Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 12 (2), 360-365

Pharmaceutico-Analytical standardization of 60 *Puti Abhraka Bhasma*

Research Article

Krupali Jani[1*], Prashant Bedarkar[2], Shukla V J[3], Patgiri B J[4]

1. Ph.D Scholar, 2. Associate Professor, 4. Professor and Head,
RasaShastra and Bhaishajya Kalpana Department,
3. Head, Pharmaceutical Chemistry,
I.P.G.T.&R.A, Gujarat Ayurved University, Jamnagar 361008, Gujarat.

Abstract

Abhraka Bhasma comes under *Maharasa Varga* and after *Parada* second position hold by *Abhraka*. From centuries, Acharayas have been using *Abhraka Bhasma* incorporated in vast number of formulations. There are so many methods and medias is used for *Shodhana*,Marana process of *Abhraka* ,in present study for *Abhraka Shodhana, Godugdha* is used as *Shodhana* media followed by,*Dhanyabhraka* and for *Marana Gomutra* is used. Aim: To generate pharmaceutical and analytical profile of 60 *Puti Abhraka Bhasma* Material & methods: *Abhraka Shodhana* was done by quenching *Abharaka* in *Godugdha* followed by *Dhanyabhraka* in *Kanji* later subjected to *Puta* using *Gomutra* as liquid media.Physcio- chemical parameters of *Bhasma* is performed as per API. Discussion: Different critical aspects of *Abhraka Bhasma* will be discussed while increasing number of *Puta* Conclusion: 60 *Puti Abhraka Bhasma* dull brown in color and passed all the classical and modern parameters.

Key Words: *Abhraka, Bhasma,* Calcination*, Gomutra, Marana, Shodhana.*

Introduction

The Ayurveda is the traditional system of medicine which is been used by Indian's. The science of life is the basic meaning of the word Ayurveda. The treatment of mica (Biotite) with that of medicinal agents is the basic method of preparing the *Bhasma*. Since ancient times *Abhraka Bhasma* were used as an Ayurvedic medicine to cure various disease such as asthma, Tuberculosis, cancer, Hepatic dysfunction, Diabetic and so on. The toxicity of the minerals has been shown only when excess dose of material is given. *Abhraka Bhasma* the oxide form of the minerals are poorly soluble and hence not in free form which has been shown by acute toxicity study 5000mg/kg BW is safe in the wister rats of both sex. (1) *Bhasma* is a minute dosage form of drug (especially metals and minerals) which intake is not possible in raw form. So it is required to be converted into palatable form by various processes like *Shodhana* and *Marana.* One more advantage of *Bhasma Kalpana* is that it has very long shelf life compared to other dosage forms and it can give best therapeutic effect at very small dose.(2) *Shodhana* of drug is necessary to remove harmful and ill effects of drug for better consumption. In case of *Abhraka, Shodhana* plays very important role not only for size reduction but also to remove silica-silicates and other fat soluble impurities from *Abhraka* by doing *Shodhana* in *Godugdha*. After *Shodhana Dhanyabhraka Nirmana* is done which is a very important event takes place before subjecting the *Abhraka* for *Puta*. In ayurvedic various *Marana* methods has been mentioned but in this study marana with single liquid media was done i.e. *Gomutra*. It is also mentioned in texts as no. of *Puta* increases its therapeutic value aslo increases. The number of *Putas* described for *Abhraka* are from 1 to 1000 which is very significant than any other *Bhasma.* As no. of *Puta* increases *Bhasma* starts working as Nano particle*, Bhasma* should pass all the examination which is mentioned in the text if *Bhasma* will not pass test then it is not prepared, among all examination *Nishchantartva* is one of the important examination for *Abhraka Bhasma* if there is lusture in *Bhasma* then it still need to subjected for *Puta* there are some other examinations also for conforming whether *Bhamsa* is prepared properly 0of not *i.e Sukhma, Slakshna, Dantagrahakachkachaabhava, Nirutha, Apunarbhava Vaitaratva, Unama* etc.(3) In the present study prime goal is to cover all the pharmaceutical aspects of *Bhasma* preparation and what all points to be taken under consideration when prepared as tested as per classical methods. So far, no detailed description of pharmaceutical preparation of *Abhraka Bhasma* is carried out. Repeated calcination at 900 °C in electric muffle furnace to achieve its *Bhasma.* Conventional *Puta* resulting in to oxidation and micronization of substance, which makes the finished product in edible form having increased bioavailability, therapeutic characteristics and devoid of toxic feature.

