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Pharmacognostical and Phytochemical Evaluation of *Gandhakadi Yoga*

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ABSTRACT

Thalassemia is one of the most challenging form of Haematological disorders. *Gandhakadi Yoga* is an Ayurvedic medicine comprising of *SHUDDHA GANDHAKA* (Sulphur), *VIDANGA* (*Embelia ribes* Burm.f.), *AGASTYA PATRA* (*Sesbaniya grandifoliya* Linn.), *SHIGRU PATRA* (*Moringa Oleifera* Lam.). *Gandhakadi Yoga* is a customized preparation of the formulation proposed for *Loha Sevanajanya Vikara Prashamana* (iron overloading) in Ayurveda Prakasha. here in *Gandhaka* and *Vidanga* are triturated with *Agatsya patra Swarasa* and then used therapeutically. So in the present study the formulation *Gandhakadi Yoga* has been selected for clinical evaluation on patients of Thalassemia Major, against the standard conventional approach (i.e. Blood Transfusion & Iron chelation therapy). The Pharmacognostical features of *Gandhakadi Yoga Vati* under the microscope observed that Oil globules, stone cell and Epicarp cells of *Vidanga* (*Embelia ribes* Burm.f.), Fragmented Unicellular Cell of *Shigru*, Simple Fiber of *Shigru*, Simple Trichome of *Bhringaraja* base of *Bhringaraja* (*E.alba.*) and Crystalline depositions of *Gandhaka* were microscopically. Organoleptic features of finished product were within the normal range described in the classic.

Keywords: *Gandhakadi Yoga*, *Beejadushtijanya Pandu*, Thalassemia Major, HPTLC, Pharmacognostical.

INTRODUCTION

Thalassemia is one of the inherited blood disorder which manifest due to the abnormal formation of Haemoglobin. Thalassemia occurs in about 208 million people with about 4.7 million having severe disease as earlier published data of 2013. It is most frequently observed among people of Italian, Greek, Middle Eastern, South Asian, and African descent. Incident rate is similar in Male and Females. It out came from 25,000 deaths in 2013 down from 36,000 deaths in 1990. Children born with Thalassemia major usually develop severe anemia, ineffective erythropoiesis, jaundice and Haemosiderosis which results in greenish brown complexion. In Thalassemia, patient suffers from retarded physical growth, poor feed, Hepatosplenomegaly, irregular fever due to increased metabolic activity or in recurrent infection. Increased nutrition demand results in cachexia, fatigue, bony abnormalities etc. [1].

Gandhakadi Yoga is an Ayurvedic medicine comprising of *SHUDDHA GANDHAKA* (Sulphur), *VIDANGA* (*Embelia ribes* Burm.f.), *AGASTYA PATRA* (*Sesbaniya grandifoliya* Linn.), *SHIGRU PATRA* (*Moringa Oleifera* Lam.). *Gandhakadi Yoga* is a customized preparation of the formulation proposed for *Loha Sevanajanya Vikara Prashamana* (iron overloading) in Ayurveda Prakasha [2]. Here in *Gandhaka* and *Vidanga* are triturated with *Agatsya patra Swarasa* and then used therapeutically.

The ingredients of *Gandhakadi Yoga* have properties like *Agnideepana*, *Aamapaachana*, *Anulomana*, *Krimighna*, *Raktashodhana*, and *Rasayana* which help to relieve the signs and symptoms of the disease while *Lohashodhana*, *Lohamaarana*, *Lohasevanajanya Vikara Prashamana*, *Vishaghna* properties decrease the iron overload and increase BT interval. As it is in *Vati* form its intake is very simple and does not produce any struggling for its taking.

Pharmacognostical Evaluation

Many-sided features like color, odor, taste and touch are recorded by using sensory organs [3]. *Gandhakadi Yoga* was powdered and dissolved with water and microscopy of the sample was done without stain and after staining with Phloroglucinol + HCL. Microphotographs of *Gandhakadi Yoga* was too taken under a Corl-ziesstrinocular microscope [4]. By Powder microscopy take noticed the features, decided the chemical feature of the cell wall along with the form and chemical character of the content of the cells. The Ayurvedic Pharmacopoeia of India (A.P.I.) standards were used for authentication [5].

Physico-Chemical evaluation

Gandhakadi Yoga was subjected to physicochemical study in order to develop analytical profiles. In this phase following parameter were carried out -Loss on drying at 110°C, PH value, Ash value, Water-soluble extractive, Alcohol soluble extractive [6].

