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Pharmacognostical and Pharmaceutical Analysis of *Panchavalkaladi Taila* – An Ayurvedic Formulation for Pelvic Inflammatory Disease

Author: Matangee Pandya[1]

Co Authors: Shilpa B Donga[2], C R Harisha[3] and V J Shukla[4]

[1]Department of Prasuti Tantra and Streeroga, IPGT & RA, GAU, Jamnagar, Gujarat, India
[2,3]Pharmacognosy laborarory, IPGT & RA, GAU, Jamnagar, Gujarat, India
[4]Modern Pharmaceutical chemistry laboratory, IPGT & RA, GAU, Jamnagar, Gujarat, India

ABSTRACT

Introduction

Panchavalkaladi Taila is described in charak samhita in *Yonivyapad chikitsa Adhyaya*. *Panchavalkaladi Taila* is containing *Vata, Udumbara, Pipala, Plaksha, Parisha, Shallaki, Jingini, Jambu* and *Dhava*, which have properties of *Kashaya* and *Tikta Rasa, Sthambhaka, Shothahara, Vranaropana*. It is indicated in *Vipluta, Upapluta* and *Paripluta Yonivyapad*. This formula can be use in all infectious and inflammatory gynecological disorders i.e. pelvic inflammatory disease, valvovaginitis, white discharge, etc. *Panchavalkaldi Taila* is a less explored formulation and so it is to be studied in details for standardization of its qualitative analysis.

Aim

The present study was aimed to set a manufacturing protocol and to develop pharmacognostical and pharmaceutical profile of *Panchavalkaladi Taila*

Materials and Methods

Preparation of *Panchavalkaldi Taila*, all SOPs using raw drugs i.e. previously authenticated raw drugs, subjected to pharmacognostical, qualitative parameters and high performance thin-layer chromatography (HPTLC) analysis as per standard protocols were included in study.

Result and Discussion

The pharmacognostical study revealed the presence of characteristics features of all the drugs present in the composition. Pharmaceutical analysis showed that specific gravity at 40^0C is 0.9163, Refractive index at 40^0C is 1.48, Acid value is 3.2712, Saponification value is 150.24, Iodine value is 86 g. HPTLC fingerprinting profile of *Panchavalkaladi Taila* revealed 08 spots at 254 nm and 05 spots at 366nm.

Conclusion

The present investigation will be helpful in assessing the pharmacognostical and phytochemical analysis for *Panchavalkaladi Taila.*

Key Words: *HPTLC, Pharmacognosy, Phytochemical, Panchavalkaladi Taila*

INTRODUCTION The female genital tract commonly provides a satisfactory environment for many pathogenic microorganisms and multiple infections. Pelvic Inflammatory Disease (PID) is a

burning problem to the reproductive health of young women. PID define as spectrum of infection and inflammation of upper genital tract organs typically involving the uterus (endometrium), fallopian tube, ovaries and adjacent pelvic structure[1]. The clinical description of *Paripluta* is suggestive of inflammation and tenderness in *Yoni*[2].

Panchavalkaldi Taila[3] is containing *Vata, Udumbara, Pipala, Plaksha, Parisha, Shallaki, Jingini, Jambu* and *Dhava*, which have properties of *Kashaya* and *Tikta Rasa*, *Sthambhaka, Shothahara, Vranaropana*[4]. *Panchavalkala* has been reported to exert astringent, analgesics, striping action, hemostatic, anti-inflammatory, anti-microbial[5], anti-bacterial, anti-protozoal and anti-fungal activities[6]. Though some work has been carried out in form of *Varti* in *Upapluta Yonivyapad*. But it is unexplored yet in form of *Taila* in pelvic inflammatory diseases. Its indications are wide and seems to be fruitful so here a work was carried out for development of its manufacturing protocol and assessing the pharmacognostical, and phytochemical analysis. Most of the drugs in this composition is of *Kashaya Rasa, Ruksha Guna* and *Kapha Doshanashaka* properties *Vranashodhana, Vranaropana, Vedanasthapana, Shothahara* and *Dahaprashamana*. Further properties are as shown in Table 1.

