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Critical review of *Shodhana* and *Marana* of *Swarnamakshika*

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ABSTRACT

In *Rasashastra* classical books different authors have given different opinions regarding classification of *Swarnamakshika*. Some considered it as *Saklamyaghan* (cures all diseases) and *Prana* of *Parada*. (Inevitable in various mercurial operations). Hence it was placed under *Maharasavarga*. *Swarnamakshika* is grouped under *Updhatu* of *Swarna* and is composed of Copper, Iron and Sulphur. *Swarnamakshika* is considered as potent *Rasayana* drug and is indicated in diseases like *Pandu*, *Anidra*, *Apasmara* etc. Many *Shodhana* and *Marana* procedures have been explained for *Swarnamakshika* in different classics. A standard *Swarnamakshika* is prepared conveniently by using *Nimbuka Swarasa* as *Shodhana* and *Marana* media. *Marana* was done by using *Nimbuka Swarasa* until *Bhasmasiddi Lakshanas* found and it took 10 *Putra* till it attained reddish brown colour. In order to minimize the variability of manufactured product, standardization of *Bhasma* is must. *Swarnamakshika Shodhana* procedures remove toxicity from the minerals, metals gems, and poisons and make them safe for consumption; on the other hand if the medicines contain toxicity or any form of impurities, it may cause different health hazards.

Key words: *Swarnamakshika*, *Shodhana*, *Marana*, *Swarnamakshika Bhasma*.

INTRODUCTION

Swarnamakshika is said to have its origin from the drops of blood falling from the wound in the injured sole of Lord Krishna. The wound in the sole was caused by an arrow arched by a hunter by confusion with the animal, when he was in *Yoganidra* in the forest, after completing his duty in *Mahabharata*.^[1] *Swarnamakshika* (chalcopyrite) *Bhasma* has been

used for different therapeutic purposes since long in *Ayurveda*. It has been used for *Pandu* (anaemia), *Anidra* (insomnia), *Apasmara* (convulsions), *Mandagni* (poor digestion), *Kusta* (skin diseases) etc.^[2] as well as potent *Rasayana*^[3] drug. It has been used singly or in compound formulations as an important ingredient. *Swarnamakshika* is grouped under *Updhatu* of *Swarna*, as it has similar properties to that of *Swarna*, also it possess additional properties due to addition of *Loha* (iron) and *Tamra* (copper) in it.^[4] As it has abundant use in therapeutic procedures. Methods of *Shodhana* and *Satvapata* of *Swarnamakshika* are described by *Acharya Nagarjuna*, author of *Rasendra Mangala* (7-8th century).^[5] He also considered it as best drug for incineration of *Rajata*.^[6] *Rasa Hridayatantra* (10th century) describes therapeutic usage of *Makshika* as *Rasayana* and its usage in various alchemical dominancy. The references regarding usage of *Makshikasatva* in giving *Mukha* to *Parada Garbhadravana*, making *Parada Bandha* etc. are available.^[7] *Swarnamakshika* is elaborately

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explained by *Rasarnava* (12th century). He also explained about mythological origin of *Swarnamakshika*, *Shodana* and *Satvapatana* are also elaborately available.^[8] Ayurvedic texts have described methods of quality control of *Bhasmas* through different parameters like *Nischandratva*, *Varitara*, *Nirutha*, *Apunarbhava* etc. to achieve a specific acceptable standard *Bhasma*.^[9] Many *Shodhana* and *Marana* procedures have been explained for *Swarnamakshika* in different classics. The present selected topic “Study of *Shodhana* and *Marana* of *Swarnamakshika*” is an attempt to review on best suitable method of processing technique, so that availability of raw material and its cost effectiveness and minimum time factor required to prepare a genuine *Bhasma* is attained, by following standard operative processes which includes collection of standard raw material, product at different stages of pharmaceutical processing like *Shuddha Swarnamakshika*.

AIMS AND OBJECTIVES

1. Review of *Shodhana* procedures of *Swarnamakshika* as per classics.
2. Review of *Marana* procedures of *Swarnamakshika* as per classics.

Definition of *Shodhana*^[10,11]

- The process which eliminates the untowards quality is called *Shodhana*.
- When a substance is subjected to trituration with appropriate material for removal of unwanted material or impurities is known as *Shodhana*,
- Subjecting the *Loha*, *Dhaatu*, *Rasa*, *Uparasa* to the procedure likes *Swedana*, *Marana* etc with appropriate minerals to remove the *Doshas* is termed as *Shodhana*.

