



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203




Human Journals

Research Article


July 2020 Vol.:18, Issue:4

© All rights are reserved by Savitri G. Katariya et al.

Pharmacognostical and Phytochemical Evaluation of *Gandhaka kalpa* - A Herbo-Mineral Ayurvedic Drug



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals



ISSN 2349-7203

***¹Savitri G. Katariya, ²V.K. Kori, ³K.S. Patel,**
⁴Harisha C.R., ⁵V.J. Shukla

¹*M.D. Scholar, Kaumarbhritya department,*

²*Assistant Professor, Kaumarbhritya department,*

³*Professor, Head, Kaumarbhritya department,*

⁴*Head, Pharmacognosy Department,*

⁵*Head, Pharmaceutics Department, IPGT & RA,*
Jamnagar, Gujarat, India

Submission: 23 June 2020
Accepted: 29 June 2020
Published: 30 July 2020



HUMAN JOURNALS

www.ijppr.humanjournals.com

Keywords: *Beejadushtijanya Pandu, Gandhaka Kalpa, HPTLC, Pharmacognostical Thalassemia Major*

ABSTRACT

Introduction: Thalassemia is a blood related genetic disorder which involves the absence of or errors in genes responsible for production of haemoglobin. *Gandhaka Kalpa* is an Ayurvedic medicine comprising of *Shuddha Gandhaka* (Sulphur), *Haritaki* (*Terminalia chebula* Retz.), *Amalaki* (*Emblica officinalis* Gaertn.), *Bibhitaki* (*Terminalia bellerica* Roxb.), *Bhringaraja* (*Eclipta alba* Hassk.). *Triphala* and *Bhringaraja* are reported as hepato spleno protective, antioxidant, immunomodulator, antihepatotoxic, *Rakta Shodhana, Amahara, Deepana, Rasayana, Vishahara, Tvachya, Chakshushya* are classical properties of the ingredients of the formulation may be beneficial to treat the complications of iron overloading. *Gandhaka, Bhringaraja, Triphala* are triturated with *Bhringaraja Patra Swarasa* and *Triphala Kwatha* and then used therapeutically. **Aim:** To confirm the authenticity and distinguish of the drugs used in the preparation and analyze the sample of *Gandhaka Kalpa* by utilizing suitable Pharmaceutical parameters. **Material & Method:** All the drugs were authenticated for quality and purity by the experts of Pharmacognosy Laboratory of the IPGT&RA and then submitted in Pharmacy, GAU, Jamnagar. *Gandhaka Kalpa* prepared with Standard Operating Procedures (S.O.P.) and physicochemical analysis of the prepared product was carried out in the Pharmaceutical laboratory of IPGT&RA, GAU, Jamnagar. **Discussion:** The Pharmacognostical features of *Gandhaka Kalpa* powder under the microscope observed that trichome of *Haritaki*, group of scleroid of *Amalaki*, stem cell of *Bringaraja*, rosette crystals of *Bibhitaki*, trichome of *Bhringaraja*, epicarp cell of *Haritaki*, fibres of *Amalaki*, lignified stones of *Haritaki*, lignified sclereids of *Amalaki*, lignified stone cell of *Bibhitaki* were microscopically. Organoleptic features of finished product were within the normal range described in the classic. **Conclusion:** In spite of pharmacognostical study of row drugs, microscopic study of *Gandhaka Kalpa* powder has been carried out to standardize the finished product. Analytical study of *Gandhaka Kalpa* powder was conducted to estimates the organoleptic, physical, physicochemical parameters and to evolve suitable chromatography (TLC) pattern of the drug.

