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# A REVIEW ON BHASMA PAREEKSHA – NANO DOSAGE FORM OF AYURVEDA (MEDICINE) MEDICAL SCIENCE

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## ABSTRACT

Bhasma one of the distinctive dosage form of ayurveda medicine. Generally prepared out of metals, minerals & animal source of origin drugs, rarely from herbal source of origin drugs. This dosage form was introduced in ayurveda after origin of Rasashastra. Earlier too the fine powder prepared out of metals & minerals etc were therapeutically used but the term Bhasma was not mentioned (Nomenclature) to that product. Even the proper explanation of pharmaceutical procedures to prepare Bhasma not observed in samhitas. Systemic explanation of this i.e pharmaceutical procedures which involves like shodhana, marana steps available in rasagranthas along with the quality analysis tests to ensure the final product Bhasma safety. As it is indicated for internal administration. These quality assurance parameters or test mentioned in classical books are known as Bhasma sidhi laksana or pareeksa. They have been divided into two types samanya Bhasma pareeksha & Vishesha Bhasma pareeksha. Samanya Bhama pareeksha tests are adopted for all kind of Bhasma irrespective of drug & its source of origin. Vishesha are the specific one ment to particular Bhasma prepared out of particular Dravya. Varna, varitara, rekhapurna, unnam etc categorized under samanya Bhasma pareeksha. Dadhi pareeksha, nischandratwa are categorized under vishesha which are ment for particular Bhasma not for all kinds of Bhasma.

**KEYWORDS:** *Nano dosage form, Bhasma, Ayurveda, quality assurance.*

## INTRODUCTION

Ancient time Vaidya used to prepare medicine for their patients themselves and after ensuring its quality they used to dispense it. Hence there was no question of further ensuring or checking up of quality of medicine. Later, trend started that a group of Vaidyas with their servants started to prepare medicine, under supervision of Vaidya to minimize

vaidya's work burden & giving him time to patient examination (clinic). This is because of few dosage forms especially Rasoushadhis will take lengthy duration as pharmaceutical procedures are like shodhana marana are tedious requires time duration in terms of days, week etc. in later period this trend recognized and concept of rasashala[1] as emerged as place to prepared medicine only. Where after preparing different dosage forms of medicine they used to analyze its quality too further a sample of that dosage form was given free of cast to vaidyas in the name of dhanwantari bhaga rudra bhaga.[2]

In the context of Bhasma many tests mentioned to follow to analyze and ensure its quality & safety. Example : Varitara, Unnam, rekhapurna nirdhuma etc. These all tests are commonly classified in to two types A) samanya pareeksha these are followed to ensure quality of to all kind of Bhasma and B) vishsha pareeksha these are recommended to certain Bhasma only not to all ex: dadhi pareeksha, Nirdhuma pareeksha etc.

Samanya Bhasma pareekshas: Varna, Varitara, Unnam, Rekhapurna, slakshnatwa, sukshamatwa, laghutwa, nirutha, gatarasatwa,
Samanya Bhasma pareekshas : dadhi pareeksha, nischandra, Avami,

***BHASMA PARIKSHA* PARAMETERS[03]**

*Apunarbhava Nischandre Slakshnata Sukshmata Laghu*|
*Rekhapuranam Niruthna cha Nirdhumaut- tamam tatha*||
*Varitaram Awami cha Niswadu Mridu Varankam*||
*Dante Kachkachaabhavam Dhatunaam Bhasma Niranya*||
*Tamram Amla Pariksha Sayat Rasavidhbhi Parikshitam*||

**Discussion on individual tests**

**1. *Varna* (Color) :** It can be noted in almost all classical texts color which going to gained at the end of marana pharmaceutical stage of bhasma is mentioned. Most of the reference to indicate color similes were noted instead of Thus by the end that specific color is not there certainly it indicates quality of Bhasma. **Significance:** Specific color for specific *Bhasma*. This indicates specific chemical composition color. Change or alteration in the chemical composition in the end product of i.e Bhasma will have different color thus itself arises question on quality assurance.

**Table 01: Showing the Different *Dhatus* (metals) and their *Bhasma Varna* (colour).[04]**

| S.No. | ***Dhatu*** | ***Bhasma Varna*** |
|---|---|---|
| 1. | *Swarna* (gold) | *Champak varna* |
| 2. | *Rajata* (silver) | *Krishna varna* |
| 3. | *Tamra* (copper) | *Krishna varna* |
| 4. | *Kansya* (bronze) | *Dhusar varna* |
| 5. | *Naag* (lead) | *Paravatprabha* |
| 6. | *Vanga* (tin) | *Shubhra varna* |
| 7. | *Tikshnaloha* (iron) | *Jambuphala varna* |
| 8. | *Abhrak* (mica) | *Ishteekabha varna* |

In Parada Samhita, while quoting the reference from Rasarajsundar, the colours of *Bhasma* are described as follows.

