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PHARMACOGNOSTICAL, PHYSICOCHEMICAL AND CHROMATOGRAPHIC STANDARDIZATION OF *MANJISHTHADI VATI*: AN AYURVEDIC POLYHERBAL FORMULATION

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ABSTRACT

Introduction: *Vyanga* (Melasma) is a *Kshudra Roga* characterized by painless hyperpigmented patches on the face caused by vitiation of *Vata* and *Pitta Dosha* along with *Rakta Dushti*. *Manjishthadi Vati*, owing to its *Varnya*, *Raktashodhaka*, and *Pitta-Shamaka* properties, was selected for the present study. It acts by pacifying vitiated *Doshas*, purifying *Rakta*, and reducing abnormal pigmentation, thereby aiding in the management of *Vyanga*. **Aim:** To analyse the pharmacognostical and pharmaceutical properties of *Manjishthadi Vati*. **Materials and methods:** *Manjishthadi Vati* was prepared using authenticated raw drugs and subjected to pharmacognostical evaluation through organoleptic and microscopic studies. Pharmaceutical evaluation included hardness, weight variation, loss on drying, total ash, acid insoluble ash, water-soluble extractive, alcohol-soluble extractive and pH determination using standard analytical procedures. Thin Layer Chromatography (TLC) was performed to develop the chromatographic fingerprint profile of the formulation. **Results:** Organoleptic and microscopic studies confirmed the presence of characteristic diagnostic features of all the constituent drugs. The physicochemical analysis showed hardness of **4.43 ± 0.15 kg/cm²**, weight variation of **315.8 ± 15.79 mg**, loss on drying

0.88 ± 0.03% w/w, total ash **5.39 ± 0.31% w/w**, acid insoluble ash **1.50 ± 0.34% w/w**, water-soluble extractive **16.77 ± 0.43% w/w**, alcohol-soluble extractive **34.15 ± 0.30% w/w**, and pH **6.17 ± 0.29**. TLC fingerprinting revealed characteristic spots at both 254 nm and 366 nm, confirming the presence of multiple phytoconstituents in the formulation. **Conclusion:** The present study established preliminary pharmacognostical, physicochemical and chromatographic standards for *Manjishthadi Vati*. The findings may serve as useful reference parameters for the identification, quality assessment and standardization of the formulation.

KEYWORDS: *Manjishthadi Vati, Vyanga,* Melasma, Pharmacognosy, TLC.

INTRODUCTION

Ayurveda is an Indian system of medicine possessing a vast number of compound formulations for various disease entities. *Manjishthadi Vati* is a polyherbal formulation containing four medicinal drugs, namely *Manjishtha, Sariva, Yashtimadhu and Shweta Chandana* [Table 1], from *Charakokta Varnya Mahakashaya*[1] owing to their complexion-enhancing and blood-purifying properties. *Vyanga* (Melasma), a *Kshudra Roga*[2] characterized by painless bluish-black or brownish discoloration over the face, is mainly caused by the vitiation of *Pitta* and *Vata Dosha* along with *Rakta Dushti*. Therefore, *Manjishthadi Vati* helps in pacifying vitiated *Doshas*, purifying *Rakta* and promoting normal skin complexion, resulting in alleviation of the signs and symptoms of *Vyanga*. *Manjishthadi Vati* is an *Ayurvedic* herbal preparation composed of medicinal plants belonging to different botanical families but possessing similar Ayurvedic pharmacological properties such as *Varnya* (Enhances complexion), *Raktaprasadana* (Blood-purifying), *Pitta-Shamaka* and *Twachya* (Beneficial for the skin) actions, which are beneficial in the management of *Vyanga*. The formulation contains *Manjishtha, Sariva, Yashtimadhu and Shweta Chandana*. Maintaining the quality and evaluating the efficacy of this herbal formulation is of great importance in the light of scientific validation. However, till date, no comprehensive scientific evaluation of *Manjishthadi Vati* has been reported. In the present study, *Manjishthadi Vati* was subjected to pharmacognostical (microscopic), pharmaceutical (evaluation of various physicochemical parameters) and TLC studies in order to establish a preliminary profile and standardization parameters for the formulation.

MATERIALS AND METHODS

Collection of Raw drugs and authentication

The raw materials were procured from the pharmacy of the institute. All the raw drugs were

identified and authenticated in the Pharmacognosy Laboratory of the institute.

