Journal of Medicinal Plants Studies
www.PlantsJournal.com

ISSN (E): 2320-3862
ISSN (P): 2394-0530
NAAS Rating: 3.53
JMPS 2020; 8(1): 31-33

Received: 19-11-2019
Accepted: 21-12-2019

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A detailed pharmacognostic, physicochemical and phytochemical study of Haridra, Haritaki and Guduchi Churna

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Abstract
A large number of plants are claimed to possess the medicinal properties in the system of Ayurveda. Among those Haridra (*Curcuma longa*), *Haritaki* (*Terminalia chebula*) and *Guduchi* (*Tinospora cordifolia*) are commonly used in many formulations to treat *Kustha* (Skin disorders). But these herbs are needed to be standardized to prove their authenticity and establishment of a unique identification data. Present study is carried out to establish a standard pharmacognostic profile & phytochemical standard of these three herbs to find out the bioactive compounds which will be helpful to ensure the purity, safety and efficacy. Here in this present work the powdered form of combined Haridra, Haritaki and Guduchi is subjected to physiochemical and phytochemical analysis. The microscopic study shows different significant cell structures and exhibits the unique identification characteristics. Hereby the present study will be beneficial for future references for standardization.

Keywords: *Haridra*, Haritaki, Guduchi, Kustha, identification, physicochemical, phytochemical, pharmacognostic, standardization

1. Introduction
Ayurveda, the oldest science of healing, focuses on treating different diseases by balancing *tridoshas Vat, Pitta, Kapha.* The first target of Ayurveda is prevention from diseases and maintenance of health. One of the guiding principle of Ayurveda is to improve the immunity of the body tissues instead of temporary relief against infective pathogens. In present era, modern medicine is also looking forward to find out the alternative class of immunomodulatory drugs which are having minimal adverse effects and maximum benefits to an individual. The formulation of Haridra (*Curcuma longa*), *Haritaki* (*Terminalia chebula*) and *Guduchi* (*Tinospora cordifolia*) is taken in context to *Kustha Vyadhi* mentioned in the classics of *Ayurveda* [1]. The combination of Haridra, Haritaki and Guduchi churna is yet not scientifically analysed for different Pharmacognostic and physicochemical characteristics. So, there is a need to standardize these drugs by establishing a unique identification data and also to find out the bioactive compounds present in them.

2. Material and Methods
A. Collection & Identification of raw herbs
Haridra (rhizome), Haritaki (matured fruit) and Guduchi (stem) were collected in dried form in the month of July 2018 (late summer) from the local market of Guwahati. The samples were physically identified in the Department of Dravyaguna and sent to the department of Rashashala, Govt. Ayurvedic College & Hospital Ghy-14.

B. Test Drug Preparation
First, the dried herbs were cleaned and then processed in the form of churna (moderately fine powder) separately in the dept. of Rashashala, Govt. Ayurvedic College & Hospital Ghy-14. The quantity of the churna (powder form) were combined in equal ratios & sent to the State Drug Testing Laboratory (AYUSH), Govt. Ayurvedic College & Hospital Guwahati-14 where detailed Pharmacognostic, Physicochemical and Phytochemical study were carried out.

Fig 1: Moderate fine powder of Haridra, Haritaki & Guduchi

2.1 Macroscopic study
It refers to the evaluation through organs of sense and includes the macroscopic appearance, colour, odour, taste etc. of the drugs.

Table 1: Macroscopic observation of Haridra, Haritaki and Guduchi powder

Sl. No	Observed	Haridra, Haritaki, Guduchi powder
1.	Texture	Moderately fine powder
2.	Colour	Yellowish brown
3.	Odour	Aromatic
4.	Taste	Astringent

2.2 Microscopic evaluation of Haridra, Haritaki and Guduchi powder
Coarse powder was used to study microscopic characters, physicochemical parameters and phytochemical investigation. The powder microscopy was performed according to the method of Khandelwal. Microscopic method is one of the simplest and cheapest method to start with for establishing the correct identification of the source materials [2]. Powdered microscopy showed the presence of calcium oxalate crystals, starch grains, stone cells, spiral vessels etc. shown in Fig. No.2.

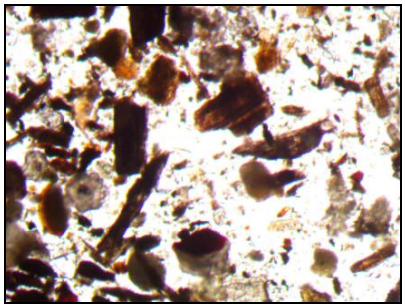

Fig 2: Powdered microscopy

2.3 Physicochemical Analysis
Different physicochemical properties like LOD, PH value, total ash, acid insoluble ash, extractive values of the powder were determined using the methods described in the British Pharmacopoeia and Ayurvedic Pharmacopoeia [3].

