation according to Traditional and Furnace method requires 2 and 2 Putas respectively, thus it can be concluded that Furnace method achieves *Bhasma Pareeksha* earlier than Traditional method due to concealed heating.

2. According to organoleptic test it can be concluded that both the methods achieve expected qualitative parameters as per classical texts.

3. PH of *Niramla Kasis Bhasma* prepared by Traditional method was 3.53 and of Furnace method was 3.56, thus it can be concluded as, acidic nature of the *Shuddha Kasis* was reduced markedly in Traditional method.

4. Total ash value of *Kasis Bhasma* by traditional method 89.38% and by furnace method was 92.38%.

5. Acid insoluble ash value of *Kasis Bhasma* by traditional method 21.42% and by furnace method was 24.22%.

6. On the basis of observations of X-Ray Diffraction, it is concluded as Raw *Kasis* consist of Ferrous Sulphate (FeSO:7H:O) while in *Kasis Bhasma* Traditional method showed mixed phases of Ferrous Sulphate and Ferric Oxide (Fe_2Os).

7. From this it can be concluded that, *Kasis Bhasma* Traditional method and *Kasis Bhasma* Furnace method both have structure of Fe:0, and average grain size is smaller in *Kasis Bhasma* traditional method than in *Kasis Bhasma* furnace method.

8. Antimicrobial analysis of *Kasis Bhasma* against E. Coli by Traditional method was 13 mm and by Furnace method was 12 mm.

9. From this it can be concluded that weight loss was significant in Raw and *Shuddha Kasis*, where it shows the need of further processing i.e. need of *Puta*.

10. On the basis of observations, it can be concluded that *Kasis Bhasma* prepared by Furnace method is better than Traditional method due to concealed and controlled healing.

11. After clinical validation of efficacy of the *Kasis Bhasma* prepared by Furnace method, this method could be used in order to reduce batch to batch variation in the end product.

REFERENCES

1. Sharma S. Rasa Tarangini, 11th Reprint edition, New Delhi: Motilala Banarsidas, 2009.
2. Morbale Mangal Sunil, Herwade Ajitkumar Shantinath. Concept of Shodhan [Purification Process]. International Ayurvedic Medical Journal, 2015; 3(9): 1-4.
3. Shri Brahmashankar Mishra, Shri Ruplalji vaishya, Bhavaprakasha Nighantu, Vol.1, Chaukhambha Sanskrit Bhawan, Varanasi, 12th edition, 2016.
4. Shri Brahmashankar Mishra, Shri Ruplalji vaishya, Bhavaprakasha Nighantu, Vol.1, Chaukhambha Sanskrit Bhawan, Varanasi, 12th edition, 2016. www.ferroussulphate.wikipedia.org.net
5. Ayurvedic Formulary of India, Part- I, Part A, Formulation, Edition-2nd, Government of India, Ministry of Health And Family Welfare, Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi, 2003.
6. Santoshkumar Sharma [Khandal], Textbook of Rasashastra & Bhaishajya Vigyana, Jaipur Prakashan, Jaipur, Reprint.

7. Siddhinandan Mishra, Textbook of Rasashastra & Bhaishajya Vigyana, Chaukhambha Prakashana, Reprint.
8. Sadananda Sharma, Rasa Tarangini, Kashinath Shastry ed. New Delhi, Motilal Banarasidas publication, adhyaya 2nd, Shlok no. 52, Reprint, 2000.
9. Vagbhatacharya, Rasa Ratna Samuchchaya, Kaviraja Ambikadanta Shastri, Varanasi, Chaukhambha Amarabharati Publication, adhyaya 5th, Shlok no. 29, 9th edition, 1995.
10. Sadananda Sharma, Rasa Tarangini, Kashinath Shastry ed. New Delhi, Motilal Banarasidas publication, adhyaya 2nd, Shlok no. 49, Reprint, 2000.
11. Sharma S. Rasatarangini, Motilal Banarasidas, New delhi, Reprint, 11th edition, 2009.
12. Shri Brahmashankar Mishra, Shri Ruplalji vaishya, Bhavaprakasha Nighantu, Vol.1, Chaukhambha Sanskrit Bhawan, Varanasi, 12th edition, 2016.
13. Sharangadhara, Sharangadhar samhita; Madhyama khanda 9/169-172, with Jivanprada commentary, edited by Dr. Smt. Shailaja Srivastava, 4th Ed. Varanasi, Chaukhamnha Orientalia, 2005; 237.
14. Bhagwata Govinda Padacharya, Rasa Hridaya Tantra, Mugdhavabhodhini hindi commentary by Acharya Chaturbhuja Mishra, 2nd ed. Kalera, Ajmer, Krishna Gopal Ayurveda Bhawan, 2002.
15. Mishra S. Rasa Prakash Sudhakara of Yashodhara, 2nd edition, Varanasi: Chaukhamba Orientalia, 1998.
16. Acharya Ananthadev Suri, Rasa Chinthamani, siddhi pradha commentary by Dr. S.N.Mishra, 1st ed. Varanasi, Chaukhambha orientalia, 1990.
17. Shalinatha. Rasa Manjari, reprint edition, New Delhi: Chaukhambha orientalia, 2006.
18. Acharya Dundukanatha, Rasendra Chinthamani, siddhi pradha commentary by Dr. S.N.Mishra, 1st ed. Varanasi. Chaukhambha orientalia, 2000.
19. Shastri A. Rasendra Sara Sangraha, Ist edition, Varanasi: Chaukhamba Sanskrit Series Office, 1994.
20. Shastri JK. Rasa Kamdhenu of Chudamani, Reprint edition, Varanasi: Chaukhamba Orientalia, 1992.
21. Sharma S. Rasa Tarangini, 11th Reprint edition, New Delhi: Motilala Banarsidas, 2009.
22. Mukharjee B. Rasa Jala Nidhi, Vol.1-5, 3rd edition, Varanasi: Chaukhambha publishers, 1998.
23. Joshi D. Rasamritam, Loha Vijnaniyam, Ist edition, Varanasi: Choukhambha Sanskrit Bhawan, 1998.
24. Chunekar KC. Bhav Prakash Nighantu, Varanasi: Chaukhambha Bharati academy, 2002.

25. Dev Nath Singh Gautam, An Ayurvedic literature review on therapeutic potentials of Kasisa, International Research Journal of Pharmacy, ISSN 2230-8407, 2018; 9(1): 1-5. www.irjponline.com.
26. Chandrabhushan Jha, Ayurveda Rasashastra, Chaukhambha Surabharati Prakashan, Edition, 2007.
27. Vaidya Jadavaji Trikamji Acharya, Chakrapani, Charaka Samhita by Agnivesa, Sutrasthana, adhyaya 1st, Shlok no. 71, Chaukhambha Publications, New Delhi, Reprint 2017.