*** Corresponding Author:**
Krupali Jani
Ph.D Scholar,
Rasa Shastra and Bhaishajya Kalpana Department,
I.P.G.T.&R.A, Gujarat Ayurved University,
Jamnagar 361008, Gujarat. India.
Email Id: krupali.jani04@gmail.com

Materials and Methods

Collection of materials

Ashuddha Abhraka of acceptable quality was procured from the pharmacy of Gujarat Ayurved University, Jamnagar,Gujarat. It was authenticated for *Grahya Lakshana* as per Classical and modern methods. (4)

For *Shodhana* process, *Godugdha* was purchased from shreeji goras dairy, Jamnagar**.** For *Dhanyabhraka Nirmana, Shali dhanya* was purchased from local market of Jamnagar. For *Marana process,* fresh *Gomutra* was collected from panjrapol *Gaushala*, Jamnagar, Gujarat.

Pharmaceutical study

It is divided in four different stages;

- *Shodhana* of *Abhraka*
- Preparation of *Dhanyabhraka*
- Preparation of *Abharka marana*

Shodhana of *Abhraka* (5)

For *Shodhana*, *Ashuddha Abhraka* was heated in iron pan until it became red hot. Then it was quenched (*Nirvap*) in *Godugdha* taken in s.s vessel as liquid media.It was again heated until red hot state and same process was repeated for 7 times.

Table 1: Showing Observations and Results during *Abhraka Shodhana*

	Nirvapa no.	Duration required to achieve red hot stage (min)	Quenching time/ Soaking duration (min)	Wt. Changes in *Abhraka*			Media volume changes		
				Initial (g)	After (g)	% Change	Initial (ml)	After (ml)	% change
Batch 1	1st	26	5	1500	1600	6.6↑	2500	1700	32↓
	2nd	44	5	1600	1696	6↑	2500	1500	40↓
	3rd	35	7	1696	1635	3.5↓	3000	2100	30↓
	4th	28	6	1635	1689	3.3↑	3000	2000	33↓
	5th	25	5	1689	1655	2.1↓	3000	2000	33↓
	6th	22	5	1655	1589	3.9↓	3000	2000	33↓
	7th	30	11	1589	1515	4.6↓	3000	1800	40↓
Batch 2	1st	35	5	1500	1927	28.4↑	2500	1500	40↓
	2nd	32	5	1927	1973	2.5↑	2500	1510	39.6↓
	3rd	25	7	1973	1979	1.8↑	3000	2150	28.3↓
	4th	13	6	1979	1969	0.2↑	3000	2150	28.3↓
	5th	13	5	1969	1885	1↑	3000	2000	33.3↓
	6th	14	5	1885	1885	1.4↑	3000	2150	28.3↓
	7th	14	9	1885	1960	3.9↑	3000	2050	31.6↓
Batch 3	1st	40	5	1500	1950	30↑	2500	1750	30↓
	2nd	35	5	1950	1900	2.5↑	2500	1700	32↓
	3rd	25	7	1900	1936	1.8↑	2500	1625	35↓
	4th	15	6	1936	1940	0.2↑	2500	1650	34↓
	5th	15	5	1940	1960	1↑	3000	2000	33↓
	6th	14	5	1960	1988	1.4↑	3000	2100	30↓
	7th	15	9	1988	1924	3.2↓	3000	2000	33↓
Batch 4	1st	40	5	1500	1955	30.3↑	2500	1750	30↓
	2nd	35	5	1955	1960	0.2↑	2500	1700	32↓
	3rd	25	7	1960	1939	1.07↓	2500	1500	40↓
	4th	20	6	1939	1950	0.5↑	3000	2150	28.3↓
	5th	15	5	1950	1955	0.2↑	3000	2000	33↓
	6th	14	5	1955	1980	1.2↑	3000	2100	30↓
	7th	14	9	1980	1920	3.0↓	3000	2200	26.6↓