Table 1 Pharmacokinetic action of the ingredients of *Panchavalkaladi Taila*

Name of drug	Latin Name	Part used	Ratio	*Rasa*	*Guna*	*Veerya*
Kalka Dravya						
Vata	*Ficus bengalensis* Linn.	Stem Bark	1 part	*Kashaya*	*Guru, Ruksha*	*Sheeta*
Udumbara	*Ficus racemosa* Linn.	Stem Bark	1 part	*Kashaya*	*Guru, Ruksha*	*Sheeta*
Ashvattha	*Ficus reliiosa* Linn.	Stem Bark	1 part	*Kashaya*	*Guru, Ruksha*	*Sheeta*
Plaksha	*Ficus lacor* Buch.	Stem Bark	1 part	*Kashaya,Madhura*	*Sheeta*	*Sheeta*
Parisha	*Thespesia populnea* Linn.	Stem Bark	1 part	*Kashaya,Madhura*	*Guru, Ruksha*	*Sheeta*
Jambu	*Syzygium cumini* Linn.	Stem Bark	1 part	*Kashaya,Madhura, Amla*	*Laghu, Ruksha*	*Sheeta*
Shallaki	*Boswellia serrate* Roxb.	Stem Bark	1 part	*Kashaya,Tikta, Madhura*	*Laghu, Ruksha*	*Ushna*
Dhava	*Anogeissus latifolia* Wall.	Stem Bark	1 part	*Madhura Kashaya, Katu*	*Laghu, Ruksha*	*Sheeta*
Jingini	*Odina woodier* Roxb.	Stem Bark	1 part	*Kashaya,Madhura, Amla*	*Laghu, Ruksha*	*Sheeta*
Drava Dravya						
Water	-	-	16 part	-	-	-
Sneha Dravya						
Tila Taila	-	-	4 part	-	-	-

MATERIALS AND METHODS

Collection and Authentication of Raw Drugs[7]

Panchavalkala, Jambu and *Tila Taila* were collected from the Pharmacy of Gujarat Ayurved University, Jamnagar. *Jingini* and *Dhava* were collected from the forest region of Taluka Una (Gir-Somnatha District), Gujarat. *Shallaki* was collected from the Jay Bhagwan pharmacy,

Gondal Dist. Rajkot, Gujarat. Identification and authentication of all procured raw drugs were done from Pharmacognosy laboratory of IPGT & RA, Jamnagar before manufacturing.

Method of preparation of *Panchavalkaldi Taila*

Raw material of these drugs were formed *Yavakuta* (Coarse powder), it was soaked in water overnight and *Kwatha* was prepared by boiling it to 1/8th. All *Kalka Dravyas* were taken in *Choorna* form and a bolus was formed by adding sufficient amount of water. *Tila Taila* was taken and heated to melt it. Then *Kalka Dravyas* were added in *Taila* followed by prepared *Kwatha*. It was boiled until *Siddhi Lakshana* were obtained.

Pharmacognostical Analysis

Panchavalkaladi Taila was analyzed pharmacognostically based on organoleptic characters, i.e. colour, odour, taste and texture were recorded. Microscopic studies of the raw drugs with and without stain to find out the lignified materials along with other cellular constituents were done. The micro photographs were taken under Carl Zeiss Trinocular microscope attached with camera[8].

Pharmaceutical Analysis

Analytical study of *Panchavalkaladi Taila* was carried out by using various physicochemical parameters as mentioned in Ayurvedic Pharmacopeia of India, 2007. *Panchavalkaldi Taila* was used as a sample[9]. Following parameters were performed.

Determination of Specific gravity at 40°C

A 25 ml pycnometer, capacity was cleaned, dried, weighed and filled up to the mark with water at the required temperature and weighed. At the same time and temperature, the pycnometer was filled up to the mark with the sample and weighed; the specific gravity was expressed in grams and determined by dividing the weight of the sample in grams by the weight of the water.

Determination of Refractive Index at 40°C

Regulated at 40°C, attach the prism box of Abbe's refractometer to a thermostatic bath. Open this prism box, place a few drops of sample on the lower prism and close the box. Mirror was adjusted to give a bright illumination of the field. Turn the Knurled knob until the field has a light and dark section. If there was a colored fringe between the two areas, adjust the Amici prisms until the boundary was sharp and black, set it on the cross hairs and note the reading of refractive index. Open the prism box and wipe off the sample with cotton wool moistened with acetone.

