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Original Article

A Pharmacognostical and Physicochemical Evaluation of *Bhringraj Vati*

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ABSTRACT

Background: Since the past decades, there has been increasing acceptance and public interest in herbal products and therapies in both developing and developed countries. So, we cannot assure pharmaceutical industries insulation from adulterations and quality decrement. Therefore, quality control for the efficacy and safety of herbal products is a prime concern. *Bhringraj* is a plant of immense value. It is a plant from the family Asteraceae. Besides curing diseases, it also improves general health. *Bhringaraj Vati* is not mentioned in any classics. It is an *Anubhuta* drug formulated for the treatment of the metabolic syndrome. **Objective:** The present study is aimed at setting up a standard profile of *Bhringaraj Vati* through Pharmacognostical and Physicochemical parameters.**Methods:** Raw drugs identification and authentication were done by pharmacognostical study, i.e., morphological features, organoleptic characters, and powder microscopy. The physicochemical evaluation was carried out of the final product.**Results& conclusion:** Pharmacognostical study of raw drugs showed the presence of starch grain, trichome with a smooth surface, collapse spongy parenchyma, fibers with the wide lumen, micro-crystals, etc. Pharmaceutical evaluation showed results PH 7,loss on drying 7.5%w/w, Ash value 35%w/w, Acid insoluble ash 19.5%w/w, Water-soluble extract 15.9%w/w, Methanol Soluble Extract 9.36 %w/w, Hardness 2.35 kg/cm^2.The result of the present study will also serve as reference standards in the preparation of drug formulation.

Keywords: *Bhringaraj Vati*, Pharmacognosy, Physico-chemical analysis.

1. INTRODUCTION

Metabolic syndrome is a constellation of hazardous risk factors, provides a favorable stage for developing cardiovascular disease, particularly heart failure and type 2 diabetes mellitus. [1] Recent epidemiological studies on

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metabolic syndrome, have shown that the prevalence of metabolic syndrome increase with age. In the USA, the prevalence of the metabolic syndrome is estimated 34% of the adult population.[2] Diet, exercise, and medications can help to improve this condition.

Metabolic syndrome seems to be alike *Rasavaha Srotodusti&MedavahasrotoDusti* mentioned in Ayurveda. The manifestation of both *Srotodusti* occurs as a group of symptoms of *Atisthula* and *Purvarupa* of *Prameha*, suggest the underlying hampered uptake and metabolism mechanism of glucose and fat. The causes of metabolic syndrome like inactive lifestyle, excessive fatty diet, alcohol, and lack of exercise, day time sleep are similar to the causes of *Rasavaha Srotodusti&MedavahaSrotodusti*, forced to believe both metabolic syndrome and both *Rasavaha Srotodusti&MedavahaSrotodusti* to be originated from the same source. The consumption of causative factors of both *Rasavaha Srotodusti&Medavahasrotasa Dusti*, vitiate *Agni* especially *Rasadhatvagni&Medadhatvagni*, produce *Aama* and excessive *Meda* resulting in obstruction of *Vata*, which can result in further complications and progression of the disease. Metabolic syndrome is a lifestyle disorder occurring due to faulty lifestyle. Lifestyle modification or correction is the primary and utmost intervention for prevention and treatment of such diseases. *Bhringaraj Vati* is not mentioned in any classics. It is an *Anubhuta* drug formulated by giving seven *Bhavanas* of *Bhringaraj Swarasa* to *Bhringaraja Churna.* Standardization of drug means confirmation of its identity and determination of its quality and purity to justify their acceptability in modern system of medicines.

2. MATERIALS AND METHODS

Collection of Raw Drugs:

Bhringraj Churna was collected from local market where-as fresh *Bhringraj* was collected from the local area near Jamnagar. *Bhringraj Swaras* was extracted in the Pharmacy of Gujarat Ayurveda University, Jamnagar.

Table 1: Botanical name & part used

Sanskrit name	Botanical name	Part used
Bhringraj	Eclipta alba Hassk	Panchanga

- **Preparation of *Bhringraj Vati:***

Take fine powder (#120) of *Bhringraj Churna.* Then seven *Bhavana* of *Bhringaraj Swarasa*should is given separately one by one for one day each. Then *Vati* was prepared.T hen after it was stored in an airtight container. The whole process of *Vati* preparation was done at the Pharmacy of Gujarat Ayurveda University, Jamnagar under a sterile environment.

