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Research Article

PRELIMINARY PHARMACOGNOSTICAL, PHYTOCHEMICAL STUDY AND HPTLC ANALYSIS OF *COSTUS PICTUS* D.DON.

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ABSTRACT

The ancient wisdom in Ayurveda medicine is still not exhaustively explored. Multiple exotic plants existent in India which are not described in classical literature of Ayurveda are commonly referred to as *Anukta Dravya* (undocumented). *Costus pictus* D.Don is such a plant, recently introduced in India from Mexico, which is used for renal disorders there. In India, it is used in Diabetes mellitus. This is proven for antidiabetic, antioxidant, anticancerous, antimicrobial and diuretic actions. It is an easily propagated, palatable and cost effective plant. Identification through pharmacognostical and phytochemical studies is essential for the standardization of any plant. The green leaf is narrowly elliptic with 10 to 25cm length and 2.5 to 6cm width. Microscopy revealed presence of vascular bundles, unicellular trichomes in upper epidermis, thin walled parenchyma cells in ground tissue and layers of parenchymatous hypodermis. Powder microscopy showed presence of epidermal parenchyma cells with underlying chlorenchyma group of fibers and fibro vascular bundles.TLC photo documentation revealed presence of many phytoconstituents with different Rf values. Densitometric scan showed many peaks, 10 at 254nm, 11 at 366nm, 6 at 520nm and 9 at 620 nm after derivatisation. Moisture content was 20%. The percentage of total ash, acid insoluble ash, and water insoluble ash was determined. The water soluble extractive value was 22.57 which is highest among all the extracts. The results indicated the presence of alkaloid, steroids, tannins, flavanoids, phenol, carbohydrate and resin in ethanolic extract and steroid, flavanoids, phenols, saponins, tannins and glycosides in water extract.

KEYWORDS: *Costus pictus*, *Anuktadravya*, Pharmacognosy, Phytochemistry, HPTLC.

INTRODUCTION

Ayurvedic herbal medicine has been refined by thousands of years of experience and practical application. Many natural measures are being shown to produce better results than drugs or surgery without side effects. Also there is an evidence that many current drug therapies simply suppress symptoms and ignore the underlying disease processes. In contrast, many natural products appear to address the cause of many such diseases and yield superior clinical results. Research in this field is a never ending process.[1] Studies have already reported that natural sources of medicinal plant are unable to meet the demand for popular herbal products. [2]

Hence there is a compelling need to search for less known plants with multiple uses reported in ethno medicine and incorporate it after thorough screening into popular use. Multiple exotic plants are existent in India which are not referred to either in classical literature of Ayurveda i.e. *Ayurveda Saṃhitas* or in *Nighanṭus* and are commonly referred to as *Anukta Dravya* (undocumented) in Ayurveda.[3] Therefore, there is an urgent need to demarcate, identify and then analyze them scientifically.

Costus pictus D.Don is a recently introduced plant in India from Mexico which is used for renal disorders there. In India it is used for treatment of Diabetes mellitus. Methanolic extract of *Costus pictus* D.Don was found to reverse fatty changes, sinusoidal dilatation, degeneration and inflammation of liver cells in diabetic rats.[4] In different studies it was proven that this plant had antioxidant, anti cancerous, antimicrobial and diuretic actions. It is a widely grown plant which does not need much care and easily propagated. It is palatable and cost effective drug also. Local name is Insulin plant and

the botanical source is *Costus pictus* D.Don ex Lindl. belonging to the family *Costaceae* (sub-family of *Zingiberaceae*). This is a native of South and Central America, widely cultivated in South India and also run wild in many places.[5]

Traditionally, *Costus pictus* D.Don is known for glucose lowering activity, valued mainly for its tonic, stimulant, antiseptic, aphrodisiac property and able to check the hair turning grey. Its root is anodyne, antibacterial, antispasmodic, aphrodisiac, carminative, stimulant, stomachic, tonic and vermifuge.[6] In India, the plant is popularly known as 'Insulin Plant'. Local people eat the leaves to cure diabetis. The rhizomes are cooked, eaten and used as anthelmintic.[7] In Folk Medicine of Mexico, its infusion is used to treat renal disorders and inflammation.[8] In Cuba, the decoction of leaves is traditionally used for urinary infections including lithiasis and renal colitis.[9]

From a practical perspective, Pharmacognosy includes quality control (identity, purity, constancy), efficacy (therapeutic indications, clinical studies, pharmacological investigations) and safety (adverse reactions, drug interactions, contra-indications, precautions).[10] Detailed pharmacognostical study of plant help us to differentiate between closely related species of the same genus or related genera of the same family. Apart from this, proper identification of plant excluding with the adulterant morphologically and microscopically is necessary for assuring the quality of drugs up to adequate standard. So before using a drug, it is very much essential to carry out its detailed pharmacognostical study. The isolation, purification and identification of active constituents are chemical methods of evaluation. Preliminary phytochemical screening is a part of chemical evaluation. A plant contains many chemical compounds such as carbohydrates, proteins, lipids, alkaloids, glycosides, tannins and oils that exert a physiological and therapeutic effect. The plant is subjected to preliminary phytochemical screening for the detection of various plant constituents[11] The preliminary phytochemical studies are essential to know the basic constituents present in drug. It helps to get an idea about the enormous variety of organic substances. The action of a drug depends upon the basic components present in the drug.[12] So this study is aimed to draw a morphological, histological and phytochemical standard of *Costus pictus* D.Don.

MATERIALS AND METHODS

Collection of Sample

Leaf of *Costus pictus* D.Don plant was collected from VPSV college garden, Kottakkal during 2015. The authenticity of leaves were confirmed by experts of Dravyaguna vijnanam department of VPSV Ayurveda college, Kottakkal. Sample was cleaned and dried. Dried sample was powdered and kept in air tight bottles. This powder was used for phytochemical studies.

Macroscopy

The external morphological features of the test drug, leaf of *Costus pictus* D.Don were keenly observed under naked eye and documented by using Fujifilm Finepix JV200 digital camera with size indicating rulers. The work had been carried out in Dept. of Dravyaguna vijnanam, V.P.S.V. Ayurveda College, Kottakkal.