High Performance Thin Layer Chromatography [7]

In HPTLC study of *Gandhakadi Yoga*, Methanol extract of *Gandhakadi Yoga* was spotted on pre-coated silica gel GF 60254 Aluminum plate by mean of Camag Linomate V sample applicator fitted with a 100µl Hamilton syringe. The mobile phase consisted of Toluene: Ethyl

acetate a ratio of 9:1 v/v. After development, densitometric scan was performed with a Camag TLC scanner III in reflectance in absorbance mode at 254 and 366 nm under control of Win CATS Software (V1.2.1.Camag). Then, the plate was sprayed with Vanillin Sulphuric acid followed by heating and then visualized in daylight.

MATERIALS AND METHODS

Drug Material

Raw drug materials were collected from the pharmacy store of Gujarat Ayurved University. The constituents and the part used are given in the table.

Table 1: Ingredients of *Gandhakadi Yoga*

No	Ingredient	English/Latin name	Part used	Quantity
1.	<i>Shuddha Gandhaka</i>	Sulphur	-	1 part
2.	<i>Vidanga</i>	<i>Embelia ribes</i> Burm.f.	Dry Fruit	1 part
3.	<i>Agastya Patra</i>	<i>Sesbaniya grandifoliya</i> Linn.	Green Leaves	Q.S. for <i>Bhavana</i>
4.	<i>Shigru Patra</i>	<i>Moringa Oleifera</i> Lam.	Green Leaves	Q.S. for <i>Bhavana</i>

Method of Preparation of the *Gandhakadi Yoga*

Before preparation of *Gandhakadi Yoga*, *Gandhaka Shodhana* was done with the help of *Bhringraja Swarasa* [8] for 3 times in 3 consecutive days. *Shuddha Gandhaka* and *Vidanga* [9] were taken in given proportion and made into fine powder and sieved in mesh no. 80. The powders were mixed well in mass mixing machine until a homogenous mixture was obtained. After that fresh leaves of *Shigru* and *Agatsya* [10] collected and juice were obtained. Then 7 *Bhavna* of each *Swarasa* were given separately and *Vati* of 250 mg each were prepared.



Figure 1: Powder Form of *Gandhakadi Yoga*

RESULTS AND DISCUSSION OF GANDHAKADI YOGA

M Morphology/ Appearance

1. Shape- Round

Organoleptic characters

1. Color- Light Ash
2. Odor- Slightly Aromatic
3. Taste- Light astringent
4. Touch- Hard
5. Weight- 250 mg

Microscopic characters

1. Black Debbries of *Gandhaka*
2. Dark Brown content of *Vidanga*
3. Oil globule of *Bhringraja*
4. Prismatic Crystal of *Shigru Patra*
5. Trichome of *Agatsya Patra*
6. Warty Trichome of *Bhringraja*
7. Silica deposition of *Bhringraja*
8. Lignified Fiber of *Agatsya Patra*
9. Lignified Stone cells of *Vidanga*
10. Lignified Sclerid of *Vidanga*
11. Brown Content of *Agatsya Patra*

