



COMPARATIVE ANALYSIS BETWEEN THE PROPERTIES OF KRISHNAVAJRA ABHRAKA AND BIOTITE

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ABSTRACT

The description of Abhraka is found from the vedic to modern period. It is been advocated for the Lohavada (conversion of lower metal to higher metal) as well as Dehavada (therapeutic use). Abhraka is only the one that makes Mercury heat stable by the process of Pakshachedana. It also play a very significant role in traditional system of medicine as the Abhraka bhasma has been used as a constituent along with Mercury in most of the rasa preparations. All these display the importance of Krishnavajra Abhraka in Ayurveda. Among all types of Abhraka Krishnavajra Abhraka is used for therapeutic purpose. So, in the present study a comparative analysis was done between the properties of Krishnavajra Abhraka and Biotite and the study shows the resemblance in properties of Krishna Vajrabhraka and Biotite. The

identifying remarks such as hardness, specific gravity, colour, basal cleavage, crystalline structure, conduction of heat, shining pattern.

KEYWORDS: Abhraka, biotite, kishnavajra abhraka.

INTRODUCTION

Ayurvedic drugs are usually prepared of herbs and herbo-mineral combinations.^[1] A branch dealing with the use of medicines predominantly of metal/mineral origin, emerged by the name Rasashastra (Rasa- Mercury, Shastra-Science).

Most of the drugs employed For Rasa-Chikitsa contains Mercury and are classified as Rasaushadies. Mercury is entitled as '**RasRaja**' i.e. it is like a king in all Maha rasa, Uprasa, Sadharana rasa etc.^[2] In Rasa Shastra Abhraka and Gandhaka stands next to Parada in importance. They are also considered as an essential agent for the various process of Parada Murcchana and Jarana etc. Among these two Abhraka is called as Gauriteja and it cause Bandhana of Mercury (Sutendra Bandhi).^[3] The Jarana of Mercury by Krishnavajra Abhraka make it more potent,^[4] also Pakshachedana of Mercury can be only carried out by Abhraka satva^[5] which makes it stable towards heat and suitable for Dhatu Parivartana^[6], all these display the importance of Abhraka in Rasa-shastra, besides above facts Abhraka in the form of bhasma is an important ingredient in most of the rasa preparations that are used to cure various diseases. In modern context Krishnavajra Abhraka is compared with Biotite Mica. Mica was first mined in India about 4,000 years ago, where it was used primarily in medicines, and some Hindu physicians still incorporate Biotite Mica into medicines today. Early civilizations also used Mica for decorations, as windows and as surfaces on which to draw or paint. "Mica" represents 37 phyllosilicate minerals that have a layered or platy texture. These mica minerals all have a crystalline structure that forms layers that can be split into thin sheets, a physical property called perfect basal cleavage. The principal micas used in commercial applications are biotite, muscovite and phlogopite.^[7]

So, all the above facts display the importance of Abhraka for both Dhaturvada (conversion of lower metal to higher metal) and Dehavada (therapeutic use). Among the various Rasa granthas, Rasendra Mangala first mentioned the name and use of Abhraka.^[8, 9] It was described as Maharasa^[10,11,12], Rasa^[13], Uprasa^[14,15,16,17,18,19,20], Updhatu^[21,22] and Loha^[23,24] by different Acharyas as shown in table no.1. Various parameters were used by Acharyas to classify the types of Abhraka in accordance to its reaction with agni (fire)^[25], its varna (social status)^[26], its udbhava sthana (origin)^[27] and its color^[28] shown in table no.2. Among all the types of Abhraka Krishnavajra Abhraka is best.^[29] Moreover, the modern classification of Mica satisfies the classification based on color made by the Rasaghrantha. Among the four colors Sweta Abhraka can be assigned to Muscovite $[H_2KAl_3(SiO_4)_3]$ ^[30] and Paragonite $[H_2NaAl_3(SiO_4)_3]$ ^[31], Rakta to Phlogopite $[H_2KMg_3Al(SiO_4)_3]$ ^[32], Peeta to Lepidolite $[KLiAl(OH,F)_2Al(SiO_4)_3]$ ^[33] and Zinnwaldite $[Li_2K_2Fe_2Al_4Si_7O_{24}]$ ^[34] and Krishna to Biotite $[H_2K(Mg,Fe)_3Al(SiO_4)_3]$ ^[35]

