

MICROSCOPIC STUDIES OF *TRIDEX PROCUMBENS* LINN.

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ABSTRACT

This study was aimed to develop of complete microscopy and macroscopy of *Tridex procumbens* in which the leaves, petioles, roots and stems were studied. *Tridex procumbens* Linn. Fam. **Asteraceae** commonly known as 'Coat Buttons' is an important plant used against various activities in indigenous system of medicine such as hepatoprotective, anti-hepatotoxic, antipyretics, anti-diabetic, blood coagulant, anti-diabetic and in wound healing activity. The transverse section of leaf shows epidermis single layered on both the surfaces and covered with thick cuticle. Trichomes were of covering type simple, multicelled and more in number on dorsal side. Leaves consist glandular and non glandular type of trichomes. The anomocytic types of stomata at present in both lower and upper surface of leaves. The quantitative microscopical studies of leaf were also carried out like palisade ratio, vein islet number, vein termination number, stomatal number (lower surface), stomatal index (upper surface), stomatal index (lower surface). The transverse section of Petiole shows Single layered epidermis covered with cuticle, multicellular trichomes, vascular bundles, xylem surrounded by the phloem. The transverse section of root shows cork, cortex, xylem, phloem, medullary rays and pith. The transverse section of stem shows cork, cortex xylem, phloem and pith.

KEY WORDS: Microscopy, macroscopy, *Tridex procumbens*

1. INTRODUCTION

Tridax procumbens Linn fam. **Asteraceae** is a common plant found in tropical areas, growing primarily during rainy season. It was introduced into China in the 1940. It is commonly known as 'Ghamra' and in English popularly called 'coat buttons' because of appearance of flowers.

Tridax procumbens reported to have hepatoprotective activity. It also possess anti-inflammatory, immunomodulator, anti-diabetic activity, and *in-vitro* activity against promastigotes, haemostatic, antioxidant, anti-hepatotoxic, antipyretics, antibacterial activity, and leaves are reported as antidiarrheal, antidyenteric

and useful in bronchial catarrh. The juice of leaves was used in styptic and controls bleeding wounds. *Tridax procumbens* is also used to manage hypertension, in treatment of fever, typhoid fever, cough, asthma and epilepsy.⁸

The plant has been reported to contain flavonoids, alkaloids, sterols, carotenoids and tannin.¹⁷ The plant also contain glucoluteolin, luteolin, isoquerctin and quercetin (flowers); fumaric acid (leaves); n-alkanes(C₁₅-C₃₂) , saturated and unsaturated fatty acid(C₁₂-C₂₂), arachidic, behenic, lauric, linoleic, linolenic, myristic, palmitic, palmitoleic and stearic acid. Dotriacontane, 1(2,2-dimethyl-3-

hydroxypropyl)-2isobutylphthalate, heptacosanyl-cyclohexane carboxylate, 12-hydroxytetracosan-15-one, methyl-14-oxooctadecanoate, methyl-14-oxononacosanoate, 3-methylnondecylbenzene, 32-methyl-30-oxotetriacont-31-en-1-ol, 30-methyl-28-oxodotriacont-29-en-oic acid, 9-oxoheptadecane, 10-oxononadecane; β -amyirin, β -amyrone, Δ^{12} -dehydrolupen-3-one, lupeol, fucosterol and β -Sitosterol were also isolated from the plant.³ It is also a potential source of protein supplements and pro vitamin A (carotenoids).¹³

2. MATERIAL AND METHOD

2.1 Authentication of the plant material:

The plant material was collected then it will be identified and authenticated by Dr. Ziaul Hasan Asst. professor of department of botany, Safia College of science, Bhopal M.P and voucher specimen no. was assigned as 236/Bot/Safia/11.

2.2 Method: The fresh parts of plant were used for microscopic studies. The leaves were separated, dried, coarsely powdered and stored in a closed container for further studies Macroscopic and microscopical characters were studied as described in quality control method. Microtome section were taken, stained and mounted and sections were observed under binocular and projection microscope. Photograph at different magnification were taken by using Nikon digital camera 12 megapixel.

