

PHARMACOGNOSTICAL STUDIES ON CHANGERI OXALIS CORNICULATA LINN. (OXALIDACEAE):

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ABSTRACT: *Pharmacognostical studies on Oxalis corniculata (Changeri) stem and leaves along with pre-liminary phytochemical studies are presented in this paper.*

INTRODUCTION:

Oxalis corniculata (Oxalidaceae) Known as Puliyarai in Tamil, Changeri in Sanskrit is an annual growing through out India, cultivated in waste lands (Gamble 1947). Changeri possesses Amlakashaya rasa, Leghu rooksha guna, Ushna veerya and Amla Vipaka as therapeutic properties. (Sharma P.V. 1983). Changeri is Kapha vata haram, Deepanam. It is used in diseases like Grahani, Atisara, Arsa (piles) and Kushta (Skin diseases). Changeri is used in Ayurvedic preparations like changerigrita which is used in diseases like Arsa, Grahanidosha, Anaha Mutrakrichara, Pravahika and Gudabramsha. (K. Raghunathan and V.N.K. Ramdas 1976). It is used in Siddha preparations like Uppuchenduram which is used in the treatment of pitta disorder colic, burning sensation of the chest, hyper acidity, indigestion and menstrual disorders (Anonymous 1972). Leaves of changeri are good source of vitamin C and carotene. The are rich in calcium and potassium oxalates, citric and tartaric acids, on a perusal of literature it is found that no pharmacognostical studies of this drug have been carried out. Hence the present study is carried out, the present paper deals with macroscopic and microscopical characters of stem and leaves, physico chemical studies,

extractive values, tests for inorganic and organic constituents. T.L.C. and U.V. fluorescence studies.

MATERIALS AND METHODS:

Fresh plants of *Oxalis corniculata* was collected from Bangalore. Free hand sections of stem and leaves were stained and mounted., Cell structures were studied according to kay (1938) Johansen (1940). Quantitative analysis of the leaf were carried the physico chemical studied of the dried plant material were carried out according to standard procedure (Anonymous 1966)). All the reagents used were of GPR Grade. The fluorescence studied of the powdered drug under ultra violet light were carried out according to chase and pratt (1949). T.L.C. Studied were carried out following Igon Stahl (1969)

MORPHOLOGY:

Small procumbent herb, stems rooting at nodes, leaves palmately trifoliate, leaflets obcordate, sessile, flowers yellow and solitary, capsules long linear, five angled, seeds broadly ovoid. Plate I.

MACRISCIOUC CGARACTERS:

STEM: The stem is slender, terete and pubescent, 0.4 to 1.5 cm long. The internodes vary from 4.5 to 8.5 cm in length. Acidic odour, taste sour when fresh.

LEAF: Leaves palmately trifoliate, obcordate leaflets 0.5 to 1 cm long with reticulate venation. The upper surface hairy, pubescent. Acidic odour, taste sour when fresh.

MICROSCOPIC CHARACTERS:

STEM: Transverse section of young stem shows single layered epidermis covered by cuticle (Fig 1,2,3). Trichomes are long elongated with tapering ends (Fig1) and cortex consists of 3 to 4 layers of collenchyma cells. The remaining ground tissue is composed of thin walled circular parenchymatous cells. Endodermis distinct, vascular bundle collateral open and endarch. The vessels long, cylindrical with simple pits.

Xylem parenchyma cells thin walled and rectangular. Tracheids with simple pits. Xylem fibres long, narrow tapering at both ends. Xylem elements lignified. The phloem consists of sieve tubes, companion cells, phloem parenchyma. There is parenchymatous pith at the centre. Plate II.

MIDRIB: The transverse section of midrib shows single layered epidermal cell, some of the epidermal cells show trichomes. Hypodermis consists of sieve tubes, companion cells, phloem parenchyma. Xylem consists of vessels tracheids and xylem parenchyma (Fig 8)

LAMINA: The transverse section of lamina shows a single layer upper epidermis. The cells of upper epidermis are bigger in size. The trichomes are present on both surfaces. Stomata are seen on both surfaces. The

mesophyll all consists of palisade and spongy parenchyma cells. Vascular bundle small collateral and surrounded by endodermis. Lower epidermis consists of thin walled barrel shaped cells. (Fig 9) Epidermal cells in surface view are broad, slightly irregular and thin walled showing stomata and trichomes. Palisade ratio 3 to 5. Vein islet no 6 to 9, stomatal no. 25 to 40 (Fig 10,11) Table 1, Plate III.

HISTOCHEMICAL TESTS: Crystals of calcium oxalate are found in the cortical cells. Acidic taste of leaf is due to citric acid. Xylem elements gave positive response of lignin when stained with phloroglucinol followed by drop of conc. Hydrochloric acid.

