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Research Article

PHARMACOGNOSTICAL, PHYSICOCHEMICAL AND HPTLC EVALUATION OF *TRIVRITTADI KWATHA*: A POLYHERBAL FORMULATION

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ABSTRACT

Background: *Trivrittadi kwatha* is mentioned in *Charaka samhita* as a therapeutic formulation to treat *Kushtha* (Skin disorder). The skin diseases are considered in the umbrella of *Kushtha*. There is no definite line of treatment is given in the classics but the Seers have described *Shwitra* (Vitiligo) under the *kushtha* and line of treatment should be done like *Kushtha*. Vitiligo affects 1% of the population worldwide but management is till unsatisfactory. *Trivrittadi kwatha* contains *Trivritta* (*Operaculina turpethum* (Linn.), *Danti* (*Boliospermum montanum* Muell-Arg.) and *Triphala which is compound of Haritaki (Terminalia chebula), Bibhitaki (Terminalia belerica)* and *Amalaki (Emblica officinalis)*. This polyherbal formulation has enough potential to do *Virechana* (therapeutic purgation). **Method:** *Trivrittadi kwatha* powder was evaluated for their pharmacognostical and pharmaceutical analysis. **Results:** Microscopic characters were found of *Trivritta, Danti, Haritaki, Bibhitaki* and *Amalaki.* Results obtained in pharmaceutical parameters of *Trivrittadi kwatha* powder like loss on drying 8.2 % w/w, Ash value 6.268 %, Alcohol soluble extract 91.5 % w/w etc. are within limit mentioned by Ayurvedic Pharmacopoeia of India. High Performance Thin Layer Chromatography (HPTLC) profile of *Trivrittadi kwatha* powder showed similarities in number of spots. **Conclusion:** From the study, data developed can be espoused for laying down the standards for *Trivrittadi kwatha*.

KEYWORDS: HPTLC**,** Pharmaceutical analysis, Pharmacognocy, *Trivrittadi kwatha, Shwitra,* Vitiligo.

INTRODUCTION

Shwitra is the group of symptoms which manifest as the spot on the skin and causes cosmetic imbalance body which ultimately leads to many socialized psychological stigma in life of the patient. *Trivrittadi kwatha* is first mentioned in *Charaka Samhita* as drug triad that first content *Trivritta* so that's why this formulation named so[1]. The pathogenesis of *Shwitra* is not found separately in texts except *Harita Samhita*. According to *Harita Samhita* the Vitiation of *Vata* along with the *Pitta Dosha* spoils the *Rakta Dhatu* and creates the spot of *Pandura Varna* that is called *Shwitra*. In this way the specific line of treatment is alone given by *Aacharya Harita*. It consist *Shodhana* particularly *Virechana* (therapeutic purgation) and the *Rakta mokshana* (blood-letting) should followed by it. Thus, for *Virechana* purpose *Trivrittadi kwatha* can be administered internally. The use of herbs as medicine is the oldest form of healthcare known to humanity and has been used in all cultures throughout history[2]. During the past decade, there has been increasing public interest and acceptance of natural therapies in both developing and developed countries. Due to poverty and limited access to modern medicine, about 80% of the world's population, especially in the developing countries uses herbal medicine as their source of primary healthcare [3].

The problems associated with unregulated herbal products highlight the major public health issues that can arise when their herbal ingredients have not been authenticated correctly. Herbal ingredients must be accurately identified by macroscopic and microscopic comparison with authentic material or accurate descriptions of authentic herbs[4]. Available data concerning scientific evaluation of *Trivrittadi kwatha* is none. With the help of identity, purity, content, and other chemical, physical, or biological properties, or by the manufacturing processes quality can be defined as the status of a drug.

The advantage of HPTLC in the analytical testing of herbal products is that it provides positive identification as well as visualization of the separated fractions of the sample component and helps in quantitative, qualitative analysis with the same system.

So, current study is anticipated to evaluate *Trivrittadi kwatha* powder through pharmacognostic, physico-chemical and HPTLC analysis.

AIM

To authenticate the *Trivrittadi kwatha* as per pharmacopeial (Ayurvedic Formulary of India and Ayurvedic Pharmacopeia of India) method. To evaluate the quality of drug.

MATERIALS AND METHODS

Collection and preparation of the drug

All drugs were collected from the pharmacy of IPGT & RA, Jamnagar. The obtained drugs were shade dried, equal amount of had taken and made into a coarse powder with help of mechanical grinder. Ingredients of *Trivrittadi kwatha* are summarized at [Table 1].

