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Pharmacognostical and phytochemical analysis of classical Hridya Yoga of Bhavamishra

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Abstract
The quality assessment of herbal formulation is of vital importance in order to justify their acceptability in the modern circumstances. Standardization and quality control strategies are more required to provide effective and safe drugs. A classical formulation of Bhavaprakasha hridroga adhikara was evaluated by Pharmacognostical, Preliminary Physicochemical and Phytochemical studies. The powder microscopical study showed the presence of simple and compound starch grains, acicular and prismatic crystal, pitted vessels and sclereids, annular and spiral vessels, brown coloured content, peglike structure and cells with oil globules. Preliminary physicochemical parameters showed that water soluble extractive value is more than alcohol soluble extractive value. Qualitative analysis of methanolic and water extract showed the presence of tannin and phenolic compounds, alkaloid, steroid, flavanoid, saponins and carbohydrate.

Keywords: Pharmacognosy, Hridya yoga, Physico-chemical analysis

Introduction
Success of every health care system depends on the authenticity, purity and safety of suitable drugs. In nutshell we can say that every healthcare system will get paralyzed without having safe/ potent drugs. For a quality assured herbal product standardization is always required. Standardization should be based on microscopical, physical, chemical and phyto-chemical parameters. The detailed pharmacognostical and phytochemical evaluation of a herb or formulation provides a means of standardization which is useful for future reference. In the present paper an attempt has been done to standardize one of the reputed formulation of Bhavaprakasha hridroga adhikara based on microscopical, physical, physico-chemical and phytochemical characteristics. The yoga consists of Harithaki (*Terminalia chebula*), Vacha (*Acorus calamus*), Rasna (*Alpinia galanga*), Pippali (*Piper longum*), Nagaram/Shunthi (*Zingiber officinale*), Shati (*Hedychium spicatum*) and Pushkaramool (*Inula racemosa)* [1]

Materials & Methods
Collection of drugs
The individual drugs of the classical hridya yoga were collected personally by the scholar, and were identified. Individual powder microscopy was done at Pharmacognosy unit, IPGT&RA, Jamnagar to prove the authenticity of the drug.

Preparation of powder
All the drugs were powdered separately and the powder was sieved through mesh size #85. All the seven drugs were taken in equal quantity and mixed together to make the formulation.

Preparation of extracts:
About 5g of the test drug (formulation) was macerated with methanol (100ml) in a closed flask for 24 hours with initial shaking frequently during first 6hrs and kept it for 18 hrs. After 24 hours it was filtered and alcoholic extracts were collected in semisolid form. The same procedure was followed to obtain aqueous extracts of the test drugs [2].

Organoleptic characters:
Organoleptic characters of test drug such as odor, taste, texture and color were observed and recorded.

Powder microscopy
For examining characters of the test powder, pinch of powder was taken on glass slide and observed as such to see their cell contents and then stained with phloroglucinol and hydrochloric acid to observe the lignifications of the cell wall [3]. The sample was observed under compound microscope and photographs were taken.

Physicochemical parameters
Physico-chemical Parameters like Loss on drying, alcohol soluble extractive and water-soluble extractive values and pH were determined as per the API guidelines for the test sample [4].

Phytochemical parameters
Preliminary phytochemical studies of methanolic and aquous extract of the test drug was carried out. Presence of various phyto-constituents viz., alkaloids, starch, proteins, amino acids, glycosides, flavonoids, phenols, saponins, steroids, tannins and phenolic compound and amino acids were evaluated [5, 6].

Table 1: Composition of Test Drug with Individual Powder Microscopic Characters.