Table 2: Showing Comparison of 4 batches *Shodhana*

Parameter	Batch 1	Batch 2	Batch 3	Batch 4
Total duration of *Nirvapa*	3 hrs 30 min	2 hrs 26 min	2 hrs 39 min	2 hrs 43 min
Avg. duration for red hot stage (min)	30	19	23	23
Avg. soaking time (min)	6	6	6	6
Final dry weight of *Abhraka* (g)	1519	1269	1310	1316
Avg. loss of media (%)	34.42	32.77	32.42	31.41
Avg. temp. of vessel during red hot stage (°C)	550	564	560	556
Avg. temp. of hearth during red hot stage (°C)	802	820	810	809
Avg. temp. of milk during quenching (°C)	70	66	65	70
Change in the total wt. of *Abhraka* (%)	2.12	15.62	16.13	13.47
Loss in the wt. of *Abhraka* after last heating (%)	0.26	35.25	31.9	31.4
Average yield of *Abhraka* (%)	97.88	84.8	83.87	87.53

Preparation of *Dhanyabhraka*(6)

Shuddha Abhraka and 1/4th quantity of *Shali Dhanya* were mixed properly & filled in a jute bag Then *Pottali* was made by tying the jute bag. It was immersed in S.S vessel filled with *Kanji &* kept undisturbed for consecutive three days. After three days jute bag was rubbed with bare hands & small particles of Abhraka came out from the pores of jute bag. This *Abhraka* was Collected and dried under sun light. Final weight of *Abhraka* after process was 4.404 Kg.

Table 3: Ingredients with quantity

Sr.no	Ingredients	Quantity
1	*Shudhha Abhraka*	5.013g
2	*Shali Dhanya*	1.35g
3	*Kanji*	Q.S (20*l*)

Table 4: Showing Results and Observation of *Abharaka Marana*

No. of *Puta*	Initial weight of *Abharaka* (*g*)	Liquid media (*Gomutra*) used for *Bhavana* (*ml*)	Weight of *Chakrika* after drying (*g*)	Weight of *Chakrika* after *Puta* (*g*)	Increase of wt. after *Bhavana* (%)
1	4.404	7000	4.608	4.395	4.63
2	4.395	5000	4.612	4.373	4.93
3	4.373	2800	4.595	4.350	5.07
4	4.350	2400	4.652	4.352	6.94
5	4.352	2400	4.553	4.321	4.41
6	4.321	2200	4.521	4.320	4.62
7	4.320	2200	4.525	4.351	4.74
8	4.351	2400	4.551	4.345	4.59
9	4.345	2400	4.545	4.347	4.60
10	4.347	2200	4.550	4.341	4.66
11	4.341	2200	4.542	4.342	4.63
12	4.342	2200	4.556	4.339	4.92
13	4.339	2200	4.546	4.337	4.77
14	4.337	2400	4.538	4.332	4.63
15	4.332	2200	4.540	4.330	4.80
16	4.330	2200	4.532	4.300	4.66
17	4.300	2200	4.515	4.312	5
18	4.312	2200	4.520	4.305	4.82
19	4.305	2200	4.507	4.300	4.69
20	4.300	2200	4.505	4.310	4.76
21	4.310	2000	4.520	4.291	4.87
22	4.291	2000	4.500	4.290	4.89
23	4.290	2000	4.495	4.288	4.87
24	4.288	2000	4.488	4.283	4.66
25	4.283	2000	4.483	4.271	4.66
26	4.271	2000	4.473	4.250	4.72
27	4.250	2000	4.502	4.255	5.92
28	4.255	2000	4.455	4.231	4.70
29	4.231	2000	4.432	4.232	4.75
30	4.232	2000	4.435	4.220	4.79
31	4.220	2000	4.520	4.212	7.10
32	4.212	2000	4.462	4.205	5.93
33	4.205	1900	4.490	4.159	6.77
34	4.159	1900	4.430	4.145	6.51
35	4.145	1900	4.395	4.105	6.03
36	4.105	1800	4.315	4.101	5.11
37	4.101	1800	4.308	4.095	5.04
38	4.095	1800	4.298	4.090	4.95
39	4.090	1800	4.290	4.085	3.29
40	4.085	1800	4.291	4.072	5.04
41	4.072	1700	4.272	4.070	4.91
42	4.070	1700	4.273	4.061	4.98
43	4.061	1700	4.250	4.051	4.65
44	4.051	1700	4.225	4.052	4.29
45	4.052	1700	4.220	3.995	4.41
46	3.995	1700	4.100	3.995	2.62
47	3.995	1700	4.105	3.993	2.73
48	3.993	1700	4.115	3.990	3.05
49	3.990	1700	4.103	3.991	2.83
50	3.991	1700	4.125	3.992	3.35
51	3.992	1700	4.120	3.990	3.20
52	3.990	1800	4.123	3.992	3.22
53	3.992	1700	4.120	3.990	3.20
54	3.990	1800	4.124	3.993	3.35
55	3.993	1800	4.115	3.992	3.05
56	3.992	1800	4.126	3.989	3.35
57	3.989	1700	4.119	3.989	3.25
58	3.989	1700	4.115	3.985	3.15
59	3.985	1700	4.120	3.983	3.38
60	3.983	1700	4.128	3.983	3.64