Table 2: Main constituents seen in a microscopic study of *Gandhakadi Yoga*

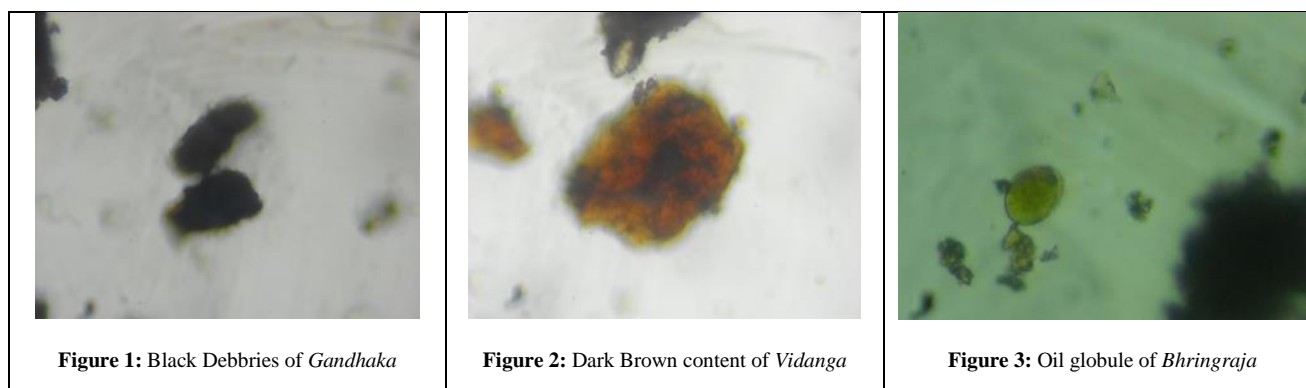
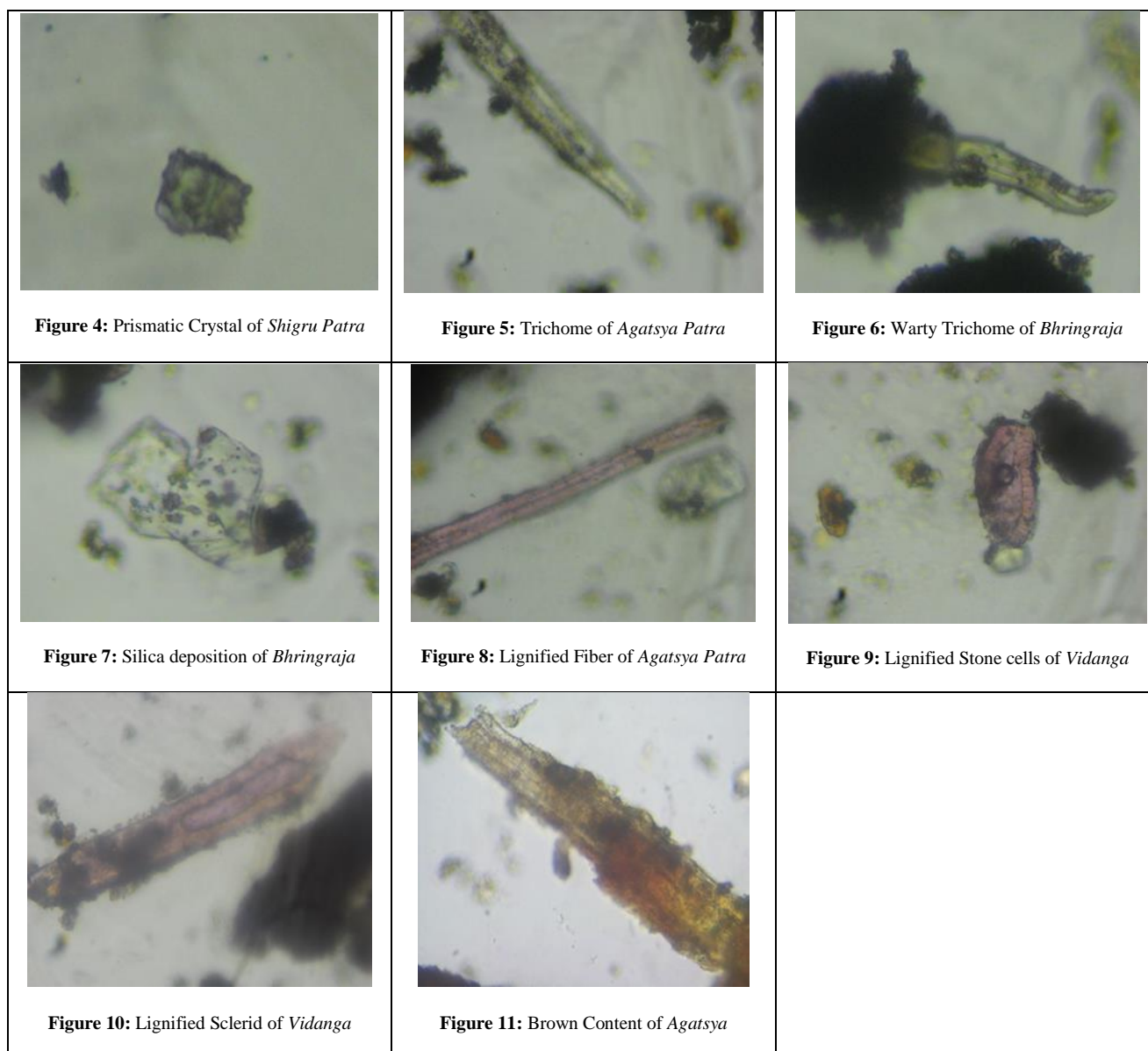


Figure 1: Black Debbries of *Gandhaka*

Figure 2: Dark Brown content of *Vidanga*

Figure 3: Oil globule of *Bhringraja*



Physicochemical analysis

Outcome of physicochemical analysis i.e. Loss on drying, Ash value, Water-soluble extract, Alcohol soluble extract and PH are shown in Table 2.

Table 2: Physico-chemical parameters

Sr. No.	Parameters	Value
1	Loss on Drying at 110°C	0.001% w/w
2	Ash Value	7.5% w/w
3	Water Soluble Extract	12.5% w/w
4	Alcohol Soluble Extract	5.7% w/w
5	PH	6.5

Following Physical parameters of *Gandhakadi Yoga* tablets were analyzed^[11, 12, 13].

