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PHARMACOGNOSTICAL AND PHARMACEUTICAL EVALUATION OF *MANDURA VAJRA VATAKA* - A COMPOUND AYURVEDIC FORMULATION

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ABSTARCT

Anaemia is considered as a blood disorder characterized by low Haemoglobin level. Iron deficiency is the commonest nutritional deficiency in the world and its prevalence is highest in Indian population. According to the World Health Organization (WHO), there are two billion people with anaemia in the world and half of the anaemia is due to iron deficiency.[1] *Mandura Vajra Vataka* is compound of Ayurvedic formulation mentioned in Chakradatta, *Pandu Chikitsa*. *Mandura Vajra Vataka* contains *Pippali*, *Amalaki*, *Bibhitaki*, *Vidanga* etc. and *Mandura Bhasma*. The present study was carried out to standardize the finished product *Mandura Vajra Vataka* to confirm its identity, purity and quality. The presence of Black debris of *Maricha*, black deposition of ferric oxide, border pitted vessel of *Pippali*, Crystal deposition of cow's urine, fragment of *Devdaru* etc. were the characteristic features of observed in microscopy of drug. Physico-chemical analysis shows loss on drying is 8.34% w/w, water soluble extract is 25.10% w/w, methanol soluble extract is 9.48% w/w, ash value is 60.88% w/w and PH is 6.5. High Performance Thin Layer Chromatography (HPTLC) at 254 nm and 366 nm resulted into 11 & 6 spots respectively.

KEYWORDS: *Mandura Vajra Vataka*, Pharmacognosy, Pharmaceutics, HPTLC.

INTRODUCTION

In Ayurveda, *Pandu* is considered as a specific disease with its own Pathogenesis and treatment.[2] In *Pandu Roga,* there is change in the color of the body like pallor of skin, sclera, Nail, Tongue etc. due to *Rakta Alpata* means Hemoglobin level decrease than the normal level. We can correlate this disease to Anemia in modern science.

Anemia is characterized by abnormally low levels of healthy RBCs. RBCs deliver oxygen to tissues throughout the body. The reduction of any or all of these blood parameters reduces the essential delivery of oxygen through the bloodstream to the organs of the body. Iron which is found in the bloodstream is essential for growth, enzyme development and function, a healthy immune system and muscle strength. It is an important component of hemoglobin and myoglobin, the type of hemoglobin in muscle tissue. PCV also decrease in Iron Deficiency Anaemia.[3]

Iron deficiency is a very common nutritional disorder worldwide and is known to affect approximately one third of the global population. While its incidence in affluent countries is low, the incidence of IDA in India is very high. According to National Family Health Survey (NFHS) III data, the incidence of anemia in urban children is 71%, rural is 84%, and overall is 79%.[4] Nutritional iron deficiency is the most common cause of anemia in India.[5]

Mandura Vajra Vataka contains are *Pippali*, *Amalaki*, *Bibhitaki*, *Vidanga* etc. and *Mandura Bhasm. Mandura Bhasma* is a drug of choice for iron deficiency anemia (microcytic anemia) and debility associated with the anemia. In Ayurveda, it is also used for amenorrhea (absent periods), dysmenorrhea, jaundice (hemolytic jaundice) and liver and spleen disorders. The Pre-clinical studies of *Mandura Vajra Vataka* have already been carried out; in which standardization, pharmaceutical, pharmacological studies and also clinical observations on healthy volunteers were done. To maintain the therapeutic activity of the drug standardization is very much necessary.

MATERIALS AND METHODS

Drug Material

Raw drug materials were collected from the pharmacy of Gujarat Ayurveda University. The ingredients and the part used are given in table no 1.

Methods of preparation of *Mandura Vajra Vataka*

One part of each *Panchkoala*, *Triphala*, *Maricha*, *Devdaru*, *Vidanga*, *Nagarmotha* should be added with doubled the quantity of *Gomutra Sodhita Mandura Bhasma* and boiled with eight times of cow's urine till it become semi-solid. There after *Vatakas* (pills) should be prepared out of it.