Preparation of *Abhraka Bhasma* (7)

Shuddha Abhraka was taken in end runner and *Gomutra* was added in sufficient quantity for levigation (*Bhavana*) till mass became soft. *Chakrikas* were prepared and allowed to dry. Then it was kept in *Sharava* (earthen saucer) and covered with another *Sharava.* Average weight of 10 *Chakrika* before *Puta* was 15.1 ± 0.7.After proper drying, it was subjected to *Puta* in electric muffle furnace (EMF) having temperature upto 900^{0}C. After attaining optimum temperature i.e. 900^{0}C, it was further maintained for one hour and then furnace was switched off. On self-cooling i.e. *Swangasheeta,* material was taken out from furnace and weighed. Hardness was noted with the help of hardness tester. (8) Again p*uta* was given in the same manner and repeated for 60 times. Same temperature pattern was followed for every *Puta*. Observations were noted and samples of *Abhraka Bhasma* were collected after 10,20,30,40 and 60 *Puta.* (Graph 1)

Graph 1: Showing heating pattern of muffle furnace

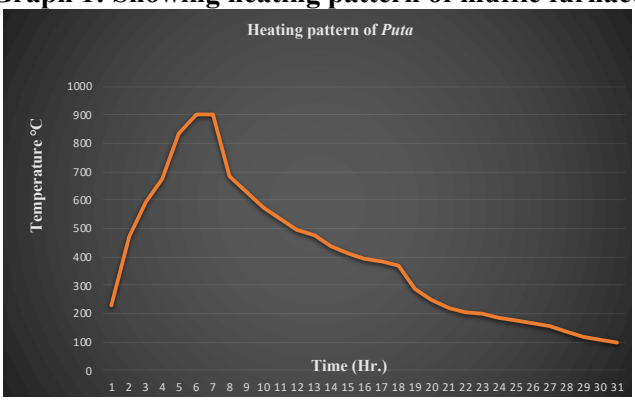


Table 5: Showing the complete *Marana* process of *Abhraka Bhasma*

Total number of *Puta*	Temperature ℃	Number of days During one *Puta*	Duration of levigation
60	900	3 days	3 hrs /*Puta*

Table 6: Showing Results of *Bhasmapariksha* and hardness of *Abhraka Bhasma*

Puta	*Rekha-purnatva*	*Nish-chandratva*	*Vari-taratva*	Hardness
1 to 5	-	-	-	14
6 to 10	+	-	-	
11to 15	+	-	-	13
16 to 20	+	-	-	12
21 to 25	+	-	-	8
26 to 30	+	-	-	
31 to 35	+	+	+	6
36 to 40	+	+	+	5
41 to 45	+	+	+	3
46 to 50	+	+	+	
51 to 55	+	+	+	
56 to 60	+	+	+	