Table 1: Ingredients of *Manjishthadi Vati.*

No	*Ingredients*	Latin Name	Part used	Part
1	*Manjishtha*	*Rubia Cordifolia* Linn	Root	1 part
2	*Yashtimadhu*	*Glycyrrhiza Glabra*	Root	1 part
3	*Sariva*	*Hemidesmus Indicus*	Root	1 part
4	*Shweta Chandana*	*Santalum album* Linn	Heartwood	1 part

Preparation of Drug

Manjishthadi Vati was prepared using equal proportions of *Manjishtha* (*Rubia cordifolia* Linn.), *Sariva* (*Hemidesmus indicus* R. Br.), *Yashtimadhu* (*Glycyrrhiza glabra* Linn.) and *Shweta Chandana* (*Santalum album* Linn.), selected from *Charakokta Varnya Mahakashaya*. The finely powdered drugs were mixed thoroughly and triturated with the *Kwatha* to obtain a homogeneous mass. A suitable binding agent was added to achieve the desired consistency, and *Vatis* of 250 mg were prepared.

Pharmacognostical Evaluation

The pharmacognostical study of *Manjishthadi Vati* was carried out at the Pharmacognosy Laboratory. The Pharmacognostical study comprised of organoleptic study and microscopic study of the finished product.

Microscopic Study

Manjishthadi Vati was powdered and dissolved with water and microscopy of the sample was done without stain and after staining with phloroglucinol + HCL. Microphotographs of *Manjishthadi Vati* were also taken under Carl Zeiss trinocular microscope.[3]

Organoleptic characters

The organoleptic characteristics of Ayurvedic drugs are crucial as they offer an initial indication of the sample's authenticity. Parameters such as taste, color, Odor, and texture were systematically evaluated under expert supervision.[4]

Physicochemical Analysis

Manjishthadi Vati was analyzed using various standard physico-chemical parameters. The common parameters mentioned for compressed tablets in *Ayurvedic* Pharmacopeia of India, and CCRAS, guidelines are hardness, weight variation test, loss on drying, total-ash value, acid insoluble ash value, pH value, water and alcohol soluble extractive values.

a) Hardness test

The hardness of *Manjishthadi Vati* was determined using a Monsanto hardness tester. Randomly selected tablets were placed individually in the tester, and the force required to break each tablet was recorded. The average hardness was calculated and expressed in kg/cm^2.[5]

b) Weight variation test

Twenty tablets of *Manjishthadi Vati* were selected randomly and weighed individually using a digital analytical balance. The average weight was calculated, and the individual weights was compared with the average weight to determine the weight variation.[6]

c) Loss on drying

Loss on drying was determined by accurately weighing the powdered samples of *Manjishthadi vati* and drying it in hot air oven at 105 ºC until constant weight was obtained.[7]

About 5 g of the powdered drug was macerated with 100 mL of distilled water and kept for 24 hours with occasional shaking during first six hours. Then filtered and 25 ml of filtrate was evaporated in previously weighed dish. The percentage of water-soluble extractive value was calculated.[8]

d) Alcohol-soluble extractive value

In 100 ml alcohol 5 gm powdered drug was added and macerated for 24 hours with occasional shaking during first six hours. Then filtered and 25 ml of filtrate was evaporated and dried. The percentage of alcohol-soluble extractive value was calculated.[9]

e) Total ash

Accurately weighed powdered sample of *Manjishthadi Vati* was taken in previously weighed crucible then placed in muffle furnace for ignition at 450 ºC until carbon free ash was obtained.[10]

f) Acid insoluble ash

The total ash obtained was boiled with 6N Hydrochloric acid, filtered and washed with distilled water until becomes chloride free using ashless filter paper. The residue was incinerated, cooled and weighed.[11]

g) pH

10% aqueous solution of the powdered drug was prepared then pH was measured at room temperature by using a calibrated digital pH meter.[12]

Thin Layer Chromatography[13]

TLC of *Manjishthadi Vati* was performed on pre-coated silica gel 60 F_{254} plates. The sample extract was applied as spots on the plate and developed using a suitable mobile phase in a TLC chamber saturated with the solvent system. After development, the plate was air-dried and observed under UV light at 254 nm and 366 nm. The Rf values and number of spots were recorded to establish the chromatographic fingerprint profile of the formulation.

