

CHARACTERISATION OF VAIKRANTA, AN AYURVEDIC MINERAL DRUG

Prem Shankar Pandey*

*Department of Rasa Shastra and Bhaishajya Kalpana, Faculty of Ayurveda,
Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221005, India.

Article Received on
29 August 2019,

Revised on 19 Sept. 2019,
Accepted on 09 Oct. 2019,

DOI: 10.20959/wjpr201912-16053

*Corresponding Author

Prem Shankar Pandey

Department of Rasa Shastra
and Bhaishajya Kalpana,
Faculty of Ayurveda,
Institute of Medical
Sciences, Banaras Hindu
University, Varanasi -
221005, India.

ABSTRACT

Ayurveda is thousands of years old holistic system of Indian medicine. Various minerals and metals preparations are used as medicine in Ayurveda. In the Ayurvedic description several metallic preparations called Bhasma are in clinical use since 8th Century, A.D. Vaikranta (Tourmaline) has been in use under Maharasa group. It is widely used for treatment of a number of diseases. The present study deals with the mineralogical characterization of mineral Vaikranta having medicinal importance in Ayurvedic system of medicine. Vaikranta is used in the form of Bhasma for the treatment of tuberculosis, diabetes, skin diseases, brain tonic, aenemia, asthma, nervous diseases, piles etc. However, raw drug standardization plays a vital role for assuring the therapeutic potential of the final drug, Vaikranta is distributed in hills of Rajasthan, Bihar, Jharkhand and Karnataka. The sample of

Vaikranta was collected from local vendor and authenticated by the subject expert and further analysed through physical properties of the mineral. The results showed that Vaikranta is mineral of Iron, Silicon, Aluminium, Magnesium and Sodium and are present in requisite amount. Vaikranta is available in seven colours, but the black Vaikranta(Tournaline) is real therapeutically active mineral. It is observed that it possess definit crystal form, streak, hardness, cleavage, fracture, luster, specific gravity. All these physical properties and study of Electron Probe Micro Analysis (EPMA) of minerals Vaikranta are very well match with the acceptable characteristics of Vaikranta as described in Ayurvedic classics.

KEYWORDS: Vaikranta, Tourmaline, Rasa Shastra, Maharasa, EPMA, Standardisation.

INTRODUCTION

Ayurveda is one of the oldest system of Indian medicine, practised in Indian sub-continent, which is well established science of life. This science is trusted and established through thousands of years.^[1] Various herb, metal and non-metal preparations are used as medicine in Ayurveda. Charak and Sushurata during his period, introduced medicinal plants which were primarily used for the preparation of remedial agents. Nagarjuna, the Indian alchemist in 8th Century A.D. first introduced the use of metals and minerals like Rasa (mercury), Swarna (gold), Abhraka (mica), Tamra (copper) as medicinal agents.^[2] A careful examination of the texts of Rasa Shastra (a branch of Ayurveda) reveals that it not only covers the entire field of inorganic pharmaceutical preparations but also especially how the metal and mineral preparations are to be prepared and used. The metals, minerals are converted into Bhasma by triturating, macerating, heating and burning several times using Ayurvedic methodology, Sodhana, Bhavana and Marana. The process changed the physical and chemical properties of parent metals, minerals and gems and converted into particles of nano-size drug. The nano-size helped the drugs to reach the target site efficiently. The scientist of the ancient time did this process to get rid of toxic effect of the metals/minerals. The drugs developed in this method were not only more effective but had quick action and required smaller dosage. Hence the use of metals and minerals became the strength of Ayurvedic therapeutics.^[3]