**Table 02: Showing the *Dhatus* and their *Bhasma varna.*[05]**

| S. No. | ***Dhatu*** | ***Bhasma Varna*** |
|---|---|---|
| 1. | *Swarna*(gold) | *Kapotkanthabha* |
| 2. | *Pittala*(brass) | *Kapotkanthabha* |
| 3. | *Tamra*(copper) | *Mayurkanthabh* |
| 4. | *Rajata*(silver) | *Ujjwal varna* |
| 5. | *Vanga*(tin) | *Ujjwal varna* |
| 6. | *Naag*(lead) | *Krishnasarpanibha* |
| 7. | *Tikshnaloha*(iron) | *KajjalSannibha* |

**2. *Varitara*[7,8,9,10]**: *Vari* means water and *Tara* means to float, Varitara to float on water. A pinch of Bhasma sprinkled on stagnant water it should float. This test indicates the lightness of *Bhasma*. **Significance:** Floating of *Bhasma* signifies the lighter (*Laghu*) the particle, surface tension of water does not allow the particle to sink and keep them floating on water & specific gravity of bhasma is less than water. The raw material may be heavy material but Bhasma will be light.

**3. *Unnam*[11]**: Unnam test is further continued stage or step of varitara test. Little quantity of Bhasma sprinkled over water and a grain is placed over it. After placing grain over that floating bhasma Bhasma not supposed to sink. Which particle wont sink indicates good quality of Bhasma **Significance:** It indicates the very lightness of *Bhasma* and also further revalidates *Varitara Pariksha* i.e., Bhasma specific gravity is so less that even after baring the weight of the grain it will not sink.

**4. *Rekhapurnata*[12,13,14]** This test indicates the fineness of *Bhasma* particles. *Bhasma* particles. In this test pinch of Bhasma take between two fingers i.e thumb and index gently rubbed, at this time Bhasma particles supposed to enter in between gap space grooves of finger skin without falling on ground. **Significance:** This test ensures smaller particle size of the Bhasma. Which lies micro to nano size.

**5. *Nishchandratvam* (lusterless)[15,16]**: *Bhasma* must be *Nischandra* (lusterless) after completion of pharmaceutical procedure pinch of Bhasma brought to sunlight and carefully observed, noted that Prescence of shiny or any luster. The presence of lustre implies that the *Bhasma* still requires further incineration. This test is especially mentioned to Abhraka bhasma[17] and *Swarna Makshika* (copper pyrite) *Bhasma*.[18] If such kind of Bhasma is dispensed to patients instead of curing it causes *Prameha* (diabetes) and *Mandagni* (indigestion).[19,20] **Significance:** The *Bhasma* should be free from the shiny or lustre particles even on observing under sunlight or through a magnifying glass which indicates the non existance of any free metal.

**6. *Slakshnatvam*[03]**: It is the tactile sensation sensed by examiner & produced by the *Bhasma* by simple touch with fingertips. Properly incinerated *Bhasma* attains this quality. **Significance*:*** *Slakshna Bhasma* indicates uniformity in the texture of the *Bhasma* and fineness of particle size.

**7. *Susukshma*[03,18]**: *Sukshma* indicates fine form of bhasma, particle size should be very fine. This finess of particles of Bhasma facilitates easy and fast absorbtion of Bhasma. **Significance:** *Bhasma* should be *Sukshma* so that it will be easily absorbed by the GI track and distributed to the target sight to start its therapeutic action.

**8. *Anjana Sannibha*[03,18]**: *Anjana* (collyrium) is one of the pharmaceutical form of the medicine used in the treatment

of eye diseases. Physically Anjana is so smooth that thought eye is one of sensory organ which very sensitive it will not create any sort of irritation neither to eye nor its mucosal membrane. So only anajana form of medicine safely recommended to use. **Significance:** supakwa Bhasma consists of very fine and smooth particles of Dravya they are absorbed by the mucosal membrane easily without causing any irritation like that of Anjana.

**9.** ***Niswadu*** **(tasteless)**[03]: A very little quantity of *Bhasma* is sprinkled over tongue and tasted, it is tasteless i.e., *Niswadu.* One should not perceive any taste like Madhura, amla, lavana etc. this is one of the Bhasma pareeksha test. **Significance:** to perceive taste food should mix with saliva and to it stimulates G protein chain biochemical reaction. that mechanism not observed may because may be Bhasma may not dissolve in saliva due to which taste perceiving mechanism of G protein within taste buds will not initiate biochemical chain will not initiate leading absence of taste or as Bhasma is very light it floats on saliva move towards next part of GI track avoiding contact of taste buds.