Determination of Acid value

Ether, 25ml and 25ml alcohol (95%) was mixed. Phenolphthalein(1 %), 1 ml solution was neutralized with N/10 alkali (few drops). Dissolve about 5gm of oil accurately weighed and mixed with neutral solvent and titrated with N/10 potassium (or sodium) hydroxide by shaking constantly until a pink color persists for 15 seconds.

Determination of Saponification value

Weigh 2 g sample was taken into a conical flask and add exactly 25ml of the alcoholic potassium hydroxide solution. Reflex condenser was attached and heated the flask in boiling water for one hour, shaking frequently. One ml of

phenolphthalein (1%) solution was added and titrated the excess alkali with N/2 Hydrochloric acid by shaking constantaly until carried out a blank for 15 seconds.

Determination of Iodine value

Iodine monochloride method (Wij's method): A dry iodine 500 ml flask was taken and added accurately weighned quantity of substance and 10 ml of CC14(Carbon tetrachloride) was added and dissolved. Iodine monochloride (20 ml) solution was added. The stopper was inserted and allowed to stand in the dark at a temperature between 15-25 ˚C for 30 min. KI(Ptassium iodide)(15 ml) solution was dropped in the cup top at that time.After 30 minutes carefully stopper was removed and rinsed. sides of the flask with 100 ml of water was taken, shaken and titrated with 0.1 M sodium thiosulphate using starch solution added towards the end of the titration as indicator. Noted the number of ml required. Repeated the operation for three time omitting the substance being examined and noted the number of ml required and calculated the iodine value from the expression.

HPTLC[8]

Instrumentation

A CAMAG HPTLC system (Muttenz, Switzerland) equipped with a sample applicator TLC auto sampler 4, twin trough plate development chamber, TLC Scanner 3, win CATS software version 1.4.4 and Hamilton (Reno, Nevada, USA) Syringe.

HPTLC method

Extract(5µl) was loaded on E. Merck Aluminum plate pre coated with silica gel 60 F_{254} of 0.2 mm thickness and the plate was developed in Toluene: Ethyl acetate (9:1) in twin trough chamber previously saturated with solvent system. After development densitometric scan was performed with a Camag TLC scanner III in reflectance absorbance mode at 254 and 366 nm under control of Win CATS Software (V 1.2.1. Camag) (Stahl, 1969). The plate was then dipped in sulphuric acid reagent and heated in a hot air oven at 105ºC until the colour of the spots appeared and profile photo was documented under white light.

RESULTS

Organoleptic characters: The results are shown in Table 2

Table 2 Organoleptic characters of *Panchavalkaladi Taila*

Drug name	Organoleptic characteristic			
	Colour	**Odour**	**Taste**	**Touch**
Panchavalkaladi Taila	Brown (dull)	Slightly aromatic	Astringent	Coarse(fibrous)

Microscopic characters

Powder microscopy of raw drugs of *Panchavalkaladi Taila* showed the striking characters of all individual drugs. The data was shown in Figure 1.

Pharmaceutical analysis

The results of following parameters[9] of pharmaceutical analysis of *Panchavalkaladi Taila* is as shown in Table 3.

HPTLC

Table 3 Pharmaceutical analysis of *Panchavalkaladi Taila*

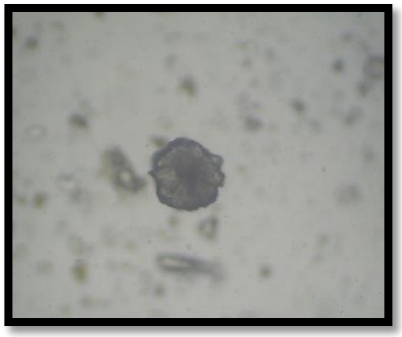
Sr. No.	Parameters	Values
1.	Specific gravity at 40°C	0.9163
2.	Refractive index at 40°C	1.48
3.	Acid value	3.2712
4.	Saponification value	150.24
5.	Iodine value	86 g
6.	Loss on Drying at 105°C (% c)	0.10%

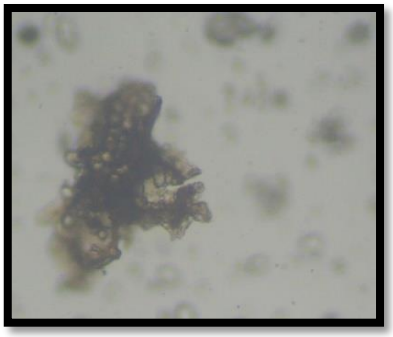
The chromatogram showed 8 peaks at 254 nm; while the chromatogram showed 05 spots at 366 nm on performing HPTLC. The data was shown in Table 4. The HPTLC profile of *Panchavalkaladi Taila* was as shown in the Figure 2.