Vaikranta has very important place in Rasa Shastra and is placed under Maharasa and Upratna group.^[4] It is described to possess features and properties similar to those of Diamond. It can be used in place of Diamond, which is very precious stone whose use is beyond the limit of common man. Vaikranta possesses pharmacological and therapeutic properties similar to Diamond, but still very few researchers have worked on it. There are controversies regarding Vaikranta in Rasa Shastra texts because it is represented by different minerals which are identified as flourspare, feldspar, quartz and tourmaline. By taking into account all the properties described in classical texts and using information from geology, mineralogy, physical, chemical and spectral analysis and biological parameters^[4], it is proved that tourmaline is the only mineral which should be used as Vaikranta. Black tourmaline should be taken for therapeutic purpose and placed under Maharasa group while others such as fluorspar, feldspar and quartz placed in Upratna group.^[5,6] Vaikranta is mostly distributed in mountain regions along the border of Vindhya ranges, Rajasthan, Jharkhand, Bihar, Karnataka, Burma and Ceylon. Vaikranta is used therapeutically by converting it to Vaikranta Bhasma after pharmaceutical treatment known as Sodhana, Bhavana and Marana.^[7] The

Ayurvedic formulations are dependent on raw materials so that the required active drugs should be prepared. It is therefore important to select genuine Vaikranta stone and identify them so that therapeutically potent Vaikranta Bhasma should be prepared as per Ayurvedic methodology. Review of Ayurvedic texts elaborately explained the physical properties of Vaikranta. Table-1.^[8] The present study was thus undertaken to assess the characterisation of Vaikranta for its physical, mineralogical characterisation through Ayurvedic as well as modern methods.

Table No 1: Description of mineral Vaikranta from an Ayurvedic perspective.

Category	Details
Broadly classified group	Maharasa category of mineral having therapeutic value
Types	Four types, fluorspar, feldspar, quartz and tourmaline.
Heating	On heating it swells up and does not fuse.
Colors	May be of seven colors viz Sveta (white), Rakta (red), Pita (yellow), Nila (blue), Ash colored (dove colored), Syamla (greenish) and Krishna(black).
Therapeutically accepted	Krishna (black), as an ideal one.
Grahya Lakshana	Krishna (Black), the ideal one, is of eight angles, eight surfaces or six angles and six surfaces, smooth, heavy.
Sodhana and Marana	Should be done as per Ayurvedic classics
Indications	Raises body immunity, tuberculosis, diabetes, skin diseases, chronic dyspepsia, nervous diseases, brain tonic, anemia, asthma, piles etc.
Potentiality	Potentiality is raised by using it with Abhrak Bhasma, Parada Bhasma, Swarna Bhasma and other similar combinations.
Doses	60 mg with honey twice a day

MATERIALS AND METHODS

The samples of Vaikranta were collected from the local market of Varanasi and authenticated by the subject expert. The mineral was tested for its physical properties and mineral characterization was made for genuine sample by adopting different methods. The following method has been adopted for its characterization.

- Identification and physical verification of Vaikranta according to Grahya Lakshana (acceptable properties) mentioned in the Ayurvedic classic texts.
- Analysis of the physical properties of Vaikranta as per the mineralogical description mentioned in the Ayurvedic Pharmacopoeia of India.^[9]
- The mineral chemistry of various phases in the studied sample was carried out by Electron Probe Micro Analysis (EPMA).

RESULTS AND DISCUSSION

The procured sample of Vaikranta was identified and verified as per the classic reference.^[10] Observations are shown in Table-2.

The physical characterization was carried out as per the Ayurvedic Pharmacopoeia of India.^[9] The results of mineralogical details of Viakranta were verified as per the reported mineralogical description of Vaikranta^[5,6] as shown in Table 3 and figure-1. The Electron Probe Micro Analysis [EPMA] for the mineral chemistry and elemental assay of various phases of the studied sample was carried out and the results are presented in Table -4, Figure-2.