**10.** ***Awami***[03]: Pinch of *Bhasma* when asked to take orally it should not produce either nausea or vomiting sensation. This Bhasma pareeksa is specially recommended to *Tamra* (copper) and *Tuttha* (copper sulphate) *Bhasma* etc. Apakwa Bhasma definitely produces above mentioned sensation whereas pakwa Bhasma will not **Significance:** It copper element or elemental form of metals stimulates excess secretion of hydrochloric acid in stomach leading to manifestation of nausea & vomiting. If Bhasma is apakwa it definitely consists of elemental form of metal and avami test will be positive if the Bhasma is pakwa test will show negative results.

**11.** ***Nirdhoomatva***[03]: This Bhasma pareeksha is not a common test it is applicable mainly for *Hartala* (orpiment)[21] and others drugs containing *Gandhaka* (sulphur) as one of the element in their chemical composition. In this Bhasma pareeksha little quantity of *Bhasma* is ignited on the fire and observed that whether of fumes are coming or not. Generally yellow color fumes. **Significance:** The presence of fumes indicates that the *Marana* (incineration) process is not properly followed, drug is yet in apakwa stage & not pakwa. It requires puta process to be continued.

**12.** ***Dante Kachkachaabhava***[03] When very small quantity of *Bhasma placed over lower molar teeth asked to crush it or rub it with upper molar teeth. One should not feel* gritty on chewing i.e., *Kachkachaabhava* and has a consistency like pollen grains of *Ketaki* (*Pandanus odoratissimus*)[22], then it is said to be formed properly for use. Significance: if Bhasma consists of larger it produces sound where as it will not for smaller size of particles.

**13.** ***Amla Pariksha***[03]: This Bhasma pareeksha is not for all Bhasma and is ment for few Bhasma. In this Bhasma pareeksha pinch of Bhasma will be placed over amla Dravya like curd, lemon juice, etc., for few minutes and observed for changes in the color of amla Dravya is noted. Change of color indicates Bhasma still needs to be continued to puta as it is is apakwa and no discoloration in *Amla Dravya* indicates Bhasma is pakwa. No need to continue to the puta further again. It is the specific test described for *Tamra* (Copper) *Bhasma*[23,24] **Significance:** In this bhasma *Pariksha the* presence or absence of free elemental form of metal in the prepared *Bhasma is checked.* If any free elemental form of metal is persistent in the *Bhasma* or the conversion process is not complete then those particles in *Bhasma* reacts with the *Amla Dravya* (e.g., curd, lemon juice, etc.) and forms salt compounds are which is responsible for the change in colour of the *Amla Dravya*. Thus it indicates need of puta process to convert remaining elemental form of metal.

**14.** ***Apunarbhava***[25,26,27,28,29]: *Bhasma* is being used will be taken in an equal quantity along with *Mitrapanchaka* i.e., *Guda* (jaggery), *Gunja* (*Abrus precatorious*), *Madhu* (honey), *Ghrita* (clarified butter) and *Tankana* (borax). This

mixture is taken in a *Musha* (crucible) and it is subjected to put which is followed while preparing the Bhasma. After completion of puta musha is opened and the materials i.e Bhasma & mitrapanchaka dravys. If it does not contain any free metal, then the *Bhasma* is said to be *Apunarbhava*. According to Rasa Tarangini, it is also known as *Niruttha Bhasma*. Significance: During this scientific test, an unstable metallic compound can reduce to a metallic state by the carbon reduction process. The absence of reduction denotes *Marana* process is complete and *Bhasma* attains *Apunarbhava Pariksha*. *Mitrapanchaka Gana Dravyas* used may act as a source of carbon at that par- ticular temperature.

**15.** ***Niruttha***[30,31,32,33]: The known quantity Bhasma and same quantity of *Roupya* are mixed taken in musha subjected to puta, which was adopted while preparing that particular Bhasma. After completion of puta process and when become swangasheeta weight of roupya is to be weighed. If there is no change or increase in weight of Bhasma it indicates Bhasma is good or it is *Niruttha Bhasma*. On opposition to this in case weight increase is there it will be considered as apakwa Bhasma.

According to Rasa Ratna Samucchya and Rasendra Chudamani, it is also known as *Apunarbhava* . In the case of *Niruttha Pariksha* of *Rajata* (silver) and *Naga*(lead) *Bhasma*, the use of in place of rajata, *Tamra* (copper) *Patra* is prescribed for testing of *Bhasma*.[34] In Anandakandah also, the use of *Tamra* (copper) *Patra* has been mentioned only for the testing of *Roupaya* (silver) *Bhasma*.[35] **Significance:** This test signifies the complete conversion of metal into *Bhasma* form. It can be considered the chemical analytical test. Specifically meant for *Dhatu* & indicates the stability of *Bhasma*.