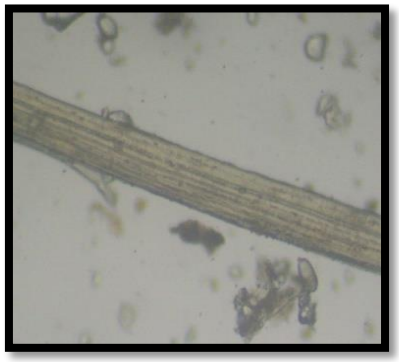
Table 4 HPTLC Profile of *Panchavalkaladi Taila*

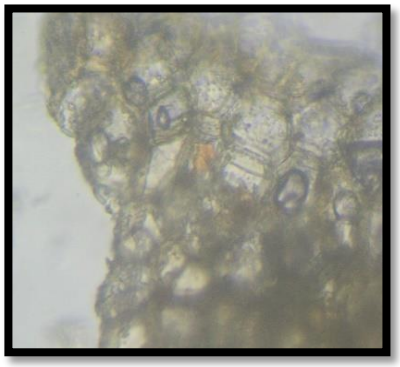
Conditions	No of Peak	Rf values *Panchavalkaladi Taila*
Short ultra violet (254 nm)	08	126.8,0.1,0.1,87.4,117,38.7,81.8,55.4
Long ultra violet (366 nm)	05	66.1,18.2,0.1,11.5,5.9