POWDER STUDY: The powder is grey in colour slightly astringent in taste. The powder was sieved through No. 40 Sieve cleared in chloral hydrate. Microscopic examination reveals epidermal cells with long elongate trichomes, surface view of xylem vessels fibres and parenchyma cells and polygonal cells of epidermis. Behaviour of powder on treatment with different chemical reagents – Table 2.

PHYSICO CHEMICAL STUDIES: The properties like loss on drying at 110°C ash value, acid insoluble ash, solubility etc. were determined. The ash was analysed for inorganic constituents. The air dried drug was extracted with petroleum ether, benzene, chloroform and alcohol successively using a Soxhlet apparatus and the percentage of each extract was determined. The values are given in table 3. The above four extracts were screened for organic constituents and the results are given in Table 6.

THIN LAYER CHROMATOGRAPHIC STUDIES:

T.L.C studies of the above four extracts were carried out in various solvent systems at 30°C using silica gel G as adsorbent, the spray being 15% H₂ SO₄ in methanol and 50% H₂SO₄ in methanol. The R_f values are recorded in Tables 5.

FLUORESCENCE ANALYSIS:

The powdered drug was sieved through No. 120 mesh and the fine powder was treated with different solvents. The fluorescence characters of the powder in each solvent under ordinary and ultraviolet light (both short and long wave

Table (1) Measurement of different tissues and cells(-)

Stem

Epidermis	T-9-11-15x5-7
P.Cortex	T-20-35-45x25-45
Vessels	M-75-85-90x22-35
Tracheids	M-45-55-60x10-20
Fibre	M-65-75-95x5-6

Lamina

Upper epidermis	T-7-9-13x6-12
Palisade	T-8-12-15x10-15
Spongy parenchyma	T-10-13-15x10-15
Lower epidermis	T-5-7-9x5-7
Trichomes	T-95-200-258x10-25

Table (2) Behaviour of powder on treatment with different chemical reagents.

Treatment

Observation

Powder + Con. Sulphuric acid	Black
Powder + Nitric acid	Brown
Powder + Picric acid (saturated)	Yellow
Powder + Acetic acid	Light green
Powder + 5% Iodine solution	Light green
Powder + 5% Ferric chloride	Green
Powder + 10% Sodium hydroxide Followed by a drop of Copper sulphate solution	Dark green
Powder + 40% Sodium hydroxide plus Few drops of 10% Lead acetate	No Change
Powder + Acetic acid + Con. H ₂ SO ₄	Green
Powder + con. NHO ₃ & excess of ammonia	Dark brown
Powder + Acetic acid + traces of ferric chloride and Transferred to the surface of Con. H ₂ SO ₄	Pinc black and & then brownish.

Table (3) Physico-chemical characters

1.	Loss on drying at 110-C	%(w/w)	-5.67
2.	Loss on ignition	%(w/w)	-15.88
3.	Acid insoluble ash	%(w/w)	-0.86
4.	Solubility	%(w/w)	
	a. In ethyl alcohol	-11.25	
	b. In water	-12.1	
5.	Extractive values%(w/w)		
	a. Pet ether	-6.5	
	b. Benzene	-0.91	
	c. Chloroform	-0.53	
	d. Ethyl alcohol	-2.53	

Table (4) Fluorescence analysis of powdered drug.

Treatment	Colour under ordinary light	Colour under UV Light	
		Short wave 254 mμ	Long wave 365 mμ
Powder as such	Light grey	Light brown	Dark brown
Powder + 1N.NaOH in methanol	Dirty green	Violet	Dark brown
Powder + 1N.NaOH in water	Brownish green	Dark violet	Dark maroon
Powder + 50% HCl	Dark grey	Dark violet	Black
Powder + 50% NHO3	Grey	Grey	Black
Powder + 50% H ₂ SO ₄	Dark green	Black	Yellowish green
Powder + Methanol	Grey with	Grey	Black
Powder + Water	Violet tinge		

Table (5) Layer Chromatography . Rf Values.

Extractives	Adsorbent	Solvent system	Developer/spray	Rf Values
Pet. Ether (60-80)	Silica gel G	Benzene,ethanol (80:20)	15% H ₂ SO ₄ in n- butanol	0.17 0.12 0.24,0.41 0.52 0.67,0.9
Benzene	Silica gel G	Benzene,ethanol (80:20)	15% H ₂ SO ₄ in n- butanol	0.05,0.25 0.30 0.41,0.49 0.67 0.87
Chloroform	Silica gel G	Benzene,ethanol (45:45:10)	15% H ₂ SO ₄ in Methanol	0.26,0.33,0.4, 0.53,0.62 0.75 0.96
Alcohol	Silica gel G	Chloroform Methanol (60:25)	15% H ₂ SO ₄ in Methanol	0.2,0.36,0.64,0.73 0.79,0.87 0.96