2.3 Macroscopical studies: Macroscopic studies were carried out by using organoleptic evaluation method. The shape, size, colour, odour, taste, base, texture, margin and apex of leaves and various plant parts of *Tridax procumbens* Linn were observed. Results are shown in **Table-1**.

2.3 Microscopic studies

Microscopic studies were carried out by preparing thin section of leaf, stem, and petiole. The thin section were collected in watch glass and bleach with bleaching agent with little boiling, after that thin section were washed with water. Stained with safrannin and mounted in glycerin for observation. Results are shown in **Table-2**.

2.4 Powder microscopy

Preliminary analysis of the powdered leaves of *Tridax procumbens* Linn were carried out. Results are shown in table-2.

3. RESULTS AND DISCUSSION

3.1 Macroscopic characters of leaf, flower, stem and root: Shown In Table -1

3.1.1 Leaf: Decumbent perennial herb. Leaves are 3-6 cm long and 1-4 cm wide, lanceolate to ovate shaped, hairy, opposite, often deeply lobed with irregularly toothed margin and acute apex. Heads solitary, involucre bracts very hairy, the outer shorter, receptacle convex, pileate. Petiole is short and easily fractured.

3.1.2 Flower: Flowers are of two type, disc flowers, the corolla narrow-campanulate, 8 mm long, bright yellow and hairy at the top, with spreading pappus of plumose hairs. Ray flowers 5 or 6, female, with narrow corolla tube and brown ligulate limb, white or pale yellow. Flowering and fruiting throughout the year.

3.1.3 Stem: Stem are herbaceous, cylindrical, decumbent and branched.

3.1.4 Root: *Tridax procumbens* having a tap root system.

3.2 Microscopical character

3.2.1 Stem: Dicot type of stem is present in *Tridax procumbens* and it consist 2-4 layered cell cork, 5-7 layered cell

epidermis, xylem, phloem, pith. Shown in **Table-2**.

3.2.2 Petiole: Kidney shaped towards the distal end and crescent shaped towards the laminal side. Single layered epidermis covered with cuticle and interrupted by simple, multicellular, 3- 5 celled trichomes. Hypodermis 1- 2 celled collenchymatous. Ground tissue parenchymatous; vascular bundles 5, the size of the vascular bundles various from centre to margin i.e. large too small. These are centripetal i.e. xylem surrounded by the phloem. Shown in **Table-2**.

3.2.3 Root: Dicot type of root is present in *Tridax procumbens* and it consist 2-3 layered cells cork, 8-12 layered cells epidermis, xylem, phloem, medullary rays. Shown in **Table-2**.

3.2.4 Leaf T.S.: Transverse section (T. S.) of leaf showed 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 side. Trichomes were of covering type which are simple, multicelled (3-6 celled) and more in number on dorsal side. The basal cells of the trichomes are swollen and trichomes look 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 epidermis followed by 5-7 celled mesophylls, parenchyma mostly devoid of inter cellular spaces. Shown in **Table-2**.

3.2.5 Trichomes

Trichomes are variable out growths of epidermal cells which are useful in the identification of the plant material. The trichomes may be differentiated into base

embedded in the cell and a projecting body.⁹ *Tridax procumbens* consist glandular and non glandular type of trichomes. Shown in **Table-2**.

3.2.6 Stomata: Stomata may occur in the epidermis particularly in leaves. Stoma consists of a pair of identical cells called guard cells and a center pore through which gaseous exchange takes place. Stomata are surrounded by epidermal cells.⁹ The anomocytic type of stomata are present in both lower and upper surface of leaves. Shown in **Table-2**.

3.3 Powder microscopy

The powder is dark green in colour, fine, odorless powder with slight bitter taste. The powder microscopy reveals the presence of different types of (Glandular and Non Glandular) trichomes, trichome base, fibres, stone cells, laticifers with adjacent parenchyma. Spiral thickenings vascular bundles are also present. Shown in **Table-2**.

3.4 Quantitative microscopy

The quantitative microscopy of *Tridax procumbens* were performed in various parameters which are shown in **Table-3**.