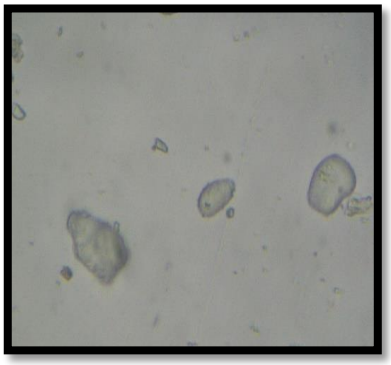

Coarse powder of *Panchavalkaladi*

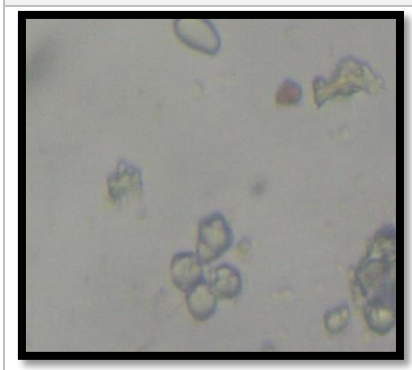

Cluster crystal of *Jingini*

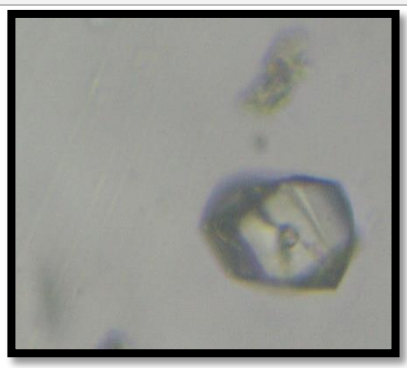

Cork cell with brown content of *Vata*

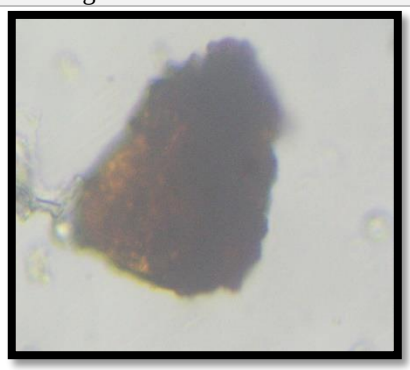

Fibers of *Vata*

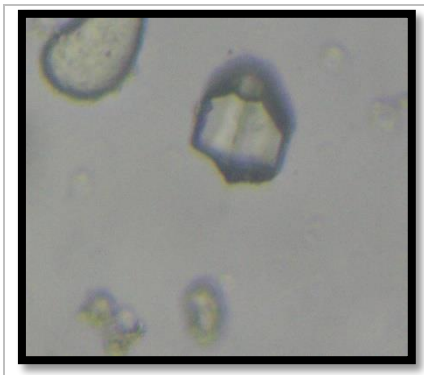
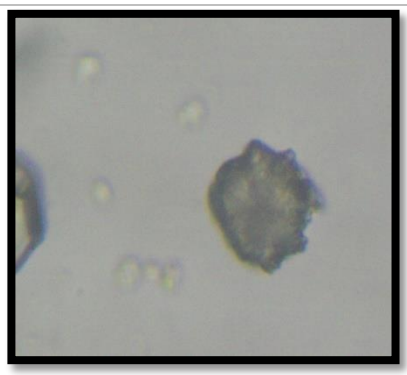
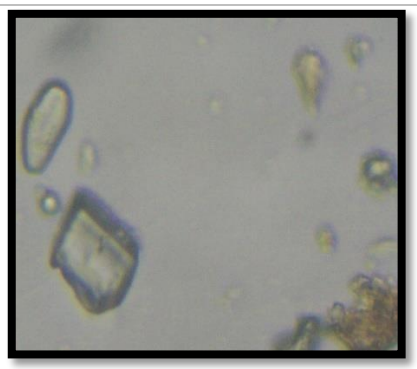
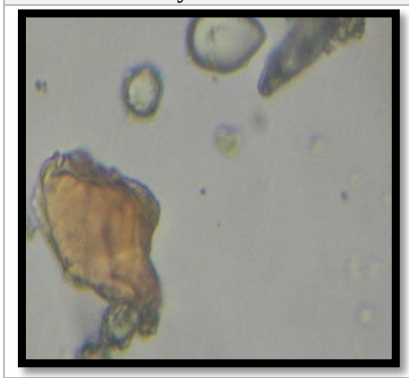
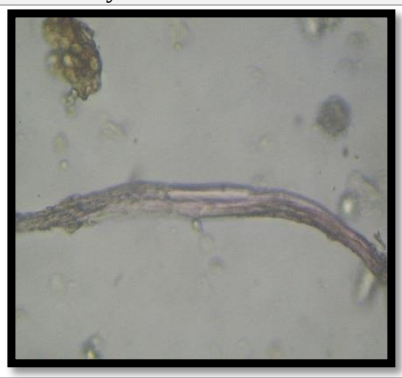
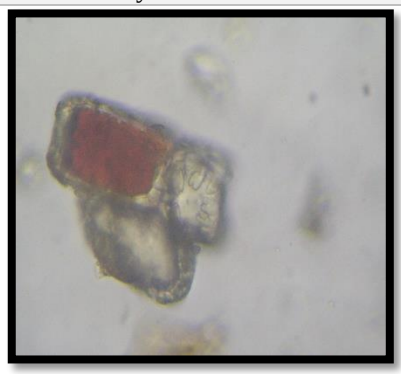
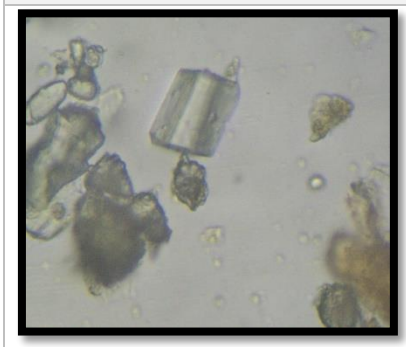
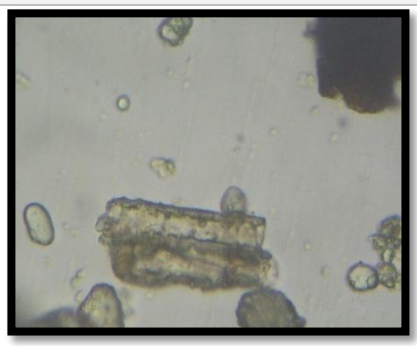
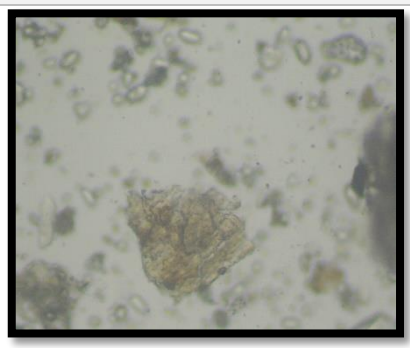
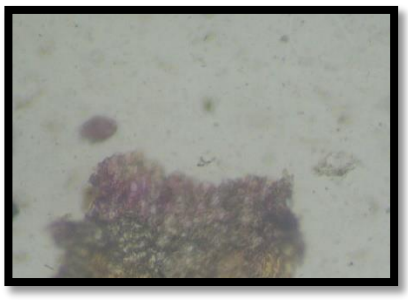
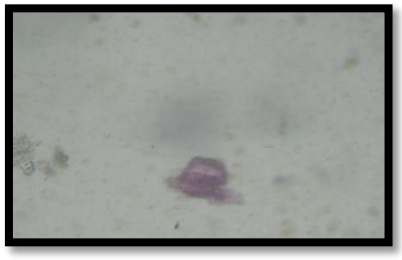
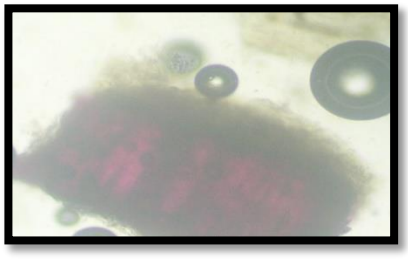
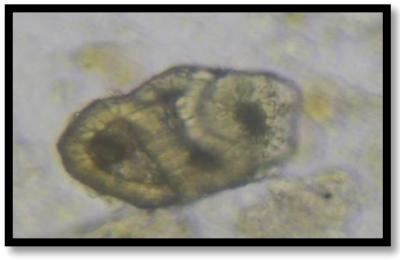

