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ORIGINAL RESEARCH ARTICLE

Physicochemical, Phytochemical and Microscopical Studies on *Tridax Procumbens* Linn.

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ABSTRACT

Tridax procumbens Linn. is a wild plant, found as weed throughout India. The plant is native of tropical America and naturalized in tropical Africa, Asia, and Australia. Local people knew it as "Ghamara", in English popularly called 'coat buttons' and is dispensed for "Bhringraj" by some of the practitioners for hair growth in Ayurveda[1]. The Present studies give pharmacopoeial standards like physical constant (LOD, Ash value and Extractive value), leaf constant (stomatal number, stomatal index, palisade ratio, vein-islet number and vein termination number) and cellular characteristics of the plant parts. The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids, fumaric acid, β-sitosterol, saponins and tannins.

Key words: LOD, stomatal index, palisade ratio, alkaloid, flavonoid.

INTRODUCTION

Tridax procumbens Linn. is a wild plant, found as weed throughout India. The plant is native of tropical America and naturalized in tropical Africa, Asia, and Australia. Local people knew it as "Ghamara", in English popularly called 'coat buttons' and is dispensed for "Bhringraj" by some of the practitioners for hair growth in Ayurveda[1]. The Pharmacognostical studies give pharmacopoeial standards like physical constant, leaf constant. The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids, fumaric acid, β-sitosterol, saponins and tannins. It is richly endowed with carotenoids, saponins, oleanolic acid and ions like sodium, potassium and calcium. Luteolin, glucoluteolin, quercetin and isoquercetin have been reported from its flowers [2,3].

It has known for its number of pharmacological activities like hepatoprotective activity[4], anti-inflammatory[5], wound healing[6,7], antidiabetic activity[1], hypotensive effect, immunomodulating property[8,9], anticancer activity[10], antioxidant activity[11], Antiobesity, bronchial catarrh, dysentery, diarrhoea and to prevent falling of hair promotes the growth of hair, and antimicrobial activity against both gram-positive and gram-negative bacteria[12,13]. The leaf juice possesses antiseptic, insecticidal and parasiticidal properties, as a remedy against conjunctivitis and is used also to check haemorrhage from cuts, bruises and wounds insect repellent.

Plant profile:

Kingdom: Plantae – Plants
Sub kingdom: Tracheobionta – Vascular plants
Division: Spermatophyta
Subdivision: Magnoliophyta – Flowering plants
Class: Magnoliopsida – Dicotyledons
Subclass: Asteridae
Order: Asterales
Family: Asteraceae – Aster family
Genus: Tridax *L.* – tridax
Species: *Tridax procumbens L.* – coat buttons

Synonym:

Hindi: Khal muriya, Tal muriya, Ghamra
Sanskrit: Jayanti Veda
English: Coat buttons, Tridax Daisy, Wild daisy

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Oriya: Dagadi pala
Marathi: Gaddi Chemanthi
Tamil: Vettukaya thalai, Thatha
Telugu: Gayapu aku, Gaddi chamanthy or Palaka aku.

Description:

The plant bears daisy like yellow-centered white or yellow flowers with three-toothed ray florets. The leaves are toothed and generally arrowhead-shaped. Its fruit is a hard achene covered with stiff hairs and having a feathery, plume like white pappus at one end .Calyx is represented by scales or reduced to pappus. The plant is invasive in part because it produces so many of achenes, upto1500 per plant, and each achene can catch the wind in its pappus and be carried some distance. This weed can be found in field, meadows, croplands, disturbed areas, lawns and road side area as with tropical or sub tropical climates[4].

MATERIAL AND METHODS

The plant of *Tridax procumbens* Linn were obtained wildly from Aniyad and authenticated by department of botany, Lunawada. The authenticated sample of plant is shade dried and subjected for size reduction and for successive extraction (% yield of extracts tabulated in **Table 4**.). The qualitative and quantitative studies includes Physicochemical parameters (Loss on drying, Total ash, Acid insoluble ash, Water soluble extractive value, Alcohol soluble extractive value) tabulated in (**Table 2**); leaf constant (stomata number, stomatal index, palisade ratio, vein-islet number and vein termination number) tabulated in (**Table 1**). The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids, fumaric acid, β-sitosterol, saponins and tannins were carried out as per WHO Guidelines, and tabulated in (**Table 3**).

RESULT AND DISSCUSSION

The qualitative as well as quantitative studies of any plant drug are the primary steps to establish its botanical quality control before going to other studies. As per WHO guidelines, botanical standards are to be proposed as a protocol for the diagnosis of the herbal drug. *Tridax procumbens* Linn. is characterized by its physicochemical, phytochemical and microscopy.