Table 1: Ingredients of *Trivrittadi kwatha*

Drug	Latin Name	Parts used
Trivritta	*Operaculina turpethum* (Linn.)	Root bark
Danti	*Boliospermum montanum* (Muell-Arg.)	Root
Haritaki	*Terminalia chebula* (Retz.)	Fruit
Bibhitaki	*Terminalia belerica* (Roxb.)	Fruit
Amalaki	*Emblica officinalis* (Gaertn.)	Fruit

Organoleptic Evaluation

Various parameters of the material such as colour, odour, touch and taste of the *Kwatha* powder were observed and recorded.[5] [Table 2].

Table 2: Organoleptic characters of *Trivrittadi kwatha*

No.	Organoleptic Characters	Results
1	Colour	Creamy-Brownish
2	Odour	Aromatic
3	Taste	Bitter
4	Touch	Coarse
5	Appearance	Powder

Microscopic Evaluation

Microscopic examination of material powder was carried out with and without staining, by powder microscopy to determine the chemical nature and microphotographs were taken using Carl Zeiss binocular microscope[6].

Physico-chemical Analysis

Physico-chemical analyses were carried out by following the parameters. Physico-chemical analysis like loss on drying at 110°C[7], pH value[8], ash value[9], water soluble extractive[10], methanol soluble extractive[11] were recorded.

Preliminary Phytochemical Investigation

Preliminary phytochemical investigations are carried out by following standard procedure of API[12].

High Performance Thin Layer Chromatography

HPTLC was performed as per the guidelines provided by API [13]. A CAMAG (Switzerland) HPTLC system equipped with a sample applicator Linomat V was used for application of samples. Methanol extract of kwatha powder was used for spotting. Toluene: Ethyl acetate: Acetic acid (7:2:1 v/v) was selected as solvent system. CAMAG TLC Scanner 3, Reprostar and Wincats 1.3.4 were used for scanning the plates. CAMAG twin trough glass chamber was used for developing the plates. The developed plate was visualized under visible day light, short UV (254 nm), long UV (366 nm) and after spraying with vanillin-sulphuric acid reagent and again observed in daylight. The Rf values were recorded.

Instrumental Conditions

Application mode: Camag Linomat V, development chamber: Camag twin trough chamber, plate: Pre coated Silica Gel GF 254 plate, chamber saturation: 30 min, development time: 30 min, development distance: 10 cm, scanner: Camag scanner III**,** detection: Deuterium lamp and mercury lamp, data System: Win CATS software.

OBSERVATIONS AND RESULTS:

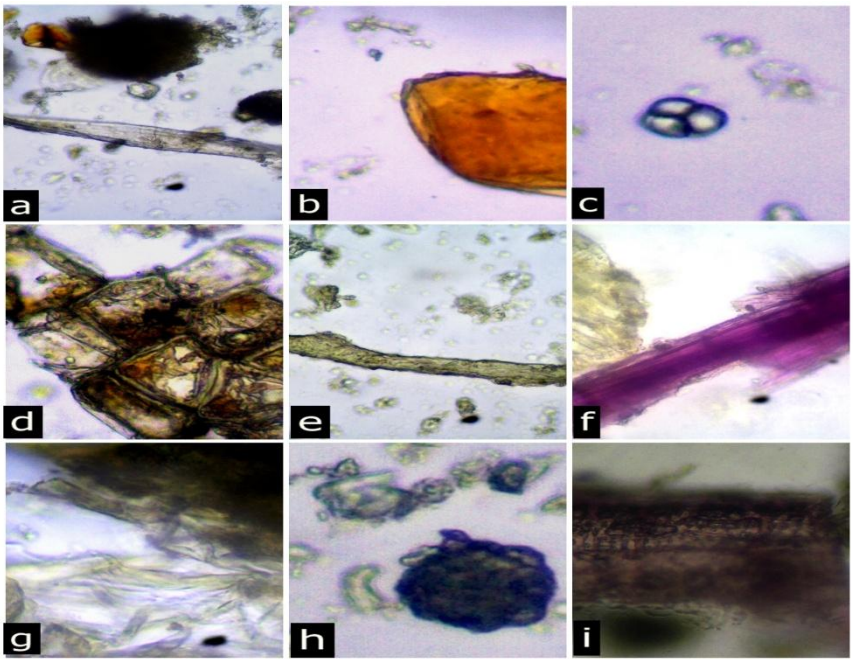
Pharmacognostic Study

Microscopic powder characters of *Trivritta* were found like Simple starch grain with hilum, Rosette crystal, Lignified fibres etc. Microscopic powder characters of *Danti* were found Simple starch grain and Scleroids. Microscopic powder characters of *Haritaki* were found like Stone cells, Scleroids and Epicarp cells. Microscopic powder character of *Bibhitaki* found that was trichomes and Microscopic powder character of *Amalaki* was found like Mesocarp cells which are depicted in [Table 3] [Fig 1-2].

