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Research Article

STANDARD MANUFACTURING PROCESS OF ABHRAKA BHASMA - A PHARMACEUTICAL STUDY

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ABSTRACT

Abhraka (Biotite) is an important and potent mineral used in Ayurvedic pharmaceutics for different therapeutic purposes since long back. Different pharmaceutical processes are incorporated to make Abhraka suitable for medicinal purposes. Among the pharmaceutical processes shodhana (purification) and marana (calcination) are significant. These pharmaceutical processes lead physico chemical changes in the Abhraka (Biotite) that makes it therapeutically suitable. In this paper an attempt has been made to study the standard operative procedure for the preparation of Abhraka bhasma.

Keywords: Abhraka, Bhasma, Shodhana, Marana, Calcination.

INTRODUCTION

Metals and mineral preparations are in frequent use in Indian system of medicine since long back without any untoward effects. They have innate qualities like quick action, lesser dose, tastelessness, prolonged self-life & better palatability[1]. Due to these qualities metallic preparation has given a unique, comprehensive health care approach to Indian system of medicine for serving as global medical system. These metallic preparations are usually used in the form of bhasma. In the present era there is a large hue & cry among modern scientific community especially of western countries, about their toxicity. This is largely because of ignorance about the rationality of the methods of processing's of these bhasma preparations before they are used in therapeutics.

In Ayurvedic pharmaceutics the process of Shodhana (purification) has its importance because the dravyas used for medicinal purposes are of metal, mineral, vegetable and animal origin. So the process of Shodhana (purification) is an essential to remove the external impurities as well as to make the drug ready for other pharmaceutical processes. It is a process of purification and detoxification by which physical and chemical blemishes and toxic materials are eliminated & substances are subjected for further processing. Marana[3] (Calcination) is a process of heat treatment of Shodhit (Purified) material at different temperature pattern known as Puta[4] which convert it into Bhasma (ashes) form which is therapeutically accepted form. Abhraka (Biotite) is an important mineral used for medicinal purposes since long back in many diseases in the form of Bhasma[5].

MATERIALS AND METHOD

First of all black color abhraka (biotite) was procured from Ayurvedic Pharmacy, I.M.S., B.H.U. and subjected to fire test for finding out its quality. For this test, measured quantity of Abhraka was heated strongly for 15-20 minutes. The sample was found unchanged in this test were selected for Shodhana purpose.

Apart from Abhraka, Triphala kwath (decoction), Kanjii (sour gruel), Paddy, juice of leaves of Arka were collected and prepared as per classical methods.

Process validation of a Shodhana(Purification) of Abhraka

Shodhana of was carried out by Nirvapa (heating and quenching)[6]. Triphala kwath was prepared per the reference Sharangadhara Samhita[7]. 2 Kg of Abhraka was heated in an iron pan to red-hot stage and quenched in each liquid media for 7 times. Abhraka flakes were turned up & down with metal tongs to given equal exposure of heat to both the surfaces. It was done in regular intervals and was quickly quenched into the media with the help of metal tongs when the Abhraka flakes reached at the stage of red hot. After complete

immersion of Abhraka into media the media was separated by filtering it through iron sieve and soft pieces of Abhraka were collected in an iron pan to subject it for next nirvapa. Temperature at the time of red-hot stage was taken by a thermocouple. Each time, liquid media was taken fresh.

Process validation of a Dhanya Abhraka

Shodhit Abhraka was further subjected to the process of Dhanyabhraka as per reference of Rasa Ratna Sammucchaya [8]. Shodhit Abhraka and its ¼ quantity of Dhanya was mixed together. The mixture was transposed on Jute cloth and a pottali was tied with the help of a jute yarn. This Pottali was dipped into Kanjii kept for 3 days. After three days the bag is massaged inside the Kanjii so that fine powder of Abhraka exudes out through the pores of the bag and collects in the vessel. This is later taken out and dried in sun. Fine shining powder of biotite thus obtained is called Dhanyabhraka.

Process validation of Abhraka marana

Abhraka Bhasma was prepared as per the reference of *Ayurveda Prakash* [9] by the principle of *Puta* (incineration) in an Electrical Muffle Furnace (EMF). First 500grams of Dhanyabhraka was weighed and was levigated with juice of leaves of Arka (Calotropis procera). After levigation pellets of uniform size & shape were made. Pellets were kept on plastic sheets for drying under sunlight. Dried pellets were kept in sarav (Silica casserole) and covered with another one and put in electric muffle furnace for heat treatment. Temperature of 900^0 for 45 minutes was maintained in each puta. Process was repeated for 24 times. Finally Brick red color bhasma was obtained.

OBSERVATIONS AND RESULTS

During the shodhana process after each nirvapa, the crammed structure of Abhraka was destroyed to from small pieces & particles due to increased brittleness. It was observed that on complete Shodhana fine Abhraka particle start floating in air & more to long distance from the place of Shodhana. It takes 25 – 30 minutes to reach at red hot stage. Result after shodhana is tabulated in table 1 .Temp pattern during each nirvapa, time duration for each nirvapa and amount of Triphala Kwath consumed during each nirvapa are explained respectively in table 2, 3 and 4. Result of dhanyabhraka process is given in table 5.