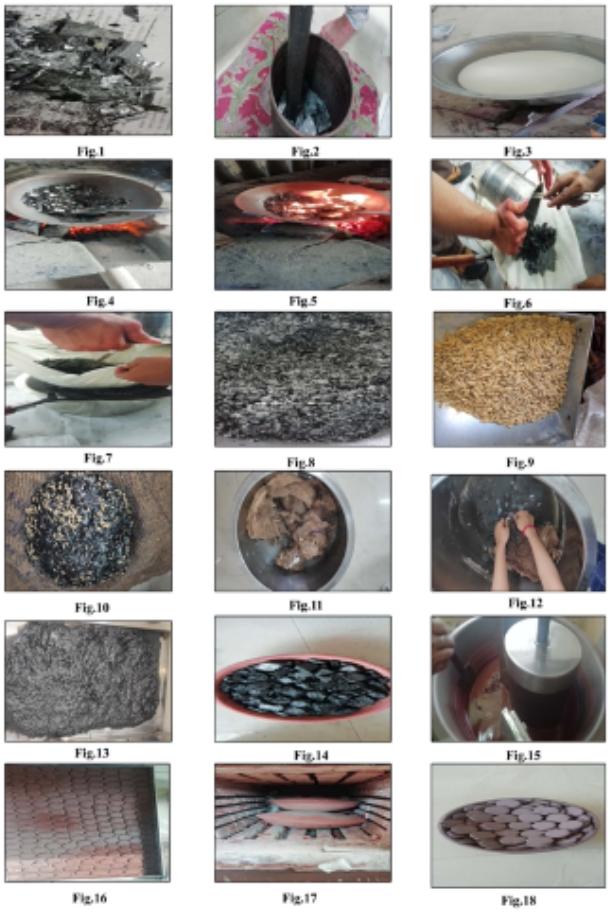
Table 7: Showing Results of Classical parameters to assess *Abhraka Bhasma*

Sr.no	*Bhasma Pariksha*	Observation
1	*Nishchandratv*	Passed
2	*Rekhapurnatva*	Passed
3	*Varitaratva*	Passed
4	*Unam*	Passed

5	*Dantagrekachkachabhava*	Passed
6	*Apunarbhava*	Passed
7	*Niruthha*	Passed

FIGURE :1

PHARMACEUTICAL PROCESING OF *ABHRAKA BHASMA*



Phamaceutical steps of *Abhraka Bhasma* preparation
Fig.1: Pieces of *Ashuddha Abhraka*
Fig.2: Poundung of *Abhraka* into small pieces
Fig.3: Boiling of *Gdugdha* for *Abhraka Shodhana*
Fig.4: Heating of Ashudha Abhraka
Fig.5: *Abhraka* become red hot
Fig.6 & Fig.7: Quenching of *Abhraka* in *Godugdha* and separating *Godugdha* from *Abhraka*
Fig.8: *Shodhit Abhraka*
Fig.9: *Dhanya* for *Dhanyabhraka*
Fig.10: Mixing of *Dhanya* and *Shodhit Abhraka*
Fig.11: Dipping *Pottali* of *Dhanyabhraka*in *Kanji* for 3 days
Fig.12: Maceration of Pottali to obtain fne particles of *Abhraka*
Fig.13: Processed *Abhraka*
Fig.14: For *Puta, Abhraka* in *Sarava*
Fig.15: *Bhavana* of *Gomuta* in *Abhraka*
Fig.16: *Chrakrika Nirmana*
Fig.17: Kept in horizontal muffle furnace
Fig.18: *Abhraka Bhasma* after *Puta*

Analytical study

i.Determination of pH(9)
ii.Determination of specific gravity(10)
iii.Determination of Total solid content(11)
iv.Determination of Loss on drying(12)
v.Determination of Ash value(13)
vi.Determination of Acid insoluble ash(14)