Table 3: Microscopic characters of *Trivrittadi kwatha*

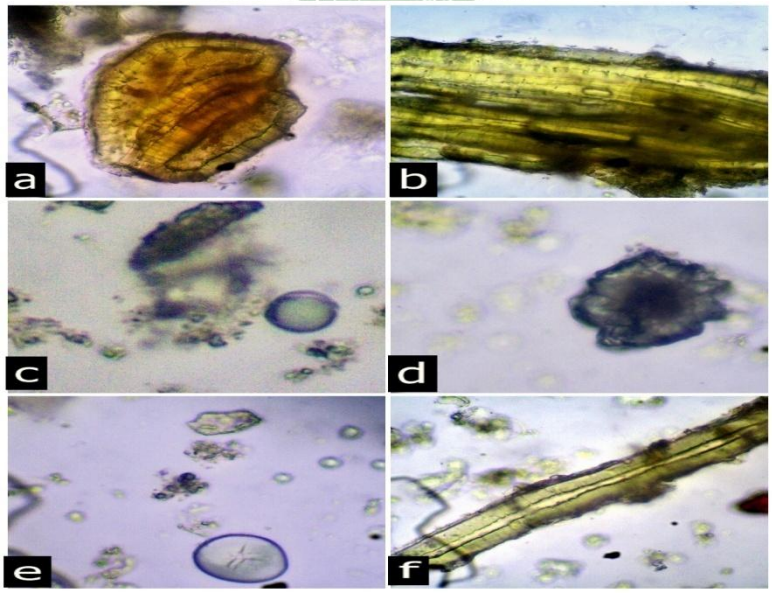
S.NO.	Name of Drug	Characters found
1	*Trivritta*	Simple starch grain with hilum, Rosette crystal, Pitted vessels, Lignified fibres, Compound starch grain, Cluster crystal, Brown content
2	*Danti*	Simple starch grain, Scleroids
3	*Haritaki*	Stone cells, Scleroids, Epicarp cells
4	*Bibhitaki*	Trichomes
5	*Amalaki*	Mesocarp cells

Figure 1: Microscopic characters of *Trivrittadi kwatha*



(a) Fibres of Amalaki, (b) Brown content of Trivritta, (c) Compound starch grain of Trivritta,(d) Epicarp cells of Haritaki, (e) Fibres of Trivritta, (f) Lignified fibres of Trivritta, (g) Mesocarp cells of Amalaki, (h) Cluster crystals of Trivritta, (i) Pitted vessel of Trivritta.

Figure 2: Microscopic characters of *Trivrittadi kwatha*



(a) Stone cell of *Haritaki*, (b) Scleroids of *Haritaki*, (c) Simple starch grain of *Danti*, (d) Rossete crystal of *Trivritta*, (e) Simple starch grain with hilum of *Trivritta*, (f) Scleroids of *Danti*

Analytical Study

Results of the analytical study of *Trivrittadi kwatha* powder are as follows.

Physico-chemical Constants

The results are depicted in **[Table 4]**

Table 4: Physico-chemical Constants of *Trivrittadi kwatha*

NO.	Parameters	Result
1	Loss on drying	8.2 % w/w
2	Ash Value	6.268 %
3	Water Soluble Extract	28.4% w/w
4	Alcohol Soluble Extract	91.5 % w/w
5	pH	6.5

High Performance Thin Layer Chromatography (HPTLC)