Types of *Shodhana*:^[12] *Samanya Shodhana* and *Vishesha Shodhana*

Samanya Shodhana - It is generally applied for the drugs which come under one category like *Maharasa*, *Upar Rasa*, *Dhaatu* etc. The drugs of one group having some similar types of impurities can be subjected to

Samanya Shodhana, so that the general impurities can be removed.

Vishesha Shodhana - It is especially applied for the drugs which contain high concentrated chemicals. Each drug of the group may have different types of impurities which can vary from substances to substances and are removed by *Vishesha Shodhana*.

Shodhana of *Swarnamakshika*^[13]

Shodhana has been defined as the process by which physical and chemical impurities get separated by treatment with various drugs. *Swarnamakshika*, if properly purified as per procedure adopted for *Shodhana*, *Marana* and *Amrutikarana*, as explained in the classics will not produce any of the side effects. Different drugs and their *Kalpas* have been mentioned for *Shodhana* of *Swarnamakshika* in different *Rasa* classics.

Table 1: Drug for *Shodhana* of *Swarnamakshika*

<i>Eranda Taila</i>	<i>Karkotikanda Swarasa</i>	<i>Tankana</i>
<i>Arnala</i>	<i>Ghrita</i>	<i>Kodrava</i>
<i>Shigrumula</i>	<i>Agasthipushpa Swarasa</i>	<i>Kalamarisha Kwatha</i>
<i>Matulunga Swarasa</i>	<i>Meghanada</i>	<i>Shalikhwatha</i>
<i>Kadalikanda Swarasa</i>	<i>Naramutra</i>	<i>Amlavetasa Swarasa</i>
<i>Suranakanda</i>	<i>Pashnabheda</i>	<i>Jambhira Swarasa</i>
<i>Triphalakwatha</i>	<i>Jayantipatra Swarasa</i>	<i>Takra</i>
<i>Nimbu Swarasa</i>	<i>Kulatha Kwatha</i>	<i>Ksheera</i>
<i>Saindhava Lavana</i>	<i>Tila Taila</i>	<i>Gomutra</i>
<i>Trikatu</i>	<i>Madhu</i>	<i>Tiktaka Swarasa</i>

Samanya Shodhana of *Updhatus* has been explained in *Brihad Rasaraj Sundara* and in *Arka Prakasha* in *Updhatu Prakarana*. *Swarnamakshika* is considered among *Updhatus* by some authors and it holds good for *Swarnamakshika*.

Samanaya Shodhana of Upadhaatu^[14]

By giving *Bhavana* (levigation) of *Triikatu Arka* and *Triphala Arka* twelve times each respectively, all *Upadhatus* gets purified.

Shodhana procedure of Swarnamakshika explained in different classics:

Different methods have been adopted for *Shodhana* of *Swarnamakshika* like:

- *Swedana*
- *Bharjana*
- *Nirvapana*
- *Bhavana*
- *Putra*

Table 2: Showing various procedures of Shodhana of Swarnamakshika explained in different Rasa classics^[15-20]

SN	Reference	Procedure	Drug Used	Method	Time/Frequency
1.	R.T. R.S.S. R.J.N.	<i>Swedana</i>	<i>Kalamarisha & Shali Kwatha</i>	<i>Dolayantra</i>	2 Ghatika
2.	R.P. R.R.S. R.Chu	<i>Swedana</i>	<i>ErandaTaila & Matulung Swarasa</i>	<i>Dolayntra/ Lohapatra</i>	2 Ghatika
3.	R.R.S. R.Chu R.T. R.J.N. Y.R.	<i>Swedana</i>	<i>Kadali Kanda Swarasa</i>	<i>Dolayantra / Lohapatra</i>	2 Ghatika
4.	R.R.S. R.Chu R.J.N.	<i>Nirvapana</i>	<i>Triphala Kwatha</i>	Heating <i>Swarnamakshika</i> and Quenching in <i>Triphala Kwatha</i>	21 or 7 times