No.	Drugs	Botanical source	Part Used	Microscopical characteristics of Powder
1.	Haritaki	*Terminalia Chebula* Retz.	Fruit rind	Few fibres, vessels with simple pits and groups of sclereids, simple starch grains, brown coloured content, peg like structure, rosette crystal
2.	Vacha	*Acorus calamus* Linn	Rhizome	Fibres, reticulate and annular vessels, simple spherical starch grains, yellowish brown content, oil globule, prismatic crystal
3.	Rasna	*Alpinia galanga* (L) Willd.	Root	Annular vessel, cork cell in surface view, fragment of fibres, parenchyma cells with starch grains, pitted vessels, silica crystals, simple and compound starch grains, spiral vessls
4.	Pippali	*Piper longum* Linn	Fruit	Fragment of epidermal cells, oil globule embedded in parenchyma, parenchyma cells of inner epidermis, perisperm cells, simple and compound starchgrains, oil globules
5.	Shunthi	*Zingiber officinale* Roscoe.	Rhizome	Annular vessel, cork cells in surface view, fragment of fibres, parenchyma cells in oil gloubules, pitted vessel, reticulate vessels, simple starch grains
6.	Shathi	*Hedychium spicatum* Sm. in A.Rees	Rhizome	Brown coloured resinous matter, cork cells in surface view, parenchyma cells with oil globules, parenchyma cells with starch grains, simple and compound starch grains, spiral vessel, transversely cut cork cells
7.	Pushkaramoola	*Inula racemosa* Hook.f.	Root	Acicular crystal, brownish coloured content, cork cells in surface view, fragments of parenchyma cells, oil globule, prismatic crystal, reticulate vessel, simple starch grains

Observations & Results
Organoleptic characters
Color: Creamish yellow
Odor: Aromatic, campheraceous
Taste: Pungent &Bitter
Texture: Rough, fibrous

Powder Microscopy
The powder microscopy of the test drug revealed the presence of- acicular crystals, annular vessels, brown coloured content, fragment of cork cells and epidermal cells, fragment of fibres, Parenchyma cells with oil globules, Peg like structure, Perisperm cells, Pitted sclereids, Pitted vessel, Pot like simple starch grains, Prismatic crystal, Reticulated vessel, Simple and compound starch grains, Spiral vessel (Figure I & II)

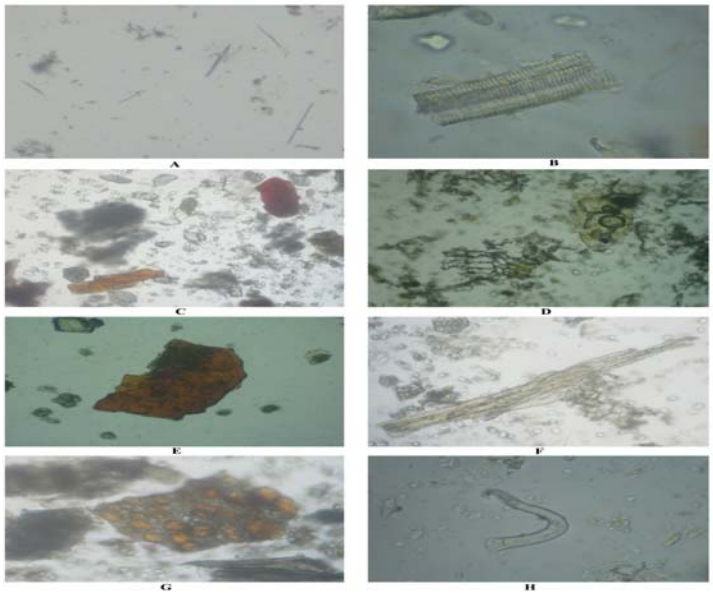

Fig 1: Microscopic characteristics of the classical hridya Yoga.

Fig. I- A) Acicular crystals, B)Annular vessels,C) Brown coloured content, D) Fragment of cork cells E) Fragment of epidermal cells, F) Fragment of fibres, G)Parenchyma cells with oil globules, H) Peg like structure