Physicochemical parameter:

The physicochemical parameter reveals the ash value, extractive value and loss on drying i.e. tabulated in (**Table 2**).

Phytochemical screening:

The phytochemical screening reveals the presence of chemical constituents i.e. tabulated in (**Table 3**).

Microscopical Studies:

The quantitative microscopy reveals leaf constant (stomatal index, palisade ratio, vein islet no, vein termination no.) i.e. tabulated in (Table 1).

T.S. of Petiole and leaf: (**Fig 1**)

T.S of petiole is characterized by the presence of Single layered epidermis covered with cuticle and multicellular, (3-5 celled) trichomes. Hypodermis is composed of 1-2 celled collenchymatous tissue. Ground tissue is parenchymatous; vascular bundles 5, the size of the vascular bundles varies from centre to margin. The arrangement of vascular bundle is centripetal i.e. xylem surrounded by the phloem.

T.S. of leaf is dorsiventral, epidermis single layered on both the surfaces and covered with thick cuticle. T.S. passing through the mid rib region shows slight depression on ventral side and slightly protuberated on dorsal size. Trichomes are simple, multicelled (3-6 celled) and more in number on dorsal side. The basal cells of the Trichome are swollen and Trichome looks like claw. Meristeel consists of single centrally located collateral vascular bundle surrounded by some parenchymatous cells filled with dark content.

T.S. passing through the laminar region shows single layered palisade cells just below the upper epidermis followed by 5-7 celled mesophyll parenchymas mostly devoid of inters cellular spaces.

T.S. of Stem: (**Fig 2 & 3**)

T.S of stem is characterized by the presence of Single layered epidermis covered with cuticle and multicellular trichomes. Cortex region composed of parenchyma cells. Some of the parenchymatous cells filled with dark content, which may be starch grains. Endodermis is next to the cortex is caped with pericyclic fibre. Below the endodermis vascular bundles arranged like bunch of grapes. Pith is in centre well developed made up of parenchyma cells.

T.S. of Root: (**Fig 4 & 5**)

T.S of root is characterized by the presence of epiblema and trichomes externally. Cortex region is made up of parenchymatous cell having dark content inside the cells. Vascular bundles are radiating towards cortex region. Bicerate or tricerate medullary rays are present in between vascular bundles. Pith is parenchymatous having protoxylem.

Table 1: Quantitative microscopy

Sample Identity	Stomatal index		Vein-islet No. per mm^2		Vein termination No. per mm^2	
	upper	lower	upper	lower	upper	Lower
Leaves	28.12	32.31	29.33	18.66	30.66	18.66

Table 2: Physicochemical constant

Sample identity	%LOD	% Total Ash	Acid insoluble ash %	Water soluble ash %	Water soluble Exractive value%	methanol soluble Exractive value%
leaves	7.2	14	2.9	2.1	16.26	10.40

Table 3: Qualitative Profile of Phytochemicals Found in *Tridax procumbens* Linn.

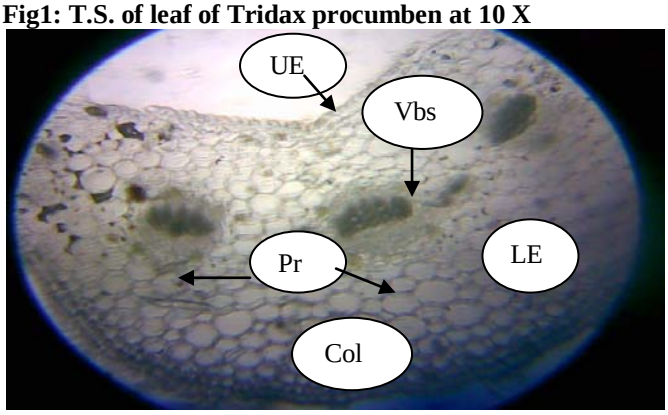
S.no	Phytochemical	Status
1	Alkaloids	+
2	Carotenoids	++
3	Flavonoids	+
4	Saponins	+
5	Tanins	++

Key: + = moderately present; ++ = highly present

Table 4: percentage yield of successive extracts of Tridax procumbens Linn.