Summary of complete marana process, time & temperature schedule used for abhraka marana, weight of pellets before and after bhavana (levigation), organoleptic character during abhraka marana are tabulated from table 6 to 9. Result of Bhasma pariksha (examination) as per view of ancient texts is given in table 10.

Table 1: Showing result after Shodhana process

Media	Initial wt. in grams	Final wt. in grams	Loss in grams
Triphala Kwath	2000	1820	180

Table 2: Showing Temp. Pattern during Nirvapa process

Nirvapa	Charcoal (^{0}C)	Vessel (^{0}C)	Abhraka (^{0}C)
1	1040	910	835
2	1040	915	825
3	1025	910	825
4	1030	900	820
5	1025	910	820
6	1010	895	820
7	1020	890	822
Mean	1027.14	903.28	823.86

Table 3: Showing time duration in each Nirvapa process

Nirvapa	Time taken in minutes
1	30
2	35
3	35
4	45
5	45
6	55
7	55
Mean	42.86

Table 4: Showing amount of Triphala Kwath consumed during Nirvapa process.

Nirvapa	Total Triphala Kwath Taken (in ml)	Remaining (in ml)	Loss (in ml)
1	3000	800	700
2	4000	1100	900
3	5000	1200	1300

4	5000	1000	1500
5	6000	1400	1600
6	7000	1200	2300
7	7000	1000	2500
Mean	5285	2257	3026

Table 5: Showing yield after the process of dhanyabhrak

Shodhit Abhraka (gms)	1800
Dhanya (gms)	450
Kanji (ml)	8000
Dhanyabhraka yield (gms)	1530
Loss (gms)	270

Table 6: Showing the complete Marana process of Abhraka Bhasma

Duration of Levigation	Total no of Putas	Temperature	No of days during one Puta
7 Hrs/Puta	24	900 ^{0}C temperature maintained for 45 min	3 days/Puta

Table 7: Showing Time & Temperature schedule used for Abhraka Marana

Time	Temperature (^{0}C)	Time	Temperature (^{0}C)
9.30 A.M	37	1.00P.M	875
9.45 A.M	50	1.15 P.M	800
10.00 A.M	130	1.30 P.M	720
10.15 A.M	235	1.45 P.M	680
10.30 A.M	290	2.00 P.M	530
10.45 A.M	330	2.15 P.M	440
11.00 A.M	400	2.30 P.M	345
11.15 A.M	520	2.45 P.M	280
11.30 A.M	600	3.00 P.M	220
11.45 A.M	760	3.15 P.M	195
12.00 A.M	835	3.30 P.M	175
12.30 A.M	910	3.00 P.M	124
Maintained for 45 Mins	910	3.30 P.M	90

Table 8: Showing weight of pellets before and after bhavana (Levigation)

No of Puta	Weight of Pellet after drying (gms)	Weight of Pellet after Puta (gms)
1	1380	1010
2	1340	980
3	1300	905
4	1270	850
5	1220	830
6	1160	790
7	1130	770
8	1090	750
9	1040	725
10	1015	715
11	980	690
12	945	665
13	910	640
14	875	615
15	845	585
16	805	565
17	770	545
18	745	525
19	705	505

20	675	490
21	640	470
22	605	455
23	570	435
24	545	420

Table 9: Showing Organoleptic character during Abhraka Marana

No of Puta	Colour of pellet	Odour	Taste	Touch
1st	Black	No typical odour	Not Perform	Hardness +++
2nd	Black	No typical odour	Not Perform	Hardness +++
3rd	Blackish brown	No typical odour	Not Perform	Hardness +++
4th	Brownish red	No typical odour	Not Perform	Hardness ++
5th	Brownish red	No typical odour	Slightly Sweetish	Hardness ++
6th	Brick red	No typical odour	Slightly Sweetish	Hardness ++
7th	Brick red	No typical odour	Slightly Sweetish	Hardness ++
8:10th	Brick red	No typical odour	Slightly Sweetish	Hardness +
11:15th	Brick red	No typical odour	Tasteless	Softness +
16:20th	Brick red	No typical odour	Tasteless	Softness ++
20:24th	Brick red	No typical odour	Tasteless	Softness ++ +

Table 10: Showing Result of bhasma pariksha of vita Abhraka Bhasma.

No of Puta	Chandrika	Varitaratva	Rekhapurnatva
1 to 4	+++	Absent	Absent
5 to10	+++	+	+
10 to 15	++	+	++
15 to 20	+	++	++
21 to 24	Absent	+++	+++

DISCUSSION

After the shodhana process there is loss in quantity of shodhit abhraka than raw material due to the reduction in impurities during the process and tendency of abhraka particles to flow in air due to their lightness. Abhraka was heated upto completely red hot state. At the red hot state of Abhraka, desired changes takes place (i.e. elements present in the Abhraka may be converted into oxide form by reacting with atmospheric oxygen). After heating it was instantly quenched in the liquid media. Instant quenching is important because repeated immediate cooling after heating leads to breaking of the material i.e. reduction in particle.