Pharmacogenetic study

Raw drugs were identified and authenticated by the Pharmacognosy laboratory, I.P.G.T & R.A., Jamnagar. The identification was carried out based on the morphological features, organoleptic features and powder microscopy of the individual drug.[6] Later, Pharmacognostical evaluation of the *Mandura Vajra Vataka* was carried out. Tablet was dissolved in small quantity of distilled water, filtered through filter paper and studied under the microscope attached with camera, with stain and without stain. The microphotographs were also taken under the microscope.[7,8]

Physicochemical Evaluation

Mandura Vajra Vataka was analyzed by using standard qualitative and quantitative parameters, HPTLC was carried out after making appropriate solvent system with Methanolic extract of *Medhya Rasayan* Tablets at the Pharmaceutical Chemistry lab, I.P.G.T. & R.A. Gujarat Ayurved University, Jamnagar.[9,10,11,12]

OBSERVATION AND RESULTS

Organoleptic Evaluation

Various parameters of the material such as colour, odour, touch and taste of the *Mandura Vajra Vataka* were observed and recorded. Touch was analyzed with the help of *Darshana, Sparshana, ghrana and Rasana Pareeksha* mentioned in Ayurveda. Results were mentioned in the Table no.2.

Microscopic study

The powder microscopy of *Mandura Vajra Vataka* confirmed the features of Black debries of *maricha*, black deposition of ferric oxide, border pitted vessel of *pipali*, Crystal deposition of cows urine, fragment of *Devdaru*, scleroids of *haritaki*, fragment of fiber of *Devdaru*, stone cell of *maricha*, simple trachoma of *Bibhitaki*, Starch grain of *chitraka* & *pipali*, Stone cell of *Vidanga* & *Devdaru*, Paranchyma cell of *chavya* etc which are depicted in plate 1.

Physical tests

Following Physical parameters of *Mandura Vajra Vataka* were analyzed and results were mentioned in the table no. 3. Physical analysis like Shape, Hardness, and Uniformity of weight were recorded.

Physico-chemical Analysis

Physico-chemical analyses were carried out by following the parameters. Physico‑chemical analysis like loss on drying at 110°C, pH value, ash value, water soluble extractive, methanol soluble extractive were recorded. Results were mentioned in the table no. 4.

High Performance Thin Layer Chromatography (HPTLC)

HPTLC was carried out after making appropriate solvent system with Methanolic extract of *Mandura Vajra Vataka*. On performing HPTLC, visual observed tablet on under UV light showed few spots but on analyzing under densitometer at 254nm and 366nm it resulted into 11 and 6 spots respectively. Results of HPTLC are given in Table no 5 and densito-gram is shown in plate 2.

Table no. 1: Ingredients of *Mandura Vajra Vataka.*

Drug Name	Botanical Name	Part Used	Quantity
Pippali	*Piper longum*	Fruit	1 Part
Pippalimula	*Piper longum*	Root	1 Part
Chavya	*Piper cheba*	Fruit	1 Part
Chitraka	*Plumbago zeylanica* Linn	Root	1 Part
Sunthi	*Zinziber officinale*	Rhizome	1 Part
Maricha	*Pipernigrum*	Fruit	1 Part
Devadaru	*Cedrusdevdaru*	Bark	1 Part
Haritaki	*Terminaliachebula*	Fruit	1 Part
Bibhitaki	*Terminaliabellerica* Roxb.	Fruit	1 Part
Amalki	*Phyllanthusembelica*	Fruit	1 Part
Vidanga	*Embaliaribes*	Fruit	1 Part
Nagarmotha	*Cyperus rotundes*	Root	1 Part
Mandura Bhasma	*Ferricoxide* calx	-	24 Part

Table no. 2: Organoleptic characters of *Mandura Vajra Vataka.*

No.	Organoleptic Characters	Results
1	Colour	Coffee brown
2	Taste	Salty and astringent
3	Odour	Slightly aromatic and cow`s urine smell
4	Touch	Hard
5	Sound	Cracking Sound,
6	Appearance	Tablet