Microscopy

Compound Microscope, slides, cover slips, sharp blades, safranin stain, petri dishes, watch glass, thin painting brush, pure water, dropper, forceps and needle were used for microscopy procedure. The work had been carried out in Dept. of Dravyaguna vijnanam, V.P.S.V. Ayurveda College, Kottakkal. Fresh green, full-grown and healthy plant of *Costus pictus* D.Don was collected from its natural habitat. The Plant was washed in pure water to remove all the impurities. A portion of leaf containing midrib and laminar region of leaf of almost straight and sufficient length to hold the sample was selected. The histology of leaf was recorded following the API guidelines using a Zeiss AXIO trinocular microscope attached with Zeiss Axio Cam camera. The Photographs of the sections were taken using digital camera attached to the microscope.

Powder Microscopy

A pinch of powder was warmed with drops of chloral hydrate on a microscopic slide and mounted in glycerine. Slides observed under microscope and diagnostic characters were observed and photographed using Zeiss AXIO trinocular microscope attached with Zeiss Axio Cam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.

Preliminary Phytochemical Analysis

Leaf of *Costus pictus* D.Don plant was collected from VPSV college garden, cleaned and dried. Dried sample was powdered and kept in air tight bottles. This powder was used for phytochemical studies. Analysis of loss on drying, total ash, acid insoluble ash, water soluble ash, volatile oil content, moisture content, alcohol soluble extractive, water soluble extractive, successive solvent extraction, cold alcohol extraction and cold water extraction had been carried out to evolve parameters for checking its quality.[13] Qualitative tests were done to detect presence of alkaloids, carbohydrates, steroids, saponins, tannins, flavonoides, phenol, coumarins, triterpenoides,

carboxylic acid, resin, quinines and aminoacids in aqueous extract of *Costus pictus* D.Don. as per API guidelines.[14,15]

HPTLC analysis

Instruments used for HPTLC analysis were Linomat camag applicator and Linomat scanner. Wincat software was used. 1gm of *Costus ictus* D.Don leaf powder was extracted with 10ml of ethanol. 4, 8 and 12µl of the above extract was applied on a pre-coated silica gel F254 on aluminum plates to a band width of 7mm using Linomat 5 TLC applicator. The plate was developed in Toluene: Ethyl acetate (9.0: 1.0). The developed plates were visualized in UV 254, 366, and then derivatised with vanillin sulphuric acid and scanned under UV 254nm, 366nm and 620nm (after derivatisation). R_f, colour of the spots and densitometric scan were recorded.[16,17]

RESULTS

Macroscopy of *Costus pictus* D.Don leaf

The leaves were simple, large fresh looking spirally arranged, oblong-lanceolate being dark green above and lighter green below. The shape of the leaf was narrowly elliptic with the length 10 to 25cm and width 2.5 to 6cm. Leaf was green in colour with characteristic taste and odour. (Figure no.1)

Microscopy of *Costus pictus* D.Don leaf

Leaf was shallowly boat shaped, having a group of vascular bundles. It consisted of thin epidermal layer. On the upper epidermis, simple unicellular, pointed non-glandular trichomes were present. The ground tissue had wide, thin walled compact parenchyma cells with shrunken walls. Below the upper epidermis and above the lower epidermis there were two to three layers of parenchymatous hypodermis.The vascular system of the midrib had wide, circular thin walled xylem elements and small clusters of phloem elements located on the upper side. The vascular bundle was surrounded by wide layer of parenchymatous bundle sheath. The vascular bundles of the lamina occured in a single horizontal row of the median part of the lamina. The lamina- bundles also had one or two wide circular xylem elements and thick clusters of phloem and parenchymatous bundle sheath. (Figure no. 2 - 7)

Powder Microscopy of Leaves of *Costus pictus* D.Don

Microscopic studies of powdered leaf of *Costus pictus* D.Don showed presence of Epidermal Parenchyma cells with underlying chlorenchyma group of fibers and fibro vascular bundles. (Figure no.8, Figure no.9)

Phytochemical Analysis

Quantitative Phytochemistry

Table 1: Results of Quantitative Phytochemical Analysis

Parameter	Results n= 3% w/w
Loss on drying	9.42
Total Ash	14.16
Acid insoluble Ash	0.90
Water soluble Ash	7.88
Volatile oil	30
Moisture content	20
Alcohol soluble extractive value	6.33
Water soluble extractive value	22.57
Cold alcohol extractive value	9.14
Cold water extractive value	15.6

Successive solvent extraction was done using hexane, chloroform, ethyl acetate and alcohol. Results were tabulated in table no: 2

Table 2: Results of Successive Solvent Extraction

Solvent	Yield % w/w
Hexane	5.62
Chloroform	1.77
Ethyl acetate	1.82
Alcohol	4.14
Water	11.46

Qualitative Phytochemistry

Qualitative analysis was done in ethanolic extract, water extract, cold alcohol extract and cold water extract of Costus Pictus D. Don leaf powder. Results are tabulated in table no 3, and 4. These are helpful to know the basic constituents present in the drug. Action of any drug depends upon these basic components.

Table 3: Qualitative Analysis of Ethanoilc Extract

Tests	**Colour if positive**	Ethanoilc extract
Alkaloids		
Dragendroff's test	Orange red precipitate	Orange red precipitate
Wagners test	Reddish brown precipitate	Reddish brown precipitate
Mayers test	Dull white precipitate	Dull white precipitate
Hagers test	Yellow precipitate	Yellow precipitate
Steroids		
Liebermann- buchard test	Bluish green colour	Bluish green colour
Salkowski test	Bluish red to cherry red color in chloroform layer and green fluorescence in acid layer	Bluish red to cherry red color in chloroform layer and green fluorescence in acid layer
Carbohydrate		
Molish test	Violet ring	Violet ring
Fehlings test	Brick red precipitate	Brick red precipitate
Benedicts test	Red precipitate	Red precipitate
Tannin		
With $FeCl_3$	Dark blue or green or brown	Dark blue or green or brown
Flavonoids		
Shinoda's test	Red or pink	Red or pink
Saponins		
With $NaHCO_3$	Stable froth	No stable froth
Triterpenoids		
Tin and thionyl chloride test	Pink	Brown color
Coumarins		
With 2 N NaOH	Yellow	Brown color
Phenols		
With alcoholic ferric chloride	Blue to blue black	Blue to blue black
Carboxylic acid		
With water and $NaHCO_3$	Brisk effervescence	No Brisk effervescence
Amino acid		
With ninhydrine reagent	Purple colour	No purple color
Resin		
With aqueous acetone	Turbidity	Turbidity
Quinone		
Conc. sulphuric acid	Pink/purple/red	Golden yellow