Table (6) Organic constituents

Extracts	Petroleum ether 60-80	Benzene	Chloroform	Ethanol
Total % by Wt. Physical appearance Condinstancy	6.5 Greenish brown Syrup	0.91 Greenish black Syrup	0.53 Greenish brown Syrup	2.53 Dark brown Gum
Steroid	+	+	-	-
Sugar	-	-	-	+
Alkaloid	-	-	-	-
Phenol	+	+	+	-
Flavone	-	-	-	+
Saponin	-	-	-	+
Tannin	-	-	-	+

SUMMARY:

Oxalis corniculata (Changeri) is one of the important drugs used in siddha and Ayurvedic systems of medicine for the treatment of dyspepsia, piles, anaemia and skin diseases. In this paper macro and microscopical characters of the plant along

with chemical, fluorescence and T,L.C studies are presented.

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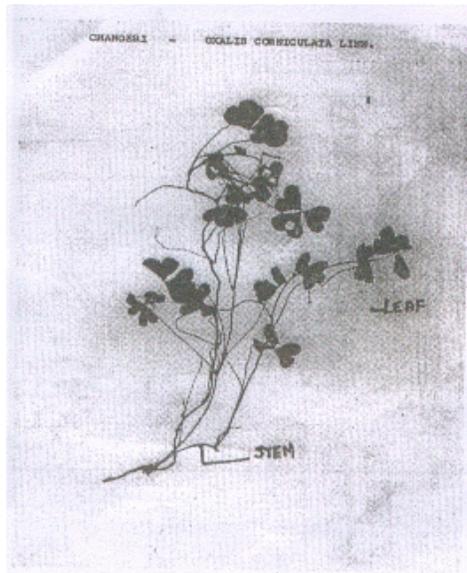
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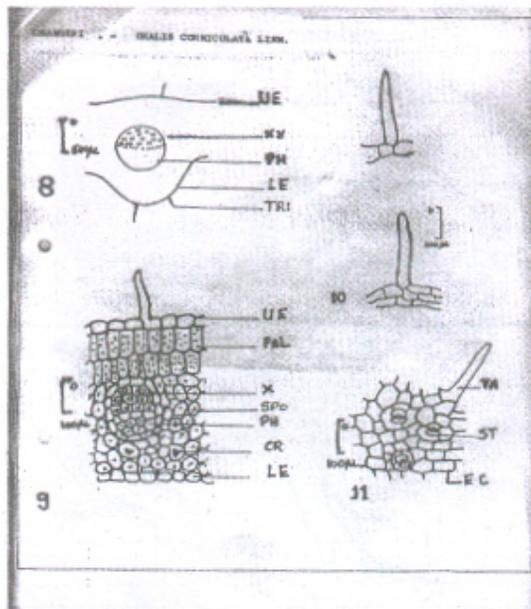
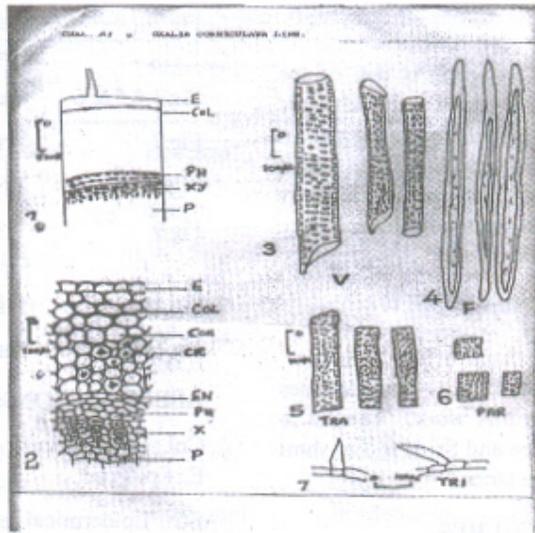
EXPLANATION OF FIGURES:

Plate I	Morphology of plant
Plant II & III	Microscopic characters of stem and leaves
Fig 1	A.T.S of stem (Diagrammatic)
Fig 2	Cellular details in t.s of a portion (Fig1)
Fig 3,4,5&6	Elements from macerate
Fig 7	Trichomes of stem epidermis
Fig 8	T.S. of midrib (diagrammatic)
Fig 9	T.S. of portion of Lamina with cellular details
Fig10	Trichomes from lamina
Fig 11	Surface view of epidermis

ABBREVIATIONS:

Col.: Collenchyma; Cor.; Cortex; C.: Crystals; E.: Epidermi;
EC.: Epidermical cell; Fibre: Xylem fibre; LE.: Lower epidermis;
PAL.: Palisade; Par.: Parenchyma; PH.: Phloem; Spo.: Spongy parenchyma;
St.: Stomata; Tri.: Trichomes; TRA,,: Tracheids; UE.: Upper epidermis;
v.: Xylem vessel.





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