5.	R.P.	<i>Swedana</i>	<i>Kadali Kanda Swarasa and Karkoti Kanda Swarasa</i>	<i>Dolayantra</i>	2 Ghatika
6.	R.T.	<i>Swedana</i>	<i>Kalamarisha Kashaya</i>	<i>Dolayanta</i>	1 Day
7.	R.M.	<i>Swedana, Puta</i>	<i>Swedana in Surankand Kullatha Kodrava Kwatha, Naramutra, Amlavetasa Swarasa, Amlavarga, Patutraya Kadalikanda Swarasa, Puta - Mardana inG hrita</i>	Subjected to <i>Swedana</i> by keeping in <i>Surankanda</i> and mentioned drugs and giving <i>Putra</i> with <i>ErandKasht haagni</i> .	1 <i>Putra</i> with <i>Agni</i> of <i>Erand Kashtha</i> .
8.	R.T.	<i>Nirvapana</i>	<i>Nimbu Swarasa</i>	Heating <i>Swarnamakshika</i> to red hot and quenching in <i>Nimbu Swarasa</i>	21 times.
9.	R.J.N.	<i>Swedana</i>	<i>Kanjika, Nimbu Swarasa, Gomutra, Jayanti Patra Swarasa</i>	<i>Dolayantra</i>	3 days
10.	A.P. R.S.S. R.J.N.	<i>Bharjana</i>	<i>3 Part Swarna Makshika + 1 Part Saindhav Lavana and Matulunga or Jambeera Swarasa</i>	<i>Pachana</i> in <i>Lohapatra</i> till bottom of vessel becomes red hot.	-

11.	R.J.N. RAV	Swedana+ Putra	Swedana - Surankanda, Taila, Kanji, Takra, Gomutra, Kadalirasa, Kulattha Kwatha, Putakshara, Amla, Lavana, Eranda Taila and Ghrita	Subjected to Swedana by keeping in Surana Kanda and mentioned drugs giving Putra by making Chakrikas	3 Putra
12	A.K R.J.N.	Swedana Putra	Swedana - Surankanda Naramutra, Kulattha Kwatha, Kodrava, Juices of Amlavetasa, Amlavarga + Tankana, Trikatu, Putra, Mardana in Eranda Taila and Ghrita	Subjected to Swedana by keeping mentioned drugs in Surankanda in Dola yantra and giving putra	Swedana in Dolayantra - 1 Day. Putra - Varahputra.
13.	A.K.	Swedana	Punarnava Kalka, Kutattha Kwatha/ Saindhav Lavana, Beeja Pura Swarasa,	Dolayantra powdered Swarnama kshika is kept in Punarnava Kalka and subjected to Swedana in Kulattha Kwatha/ made into a Pottali along with Saindhav Lavana and Beejpur Swarasa and subjected to Swedana in Kulattha Kwatha in Dola	1 Day

				Yantra.	
14.	R.J.N. A.K.	Nirvapana	Taila, Takra, Gomutra, Arnala, Kulattha Kwatha, Triphala Kwatha, Kanji.	Heating Swarnama kshika to red hot and quenching in mentioned drugs each 7 times.	7 times
15.	R.Chu	Swedana	Amla Kanji	Dolayantra	-
16.	R.Chi	Putra	Paste of root of Shigru, Agastya Patra Swarasa	Swarnama kshika is rubbed with Agastyapat raswarasa and kept in paste of roots of Shigru and subjected to Putra	-
17.	A.K.	Bharjana	3 parts Swarna Makshika 1 part Tankana, Matulunga or Jambhiri Swarasa.	Pachana in Lohapatra till Swarnama kshika attains Tamra Varna	-
18.	A.K.	Putra	Shigrumoola, Agasti Pushpa Swarasa, Pashanabhed Swarasa.	Swarnama kshika is rubbed with Swarasa of Agasti Pushpa and then with Pashanabhed Swarasa and then made to a ball duly dried subjected to Putra in	6 Putra A.K. 10 Cowdung cakes. R.J.N. 20 Cowdung cake in Andhamu sha.