Table 4: Qualitative Analysis of Different Extracts

	Hot water extract	Hot alcohol extract	Cold water extract	Cold alcohol extract
Alkaloid	-	+	-	+
Steroid	+	+	-	-
Tannin	+	+	+	+
Flavanoids	+	+	-	+
Saponins	+	-	+	-
Phenol	+	+	-	-
Glycoside	+		+	+
Anthraquinone	-		-	-
Carbohydrate		+		
Terpinoid		-		
Carboxylic acid		-		
Resin		+		
Quinone		-		
Coumarine		-		
Amino acid		-		

HPTLC analysis of *Costus pictus* D.Don leaf powder

HPTLC finger print profile of ethanol extract of *Costus pictus* D. Don had been obtained with suitable solvent system, Toluene: Ethyl acetate (9.0: 1.0)

The developed plates were visualized under UV light and white and then under light after derivatisation with vanillin sulphuric acid reagent. Rf, colour of the spots and densitometric scan at different nanometers were recorded. HPTLC: TLC photo – documentation revealed presence of many phytoconstituents with different Rf values. Densitometric scan of the plates showed numerous bands under 254nm, 366nm, 520nm & 620nm after derivatisation. There are 10 peaks at 254nm, 11 peaks 366nm, 6 peaks at 520nm and 9 peaks 620nm after derivatisation. (Fig. no: 10 - Fig. no 14)

Table 5: R_f Values of All The Samples

At 254nm	At 366nm	After Derivatisation
-	0.07 (F. Orange)	0.07 (D. purple)
0.10 (L. green)	0.10 (FD. yellow)	-
-	-	0.14 (D. purple)
0.16 (L. green)	0.16 (FD. red)	-
0.20 (L. green)	-	-
-	-	0.23 (L. purple)
0.26 (L. green)	-	-
0.31(D. green)	0.31 (FD. red)	-
-	-	0.35 (D. purple)
0.37 (D. green)	-	-
-	0.41 (FD. red)	-

0.44 (L. green)	-	0.44 (D. purple)
0.48 (L. green)	0.48 (FD. red)	0.48 (L. yellow)
-	-	0.50 (L. purple)
0.54 (D. green)	0.54 (FD. red)	0.54 (D. green)
0.58 (L. green)	-	-
-	-	0.62 (D. green)
0.64 (L. green)	-	-
-	0.66 (FD. red)	-
-	-	0.68 (L. purple)
0.71 (L. green)	0.71 (FD. red)	0.71 (L. purple)
-	0.74 (FD. pink)	-
-	0.78 (FD. red)	0.78 (D. purple)
-	0.84 (FD. purple)	0.84 (D. purple)