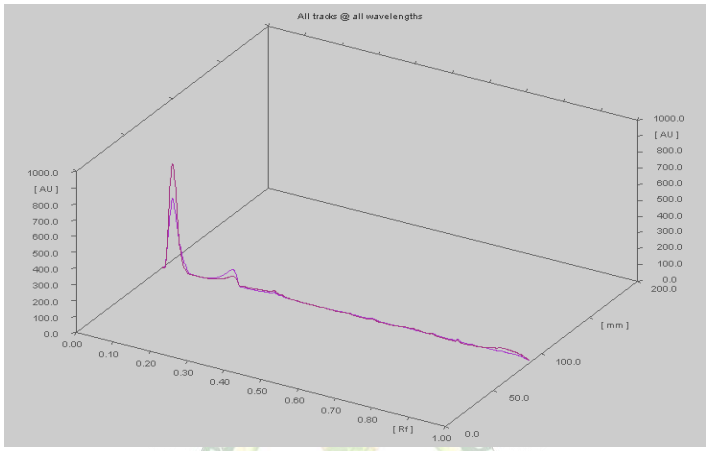
In HPTLC, in short UV-254 nm, maximum 8 spots were observed in *Trivrittadi kwatha*; while in long UV-366nm, maximum 5 spots were observed. [Table 5] [Fig 3].

Table 5: Chromatographic results of *Trivrittadi kwatha*

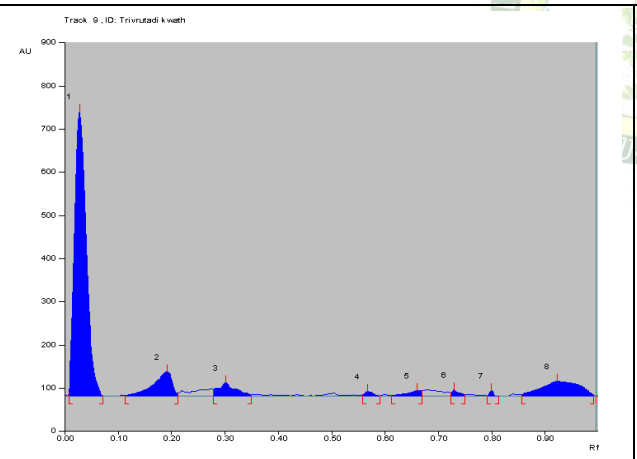
Conditions	Rf values
Short ultra violet (254 nm)	0.01,0.11, 0.28, 0.56, 0.61, 0.72, 0.79, 0.86
Long ultra violet (366 nm)	0.01,0.11, 0.28, 0.79, 0.93

Nature of adsorbed components, if with different polarity, formerly total number of components and respective Reference values also differs. In short, nature of different matrix modulates both the studied parameters.

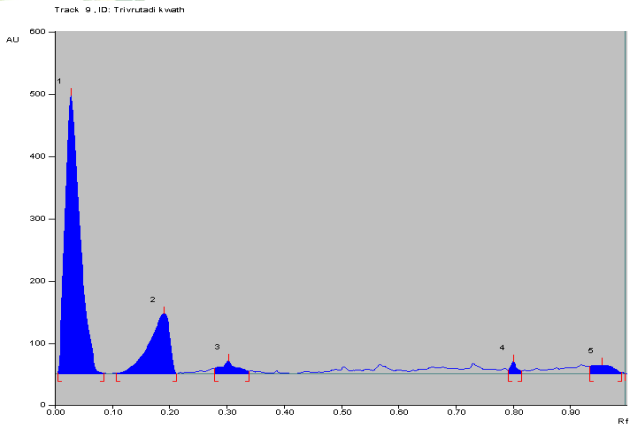
Figure 3: HPTLC evaluation of *Trivrittadi kwatha*



(a) 3D Graph: 254nm & 366nm of *Trivrittadi kwatha*



(b) Chromatographic results (Peak display) of *Trivrittadi kwatha* at Short ultra violet (254 nm)



(c) Chromatographic results (Peak display)of *Trivrittadi kwatha* Long ultra violet (366 nm)

DISCUSSION

Results obtained in physicochemical parameters of *Trivrittadi kwatha* are within limit mentioned by Ayurvedic Pharmacopoeia of India. HPTLC profile of *Trivrittadi kwatha* showed difference in number of spots due to nature of adsorbed components. This profile can be used for the identification of the medicinally important formulation of *Trivrittadi kwatha*. Present work can be considered as the first step towards identifying the followed methods through HPTLC analysis. This is a preliminary analysis and meticulous nature along with the depiction is to be carried out.

CONCLUSION

India can arise as the major country and play the lead role in production of standardized, therapeutically effective Ayurvedic formulation. This can be accomplished only if the herbal formulations are evaluated and analyzed using urbane modern techniques of standardization such as TLC, HPLC, HPTLC, GC-MS and other methods.

In this study, all the contents of *Trivrittadi kwatha* were found and evaluated that the formulation is safe and potent as *Virechana* (therapeutic purgation) drug.

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