				Sharava Samputa / Moosha	
19.	R.P.S.	Bhavana	Gomutra, Takra, Kulattha, Kwatha.	By giving Bhavana Swarna Makshika gets purified after drying	12 times
20.	R.O.	Bhavana	Tikta jala	- -	-
21.	R.J.N.	Putra	Mardana with Erand Taila	Subjected to Putra in Sharava Samputa	Putra with 30 Cowdung cakes.
22.	R.T.	Bharjana	Nimbu Swarasa	Pachana in Lohapatra till red colour	2 days
23.	R.J.N.	Swedana, Putra	Nimbu Swarasa, Shigrumula, Agasti Patra Swarasa.	Subjected to Swedana in Nimbu Swarasa and Mardana in Agasti Patra Swarasa	-

Marana procedures^[21]

Marana is derived from the word "Neu Dhatu" which means Vadha or Hinsa (to kill). In Rasa Shastra this word is used as a synonym of Bhasmikarana. The process of Marana converts the Rasa Dravya to irreversible form called Bhasma under the influence of fire in which Shodhita Rasa Dravya treated with Marakagana Dravyas so that Marita Dravya attains Pharmacotherapeutically new form. Marana is one of the processes adopted for converting metals and minerals into Bhasma form, suitable for internal use after Shodhana. In the process of Marana metals and minerals are converted into such a fine state of subdivision that when used internally they become easily digestible and absorbed.

The process of Marana has various stages that can be described in the following series:

- Shodhana
- Bhavana
- Chakrika Nirmana
- Samputikarana
- Putra
- Swaangsheets (Self cooling)
- Kuttanum (pestling)
- Parichalna
- Samrakshana

Table 3: Marana of Swarnamakshika^[22]

Drugs mentioned for Marana of Swarnamakshika in difference Rasa classics:

Gandhaka	Takra	Beejpura Swarasa
Hingula	Kumari	Ajamutra
Nimbuka Swarasa	Kulattha Kwatha	Shigrumool Swarasa
Ghrita	Ajamutra	Agastyapushpa Swarasa
Tila Taila	Matulunga Swarasa	

Table 4: Showing various procedures adopted for Marana of Swarnamakshika^[23-27]

SN	Ingredients / Dravyas Marana	Reference	Procedure	No. of Putras	Fuel
1.	Swarnamakshika - 1P Gandhaka - 1P Matulunga Swarasa - Q.S	R.R.SR J.NR. Chu	Sharava Samputa	5	Varaha Putra
2.	Swarnamakshika - 1P Gandhaka - 1P	R.P	Sharava Samputa	3	Kurma Putra

	Matulunga Swarasa - Q.S				
3.	Swarnamakshika/ Hamsapadi Swarasa - Q.S, Devdali Swarasa - Q.S, Vatapraroaha Swaras - Q.S, Arka Dugda - Q.S.	Br.R.R. S	Sharava Samputa	-	Bhudh ara Putra
4.	Swarnamakshika - 1P Parada - 1P, Gandhaka - 1P, Nimbu Swarasa - Q.S	R.S.	Kupi or Damru Yantra	3	Valuka Yantra Gaja Putra
5.	Swarnamakshika Swarasa Nimbu - Q.S	R.S.	Sharava Samputa	7	Gajapu ta
6.	Swarnamakshika Eranda taila / Ghrita/ Matulunga Swarsa - QS	R.R.S. R.J.N. R.Chu A.K.	Sharava Samputa		Intens e heat
7.	Swarnamakshita/ Nimbu Swarasa - Q.S	R.T.	Sharava Samputa	10	Gaja Putra
8.	Swarnamakshika - 1P Gandhaka - 1P Nimbu Swarasa - QS	R.P.S. R.T.	Sharava Samputa	5	Gaja Putra
9.	Swarnamakshika - 1P Hingula - 1/8 th P Nimbu Swarasa - QS	R.T.	Sharava Samputa	8	Gaja Putra
10.	Swarnamakshika - 1P Gandhaka - 1/4 th P Eranda Taila - QS	A.P.R.J .N.	Sharava Samputa	-	Gaja Putra with Tusha Dhaan

11.	Swarnamakshika - 1P Gandhaka - 1/4 th P Eranda Taila / Kullatha Kwath / Aja Mootra - QS	R.S.S.R .Ch A.P	Sharava Samputa	-	Gaja Putra
12.	Swarnamakshika - 1P Gandhaka - 1/4P Kumari Swarasa - QS	R.A.	Sharava Samputa	10/ 7	Gaja Putra
13.	Swarnamakshika - 1P Kumari Swarasa - QS	R.J.N.	Sharava Samputa	27	Kukkut a Putra
14.	Swarnamakshika - 1P Takra / Ajamutra / Kullatha Kwath/ Eranda Taila - QS	R.J.N. R.Ch Sh. Sa.	Pachana / Sharav Samputa	-	Intens e heat / Gaja Putra
15.	Swarnamakshika - 1P Matulunga Swarasa - Q.S	A.K.	Sharava Samputa	12	Gaja Putra