Table 2: Physicochemical parameters

Sl. No	Parameters	Result
1	Ash value	5.23%
2	Total ash	6.09%
3	Acid insoluble ash	1.46%
4	Loss on drying (LOD)	9.07%
5	Alcohol soluble extractive	19.6%
6	Water soluble extractive	5.68%

2.4 Phytochemical Screening
The aqueous and methanolic extracts along with other solvent extracts of powder materials were studied for various phytochemicals like alkaloids, carbohydrates, flavanoids, glycosides, gums and mucilages, phenols, tannins, reducing sugars, saponins, steroids, tannins and terpenoids by using precipitation and coloration reactions [4].

2.5 Extraction: 300 gm of powdered sample was extracted successively with solvents like petroleum ether, benzene, chloroform, acetone and methanol respectively in a Soxhlet apparatus [5]. Each solvent extract was then concentrated by distilling off the solvent under reduced pressure.

Qualitative estimation of phytochemicals in different solvent extracts of Haridra, Haritaki & Guduchi Churna

Table 3: Results of Phytochemical screening

Sl. No.	Phytochemicals	Petroleum ether	Acetone	Chloroform	Ethanol
1.	Flavonoids	Present	Present	Present	Present
2.	Carbohydrates	Present	Absent	Absent	Absent
3.	Protein	Absent	Absent	Absent	Present
4.	Tannin	Present	Present	Present	Present
5.	Alkaloids	Present	Present	Present	Present
6.	Phenolic compound	Present	Present	Present	Present
7.	Steroid	Absent	Absent	Absent	Absent
8.	Fats & oils	Present	Absent	Absent	Absent
9.	Glycosides	Absent	Absent	Absent	Present

2.6 Thin layer chromatography (TLC): Thin layer chromatography was carried out with the methanolic extract and maximum spots been separated on pre-coated silicagel G TLC plate with trial and error methods [6].

Fig 3: TLC of Methanolic extract

Table 4: The details of solvent system and the Rf values

Extract	Solvent system	Number of spots	Rf values
Methanol	N Hexane: Ethyl Acetate: Formic acid	4	0.15 0.34 0.67 0.79

3. Discussion and Conclusion
The macroscopic & microscopic identifying characters of the Haridra (Curcuma longa), Haritaki (Terminalia chebula) & Guduchi (Tinospora cordifolia) were found to be identical to the Ayurvedic Pharmacopoeia of India monograph considering the legal document of the Government of India. Powdered microscopy showed the presence of calcium oxalate crystals, starch grains, stone cells, spiral vessels etc.
The phytochemical investigation shows the presence of

flavonoids, tannins, alkaloids, phenolic compound in the powdered form of Haridra, Haritaki & Guduchi. The standardization of a crude drug is an integral part for establishing its correct identity. Before any crude drug can be included in an herbal pharmacopoeia, the Pharmacognostic parameters and standards must be established. Microscopic method is one of the simplest and cheapest method to start with for establishing the correct identity of the source materials [7]. The physical constant evaluation of a drug is an important parameter in detecting adulteration or improper handling of drugs. The macroscopic characters of the fruit can serve as diagnostic parameters. Ash values and extractive values are important in the evaluation of purity of drugs that is, the presence or absence of foreign inorganic matters. Extractive values are also useful to evaluate the chemical constituents present in the crude drug and also help in estimation of specific constituents soluble in particular solvents. Physicochemical parameters showed that alcohol soluble extractive value is more than water soluble extractive value, which indicates the presence of more alcohol soluble contents in the drug [8]. PH of the drug determines acidity or alkalinity of drug. The ability to provide timely, accurate and reliable data is an essential part of discovery, development and manufacture of Pharmaceuticals. Here an attempt was made to get a standardized data of this Churna. The pharmacognostical, phytochemical and physicochemical characters are useful to generate standards to assess the quality and purity of the drug. The information provided by this study may be useful to carry out further studies of Ayurvedic drugs of traditional medicinal practice of present era.

4. Acknowledgement

I am cordially thankful to Dhrubajyoti Sarma sir for conducting the Pharmacognostic, physicochemical and phytochemical study from the State Drug Testing Laboratory (AYUSH), Govt. Ayurvedic College & Hospital Guwahati-14.

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