Sr. No.	Parameters	<i>Gandhakadi Yoga</i>	
1.	Shape	Round	
2.	Hardness	3.33 kg/cm ²	
3.	Uniformity	Max. (mg) wt.	248mg
		Min. (mg) wt.	237 mg
		Avg. (mg) wt.	243 mg

High performance thin layer chromatography (HPTLC)

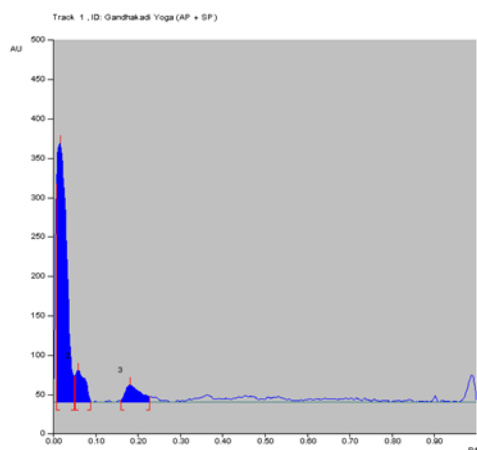
The colour and Rf values of resolved spots of HPTLC were noted. (Table 3) (Plate no. 1&2)

Table 3: Rf values obtained by HPTLC

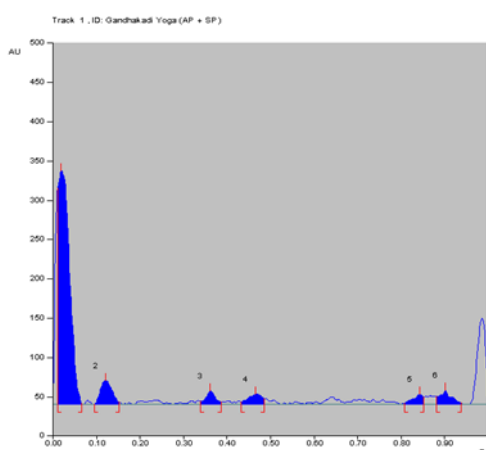
Sample	Wavelength	No. of spots	Rf value
Gandhakadi Yoga	254 nm	6	0.02, 0.12, 0.36, 0.47, 0.84, 0.90
	366nm	3	0.02, 0.06, 0.18

Plate 1: HPTLC of methanolic extract of *Gandhakadi Yoga*

Plate 2: Powder microscopic photographs of *Gandhakadi Yoga*



Peak display at 366 nm



Peak display at 254 nm

DISCUSSION

The constituents *Gandhakadi Yoga* such as *SHUDDHA GANDHAKA* (Sulphur), *VIDANGA* (*Embelia ribes* Burm.f.), *AGASTYA PATRA* (*Sesbaniya grandifoliya* Linn.), *SHIGRU PATRA* (*Moringa Oleifera* Lam.) are endowed with many-sided biological properties and hence the finished product from these constituents will have combined correctness of all the individual drugs. These plants are highly used for fulfilling various disease alignments. This concept is highly recommended for those children who are suffering from Thalassemia Major. Pharmacognostical evaluation take noticed that organoleptic features of the sample was Light Ash in color, Slightly Aromatic in odor, Light Astringent in taste, Hard in touch. Microscopic study take noticed that presence of Black Debbries of *Gandhaka*. Dark Brown content, Lignified Stone cells and Lignified Sclerid of *Vidanga*. Oil globule, Warty Trichome and Silica deposition of *Bhringraja*. Trichome, Lignified Fiber and Brown Content of *Agatsya Patra* and Prismatic Crystal of *Shigru Patra* take noticed that all the components were present in the prepared product and too proven that the clarity of

the prepared product. The HPTLC take noticed that 6 and 3 spots at 254nm and 366nm.

CONCLUSION

The Pharmacognostic and Pharmaceutical analysis of *Gandhakadi Yoga* confirmed the purity and genuinely of the drug. Further study may be carried out on it on the basis of an observation made and out come of experimental studies. As Pharmacognostical and Pharmaceutical profiles of *Gandhakadi Yoga* are available and this may be favorable for future researchers and can be used as a reference standard in the future quality control researchers.

Physicochemical values acquired in the present research work for *Gandhakadi Yoga* may be useful in near future research works as till date there is no accepted information available. As there is no published knowledge available on pharmacognostical and physico-chemical parameters of *Gandhakadi Yoga*, this primary information can be used for reference in near future for similar research works.

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