RESULTS

Pharmacognostical Evaluation

Organoleptic characters

Organoleptic characters contents of *Manjishthadi Vati* like colour, taste, touch, Odor were recorded as shown in Table No: 2

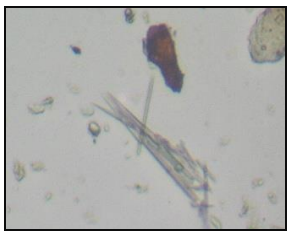
Table 2: Organoleptic Character of *Manjishthadi Vati.*

Sr.no	Character	Result
1	Appearance	Round solid tablet
2	Shape	Round
3	Colour	Brownish ash colour
4	Odour	Characteristic
5	Texture	Hard and compact
6	Surface	Smooth and uniform
7	Taste	Astringent

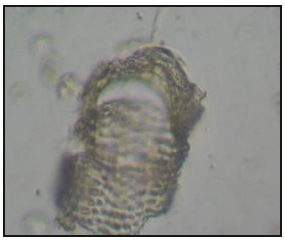
Microscopic Study

Diagnostic characters of *Manjishthadi Vati* were observed under the microscope were acicular crystal, prismatic crystal, fibers and border pitted vessels of *Manjishtha*, Fibers, crystals and pitted vessels of *Yashtimadhu*, pitted vessels, scleroid, rhomboidal crystal, starch grains of *Sariva*, stone cells, rhomboidal crystal and fibers of *Chandana*.

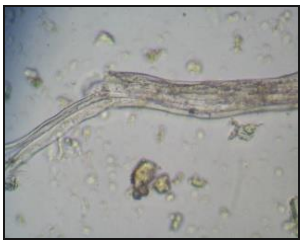
Microscopic character of *Manjishthadi Vati* (Figure-1)



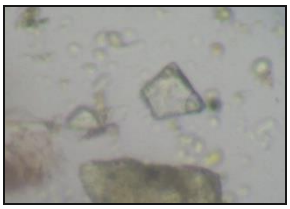
Acicular crystals of *Manjishtha*



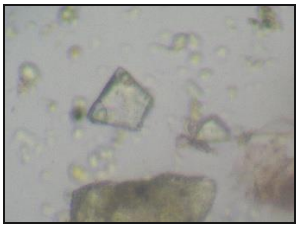
Border pitted vessels of *Manjishtha*



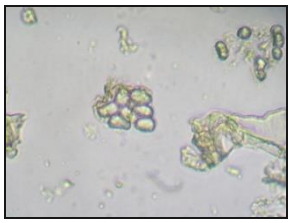
Fibers of *Manjishtha*



Prismatic crystals of *Manjishtha*

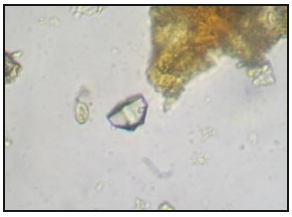


Pitted vessels of *Sariva*

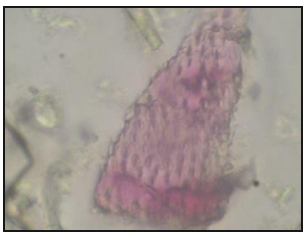


Starch grains of *Sariva*

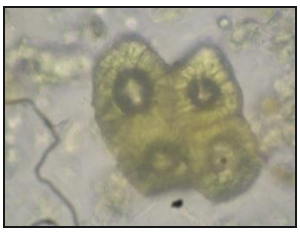
Scleroid of *Sariva*



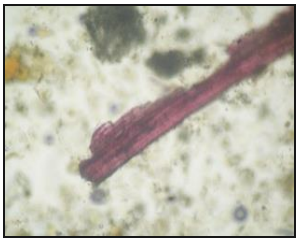
Rhomboidal crystals of *Sariva*



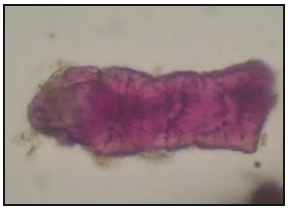
Pitted vessels of *Yashtimadhu*



Stone cells of *Yashtimadhu*



Fibers of *Yashtimadhu*



Stone cells of *Chandana*

Physicochemical results

Results of physical analysis[14] i.e. Shape, weight variation, hardness and Chemical analysis[15] like loss on drying, ash value, water soluble extract, alcohol soluble extract and pH are shown in Table 3.

Table no. 3: Physicochemical Parameters of *Manjisthadi Vati* (Mean ± SD, n=3).