Table 8: Showing Results of Analytical parameters of the *Nirvapa* media (*Godugdha*)

Parameters	*Nirvapa*							
	Bef ore	1st	2nd	3rd	4th	5th	6th	7th
Ph	9.8	9.5	9.7	9.6	9.6	9.5	9.5	9.5
Specific gravity	1.034	1.038	1.037	1.037	1.036	1.036	1.038	1.041
Total solid content	20.088	15.796	19.728	19.892	20.316	20.16	21.644	34.804

Table 9: Showing Results of Analytical parameters of the of *Gomutra*

Sr.no	Sample	pH	Specific gravity	Total solid content
1	*Gomutra*	8.5	1.0150	1.408

Table 10: Showing Results of Organoleptic characteristics of *Abhraka Bhasma*

Appearance (*Rupa*)	Fine powder
Colour (*Varna*)	Dull brown
Touch (*Sparsha)*	Smooth
Smella (*Gandha*)	Not Specific

Table 11: Showing Results of physico- chemical parameters of *Abhraka*

Sr.no	Sample	Loss on drying	Ash value	Acid insoluble ash
1	*Ashodhita Abhraka*	0.06	96.98	42.55
2	*Shodhita Abhraka*	0.09	99.33	32.05
3	*Dhanya Abhraka*	0.08	82.96	38.24
4	After 10th *Puta*	0.05	86.50	36.25
5	After 20th *Puta*	0.07	91.25	43.35
6	After 40th *puta*	0.08	96.97	31.25
7	After 60th *Puta*	0.09	99.57	41.12

Table 12: Showing Results of Qualitative test for presence of silicates in *Abhraka Bhasma*(15)

Sr.no	Puta	Presence of silicate	Confirmatory test
1	10	++	White color precipitate were observed which shows the presence of silicates
2	20	++	
3	40	++	
4	60	++	

Discussion

Abhraka Bhasma is mentioned in various disease conditions like *Jwara*,*Sannipata*, *Prameha*, *Grahni*, *Swasa*, *Kasa*, *Rajyaskshma*, *Hridyaroga*,etc. (16) Although for the preparation of *Abhraka Bhasma* numerous methods have been mentioned in texts of Ayurveda, but method of preparation is same i.e *Shodhana* (purification), *Dhanyabhraka*and *Marana*(calcination). Every *Bhasma* has some specific properties, but *Bhawna dravya* explore synergistic effect for some particular properties.(17) Rasa classics say that quality of *Bhasma* increased with number of

Puta (18) and it was also observed in a study that particle size of *Bhasma* decreases with increase in number of *Puta* (19), which increase the potency of *Bhasma*. For preparation of *Bhasma*, *Shodhana* should be done properly to eliminate all the ill effects of *Ashudha Abhraka.* In *Abhraka Shodhana* loss of material was more compared to other *Rasa Dravyas* after Shodhana as the particles size reduces finer particles tends to flow in air. *Abhraka* was heated till it became red hot, because elements present in the *Abhraka* may be converted into oxide form by reacting with atmospheric oxygen (20). Further it was quenched in *Godugdha* & this process was repeated (heating and cooling in liquid media) for 7 times which leads to size reduction of material. Repeated heating and cooling of *Abhraka* flakes causes disruption in compression – tension equilibrium leads to cracks on the flake surface. (21) Particles become very fine after *Shodhana* process during filtration of material from media, small finer particles does not get separate out from media. It was observed that material takes more time to become red hot as the number of quenching increases. After *Shodhana* bulk of material increases due to removal of moisture and reduction of particle size as layers of *Abhraka* gets separated. At later stages of quenching required quantity of liquid media increase due to smaller particle size, more absorption of media and better exposure of material to media for effective Shodhana. Average % yield of *Abhraka* after *Shodhana* 88.52% was obtained from four batches of *Shudha Abhraka.*

Role of Media in *Abhraka Shodhana*

Shodhana media acts as cooling agent during process. Due to change in temperature it serves as breakage of bond between the materials. In case of *Abhraka* when red hot material is quenched in media chemical reaction takes place which liberates hydrogen molecules.