Stone cells of *Ashwattha*


Starch grains of *Plaksha*


Starch grains of *Dhava*


Rhomboidal crystal of *Vata*


Brown content of *Parisha*

		
Rhomboidal crystal of *Udumbara*	Rosset crystal of *Plaksha*	Prismatic crystal of *Dhava*
		
Brown content of *Vata*	Stone cells of *Ashwattha*	Stone cell with tannin content of *Dhava*
		
Rhomboidal crystal of *Ashwattha*	Stone cells of *Ashwattha*	Stone cells of *Ashwattha*
		
Misocarp cells of *Jingini*	Cork cell of *Dhava*	Lognified cork cells of *Jingini*
		
Lignified fibers of *Dhava*	Lignified stone cells of *Vata*	Stone cells of *Ashwattha*

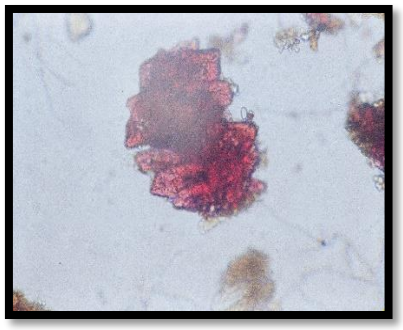
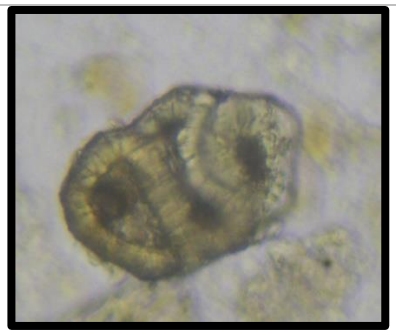
		