S.no.	Extracts	% yield W/W
1	Pet.ether	3
2	Benzene	5.1
3	Chloroform	2
4	Methanol	13
5	Aqueous	5

Fig1: T.S. of leaf of Tridax procumben at 10 X



UE- Upper epidermis; LE- Lower epidermis; Vbs- Vascular bundle; Pr- Parenchyma cells; Col- Collenchyma cells

Fig 2 : T.S of Tridax procumben Stem at 10 X

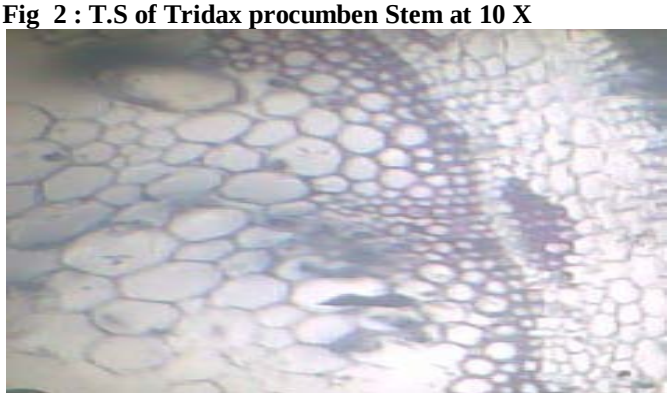
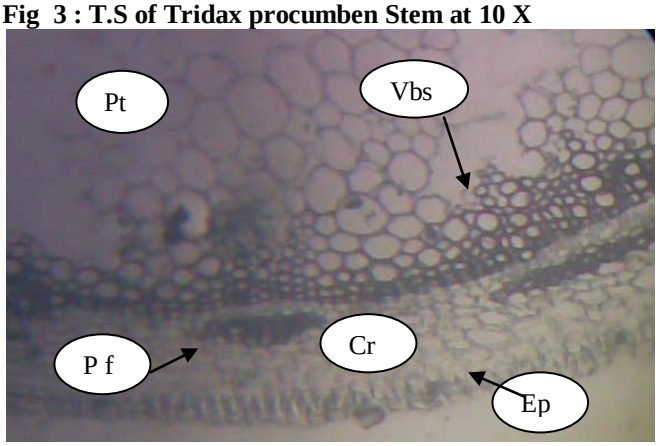
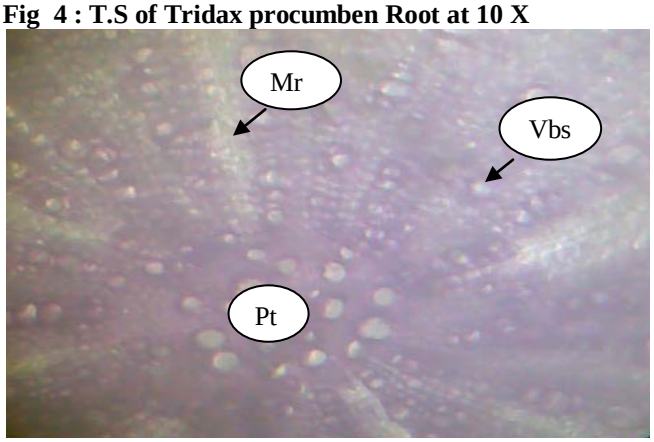


Fig 3 : T.S of Tridax procumben Stem at 10 X



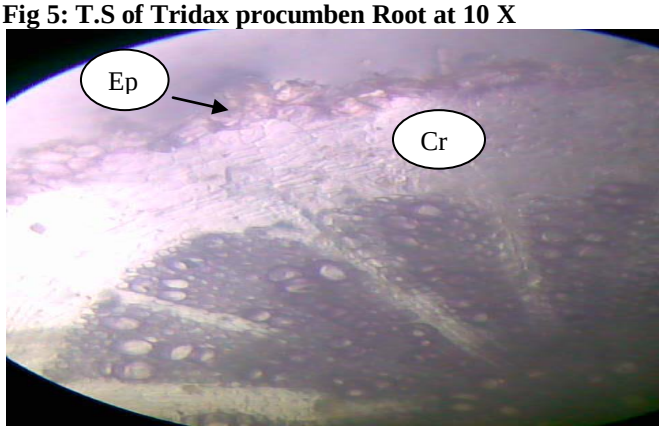
Ep- Epidermis; Cr- Cortex; Pf- Pericyclic fibre; Pt- Pith; Vbs- Vascular Bundles

Fig 4 : T.S of Tridax procumben Root at 10 X



Mr- Medullary ray; Pt- pith; Vbs- vascular bundles

Fig 5: T.S of Tridax procumben Root at 10 X



Ep- Epiblema; Cr- Cortex

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