Table 1: Description of Abharaka

Varga	Reference
Maharasa	Rasendra Chudamani ^[10] , Rasa Padhati ^[11] , Rasa Prakash Sudhakar ^[12]
Rasa	Rasa Ratna Sammuchaya ^[13]
Uprasa	Ayurveda Prakash ^[14] , Bhava Prakash ^[15] , Rasa Ratnakar ^[16] , Vrihat Rasa Raja Sundar ^[17] , Anandakand ^[18] , Rasa Jal Nidhi ^[19] , Rasa Manjari ^[20]
Updhatu	Sarangdhar Samhita ^[21] , Yoga Ratnakar ^[22]
Loha	Rasa Hridya Tantra ^[23] , Rasamrita ^[24]

Table 2: Types of Abhraka according to various parameters

Acc to the reaction to the fire ^[25]	Pinaka, Naga, Mandura, Vajra
Acc. To varna ^[26]	Brahmana(sveta), Ksatriya(Rakta), Vaisya(pita), Sudra(krisna)
Acc. To Udbhava Sthana ^[27]	Uttaraseilotha(uttama), Daksinoseilotha(madhyama), Purvaseilotha(hina)
Acc. To color ^[28]	Sveta. Rakta, Peeta, Krisna

GRAHAYA FEATURES OF ABHRAKA

In our Rasgranthas grahaya and agrahaya features of most of the dravyas are described. Grahaya features are the acceptable characters of the respective dravya and agrahaya are opposite to it. Both these features of Abhraka are to be considered importantly before using Abhraka for any medicinal purpose, besides these Acharyas have also described the depth of mines from which Abhraka should be procured as shown in table no.4 but these have no scientific relevance. The grahaya features of Abhraka by different rasagranthas are shown in table no.3.

Table No. 3: Grahaya features of Abhraka by rasagranthas

Characters	R.R.S ^[36]	R.Cu. ^[28]	R.P.S. ^[37]	R.S.S. ^[38]	R.T. ^[39]	Ra.Sa. ^[40]
Snigdha	+	+	-	-	+	-
Prthudalam	+	+	-	-	-	-
Varnasayuktam	+	-	-	-	-	-
Bharatoadhikam	+	+	-	+	+	-
Sukha nirmochyapatram	+	+	-	-	+	-
Nilanjanopamam	-	-	-	-	+	-
Mahojjwalam	-	-	-	-	+	-
Mrdulam	-	-	-	-	+	-
Vahinisaham	-	+	+	+	-	+
Kathoranga	-	-	-	+	-	-
Kajjalsanibham	-	-	-	+	-	-

- Note: R.R.S.- Rasa Ratna Samuchya, R.H.T. - Rasa Hridya Tantra, R.Cu.-Rasendra Chudamani, R.P.SU. - Rasa Prakash Sudhakar, R.S.S.-Rasendra Sara Sanghra, R.T. – Rasa Tarangini, R.Sa. – Rasayana Saar.

Table no. 4: The depth of mines

Prescribed depth	Physical properties of that abhraka	Properties of abhraka which is not collected from the prescribed depth
RAJAHASTA ^[41]	Uktaphaladam	Nihsatvam Nisphalam
1 PURUSH PRAMANA ^[42]	Satvaphalapradam Gunadhikyam	Svalpagunam
1 PURUSH PRAMANA ^[43]	Anjanabham Bharapurnam Gunadhikyam	-
GAJAPRAMANA ^[43]	Anjanabham Bharapurnam Gunadhikyam	-