F- Fluorescent; D – dark; L – light

Fig no. 1 Macroscopy of *Costus pictus* D.Don leaf

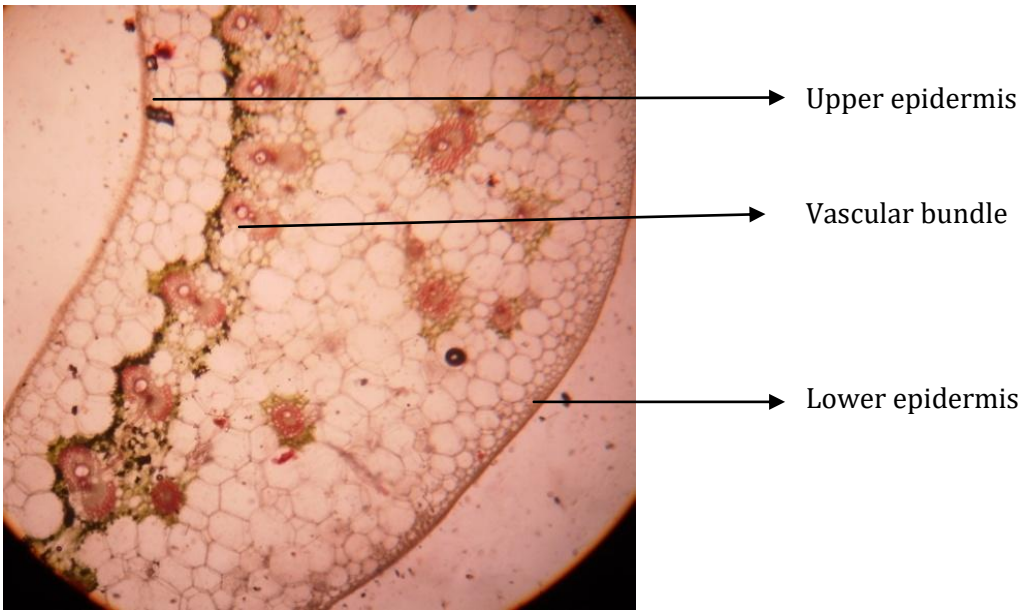


Fig no.2 Microscopy of *Costus pictus* D.Don Midrib portion – 100 X view

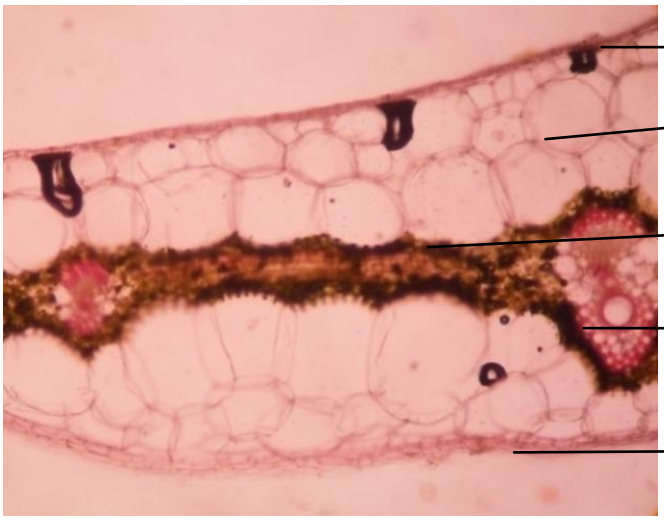


Fig no .3 Laminar portion 100 X view

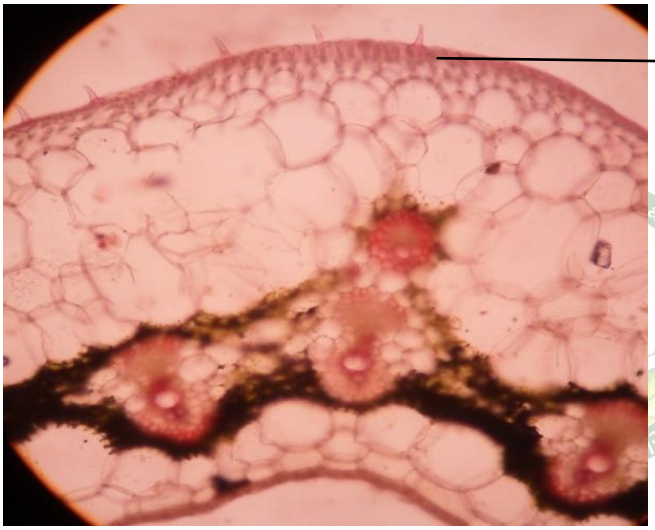


Fig no.4 Midrib portion 100X view

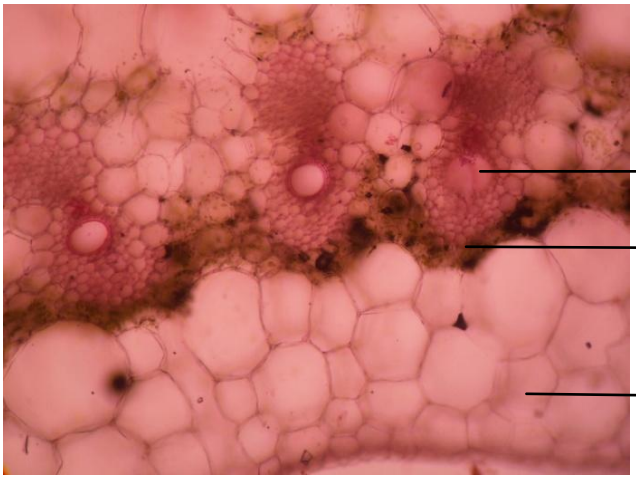


Fig no.5 Vascular bundle 100 X view

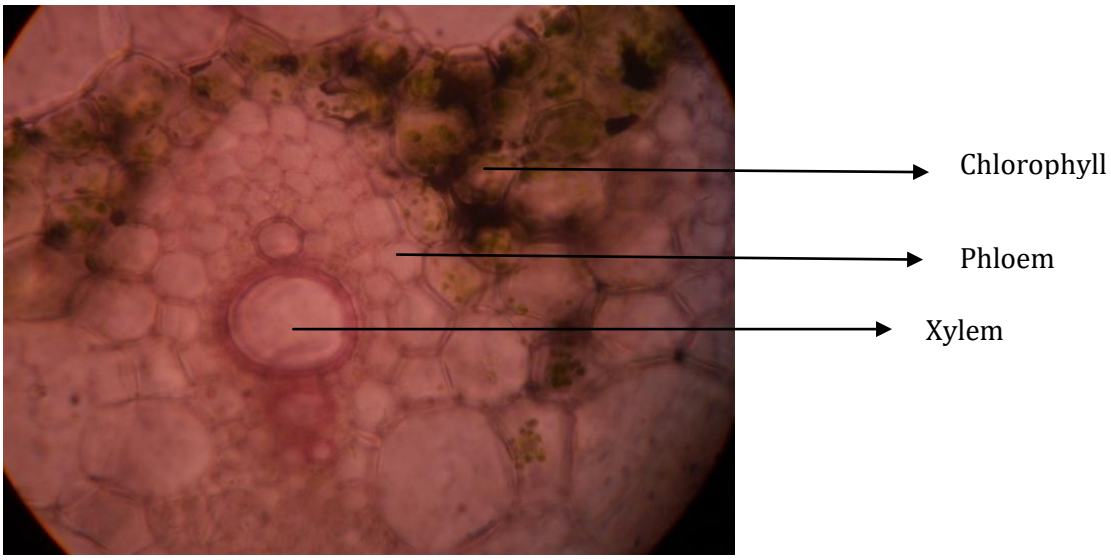


Fig no. 6 Vascular bundle 450 X view

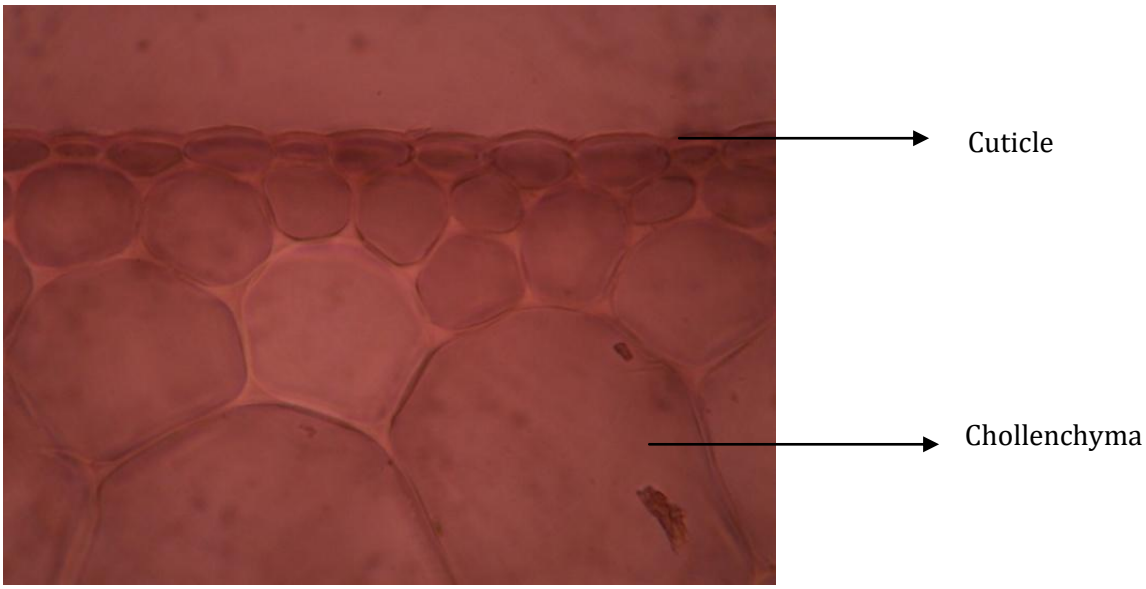
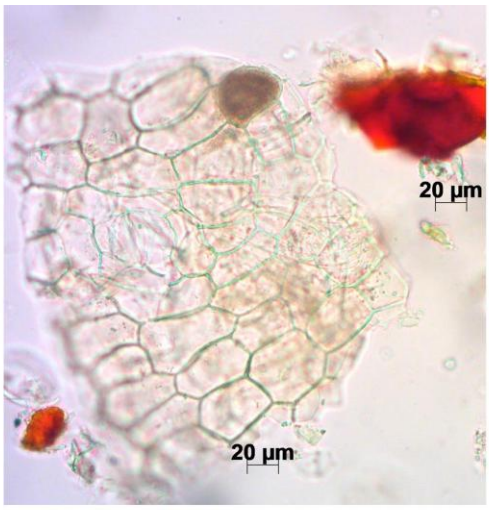
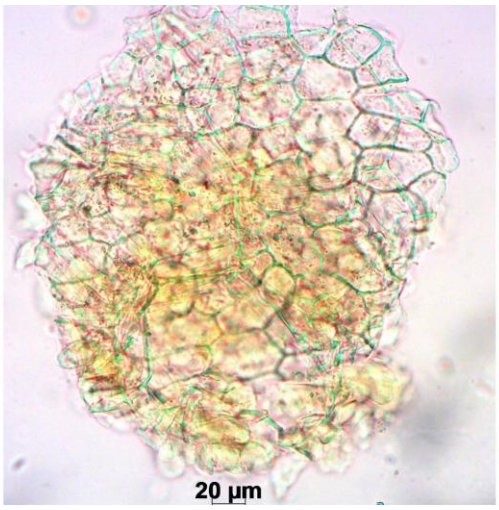