INTRODUCTION:

Thalassemia is a monogenic disorder characterized by abnormal synthesis of hemoglobin due to defects in the globin chain. As per WHO estimate, 7% of the world population are carriers of Haemoglobinopathies. Over 180 million people in the world, more than 20 million in India carry β Thalassemia gene.¹ 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 recurrent infection. Increased nutrition demand results in cachexia, fatigue, bony abnormalities etc. As iron overload is the main complication of thalassemia major, which outcomes as a consequence of repeated Blood Transfusions (BT), excess iron should be removed from the body. The most factors associated with survival of thalassemic patients are the age at which Chelation therapy is started and the success with which the serum ferritin levels are maintained below 2500 ng/mL. For the treatment of this iron overload, various iron chelators are used in modern medicine. These iron chelators are associated with various side effects.

Gandhaka Kalpa is an Ayurvedic medicine comprising of *Shuddha Gandhaka* (Sulphur), *Haritaki* (*Terminalia chebula* Retz.), *Amalaki* (*Emblica officinalis* Gaertn.), *Bibhitaki* (*Terminalia bellerica* Roxb.), *Bhringaraja* (*Eclipta alba* Hassk.).² *Gandhaka Kalpa* is a customized preparation of the formulation proposed for *Loha Sevanajanya Vikara* (iron overloading) *Prashamana* in Ayurveda Prakasha. Here is *Gandhaka*, *Bhringaraja*, *Triphala* are triturated with *Triphala Kwatha* and *Bhringaraja Patra Swarasa* and then used therapeutically.

The ingredients of *Gandhaka Kalpa* have properties like *Triphala* and *Bhringaraja* are reported as hepatosplenoprotective, antioxidant, immunomodulator³, antihepatotoxic⁴. *Rakta Shodhana*, *Amahara*, *Deepana*, *Rasayana*, *Vishahara*, *Tvachya*, *Chakshushya* are classical properties of the ingredients of the formulation may be beneficial to relieve the signs and symptoms of the disease while *Lohashodhana*, *Lohamaarana*, *Lohasevanajanya Vikara Prashamana*, *Vishaghna* properties decrease the iron overload and its complications and increase BT interval. As it is in Fine powder form its intake is very simple with *Sahapana* of *Madhu*.

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 No. 1: Ingredients of *Gandhaka Kalpa*

Sr. No.	Drug Name	English/Botanical Name	Part used	Quantity
1.	<i>Shuddha Gandhaka</i>	<i>Sulphur</i>	As whole	1 part
2.	<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	<i>Shushka Phala</i>	1 part
3.	<i>Amalaki</i>	<i>Embllica officinalis</i> Gaertn.	<i>Shushka Phala</i>	1 part
4.	<i>Bibhitaki</i>	<i>Terminalia bellerica</i> Roxb.	<i>Shushka Phala</i>	1 part
5.	<i>Bhringaraja</i>	<i>Eclipta alba</i> Hassk.	<i>Shushka Panchanga</i>	1 part

Method of Preparation of the *Gandhaka Kalpa*

Before preparation of *Gandhaka Kalpa*, *Gandhaka Shodhana* was done with the help of *Bhringraja Swarasa*⁵ for 3 times in 3 consecutive days. *Shuddha Gandhaka*, *Haritaki*, *Amalaki*, *Bibhitaki* and *Bhringaraja*⁶ 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 *Bhringaraja* and *Triphala Kwatha*⁷ collected and juice were obtained. Then 7 *Bhavana* of each *Swarasa* and *Kwatha* were given separately and fine powder were prepared.

METHODS:

Pharmacognostical Evaluation

Many-sided features like colour, odour, taste and touch are recorded by using sensory organs.⁸ *Gandhaka Kalpa* was powdered and dissolved with water and microscopy of the sample was done without stain and after staining with Phloroglucinol + HCL. Microphotographs of *Gandhaka Kalpa* was too taken under a Carl-zeiss trinocular microscope.⁹ 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.¹⁰



Figure No. 1: Powder Form of *Gandhaka Kalpa*

Physico-Chemical evaluation

Gandhaka Kalpa 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.¹¹

High Performance Thin Layer Chromatography¹²

In HPTLC study of *Gandhaka Kalpa*, Methanol extract of *Gandhaka Kalpa* was spotted on pre-coated silica gel G 60 F 254 Aluminium plate by mean of Camag Linomat 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.