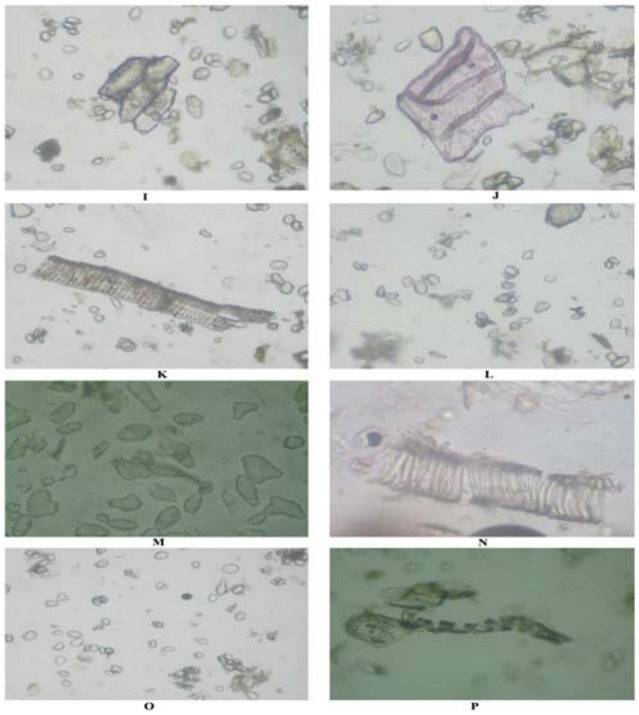

Fig 2: Microscopic characteristics of the classical hridya yoga
Fig II- I) Perisperm cells, J) Pitted sclereids K) Pitted vessels L) Pot like simple starch grains M) Prismatic crystals, N) Retticulated vessel O) Simple and compound starch grains, P) Spiral vessel

Physicochemical parameters:
The results of physicochemical characters are as follows.

Table 2: Physico chemical parameters

1	Loss on Drying (%) w/w	9.51
2	Total Ash Value (%)w/w	4.91
3	Acid insoluble ash(%) w/w	0.63
4	Water soluble extractive(%) w/w	26.57
5	Alcohol soluble extractive(%) w/w	19.68
6	pH	6.05

Phytochemical parameters
Qualitative analysis was carried out by using methanolic and aqueous extracts of the test sample. The test sample was evaluated for carbohydrate, amino acids, proteins, starch, alkaloid, tannin, steroid, flavonoids etc. their results are as quoted in table no III

Table 3: Phytochemical parameters

No	Phyto-constituents	Test performed	Results obtained	
			M.E	W.E
1.	Carbohydrate	Molish's test	+	+
2.	Reducing Sugar	Fehling's test	+	+
3.	Amino acids	Ninhydrin test	-	-
4.	Alkaloid	Dragondorff's test Wagner's test	+ +	+ +
5.	Protein	Biuret's test	-	-
6.	Tannin	Lead acetate test	+	+
7.	Steroid	Salkowaski test	+	+
8.	Flavonoids	Lead acetate	+	+
9.	Glycosides	Keller-Killiani Test	+	+
10.	Saponin	Foam Test Lead acetate test	+ +	+ +
11.	Phenolic compounds	Lead acetate	+	+

Discussion
Microscopical analysis of the formulation revealed the presence of simple and compound starch grains, acicular and prismatic crystal, pitted vessels and sclereids, annular and spiral vessels, brown coloured content, peglike structure and cells with oil globules. Starch grains were present in almost all the individual constituents of the formulation. Acicular and prismatic crystals were present in pushkaramool. Peg like structure was found in haritaki. Cells with oil globules were found in vacha, pippali, shunti and shati.
The physical constant evaluation of a drug is an important parameter in detecting adulteration or improper handling of drugs. The total ash is particularly important in the evaluation of purity of drugs i.e, the presence or absence of foreign inorganic matter. The moisture content of the drug is not too high thus it could discourage the multiplication of bacteria, fungi and yeast. Preliminary physicochemical parameters showed that water soluble extractive value is more than alcohol soluble extractive value, which indicates the presence of more water soluble contents in the formulation. pH of the drug determines acidity or alkalinity of drug. The test drug has pH 6.05 indicating its weak acidic nature. Qualitative analysis of methanolic and water extract showed the presence of carbohydrate, reducing sugar, tannin and phenolic compounds, alkaloid, steroid, flavonoid and saponins. The test drug showed negative results for proteins and aminoacids.

Conclusion
The ability to provide timely, accurate and reliable data is an essential component for the discovery, development and manufacture of Pharmaceuticals. The Pharmacognostical, Physico-chemical characters and phytochemical parameters of the classical hridya yoga may be useful to generate standards to assess the quality and purity of the formulation.

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