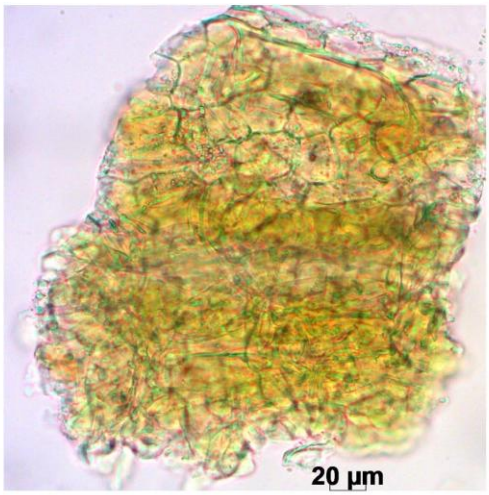
Fig no. 7 Midrib region 450 X view

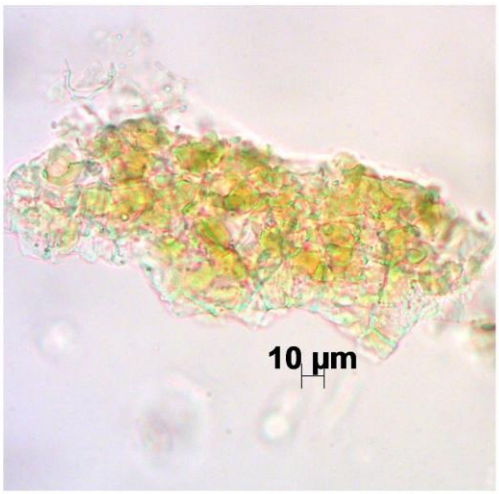


Epidermal parenchyma cells

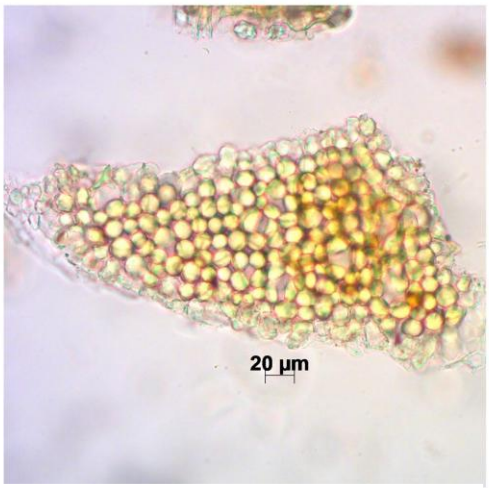


Parenchyma cells of mesophyll

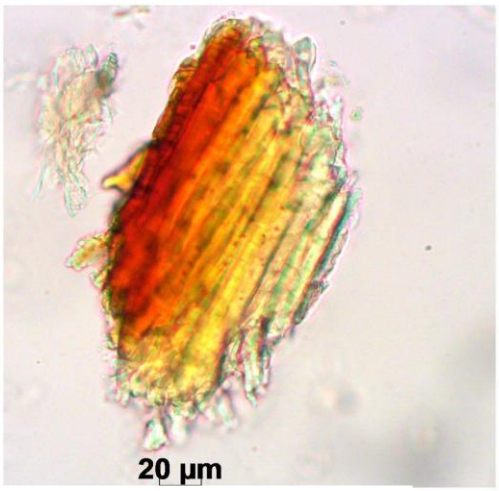




Epidermal parenchyma cells with underlying chlorenchyma



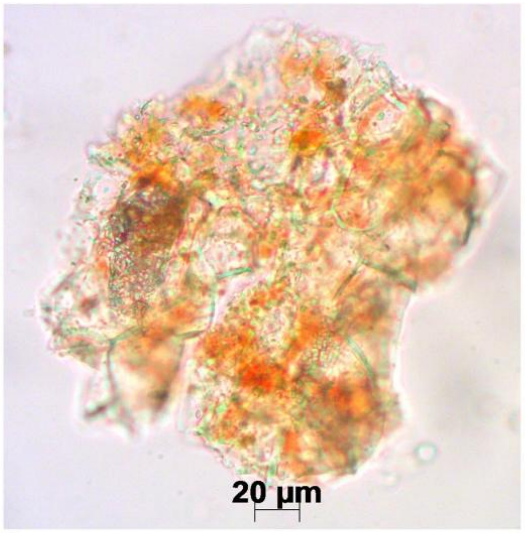
Palisade cells in surface view



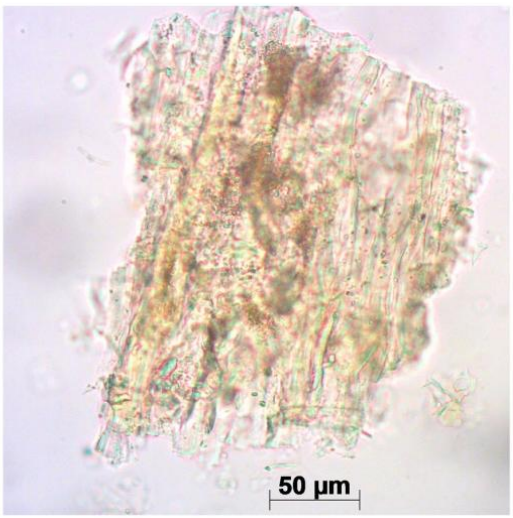
Group of fibres

Fig no. 8 Powder microscopy of *Costus pictus* D.Don leaf

Parenchyma cells from pith

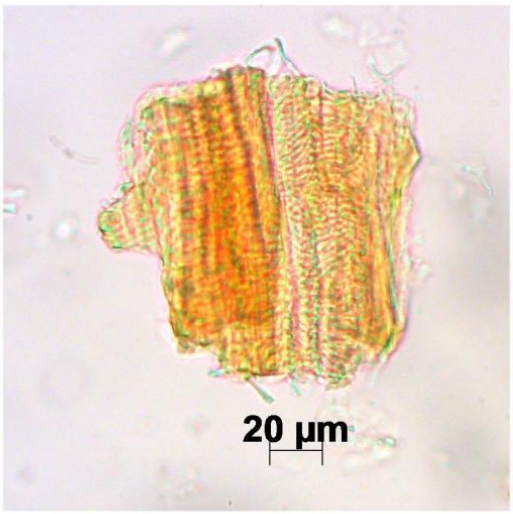


Parenchyma cells with

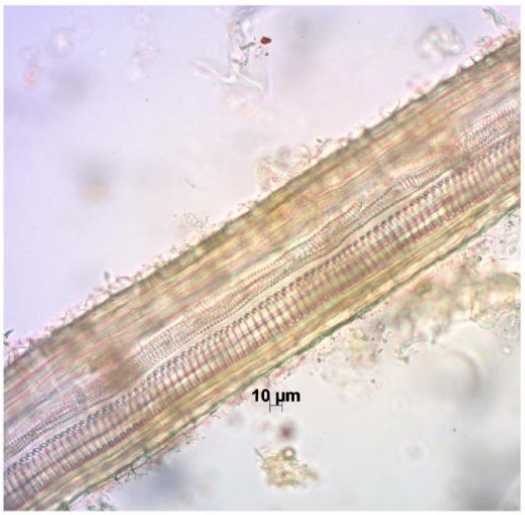


Parenchyma cells with fibres

Pitted parenchyma

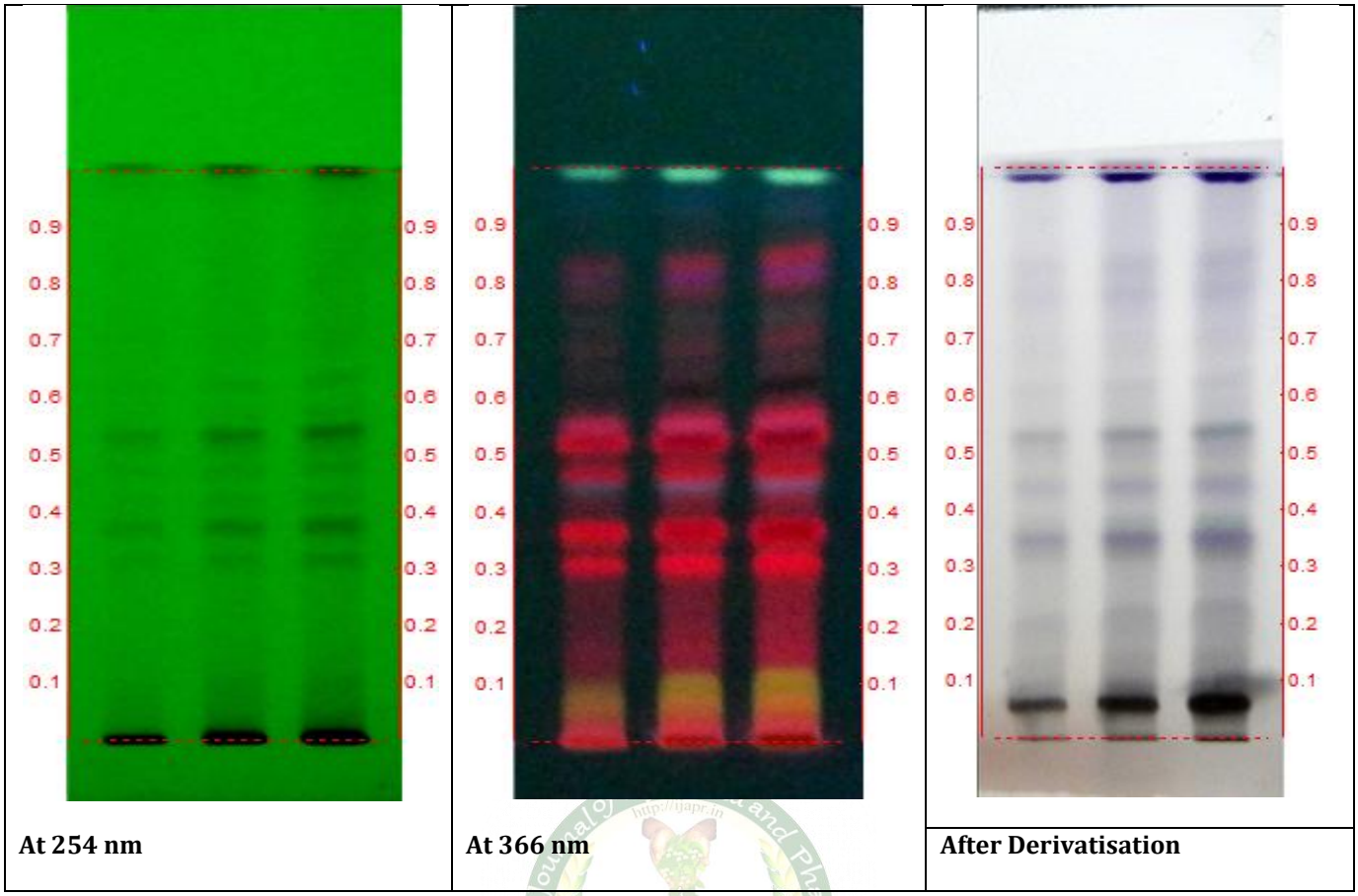


Fragment of vascular bundle



Fibro vascular bundle

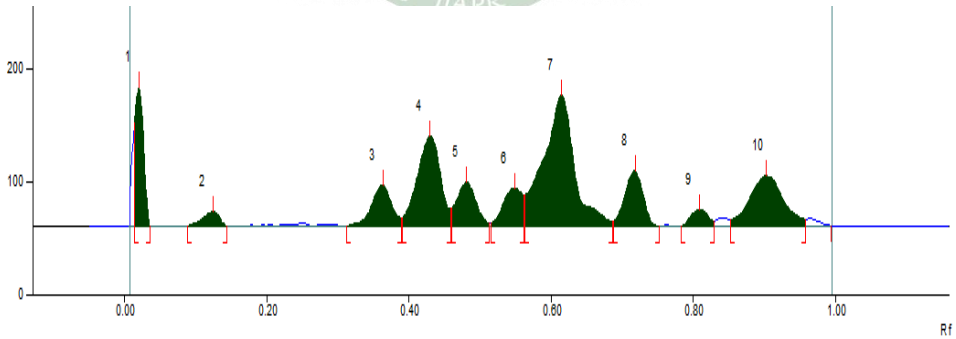
Fig no. 9 Powder microscopy



track 1- Leaf of *Costus pictus* D.Don– 4µl; track 2– 8µl; track 3 – 12µl

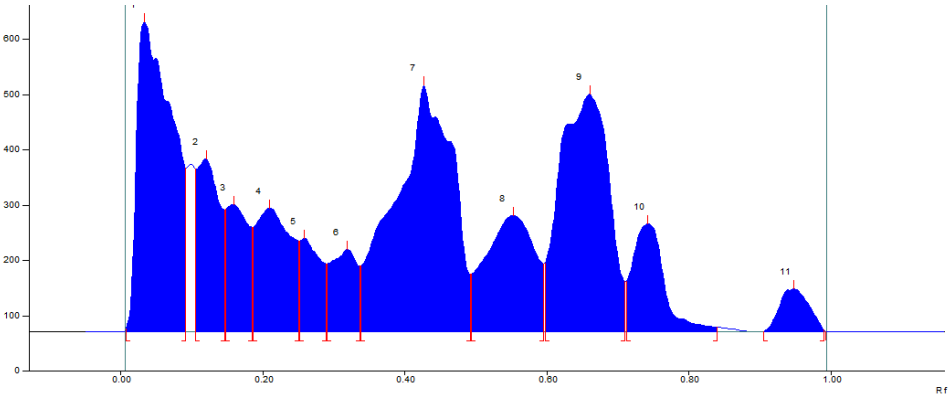