Amritikarana^[28]

Amritikarana is a special procedure for *Bhasma* to make them therapeutically safe and effective. As *Swarnamakshika* contains *Tamra* as one of the constituent. The *Amritikarna* methods adopted for *Tamrabhasma* can be implemented. After *Amritikarana* the *Doshas* remaining in the *Dhatu Bhasma* even after sufficient *Putas* are also removed as needed for some *Dhatu Bhasmas* like *Tamra*. To nullify these *Doshas* and produce *Snigdha*, *Soumya* and *Sheetagunas* in *Bhasmas*, *Amritikarana* is carried out.

Gunas and Karmas of Swarnamakshika Bhasma according to various Rasa Shastra texts^[29]

- Rasa - Madhura, Tikta, Kinchit Kashaya Rasa
- Guna - Laghu, Sheeta

- c) *Veerya - Sheeta*
 d) *Vipaka - Katu*
 e) *Dosha Prabhava - Tridoshaghna, Visheshata Kaph-Pitta Hara*
 f) *Karma - Rasayana, Vrushya, Sakalamayaghna, Vaajikaran, Chakshushya, Vishadoshahara, Swarya, Balya, Yoghahi, Pranavardhak, Dehavardhak and Medhya Dhaatuvadattmak*
 g) *Guna - Rasendra Prana, Durmela Lohdwaya Melankara.*

Therapeutic Properties^[30]

Swarnamakshika can cure all diseases, so it is termed as *Sakalamayaghna*. It is widely used as a medicine in *Ayurveda*, as it is *Uttamyogavahi*. It is best among all *Rasayanas* as it is referred as *Rasayanaagre* in classical texts. It is *Tridoshnashak*.

Table 5: Therapeutic indication of *Swarnamakshika Bhasma* in different diseases.

<i>Kshaya</i>	<i>Pandu</i>	<i>Jeerna Jwara</i>	<i>Anidra</i>
<i>Prameha</i>	<i>Kushta</i>	<i>Mandagani</i>	<i>Hridayroga</i>
<i>Arsha</i>	<i>Shotha</i>	<i>Aruchi</i>	<i>Kantheroga</i>
<i>Vastipeeda</i>	<i>Vishadoshas</i>	<i>Apsmara</i>	<i>Kaamla</i>

Anupana used for various diseases^[31]

- a) *Rajyakshma - Shilajatu*
 b) *Mutrakrichha - Yavakshara*
 c) *Shotha - Punarnava, Amrita, Shunti, Daruhaldi Kwatha*
 d) *Masurika - Kanchanara Twak Kashaya*
 e) *Vishama Jwara - Ativisha*
 f) *Kasa - Pippali, Veebhitak and Madhu*
 g) *Raktapitta - Parada, Gandhaka and Madhu*
 h) *Garbha Jwara - Rasesindura, Abhraka and Vyosha Bala Veerya Vriddhi*
 i) *Garbhani Raktasrava - Pinda Kharjura*

- j) *Bhagandar, Arsha, Jwara -Vidanga, Trikatu, Triphala Ghrita Paandu*

Dose of *Swarnamakshika Bhasma* - 1/2 Ratti to 2 Ratti.

Table 6: Important *Yogas* of *Swarnamakshika Bhasma*^[32]

<i>Kalpadruma Rasa</i>	<i>Tripurabhairava Rasa</i>	<i>Mihirodaya Rasa</i>
<i>Panchamrita Parpati</i>	<i>Trilochana Rasa</i>	<i>Jayamagala Rasa</i>
<i>Garbha Chintamani Rasa</i>	<i>Trilokya Chintamani Rasa</i>	<i>Raktapittantaka Rasa</i>
<i>Grahani Kapata Rasa</i>	<i>Tapyadi Lauha</i>	<i>Ratnagarbha Pottali</i>
<i>Chaturmukha Rasa</i>	<i>Panchamrita Rasa</i>	<i>Rasamrutha Parpati</i>
<i>Chandraprabha Vati</i>	<i>Bhaktavipaka Vati</i>	<i>Sarveshwara Rasa</i>
<i>Jayamangala Rasa</i>	<i>Maharajanrupativall abha Rasa</i>	<i>Sarjwarhar Lauha (Brihat)</i>