Dhanyabhraka

After *Shoadhan* of *Abhraka*, process of *Dhanyabhraka* has been taken up. This process is exclusively mentioned for *Abhraka* that is helpful in further particle size reduction of *Abhraka*. Aproximately 20 *l* of kanji was prepared for the process of *Dhanyabhraka*. Percentage loss of *Abhraka* was more due to mixing of *Dhanya* with *Abhraka* & small particles of *Abhraka* sticks to *Dhanya*. Process of rubbing of *Abhraka* with *Dhanya* in *Pottali* is called maceration. Removal of foreign matter (silica,stone,*Dhanya*) get trapped in *Pottali* and pure *Abhraka* is obtained. *Abhraka* Particles became so fine after *Dhanyabhraka* process that it floats on water. To collect them, the vessel is to be kept undisturbed for the sedimentation of *Abhraka* in the bottom vessel.This process reduces the elasticity and sharpness of edges of the *Abhraka* lamelia (22), percentage yield of *Dhanyabhrka* is 87.85.

Marana

Incineration of *Abhraka* after *Dhanyabhraka* is next important process. It converts raw mineral into ash form (*Bhasma*) which is easily absorbable by the body and give desired therapeutic effect. In this process the metal or mineral is levigated and made into pellets (*Chakrika*) to provide uniform heat to material they are dried till moisture free and subjected to *Puta*. Quantum of heat which is to be provided is very important factor for oxidation and reduction process as well as for formation of desired compound. If the quantum of heat is more than pellets will become hard and the material may be reduced to the original form. If the quantum of heat is less proper reaction will not occur and may require more number of *Puta* for the formation of desired compounds. (23) 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 heat of 900°C could be most important phase for preparation of a better quality of *Abhraka Bhasma*. Total 60 *Puta* were given. Due to increasing number of *Puta* hardness of *Chakrika* was decreasing gradually and liquid media used for *Bhavana* was also decreased, 9.5% loss from 1st *Puta* to 60th *Puta*.At 30 *Puta Chandrika* was not seen through naked eyes. And after *Marana* Average percentage yield *Abhraka Bhasma* was 4.177±0.1456. Bhasma passed all required classical test parameters i.e *Nishchandratv* (lustureless), *Rekhapurnatva* (furrow filling), *Varitaratva* (float on water), *Unam, Dantagrekachkachabhava* (Granniness), *Apunarbhava* (Irretrievable), *Niruthha.*

Analytical parameters

All parameters mentioned in tables are used as indices to illustrate the quality as well as the purity of the medicine. Liquid media used for *Shodhana* i.e *Godugdha*, pH was basic after every quenching from 1to 7. pH, specific gravity and total solid content was performed and it is showed in table no.8. It showed pH of media was basic in nature, specific gravity remained similar and total solid content of media found slightly increasing after every quenching due to micro fine particle of *Abhraka* was present in it which were inseparable.

Samples of *Abhraka Bhasma* having netutral pH. Moisture in *Abhraka Bhasma* was very less, ash value of samples was around 99% because *Abhraka Bhasma* is already in form of ash. Acid insoluble ash is the residue obtained after boiling sample in HCl material solubilize with HCl and insoluble matter like silica,silicates were measured after ignition. Presence of silicates was confirmed in samples of *Abhraka Bhasma* by Qualitative test.

Conclusion

Bhasma is prepared as mentioned in classics and examined by ancient and modern parameters. Total 60 times Puta was given. *Shodhana* is crucial process for further pharmaceutical processes.Average percentage yield of *Abhraka* after *Shodhana* was 88.52

from four batches of *Shudha Abhraka*, Preparation of *Dhanyabhraka* states the significance of concept used in preparation of *Abhraka Bhasma*. Percentage yield of *Dhanyabhrka* was 87.85 and *Gomutra* is the best and appropriate media for the preparation of *Abhraka bhasma*. *Marana* Average percentage yield *Abhraka Bhasma* was 4.177±0.1456. *Bhasma* passed all the Classical parameters (*Bhasma Pariksha*).The changes in physicochemical parameters before and after processing of *Abhraka Bhasma* were not much found variation but serves as a mean for Standardisation of mineral preparation. As number of *Gajaputa* increases in Bhasma therapeutic utility in management of diseases increases.