RESULTS AND DISCUSSION

Organoleptic characters

Colour- Dark brownish black. Odour- Sulphurous. Taste- Sore followed by astringent. Touch- Fine. Appearance- Powder. (Fig.1)

Microscopic characters

Diagnostic characters observed under the microscope are Trichome of *Haritaki*. Group of scleroid of *Amalaki*. Stone cell of *Haritaki*. Silica deposition of *Amalaki*. Prismatic crystals of *Bringaraja*. Rosette crystals of *Bibhitaki*. Trichome of *Bhringaraja*. Epicorp cell of *Haritaki*.

Fibres of *Amalaki*. Lignified stones of *Haritaki*. Lignified sclereids of *Amalaki*. Lignified stone cell of *Bibhitaki* (Plate 1: 1-12).

Physicochemical analysis

Table No. 2: showing outcome of physicochemical analysis of *Gandhaka Kalpa*

Sr. No.	Parameters	Value
1.	Loss on Drying at 110°C	0.001 %w/w
2.	Ash Value	11.33% w/w
3.	Water Soluble Extract	37.9% w/w
4.	Alcohol Soluble Extract	41.12% w/w
5.	pH	3.5

High performance thin layer chromatography (HPTLC)

The colour and R_f values of resolved spots of HPTLC were noted. (Table 3) (Plate 2)

Table No. 3: R_f values obtained by HPTLC

Sample	Wavelength	No. of spots	R _f value
<i>Gandhaka Kalpa</i>	254 nm	5	0.04, 0.16, 0.18, 0.50, 0.66
	366 nm	5	0.04, 0.16, 0.18, 0.50, 0.66

DISCUSSION

The constituents *Gandhaka Kalpa* such as *Shuddha Gandhaka* (Sulphur), *Haritaki* (*Terminalia chebula* Retz.), *Amalaki* (*Emblica officinalis* Gaertn.), *Bibhitaki* (*Terminalia bellerica* Roxb.), *Bhringaraja* (*Eclipta alba* Hassk.) are endowed with many-sided biological properties and hence the finished product from these constituents had 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. There is presence of all ingredients in drug formulation for good outcomes. Under the microscope, *Gandhaka Kalpa* shows all pharmacognostical characteristics in it. All pharmaceutical parameter reveals the drug is forms under slandered method of preparations and pharmaceutical parameters all are in standard range. Take noticed

that all the components were present in the prepared product and too proven that the clarity of the prepared product.

CONCLUSION

The Pharmacognostic and Pharmaceutical analysis of *Gandhaka Kalpa* confirmed the purity and genuineness of the drug. It showed all ingredients used were genuine and no adulterants found. *Gandhaka Kalpa* is potent medicine in the management of disease Thalassemia. As Pharmacognostical and Pharmaceutical profiles of *Gandhaka Kalpa* are available and this may be favourable for future researchers and can be used as a reference standard in future quality control researchers. Physicochemical values acquired in the present research work for *Gandhaka Kalpa* 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 physicochemical parameters of *Gandhaka Kalpa*, this primary information can be used for reference in near future for similar research works.

REFERENCES:

1. IAP Textbook of paediatrics, parthasarathy, psn Menon mkc Nair, Jaypee publication, reprint 2013, 5th edition, P. 661.
2. Acharya Madhav, Ayurveda Prakash, Translated by Shri Gulraj Mishra, Reprint edition, Chaukhamba Bharti Academy, Varanasi, 2007, Chap.2/59.
3. Chemistry & Pharmacology of Ayurvedic Medicinal Plants, Vd. Mukund Sabnis, Chaukhamba Amarabharati Prakashan, Varanasi, Vol-I, 1st edition-2006; Pg. 191
4. Mehta D et al., The Pharmaco-clinical study on Bhringaraja in the management of Khalitya, 2001, PG Dissertation, Dept. of Dravya Guna, Jamnagar, Conceptual Study.
5. Anonymous. The Ayurvedic Pharmacopoeia of India Part- I, Volume – II, Government of India, e-book, 2008, 21-24.
6. Khare CP. Indian Medicinal Plants, Springer-Verlag Berlin/Heidelberg, e – book, P. 237-238.
7. Anonymous. The Wealth of India, Raw Materials, Volume IX, C.S.I.R. (Council of Scientific and Industrial Research), New Delhi, Reprint 1999, P. 295.
8. Identification of Novel Anti-inflammatory Agents from Ayurvedic Medicine for Prevention of Chronic Diseases: "Reverse Pharmacology" and "Bedside to Bench" Approach. *Curr Drug Targets*. 2011; 12(11):15951653. <http://dx.doi.org/10.2174/138945011798109464>.
9. Wallis TE. Textbook of Pharmacognosy, 5th ed., New Delhi: CBS Publishers & Distributors, 2002; 123-132:210-215.
10. Anonymous. The Ayurvedic Pharmacopoeia of India, Part 1, Vol. 1, 3, 4; 1st Ed., New Delhi, Ministry of Health and Family welfare, Department of AYUSH, Govt. of India, 2008.
11. Anonymous. The Ayurvedic Pharmacopoeia of India. Part 2, vol 2, Appendices 1st ed. New Delhi: Govt. of India Publication. 2008; 233-5.
12. Stahl E. Thin-layer chromatography a laboratory handbook 2nd edition. Springer-Verlag New York, 1969; p.125-133.

Plate No. 01: Microphotographs of *Gandhaka Kalpa*


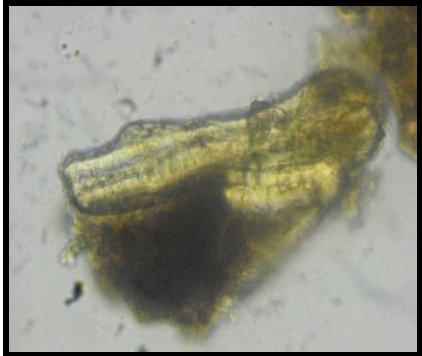




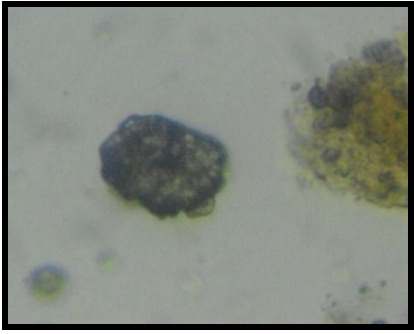
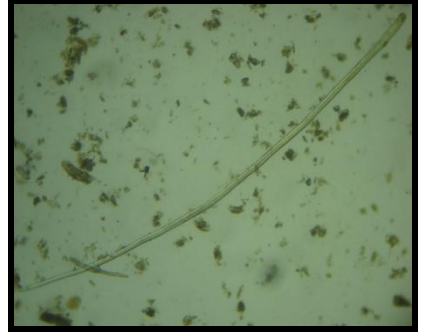
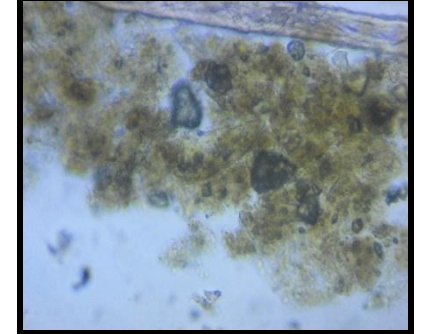