Solvent system: Toluene: Ethyl acetate (9.0: 1.0)

Fig no. 10 HPTLC photo documentation of ethanol extract of *Costus pictus* D.Don



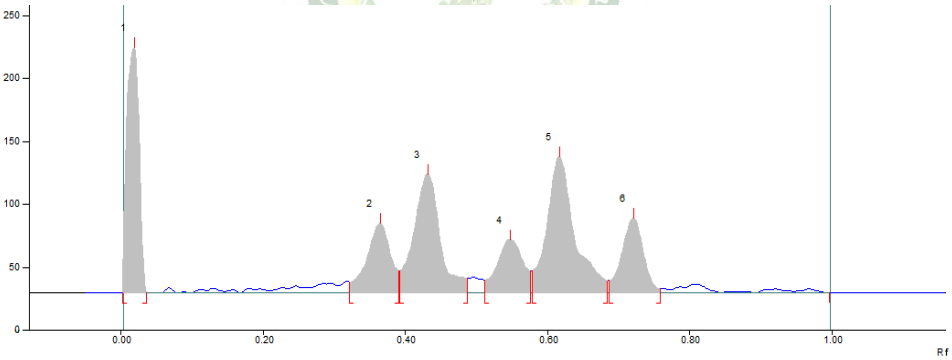
Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	90.6 AU	0.02 Rf	123.3 AU	22.47 %	0.04 Rf	0.3 AU	1077.1 AU	9.24 %
2	0.09 Rf	0.1 AU	0.13 Rf	12.8 AU	2.33 %	0.15 Rf	0.4 AU	225.1 AU	1.93 %
3	0.31 Rf	0.1 AU	0.36 Rf	36.7 AU	6.69 %	0.39 Rf	7.3 AU	744.7 AU	6.39 %
4	0.39 Rf	7.6 AU	0.43 Rf	79.8 AU	14.54 %	0.46 Rf	15.4 AU	1865.9 AU	16.01 %
5	0.46 Rf	15.8 AU	0.48 Rf	39.0 AU	7.11 %	0.51 Rf	2.4 AU	758.6 AU	6.51 %
6	0.52 Rf	2.4 AU	0.55 Rf	33.8 AU	6.16 %	0.56 Rf	28.0 AU	655.9 AU	5.63 %
7	0.56 Rf	28.2 AU	0.62 Rf	116.0 AU	21.13 %	0.69 Rf	4.6 AU	3629.2 AU	31.13 %
8	0.69 Rf	4.8 AU	0.72 Rf	48.6 AU	8.86 %	0.75 Rf	0.2 AU	905.6 AU	7.77 %
9	0.78 Rf	0.1 AU	0.81 Rf	14.3 AU	2.60 %	0.83 Rf	4.2 AU	257.9 AU	2.21 %
10	0.85 Rf	5.7 AU	0.90 Rf	44.5 AU	8.11 %	0.96 Rf	6.4 AU	1536.7 AU	13.18 %