- **Pharmacognostical Evaluation:**

The raw drug was identified and authenticated by the Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. The identification was carried out based on organoleptic characters and powder microscopy of the drug. Powdered tablets of the drug were subjected to organoleptic and microscopic evaluation separately and confirmed the genuineness of the raw drug. The tablets were dissolved in the distilled water, filtered, air dried and studied under the corl Zeiss Trinocular microscope attached with a camera with stain and without stain. The microphotographs were also taken under the microscope. [3,4]

Physicochemical parameters

The drug was analyzed by using qualitative and quantitative parameters at Pharmaceutical Chemistry Laboratory of I.P.G.T. &R.A., Gujarat Ayurved University, Jamnagar. Physical tests like the average weight of *Vati*, average hardness, loss on drying, ash value, insoluble acid ash, PH, and chemical tests like water-soluble extractive, methanol soluble extractive were taken.[5,6]

HPTLC

Methanol extracts of drugs were spotted on pre-coated silica gel GF 60254 aluminum plates as 5mm bands, 5mm apart and 1cm from the edge of the plates, using a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (7 ml), Ethyl acetate (2 ml), Acetic acid (1 ml) was used as the mobile phase. After development, Densitometric scanning was performed with a Camag T.L.C. scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V 1.2.1 Camag). The slit dimensions were 6 mm x 0.45 mm, and the scanning speed was 20 mm s-1.

3. OBSERVATIONS & RESULTS

Pharmacognostical evaluation

Table 2: Organoleptic features of *Bhringraj Vati*

Parameter	Results
Color	Dark grey
Odor	Characteristic
Test	Bitter astringent
Touch	Hard, Solid

Microscopic evaluation:

Diagnostic powder characters of *Vati* showsFibers become shorter with smooth surface, Simple starch grain, Trichome with smooth surface, Drastic damage on epidermal cell & stomata, collapse spongy Parenchyma, Fibers with wide lumen, Micro-crystals, disturbed fragment of wavy parenchyma, Disturbed parenchyma cells with chlorophyll pigment, Drastic disturbed pollen grains, Fragment of disturbed annular piral vessels. (Plate1. 1-12).

Physico-chemical Parameters :

Physico-chemical parameters of *Bhringraj Vati* like total ash value, water-soluble extract, soluble methanol extract,ph 5% v/w aqua solution**,** loss on drying, average weight, hardness all were found to be within the normal range.[7,8,9,10]

Details are given in Table 3.

Table 3: Physico-chemical Parameters of *Bhringraj Vati*

Sr no.	Parameters	Results
1	Loss on Drying at 110 c	7.5 % w/w
2	Total Ash value	35 % w/w
3	Acid-insoluble Ash	19.5% w/w

4	Water Soluble Extract	15.9 % w/w
5	Methanol Soluble Extract	9.36 %w/w
6	pH 5% v/w aqua solution	7
7	Average weight	330 mg
8	Tablet Hardness	2.35 kg/cm^2

HPTLC

HPTLC was carried out after organizing an appropriate solvent system in which maximum 11 spots were distinguished at 254 nm and seven spots at 366 nm. Results are depicted in Table 4, Plate 1, Fig. 1, Fig. 2.

Table 4: Results of HPTLC of *Bhringraj Vati*

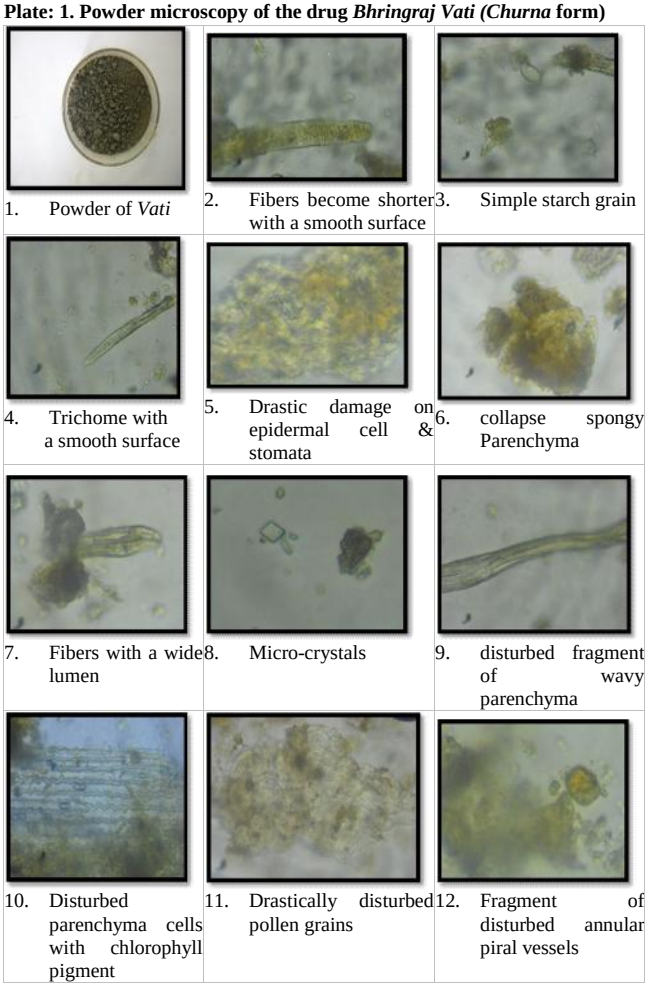
Track	Solvent system	Observation under UV radiation			
		254 nm		366 nm	
		No.of spots	Rf value	No.of spots	Rf value
Bhringraj Vati	Toluene (7ml) : Ethyl acetate (2ml): Acetic acid (1ml)	11	0.02, 0.10, 0.16, 0.19, 0.33, 0.45, 0.50, 0.56, 0.65, 0.72, 0.93	7	0.03, 0.16, 0.33, 0.50, 0.56, 0.72, 0.93