Table No 3: Physical analysis of *Mandura Vajra Vataka.*

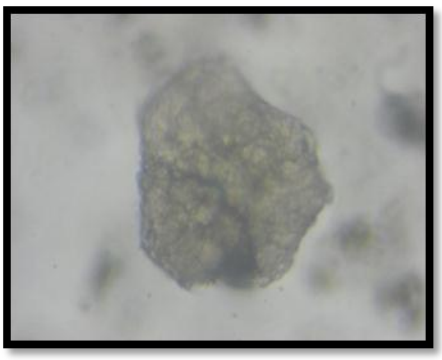
Sr.No	Parameters		*Mandura Vajra Vataka*
1	Shape		Round
2	Hardness		5kg/cm^2
3	Uniformity	Max.(mg) wt.	1046mg
		Min.(mg) wt.	983mg
		Avg.(mg) wt	996mg

Table 4: Physico-chemical analysis of *Mandura Vajra Vataka.*

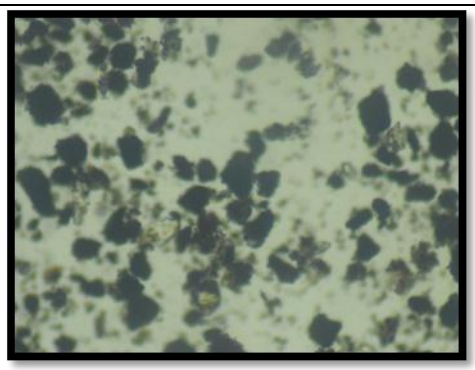
Sr.no	Parameters	*Mandura Vajra Vataka*
1	pH 10% Aqueous Sol. (%w/w)	6.5
2	Lose on drying at(110□)	8.34%
3	Ash value	60.88%
4	Water soluble extractive	25.10%
5	Methanol soluble extractive	9.48%

Table 5: Results of HPTLC of *Mandura Vajra Vataka*: Solvent system – Toluene: Ethyl acetate: Acetic Acid (7:2:1).

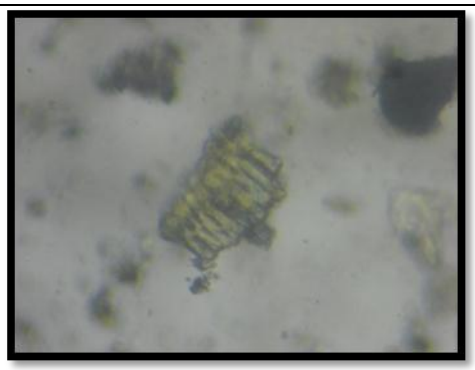
Wave Lengths	Short UV (254nm)	Long UV (366nm)
No of Spots	11	6
Max. Rf value	0.02, 0.07, 0.19, 0.26, 0.42, 0.47, 0.50, 0.56, 0.70, 0.76, 0.93	0.02, 0.47, 0.56, 0.62, 0.70, 0.98