Fig no.11 Densitometric scan of the sample of *Costus pictus* D.Don (At 254nm)



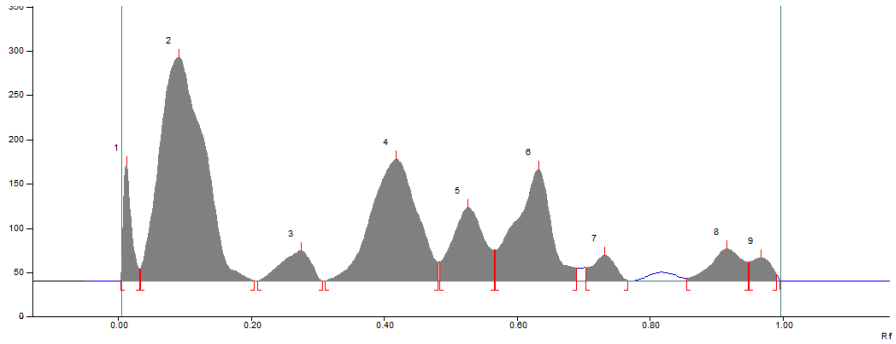
Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.01 Rf	5.3 AU	0.03 Rf	559.8 AU	18.66 %	0.09 Rf	96.3 AU	20062.2 AU	17.54 %
2	0.11 Rf	294.9 AU	0.12 Rf	312.4 AU	10.41 %	0.15 Rf	20.2 AU	7193.6 AU	6.29 %
3	0.15 Rf	220.8 AU	0.16 Rf	229.8 AU	7.66 %	0.19 Rf	88.7 AU	5143.6 AU	4.50 %
4	0.19 Rf	189.1 AU	0.21 Rf	223.8 AU	7.46 %	0.25 Rf	64.3 AU	8041.4 AU	7.03 %
5	0.25 Rf	164.4 AU	0.26 Rf	168.9 AU	5.63 %	0.29 Rf	22.8 AU	3534.1 AU	3.09 %
6	0.29 Rf	122.9 AU	0.32 Rf	149.2 AU	4.97 %	0.34 Rf	18.4 AU	3876.9 AU	3.39 %
7	0.34 Rf	119.0 AU	0.43 Rf	445.5 AU	14.85 %	0.49 Rf	03.9 AU	26061.9 AU	22.79 %
8	0.50 Rf	104.4 AU	0.55 Rf	209.7 AU	6.99 %	0.60 Rf	23.0 AU	10447.9 AU	9.14 %
9	0.60 Rf	124.8 AU	0.66 Rf	429.1 AU	14.30 %	0.71 Rf	90.9 AU	21374.1 AU	18.69 %
10	0.71 Rf	91.5 AU	0.74 Rf	194.5 AU	6.49 %	0.84 Rf	7.7 AU	6284.2 AU	5.50 %
11	0.91 Rf	0.4 AU	0.95 Rf	77.3 AU	2.58 %	0.99 Rf	2.7 AU	2333.3 AU	2.04 %