The present study deals with the mineralogical characterization of mineral Vaikranta according to Grahya Lakshana as explained in Ayurvedic texts as well as the mineralogical standards as mentioned in the Ayurvedic Pharmacopoeia of India.^[9] Vaikranta is distributed in India mainly in Rajasthan, Bihar, Jharkhand and Karnataka. The chemical composition and physical properties vary from place to place and mine to mine. The mineral identity of Vaikranta has unfortunately been a matter of controversy. It is worth mentioning that at least four items viz fluorspar, feldspar, quartz, and tourmaline are being used for Vaikranta by different pharmacies and physicians. Further, it has been established by different studies that tourmaline is the only mineral which should be used as Vaikranta. Therapeutically the black tourmaline has been in use under Maharasa group while other three varieties of Vaikranta has been used in astrology and placed in Upratna group.^[5,6] Ayurvedic texts revealed that Vaikranta may be of seven colors viz white, red, yellow, blue, dove colored, greenish and black. The physical properties for identifying the minerals are crystal structure, crystal form, color, streak, hardness, cleavage, fracture, transparency, magnetism, luster, specific gravity, conductivity, roasting and reaction on fire. Most of the physical properties verified in this study are very well match with the standard of Vaikranta (tourmaline)^[5,6] (Table-3, Firkure-1).

Table No 2: Grahya Lakshana(acceptable properties) of Vaikranta as per Ayurvedic classics.

Acceptable properties	Physical properties	Observations
Astasra	8 Borders	+
Astaphalaka	8 Surfaces	+
Shatkona	6 Angles	+
Masrina	Smooth	+
Guru	Heavy	+
Sudhamisrithavarna	Mixed colors or white	+

The properties mentioned in classical texts, such as Astasra, Astaphalaka, Shatkona, Masrina, Gurn and Sudhamisrithavarna (Table-2) are very well matched with crystal shape and nature etc, the physical properties of mineralogy. However, collection of sample from different geological sources may effect the physical properties of any sample. Vaikranta on heating in open tube gives light orange fumes which turned to green on cooling. When heated in close tube, it gives black colored fumes. It emitted white fumes on roasting which changes to grayish black color with 20% loss in weight in one hour.

The EPMA study carried out in the Department of Geology, Banaras Hindu University confirmed that Fe, Si, Al Mg and Na are in good amounts in Vaikranta. The elements Cu, S and Pb are present in minor amounts [Table-4]. The Figure-2 represented the back scattered electron microscopy of mineral Vaikranta by EPMA.

Table No 3: The results of physical properties of Vaikranta (tourmaline).

SI No.	Characterization Parameters	Vaikrant Observation
1	Nature of the crystal	Massive
2.	Crystal structure	Hexagonal
3.	Crystal form	Columnar
4.	Color	Black
5.	Streak	Black
6.	Hardness	7-7.5
7.	Cleavage	Indistinct
8.	Fracture	Conchoidal to uneven
9.	Transparency	Transparent to opaque
10.	Magnetism	Weakly positive
11.	Luster	Vitrous
12.	Specific gravity	3.06
13.	Conductivity	Poor
14.	Heating in open tube	The sample turned into light orange fumes and later turned into green on cooling.
16.	Heating in close tube	Black color fumes were seen and powder got settled down at the bottom.
17.	Roasting	Emitted white fumes with garlic odour and color changed from grayish black to blackish. The weight loss was up to 20% on roasting for 1 hour.

The present study confirms the authenticity of Vaikranta as tourmaline by following the standards of classical as well as contemporary references. Vaikranta is used therapeutically in the form of Bhasma by oral only after some pharmaceutical treatment known as Sodhana and Marana.^[7] In current trend these Bhasmas are considered as nanomedicine particles in nano

range and biomedical application of nanomedicine is well understood and is one of the emerging trend in medicine.^[11]

Tables No 4: The elemental assay of mineral Vaikranta (tourmaline) analysis by EPMA.