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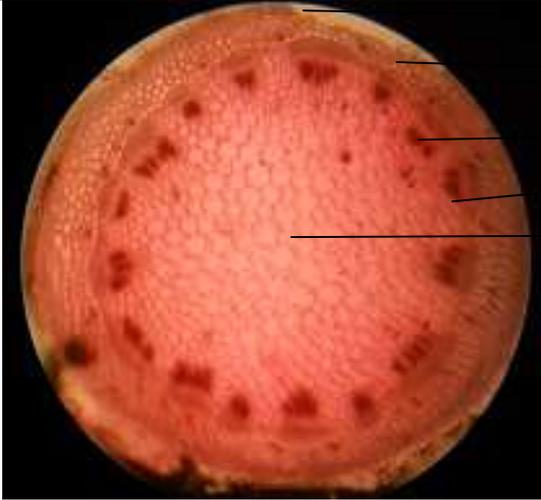
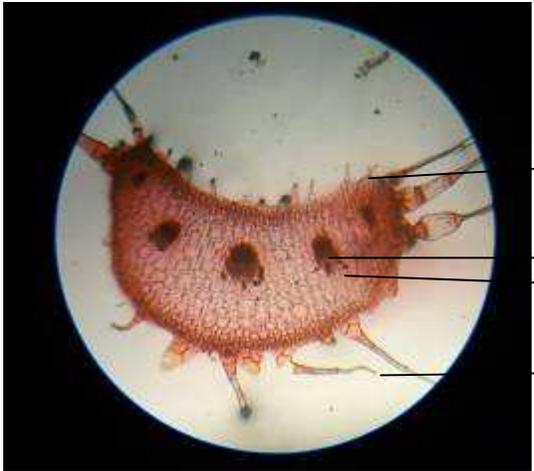
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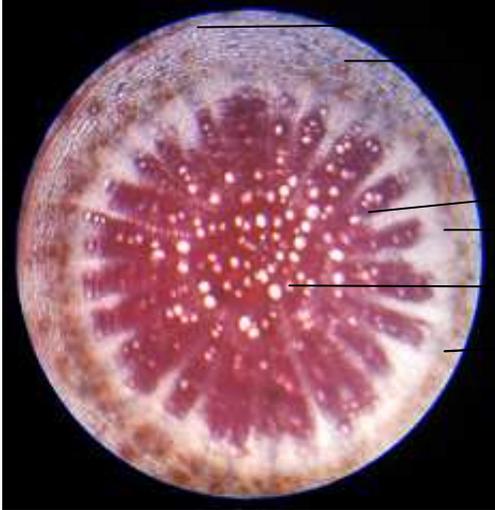
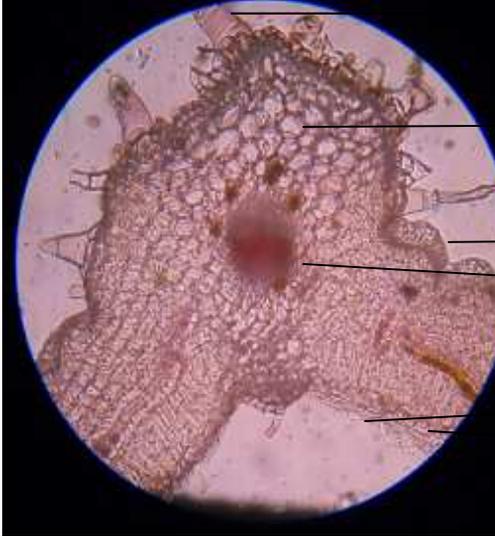
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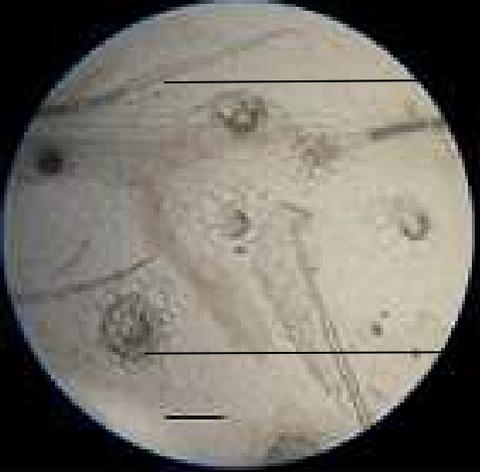
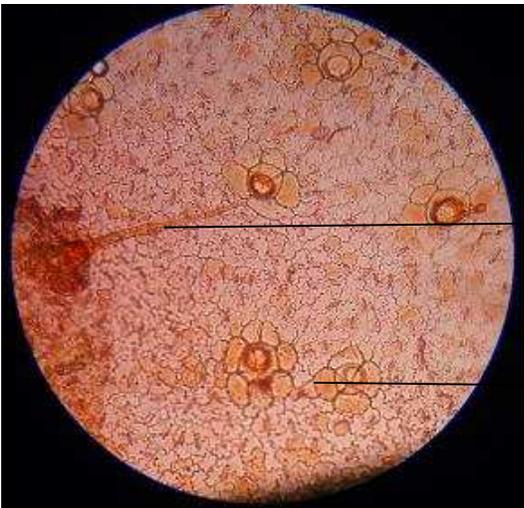
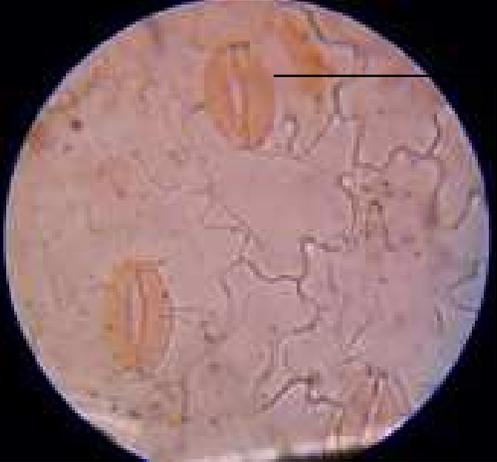
Table-1 Macroscopy of *Tridax procumbens* Linn