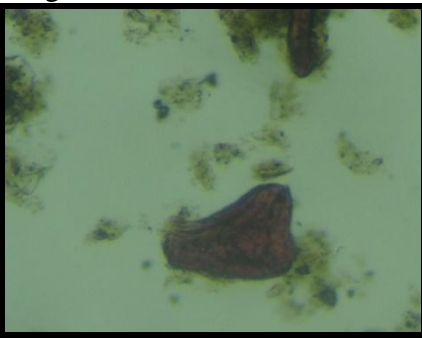

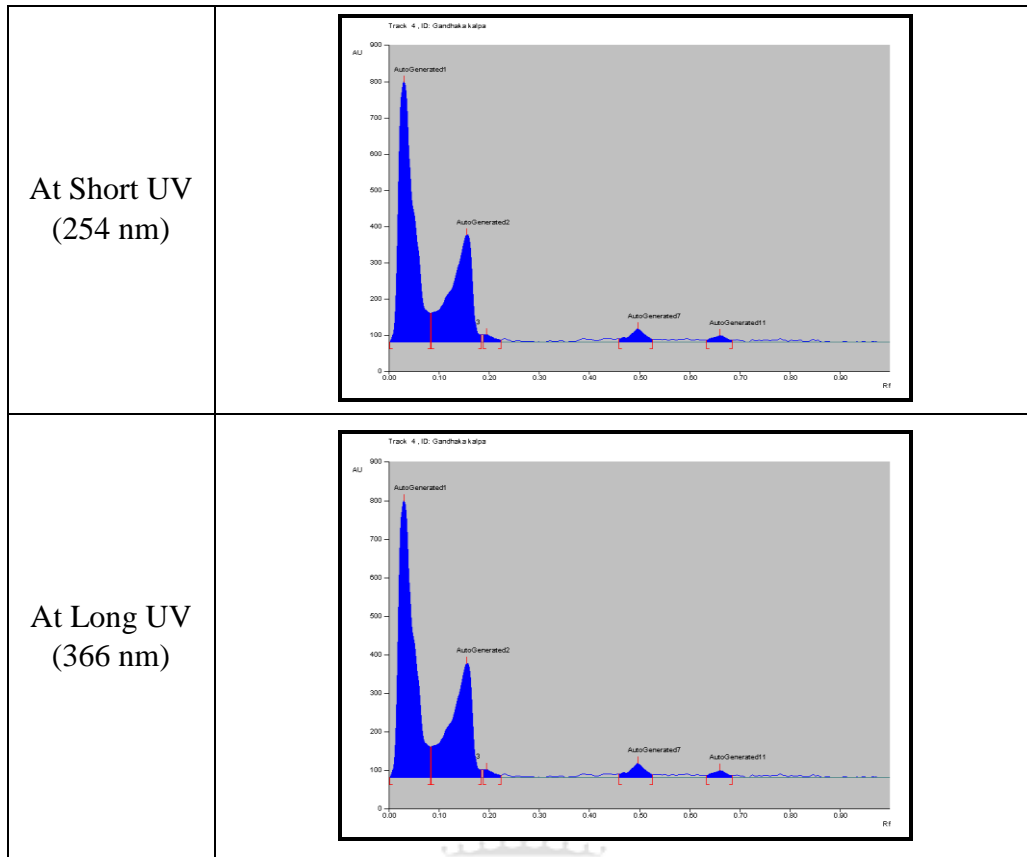
<p>Trichome of <i>Bringaraja</i></p> 	<p>2. Group of scleroid of <i>Amalaki</i></p> 	<p>3. Stone cell of <i>Haritaki</i></p> 
<p>4. Stone cell of <i>Bibitaki</i></p> 	<p>5. Selica deposition of <i>Amalaki</i></p> 	<p>6. Prismatic crystals of <i>Bringaraja</i></p> 
<p>7. Rosette crystals of <i>Bibhitaki</i></p> 	<p>8. Fibres of <i>Amalaki</i></p> 	<p>9. Epicarp cell of <i>Haritaki</i></p> 
<p>Fibres of <i>Bringaraja</i></p> 	<p>Lignified scleroids of <i>Haritaki</i></p> 	<p>Lignified stone cell of <i>Bibhitaki</i></p> 

Plate No. 02: Densitogram of HPTLC of *Gandhaka Kalpa*



HUMAN