**DISCUSSION**

Quality testing up of Bhasma must be carried out before to prescribe it to patients, as most of the bhasmas are prepared from raw materials which are highly toxic and heavy metals. Apart from this Bhasma considered under rasoushadhi group of medicine. Which possess high therapeutic efficacy at lower dosage quantity, in minimal duration of time. Their taste cannot perceived hence their high demand. This may force manufacturer to adopt shortcut methodologies in pharmaceutical procedures hence quality testing is must required. With this still it's safe to prescribe and consume. They will not create any sort of complications, ADR instead they will cure the disease further they have many advantages like their dose is very small in comparison with other dosage forms of medicine, they do not have taste, therapeutic results are observed in short time of administration, very easy to carry. Above discussed parameters are highly scientific more over doing them is very easy and comfortable. Same confirmative & quality assurance analysis nowadays can be achieved by sophisticated instrument's by spending huge amount of money. Thus, these tests may seem to be very simple but they are very scientific.

Though these Bhasma pareekshas are broadly classified in to samanya & vishesha the purpose of these to analyses the quality and safety either physically or chemically.

1. In above mentioned various tests fines of the particle size may be checked by rekhapurna, slakshnatwa, sukshmatwa, Anjana sadrashatwa, dantagre kachakacha abava.
2. Bhasmas density related tests are Varitara, Unnam.
3. Tests which confirm Prescence of free elemental form of metal particle are nischandratwa, avami, amla pareeksha, dadhi pareeksha, Nirutha, Apunarbhava pareeksha.
4. Tests which indicate incomplete conversion to its oxide or sulphide form nirdhumatwa

5. Tests which indicate ***palatability*** related niswadu or gatarasatwa

These and Those parameters methodology may be different but they are highly scientific. When individual test is being analyzed & observed. It can be noted that even in ancient time acharyas quality assurance knowledge.

*Classical parameters are which not only confirm quality but also assure safety. Though they look like traditional like but are highly scientific as explained previously. because of their smaller particle size they are quick in absorption, assimilation, reaching to the target site further showing the therapeutic results.* As mentioned above the tests like rekhapurna, slakshnatwa, sukshmatwa, Anjana sadrashatwa, dantagre kachakacha abava will predict the particle size of the Bhasma. It is proved and published in one of the research work in German published by the title Infrared Microscopy Imaging of Index-Finger Pads in this article its mentioned that ridges widths vary between 567 to 157 µm. slaksnatwa and sukshmatwa both indicate towards the samllre particle size in the Bhasma. Whereas dantagre kacha kacha abava too indicate towards the smaller particle size.[15]

Varitara and Unnam are related with the density of the Bhasma. The raw materiala may be metal like copper, iron, lead, tin or gem stone like diamond, pearl, sapphire or it may be mineral ore chalco pyrite, iron pyrite etc but the after the process of shodhana & Marana the end product Bhasma density will be very low and it is less than water so only Bhasma floats on water, even after bearing the weight of grain still it floats will not show heavy metal toxicity sign & symptoms.

The presence of fumes indicates that the *Marana* (incineration) process is not properly followed, drug is yet in apakwa stage not pakwa. It requires puta process to be continued. So Acharyas have described various parameters for qualitative issues of different *Bhasmas.* These parameters have different significances. compared to herbal formulations. The development of authentic analytical methods including quantitative analysis of bioactive compounds and other key constituents is a major need for scientists of this era. Ancient Acharyas were well known for the after-effects that occurred by ingestion of *Ashudh* and *Apakwa Bhasma*. So acharyas have described various parameters for qualitative issues of different *Bhasmas.* These parameters have different significances.

*Nishchandratvam* and *Amla Pariksha* indicates the presence of any free metal in *Bhasma* while *Varitara* and *Unama Pariksha* signifies the micro fineness and lightness of *Bhasma* particles. The *Niswadu, Awami,* and *Susukshma Pariksha* manifest palatability, acceptability, absorption, and assimilation of *Bhasma* respectively. *Slakshnatvam* and *Anjana Sannibha Pariksha* indicates the texture of the *Bhasma.* There are various complications (*Vyapad*) manifested out of *Ashuddha* and *Apakwa Bhasma Sevana Doshas* therefore, various methods of *Bhasma Parikshas* are described by Learned Acharyas.

## CONCLUSION

Rasasahstra has mentioned many parameters such as *Apunarbhava, Niruttha, Nirdhoomatva, Rekhapurnata, Varitara,* etc to analyze quality of Bhasma. Which are equivalent to some Analytical techniques testing parameters described in modern science. In fact classical tests are said to be easily performable, minimal invasive to carry, less expensive and fast reportive in comparison with modern tests like elemental analysis, crystal structure assay, partical size assay etc..

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