Sr. No	Parameter	Result
1	Hardness	4.43 ± 0.15
2	Weight Variation	315.8 ± 15.79 mg
3	Loss on drying	0.880 ± 0.031 %
4	Ash Value	5.39 ± 0.31 %
5	Acid insoluble ash	1.50 ± 0.34 %
6	Water soluble extractive	16.77 ± 0.43 %
7	Alcohol soluble extractive	34.15 ± 0.30 %
8	pH Value	6.17 ± 0.29

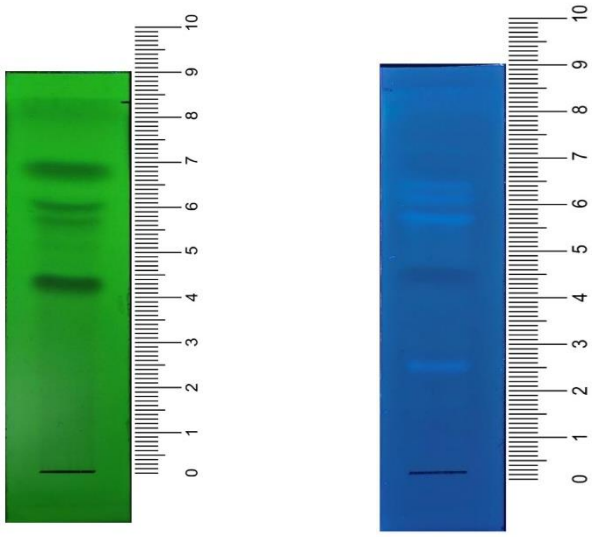
Thin Layer Chromatography study

The methanolic extract of *Manjishthadi Vati* was subjected to Thin Layer Chromatography using Toluene: Ethyl acetate: Methanol: Formic acid (6:3:1:0.1) as the mobile phase. The

developed chromatogram showed four distinct spots under UV light at 254 nm with Rf values of 0.54, 0.61, 0.68, and 0.70. At 366 nm, four spots were observed with Rf values of 0.54, 0.60, 0.68, and 0.72.

Table No. 4: Chromatographic Fingerprinting of *Manjishthadi Vati.*

Wavelength	Spots	Rf Value
At 254 nm	4	0.54, 0.61, 0.68, 0.70
At 366 nm	4	0.54, 0.60, 0.68, 0.72



TLC plate under UV 254nm TLC plate under UV 366nm

DISCUSSION

The quality, safety and therapeutic efficacy of any *Ayurvedic* formulation largely depend on the authenticity of its raw materials and the consistency of the manufacturing process. Hence, pharmacognostical and physicochemical evaluation plays a significant role in establishing reliable quality standards for finished herbal formulations. In the present study, the microscopic examination of *Manjishthadi Vati* revealed characteristic diagnostic features of all the constituent drugs, indicating that the formulation retained the identifying anatomical characters of its ingredients even after pharmaceutical processing. These observations support the authenticity and purity of the prepared formulation.

Organoleptic evaluation serves as a simple and effective preliminary method for assessing the identity and overall quality of herbal products. The colour, odour, taste, texture and appearance of *Manjishthadi Vati* were found to be in agreement with the nature of its herbal constituents, providing supportive evidence for its proper preparation and acceptable physical characteristics.

Physicochemical analysis provides measurable quality control parameters that help ensure uniformity of herbal formulations. The low moisture content observed through the loss on drying test indicates better stability of the formulation and minimizes the chances of deterioration during storage. The total ash and acid-insoluble ash values reflect the inorganic content of the formulation and indicate the absence of excessive contamination or adulteration. The higher alcohol-soluble extractive value compared to the water-soluble extractive value suggests that a greater proportion of the phytoconstituents is soluble in alcohol, which is expected due to the chemical nature of several active constituents present in the formulation. The near-neutral pH indicates that the formulation is suitable for oral administration, while the hardness value demonstrates sufficient mechanical strength to withstand routine handling, packaging and transportation.

Thin Layer Chromatography (TLC) produced a characteristic chromatographic profile of *Manjishthadi Vati* by demonstrating distinct spots at different Rf values under ultraviolet light at both 254 nm and 366 nm. The observed fingerprint pattern represents the presence of multiple phytochemical constituents and can be utilized as a reference profile for routine quality assessment and batch-to-batch consistency of the formulation.

The findings of the present investigation provide preliminary pharmacognostical, physicochemical and chromatographic standards for *Manjishthadi Vati*. These parameters can be used as reference data for the identification, authentication and quality evaluation of the formulation and may be useful in future standardization and pharmaceutical studies.

CONCLUSION

The present study established preliminary pharmacognostical, physicochemical and chromatographic standards for *Manjishthadi Vati*. The characteristic microscopic features confirmed the authenticity of the constituent drugs, while the physicochemical parameters indicated the acceptable quality of the prepared formulation. The TLC fingerprint generated in this study can serve as a useful reference for the identification and routine quality assessment of *Manjishthadi Vati*. Overall, the findings provide preliminary scientific evidence for the standardization of the formulation and may be useful for future pharmaceutical and quality control studies.

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