4. DISCUSSION

The pharmacognostic evaluation showed that organoleptic characters of the sample were dark grey in color, characteristic odor, bitter astringent in taste, hard and solid in touch. Microscopically study showed that fibers, simple starch grain, trichome, epidermal cell, stomata, parenchyma, micro-crystals, wavy parenchyma, parenchyma cells with chlorophyll pigment, pollen grains, annular spiral vessels show that the ingredient was present in the finished product and also proven that the purity of the finished product.

The physicochemical parameters play an important role in the standardization of formulation. According to the present study, the total ash is particularly important in the evaluation of purity of drugs, i.e., the presence or absence of foreign matter such as metallic salts or silica.[11,12]According to API the total ash value of *Bhringraj Churna*should not be more than 22%.[13] But here the total ash value of the final product is higher, i.e., 35%. The amount of Acid insoluble matter present in the product i.e.19.5% w/w. According to API, the Acid insoluble ash value of *Bhringraj Churna* should not be more than 11%. But here the total Acid insoluble ash value of the final product is higher, i.e., 19.5%. Here we can assume that these value changes due to the seven *Bhavana* of *Bhringraj Swaras* given during preparation of *Vati*. The water-soluble extractive values (15.9%w/w) indicated the presence of sugar, acids, etc. The loss on drying at 105°C was 10.25w/w. The pH from 7% w/v solution revealed that pH of formulation was comparable and was neutral. The Hardness (2.35 kg/cm2) of a *Vati* is a function of how much pressure has been exerted in making it, and it varies with the composition, thickness, shape, and diameter of tablets.[14]

Plate: 1. Powder microscopy of the drug *Bhringraj Vati (Churna* form)



1. Powder of *Vati*
2. Fibers become shorter with a smooth surface
3. Simple starch grain
4. Trichome with a smooth surface
5. Drastic damage on epidermal cell & stomata
6. collapse spongy Parenchyma
7. Fibers with a wide lumen
8. Micro-crystals
9. disturbed fragment of wavy parenchyma
10. Disturbed parenchyma cells with chlorophyll pigment
11. Drastically disturbed pollen grains
12. Fragment of disturbed annular piral vessels

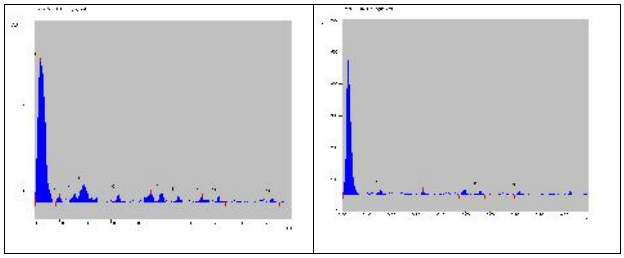


Fig 2: HPTLC of *Bhringraj Vati*at 254 and 366nm

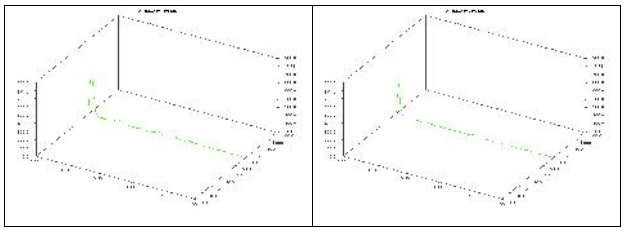


Fig 3: HPTLC 3-D graph of *Bhringraj Vati*at 254 and 366nm

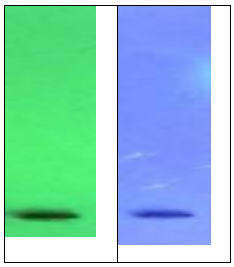


Fig 4: Chromatographic separation at day light, at 254 nm and at 366 nm

5. CONCLUSION

From the present investigation, various standardization parameters such as Physicochemical standards, Pharmacognostical Evaluation were carried out; it can be concluded that the formulation of *Bhingraj Vati* contains all good characters of an ideal *Vati* and it was found to be more effective and economic. The study shows that the content of formulation is of good quality and purity. The result of the present study will also serve as reference standards in the preparation of drug formulation and also helpful in further clinical researches.

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