Stone cells of *Parisha*	Stone cells of *Plaksha*	

Figure 1. Powder microscopy of raw drugs of *Panchavalkaladi Taila*

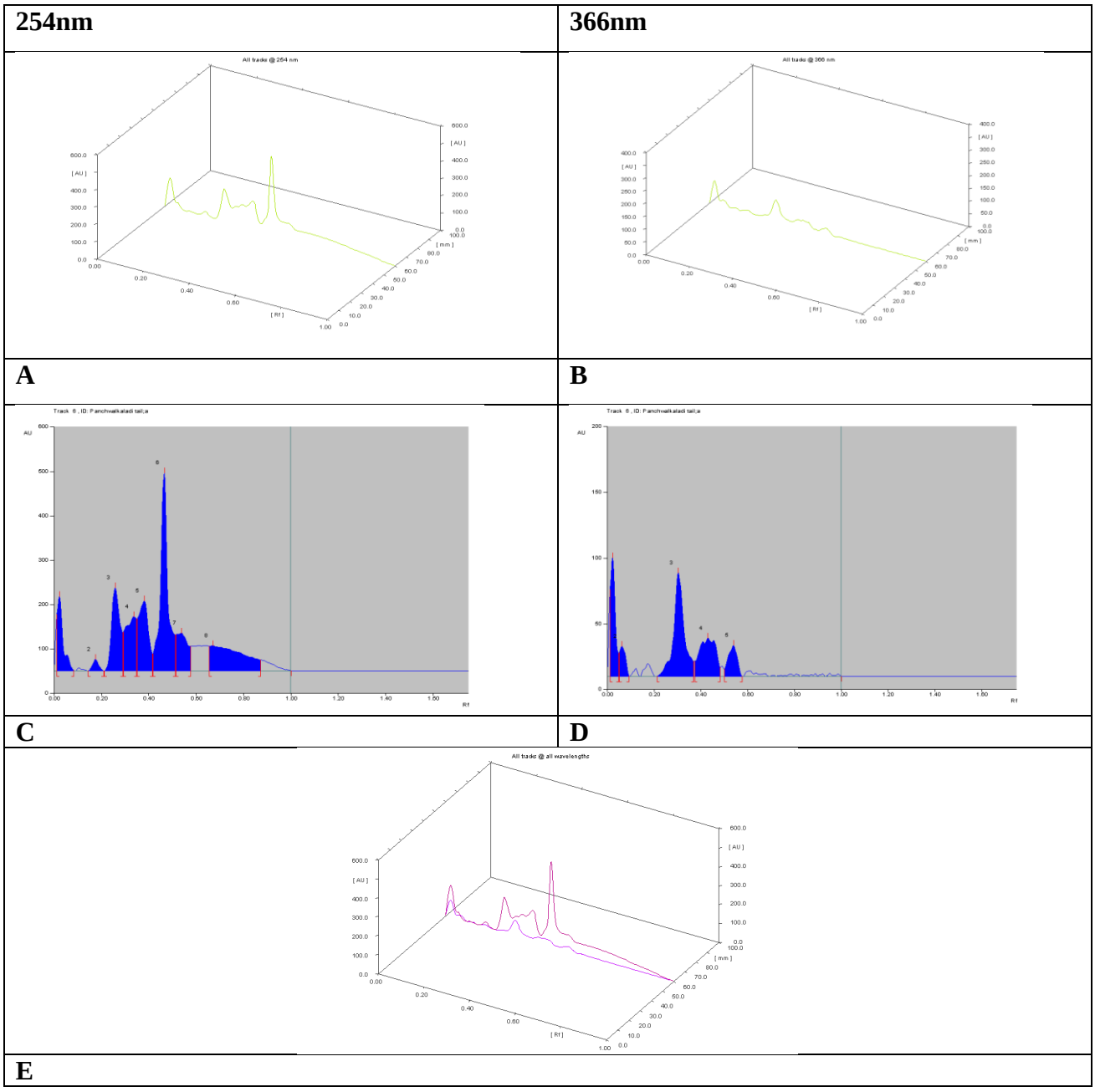


Figure 2: HPTLC profile of *Panchavalkaladi Taila*

Here, **A** represents 3D graph at 254 nm, **B** represents 3D graph at 366 nm, **C** represents peak display at 254 nm, **D** represents peak display at 366 nm, **E** represents multiple wavelength 3D graph.

DISCUSSION

Pharmacognostical measures were analyzed of *Panchavalkaladi Taila*. All the microscopic characteristic was identified in powder form that were found equivalent to standard profile. Physico-chemical and HPTLC studies inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level.

CONCLUSION

The advancement of analytical techniques can serve as a specific tool in Ayurved, thereby, allowing the manufacturers to set quality standards and specifications so as to seek marketing approval from regulatory authorities for therapeutic efficacy, safety and shelf- life of Ayurvedic drugs.

As not much work has been carried out on the *Panchavalkaladi Taila* to explore its hidden potential. Phyto-chemical evaluation of *Panchavalkaladi Taila* was illustrated the specific characters of ingredients which were used in the preparation. Physico-chemical profile is an important parameter for quality control and assurance. In the present work, the obtained results were found within prescribed limits. This information may be further useful for research activity or therapeutic use of the drug.

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