Element S No.	Fe	Cu	S	Si	Al	Mg	Na	Pb
1	10.8560	-0.0448	0.0140	17.9632	15.4275	1.1077	1.2379	0.0495
2	10.3071	-0.0447	0.0047	17.8958	14.8796	0.9843	1.3340	-0.0197
3	10.7904	-0.0297	0.0158	18.0411	15.4713	1.0463	1.3108	-0.0295
4	10.4648	-0.0747	0.0031	18.0291	14.7052	1.0680	1.3125	0.0001
5	9.9015	-0.1047	0.0219	18.4912	15.7311	1.0239	1.2166	0.1294
6	10.3263	-0.1943	0.0094	18.2873	15.6409	0.9300	1.1895	0.0497
7	9.0441	-0.1197	0.0425	18.1558	15.0675	0.8860	1.0441	0.0302
8	9.6308	-0.1796	0.0267	18.7240	15.9307	1.0173	1.1631	0.0400

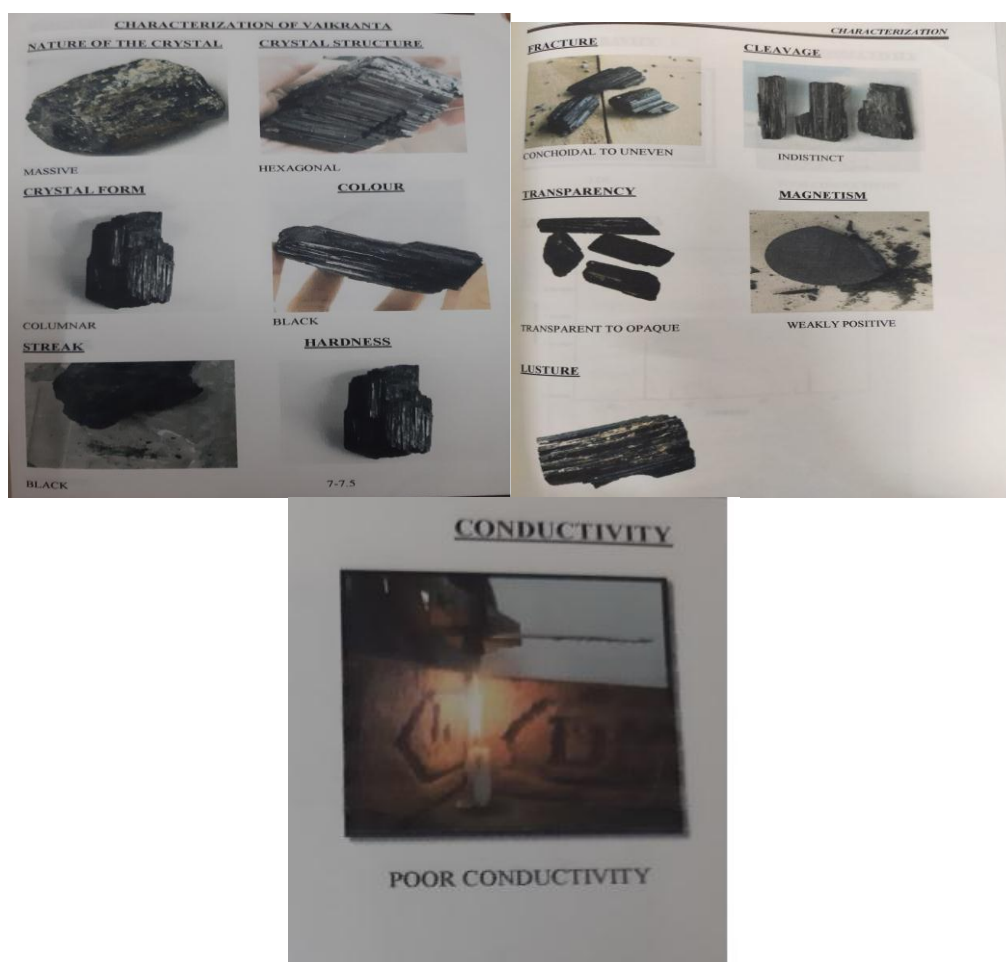


Figure 1: Test conducted for physical properties verification of Vaikranta.