COMPARISION BETWEEN THE PROPERTIES OF ABHRAKA AND BIOTITE

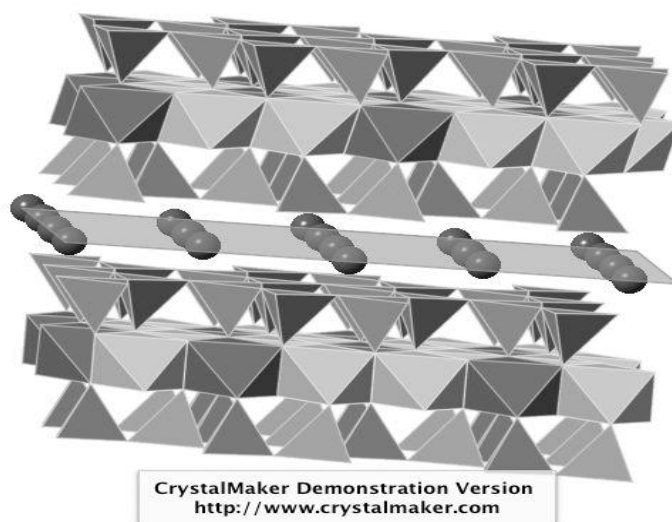
Biotite have the properties of high specific gravity capable of splitting into thin laminae, stable to heat (used to insulate heating system), hard, black color and shiny lusture that shows resemblance with Bhartoadhikam, Sukhanirmochyapatram, Vahinisaham, Kathorangam, Kajjalsaniham and Mahojjwalam properties of Krishnavajra Abhraka respectively. A comparative analysis is done among the properties of Krishnavajra Abhraka and Biotite in table no.5.

Table 5: Comparative analysis among the properties of Krishnavajra abhraka and biotite

Krishnavajra Abhraka	Biotite
Bharatoadhikam	Specific gravity(2.6-3) ^[44]
Sukha nirmochyapatram	Having perfect basal cleavage and capable of splitting into thin laminae ^[45]
Vahinisaham	Used to insulate the heating system ^[45]
Kathorangam	Hard ^[46]
Kajjalsanibham	Biotite ^[47]
Mahojjwalam	Shiny lusture ^[48]

DISCUSSION

In the present study a comparative analysis of the properties of Krishnavajra Abhraka and Biotite is carried out. As Biotite is considered to be ionic solid and the particles forming the solid are cations and anions which are held together by strong electrostatic force of attraction. To overcome this force of attraction a very high amount of energy (in the form of heat) is required to separate the cations and anions. That's why it has high melting and boiling point^[46] which makes it suitable to insulate heating system^[45] and that may be similar to the Vahinisaham property of Krishnavajra Abhraka. Also due to this electrostatic force of attraction in an ionic crystal brings the ions very close to one another. This results into small volume of the crystal and consequently the ionic crystals have high density that suppose to be makes Abhraka guru (heavy). Ionic solids do not get powdered easily as they are hard^[46] and may be because of this Acharyas mentioned the mardana of Abhraka with Dhanaya to form Dhanyabhraka and Sahasra puta for Abhraka bhasma preparation that reduce its hardness and make it fine powder. The main content of Biotite is Iron^[49] that may be considered the reason for black color of it. The Ionic solids have free electrons that are often produce due to defect in their crystal lattice that makes their surface lustrous that may be considered the reason for luster of Krishnavajra Abhraka. Biotite have perfect basal cleavage that results in easy splitting of it into thin lamina and may be due to this reason the patra of Krishnavajra Abhraka are easily separable. So, with the above facts it can be concluded that Krishnavajra Abhraka and Biotite have resemblance in most of their properties. So it may be infer that the grahaya aghraya lakshana mentioned in ancient texts were observations based on limited resources of that era which can even be authenticated by today's sophisticated modern science.



Biotite
•Layers of linked octahedra of MgO₆ and FeO₆.
•Layers of linked SiO₄ tetrahedra.
•K ions between layers



Biotite Mica

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