DISCUSSION

Objectives of *Shodhana*

A drug in its raw form contains certain impurities and toxicity that can have an adverse effect on the patient's health on consumption. *Shodhana* not only remove the impurities but also increases the therapeutic potency of the drug. The media used in the process of *Shodhana* has very important role in either breaking down or destroying the chemical constituent that is not required and increasing the biological efficacy of the drug. With the help of *Shodhana* we can achieve following objectives:

- Elimination of physical and chemical impurities which are not desired.
- Eradication on minimization of toxicity of the material.
- Transformation of the hard and non homogeneous material to soft, brittle, ductile and homogeneous material.
- Induction of desired qualities.
- Potentiation of therapeutic efficacy of the drug.

- Conversion of material in suitable form for further processing.
- Leads to unique and suitable physicochemical changes.
- For direct therapeutic uses in some cases.

Changes during Shodhana process

1. Physical changes

- Elimination of physical impurities: *Kampilaka* is separated from brick powder. *Guggulu* is separated from physical impurities. *Shilajatu* is separated from insoluble physical impurities.
- Reduction in hardness: By repeated heating and quenching hardness of the metal and mineral become less.
- Increase brittleness: By repeated heating and quenching in liquid media cracks are seen on the surface of the metal and minerals and these become brittle.
- Reduction in particle size: During *Nirvapa* process, cracks are seen on the surface of metal and minerals, and these are broken into coarse powder. In *Bhavana* process, reduction of particle size is achieved.

2. Chemical changes

- Elimination of chemical impurities: During *Shodhana* of *Swarnamakshika* (CuFeS₂) impurities like arsenic get eliminated by heating.
- Formation of chemical compounds: *Lauha* when heated upto red hot reacts with atmospheric oxygen to form ferro- ferric oxide which is favourable to the body. *Makshika* when fried, sulphur is eliminated and Iron and Copper part convert into oxide form.
- Change into desired compound: During *Shodhan* of *Tankana* and *Kankshi*, water portion is evaporated and desired chemical compound is formed like crystalline to amorphous form.

3. Biological changes

- The ultimate objective of these physico-chemical changes of the material is to increase its biological availability. Somehow, material as such or after

further procedure *Shodhana* procedure may potentiate its biological efficacy.

- Sometime this biological changes help in absorption smoothness leads to non irritability and all changes make the material body friendly.

Significance of Marana^[33]

Aacharya Nagarjuna has elaborated the importance of *Marana* in *Rasendra Mangalam*. The metal after proper *Marana* achieves the state of *Rasibhavanam* i.e. colloidal state. If this is administered properly. It can alleviate various diseases. *Marana* process reduces the drug into its finest particle form so that they can be easily absorbed in the system, mix in the *Dhatu*s and produce their desired effects without producing any complications. This procedure has an important significance in the following ways:

- Conversion of a hard metal or a mineral into a fine form.
- Elimination of any unwanted material by subjecting it to a high temperature under a suitable media of *Marana*.
- Increased therapeutic value of the drug in the body
- Conversion of a heterogenous substance into a homogenous one

Reduction of particle size

- Natural properties of the mineral subjected to *Marana* gets enhanced and even new properties are induced
- Imparts organic equalities in an inorganic mineral.
- Removal of any form of toxicity and making them absorbable into the system

CONCLUSION

Swarnamakshika is one among *Maharasa* composed of Copper, Iron and Sulphur. It is considered as a *Rasayanaagrya* and indicated in diseases like *Kushtha*, *Prameha*, *Pandu*, *Anidra* etc. *Swarnamakshika* has different Pharmaceutical procedures for *Shodhana* and *Marana*. *Shodhana* make the material brittle and

finer, prepare the material ready for further processes, reduce the grain size that facilitates advanced processes, while *Marana* is process of *Bhasmikarana* in which the *Shodhita* material is converted into ash form that can be easily administered internally for said therapeutic effect.

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