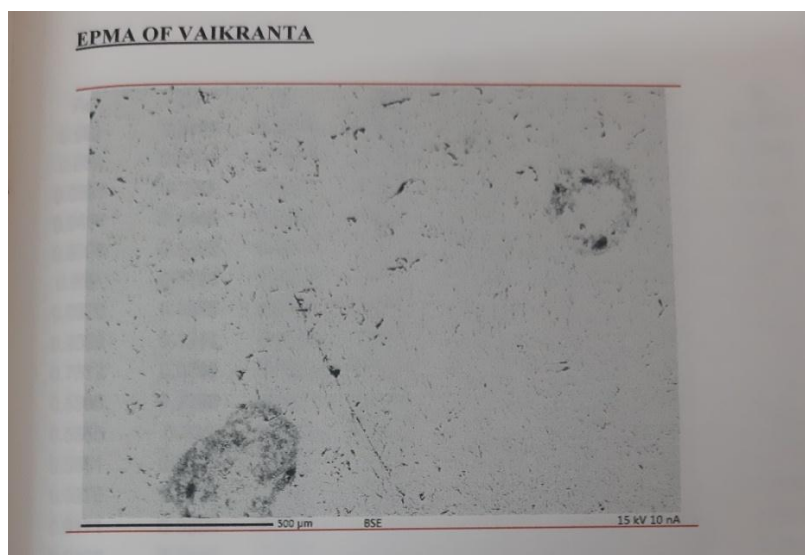


Figure No 2: Back scattered electron microscopy of mineral Vaikranta by Electron Probe Micro Analysis (EPMA).

CONCLUSION

Of several precious stones used in Indian system of medicine, Vaikranta (tourmaline) occupies a very important position. Rasa Shastra Samucchaya includes Vaikranta in the group of Maharasa. It is therefore necessary to validate the mineral identity to be used as Vaikranta in therapeutics because raw drug standardization plays an important role in assessing final drug for better therapeutic agents. The present study deals with the standardization of mineralogical characterization of Vaikranta as per Ayurvedic classics and modern methodology.

CONFLICT OF INTEREST: None.

ACKNOWLEDGMENTS

Author is thankful to Prof. N. V. Chalapathi Rao and Dr. Dinesh Pandit, Department of Geology, Center of Advance Study, Banaras Hindu University, Varanasi for EPMA study of studied sample.

REFERENCES

1. Chaudhary A. Ayurvedic Bhasma. Nanomedicine of ancient India- its global contemporary perspective. J. Biomed. Nanotechnol, 2011; 7: 68-9.
2. Rai R K, Jha C B Chansuriya JPN, Kohli KP. Cosnparative assessment of antihyperlipidaemic action of Tamra Bhasma Indian J. Traditional Knowledge, 2008; 7: 335-40.

3. Pal S K. The Ayurvedic Bhasma: The ancient sciences of nanomedicine. Recent Patents on Nanomedicine, 2015; 5: 12-18.
4. Rasaratna Samucchaya, Pub. Motilal Banarasi Das, Varanasi, 1962.
5. Sharma VN, Singh RS, Ulabhaje AV and Sen SP. Studies on identification of Vaikranta used in Ayurveda, Ancient Science of Life, 1982; 1: 146-54.
6. Tripathi R, Rathore A S, Mehta B L, Raghubir R. Physicochemical study of Vaikranta Bhasma. Ancient Science of Life, 2013; 32: 199-204.
7. Rasatarangini: Sadanand Sarma, Motilal Banarasi Das New Delhi, 6th Edn. Sambata 2016.
8. Available on : <https://www.planetayurved.com>
9. Anonymous. The Ayurvedic Pharmacopoeia of India, New Delhi, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy, 2008.
10. Pandey P S. Identification of minerals of medicinal importance with special references to Maharasa. M D thesis, Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore, 2017.
11. Ajay G, Anil M, Arvind LB. Significance of nanotechnology in mineral sciences. Asian Journal of Pharmacy, 2008; 2: 80-5.