References

1. Srinivas A, Surekha PA, Kishore AS, Srinivasan M, Balakrishna MP, Neelakanta Reddy, Toxicity Profile of Abhraka Bhasmahrak And Tamar Bhasmas In Different Vehicles. J.Herbal Medicine and Toxicology, 2010. 4-2: p 189-196.
2. Vijay Malik, Drugs & Cosmetics Act, 1940, 18th Updated Ed., Eastern Book Company, Lucknow, 2006
3. The Ayurvedic Formulary Of India, Chapter 21, Govt Of India, Ministry Of Health & Family Welfare Department Of Indian System Of Medicine And Homeopathy, Part 1, Second Edition, New Delhi (2003).
4. Rasaratna Samuchhaya, Sidhhiprada Hindi Commentary, Published By Chaukhambha Orientalia Varanasi,First Edition 201, Chapter 2/11, p 31
5. Rasaratna Samuchhaya/,Sidhhiprada Hindi Commentary,Published By Chaukhambha Orientalia Varanasi,First Edition 2011,Chapter 2/16-17, p 32
6. Rasaratna Samuchhaya, Sidhhiprada Hindi Commentary, Published By Chaukhambha Orientalia Varanasi,First Edition 2011,Chapter 2/18, p 32
7. Bhudeb Mukerjee, Rasajalanidhi, Chaukhambha Publishers, 3rd Edition, 1998, Chapter 1, p 23.
8. Available From "Quality Control of Solid Dosage Form". Scribd. Retrieved 16 February 2013
9. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department Of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 3.3.
10. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department Of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 3.2.
11. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department Of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 3.8.
12. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department Of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 2.2.10.
13. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department Of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 2.2.3.
14. Ayurvedic Pharmacopeia Of India; Government Of India, Ministry Of Health And Family Welfare Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha And Homoeopathy, New Delhi 2008; E Book; Part 2; Vol 2; Appendix 2.2.4.
15. Svehla G Vogal's Qualitative Inorganic Analysis 7th Edition, Pearson Education Ltd.New Delhi,2002, p 227
16. Sadanand Sharma, Rasatrangini, Edited By Pt.Kashinath Shastri, Delhi, Motilal Banarasidas, Reprint 2004;Chapter 10/72-73,p 234
17. Karunanidhi Sharma, Shweta Paul, Sanjay Kumar, Dhiraj Singh Rajput, Pharmaceutical Study Of Trivanga Bhasma, Annals Ayurvedic Med. 2019; 8 (3-4) p 80-93
18. Bhatt GK, Prathama Adhyaya. In Tripathi I, Editor. Rasendra Sara Samgraha, Varanasi,Chaukhambha Orientalia, 2014, Verse No.322-324,p83
19. Bhatt A, Bajaj N & Kashyap CP. Effect Of Number Of Puta On Particle Size Of Vang Bhasma International Ayurvedic Medical Journal. July, 2017. 5(7). p 2372-77
20. Pankaj Rai,Standard Manufacturing Process Of Abhraka Bhasma - A Pharmaceutical Study, Unique Journal of Ayurvedic And Herbal Medicines, May-June 2015, 03 (03)
21. Pankaj Rai,Standard Manufacturing Process Of Abhraka Bhasma - A Pharmaceutical Study, Unique Journal of Ayurvedic And Herbal Medicines, May-June 2015, 03 (03)
22. Nandurkar Vishal Marotrao. Pharmaceutical and Analytical Study of Abhrak Bhasma. AYUSHDHARA, 2020.p 2958-2963.
23. Pankaj Rai, Standard Manufacturing Process Of *Abhraka Bhasma* - A Pharmaceutical Study, Unique Journal of Ayurvedic And Herbal Medicines, May-June 2015, 03 (03)

*****