At early stage of shodhana cracks were seen at the surface of Abhraka flakes and finally these became coarse powder. Repeated heating and cooling of Abhraka flakes causes disruption in compression – tension equilibrium leads to cracks on the flake surface. During red hot state compounds are formed on the surface of Abhraka flakes.

It was also observed that on completion of shodhana fine Abhraka particles start floating in air to long distance from the place where shodhana process was carried out. This may be considered as the sign of reduction of size of Abhraka. During shodhana process of Krishnavajrabhraka colour became darker with progress of Nirvapa process. This may be because, during red hot state elements of Abhraka reacts with atmospheric oxygen to form oxide compounds, these are usually black in colour. Probably due to this reason dark colour appearance was increased in Abhraka after shodhana. It was also observed that as shodhana procedure progresses, Abhraka takes comparatively more time to get complete red hot. During shodhana some of the elements of Abhraka were converted into oxide form. At later stage of shodhana surface area of Abhraka was increased. Due to this reason Abhraka took more time to become complete red hot.

As the nirvapa process progresses consumption of triphala kwath increases because with the progress in number of nirvapa there is reduction in particle size that increases surface area of the material which is the main factor for the increased consumption of triphala kwath.

After the process of Shodhana an intermediatory process of Dhanyabhrakarna was carried out with the help of dhanya and Kanjii. Triphala kwath shodhit abhraka was taken for this.

Probable reason for choosing Kanji and Dhanya:

Kanji: Due to it acidic nature, Kanji helps in softening and reducing the particle size of Abhraka.

Dhanya: Drug used in the process of manufacturing left its impact on the finished drug in the form of its properties. Dhanya remains inert and mainly its physical properties play an important role in Dhanyabhrakarana. Dhanya is a whole rice grain.

Preparation of Dhanyabhraka needed 7 days & caused average loss of 15%.

Marana is the next important process done after Dhanyabhraka process; it may be equated with the process of incineration or calcinations. Marana process converts the mineral/metal into micro fine bhasma form, able to be absorbed in the biological system to provide desired therapeutic effect. In this process material is levigated with decoctions / juice of plant material, made in to pellets and dried completely till it loses moisture. These pellets are subjected to particular quantum of temperature for a particular period after samputikarana.

Puta, the quantum of heat and the pattern of heat provided for incineration is the most important factor for oxidation and reduction process as well as for formation of desired compound. If the quantum of heat will be more then pellets will become hard and the material may be reduced to the original form. If the quantum of heat will be less proper reaction will not occur and may require more number of puta for the formation of desired compounds.

The temperature and time are proportionately essential for facilitating optimum reactions to occur so that a genuine product can be obtained, hence it can be said that the of 900^0C could be most important phase for preparation of a better quality of Abhraka bhasma.

Total 24 puta was required to produce genuine bhasma. Black pellets were turned to Brownish Red black from 3rd puta, after 6^{th} puta onwards the colour of material was gradually converted in to Brick Red. After 1^{st} puta pellets were very hard in consistency but after 4^{th} puta onwards pellets started to become soft gradually. From 10^{th} puta, partially prepared bhasma slightly passed varitara and other test of genuine bhasma. After 22^{nd} puta material passed all required classical test parameters of bhasma.

7.

CONCLUSION

Special emphasis on pharmaceutical processing is important because a suitable method only produce genuine medicines. So it is essential to make a blue print of standard manufacturing of Abhraka Bhasma. As a result of different stages of processing techniques like *shodhana* (which involves roasting, with addition of herbal juices and continuous stirring) and *marana* [which involves bhavana (wet trituration) and *puta* system of heating], the particle size reduces significantly, which may facilitate absorption and assimilation of the drug into the body system.

Nirvapa is suitable process of Abhraka shodhana. Abhraka reaches at red hot state at 815-830^0 C approximately in 25 – 30 minutes. Process of dhanyabhraka may be completed in 5-7 days with 15% loss.

The temperature at 900^0C could be the most important phase for preparation of a better quality of Abhraka bhasma.

REFERENCES

1. Tripathi, I.D.: Gopalkrishna Bhata's Rasaedra Sar Sangraha, Chaukambha Orientalia, Varanasi, 4, 2003.
2. Shastri, K.N.: Sadanand Sharma's Rasa Tarangani, Motilal Banarasi Das, Varanasi, 22, 2002.
3. Kulkarani, D.A.: Rasa Vagbhata' Rasa Ratna Sammucchaya , Meharchand Lacchman Das, New Delhi, 1992 .
4. Dr. Shailaja Srivastava, Acharya Sarngadhar's Sgarngdhar Samhita, Chaukhamba Orientallie, 3^{rd} Edition, 2003.
5. Kulkarani, D.A.: Rasa Vagbhata' Rasa Ratna Sammucchaya , Meharchand Lacchman Das, New Delhi, 1992
6. Sharma, Gulraj. : Madhava's Ayurveda Prakash, Chaukambha Bharati Academy, Varanasi, 1999.

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