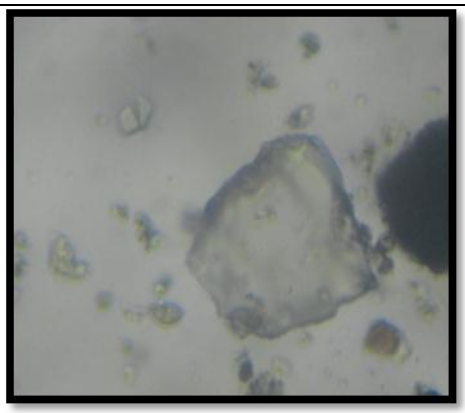
Black Debries of *maricha*



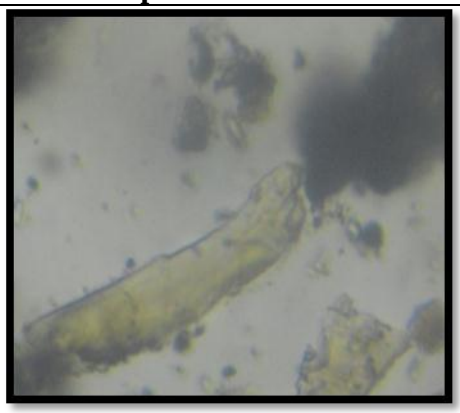
Black deposition of ferric oxide



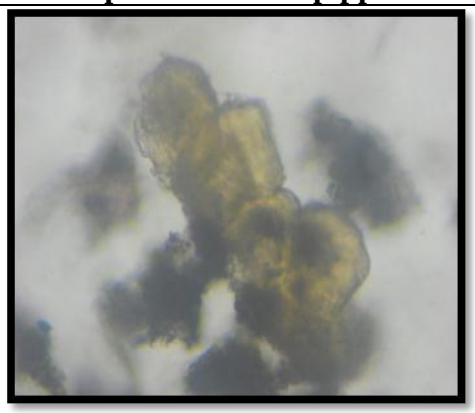
Border pitted vessel of pippali mool



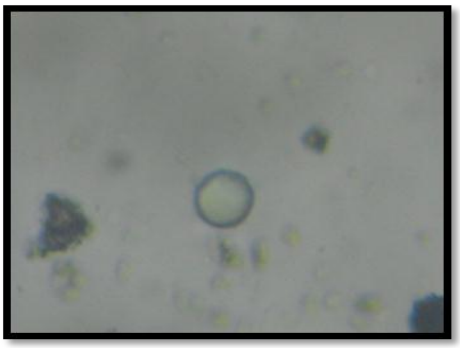
Crystal deposition of cow`s urine



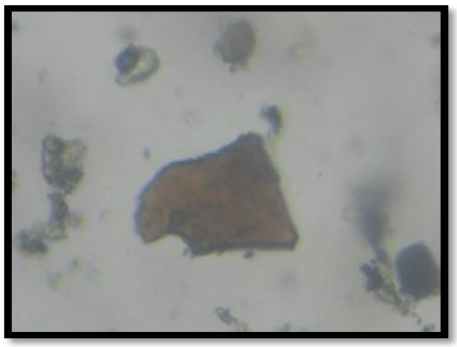
Fragment fibre of *Devdaru*



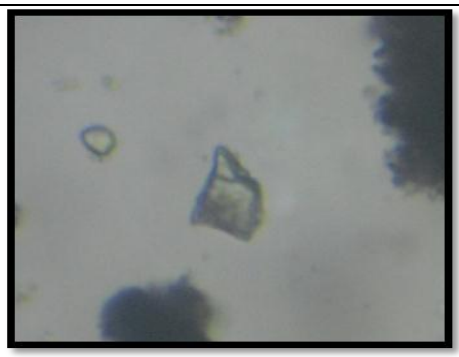
Stone cell of *maricha*



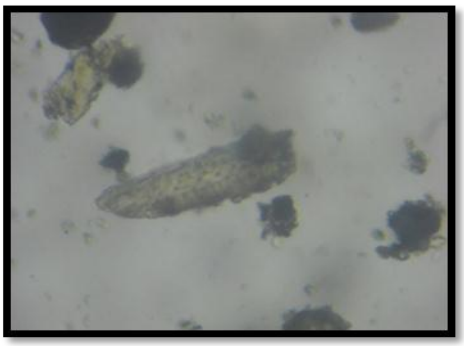
Oil globule of *pippali*



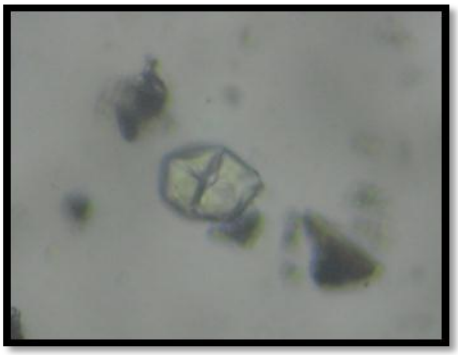
Olioresine contain of *vidanga*



Prismatic crystal of *chitrak*



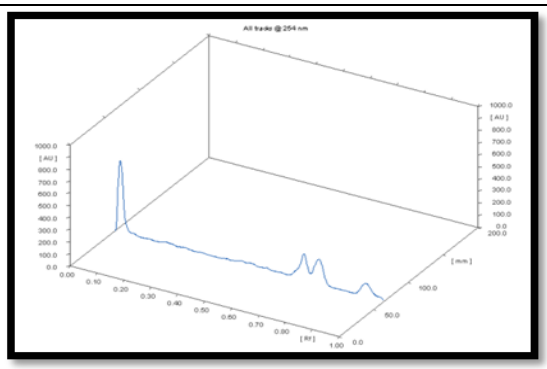
Scleroids of *Bibhitaki*



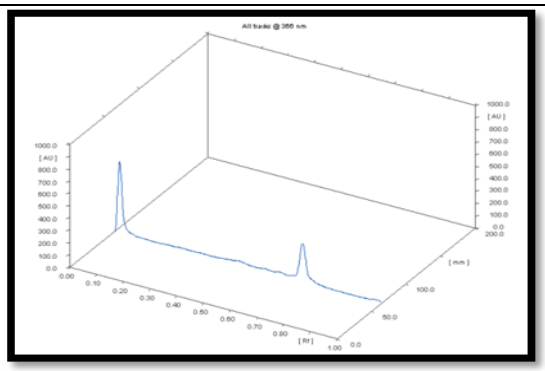
Starch grain of *sunthi*

Trachoma of *Bibhitaki*

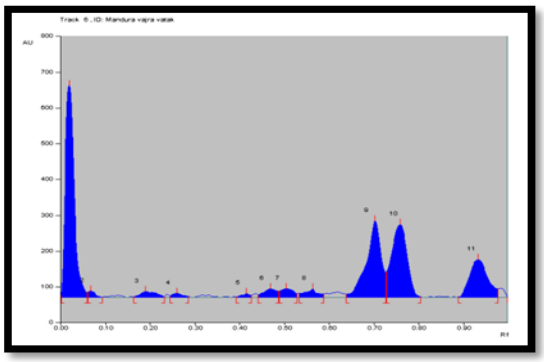
Plate 1: Microscopic characters of *Mandura Vajra Vataka.*



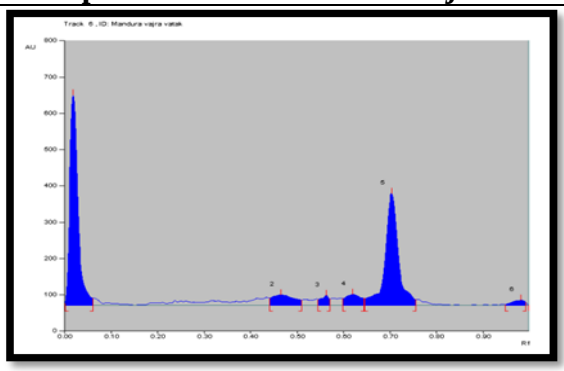
3D Graph: 254nm of *Mandura Vajra Vataka*



3D Graph: 366nm of *Mandura Vajra Vataka*



Chromatographic Results (Peak display) of *Mandura Vajra Vataka* short ultra violet (254 nm)



Chromatographic Results (Peak display) of *Mandura Vajra Vataka* short ultra violet (366nm)

Figure 2: HPTLC evaluation of *Mandura Vajra Vataka.*

DISCUSSION

Pharmacognosy and pharmaceutical evaluation of *Mandura Vajra Vataka* was performed which is a potent medicine in the management of *Pandu*. In physiochemical analysis, Uniformity of Tablets, Hardness of Tablets, Loss on Drying (110°C), Ash Value, Water Soluble Extract, Methanol Soluble Extract, and pH (10% Aqua solution) were assessed. Though the groundwork requisites for the standardization of *Mandura Vajra Vataka* are covered in the current study, additional important analysis and investigations are required for the identification of all the active chemical constituents of the test drug to substantiate the clinical efficacy.

CONCLUSION

Pharmacognostical study findings confirm that all characters were found in ingredient drugs of *Mandura Vajra Vataka*. The physicochemical analysis is inferred that the formulation meets maximum qualitative standards and all the parameters discussed here may be used as identifying tools for the quality assessment of *Mandura Vajra Vataka*. Thus Outcome of the study may be taken as standard references for the further studies.

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