Fig no. 12 Densitometric scan of the sample of *Costus pictus* D.Don (At 366nm)



Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	0.0 AU	0.02 Rf	195.0 AU	35.13 %	0.04 Rf	0.0 AU	2456.5 AU	20.98 %
2	0.32 Rf	8.6 AU	0.37 Rf	55.6 AU	10.01 %	0.39 Rf	17.6 AU	1319.9 AU	11.27 %
3	0.39 Rf	17.7 AU	0.43 Rf	94.5 AU	17.02 %	0.49 Rf	11.7 AU	2494.0 AU	21.30 %
4	0.51 Rf	10.2 AU	0.55 Rf	42.2 AU	7.60 %	0.58 Rf	17.5 AU	1096.7 AU	9.36 %
5	0.58 Rf	17.6 AU	0.62 Rf	108.1 AU	19.48 %	0.69 Rf	9.5 AU	3040.7 AU	25.97 %
6	0.69 Rf	9.5 AU	0.72 Rf	59.8 AU	10.77 %	0.76 Rf	3.0 AU	1302.5 AU	11.12 %

Fig No.13 Densitometric scan of the sample of *Costus pictus* D.Don (At 520 nm)



Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %
1	0.00 Rf	0.0 AU	0.01 Rf	131.6 AU	15.38 %	0.03 Rf	13.3 AU	1100.6 AU	3.56 %
2	0.03 Rf	13.4 AU	0.09 Rf	252.6 AU	29.52 %	0.20 Rf	0.2 AU	11934.8 AU	38.64 %
3	0.21 Rf	0.1 AU	0.28 Rf	34.3 AU	4.01 %	0.31 Rf	0.1 AU	1090.0 AU	3.53 %
4	0.31 Rf	0.1 AU	0.42 Rf	137.2 AU	16.04 %	0.48 Rf	21.1 AU	6739.3 AU	21.82 %
5	0.48 Rf	21.4 AU	0.53 Rf	82.9 AU	9.69 %	0.57 Rf	34.8 AU	2792.8 AU	9.04 %
6	0.57 Rf	34.8 AU	0.63 Rf	125.9 AU	14.72 %	0.69 Rf	14.8 AU	4755.7 AU	15.40 %
7	0.70 Rf	15.0 AU	0.73 Rf	29.1 AU	3.40 %	0.77 Rf	0.3 AU	701.0 AU	2.27 %
8	0.86 Rf	3.2 AU	0.92 Rf	36.1 AU	4.22 %	0.95 Rf	21.2 AU	1203.9 AU	3.90 %
9	0.95 Rf	21.2 AU	0.97 Rf	25.9 AU	3.02 %	0.99 Rf	7.1 AU	572.1 AU	1.85 %

Fig No 14 Densitometric scan of the sample of *Costus pictus* D.Don (At 620nm)

DISCUSSION

The macroscopic features recorded can be used for preliminary identification of the particular plant. In many of studies reported earlier, the macro-microscopic studies have been proved to be effective in establishing the authenticity and detection of adulterants/substitutes for herbal raw drugs.[18,19] *Costus pictus* D. Don is a perennial herb. The stem is red with spiral light leaves and hairy, the tissue paper like flowers. The leaves are simple, large fresh looking spirally arranged, oblong-lanceolate being dark green above and lighter green below. The shape of the leaf is narrowly elliptic with the length 10 to 25cm and width 2.5 to 6cm. Leaf is green in colour with characteristic taste and odour. Microscopical characters found in midrib and laminar portion of the leaf were similar to description in different research articles.[20,21] Leaf powder of the shade dried drug was subjected to phytochemical analysis. No foreign matter was detected. Deterioration time of the plant material is directly proportional to the amount of water present in plant material. In the present study moisture content was 20% in dried sample showing it cannot be stored for a period of time without spoilage and it will be susceptible to microbial growth. Total ash indicative of the total inorganic composition of the drug was found to be 14.16% w/w, acid insoluble ash indicating the siliceous matters was found to be 0.90% for the test sample, water soluble ash indicating the ash which is readily soluble in water was found to be 7.88% w/w. Loss on drying indicates the moisture and volatile matter content in sample and it was 9.42%w/w. Extractive values were also determined. Water soluble extractive value was found to be 22.57 which is highest among all the extracts, which show high water soluble contents in plant in present study. All these pharmacopoeial parameter helps to determine the quality and purity of herbal drugs. The results indicate presence of alkaloid, steroids, tannins, flavanoids, phenol, saponins, carbohydrate and resin in ethanolic extract and in water extract contained steroid, flavanoids, phenols, saponins, tannins, glycosides which are reported to possess various properties. These preliminary analyses of chemical composition are one of the preliminary methods to analyze chemistry of herbs. HPTLC photo documentation revealed presence of phyto constituents with different Rf values. The area under graph gives an idea about the quantitative analysis of test drug. Densitometric scan of the plates showed diagnostic bands under 254nm, 366nm, 520nm and 620nm and post derivatisation. HPTLC fingerprinting is an effective technique of screening herbal raw drugs for authenticity and quality.[22,23]

CONCLUSION

The current study is useful in identification and quality control of one of extrapharmacopoeial drug and can provide standard HPTLC profiles with selected solvent system. This may be helpful for proper identification/ authentication of drug and may provide the base for further studies.

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