Part of plant	Morphology of leaves	Observation
Leaf	Colour	Green
	Odour	Characteristic
	Taste	Acrid
	Size	3-7 cm long, 1- 5 cm wide
	Shape	Lanceolate to ovate
	Texture	Short
	Fracture	Easy
	Apex	Acute
	Margin	Irregularly toothed
	Arrangement	Opposite
	Appearance	Rough & Scabrous
	Petiole	Short
Stem	Colour	Green
	Odour	Characteristic
	Taste	Acrid
	Size	23-46 cm
	Shape	Cylindrical
	Texture	Smooth
	Fracture	Soft
Root	Colour	Brown
	Odour	Characteristic
	Taste	Acrid
	Size	15-32 cm
	Shape	Tortous
	Texture	Rough
	Fracture	Soft

Table-2 Microscopy of *Tridax procumbens*

S.No.	PART	PHOTO	DETAILS
1.	Stem		<ul style="list-style-type: none"> → Cork → Epidermis → Xylem → Phloem → Pith
2.	Petiole		<ul style="list-style-type: none"> → Epidermis → Xylem → Phloem → Trichomes

<p>3.</p>	<p>Root</p>		<ul style="list-style-type: none"> → Cork → Epidermis → Xylem → Phloem → Pith → Medullary rays
<p>4.</p>	<p>T.S of Leaf</p>		<ul style="list-style-type: none"> → Trichome → Spongy mesophyll → Upper epidermis → Vascular bundle → Lower epidermis → Palisade cells
<p>5.</p>	<p>Trichomes of petioles</p>		<ul style="list-style-type: none"> → Trichome

<p>6.</p> <p>Trichomes of lower surface of leaves</p>			<p>→ Non-glandular (multicellular) trichome</p> <p>→ Glandular(multicellular) trichome</p>
<p>7.</p> <p>Trichomes of upper surface of leaves</p>			<p>→ Non-glandular (multicellular) trichome</p> <p>→ Glandular(multicellular) trichome</p>
<p>8.</p> <p>Stomata of lower surface of leaves</p>			<p>→ Stomata (anomocytic)</p>

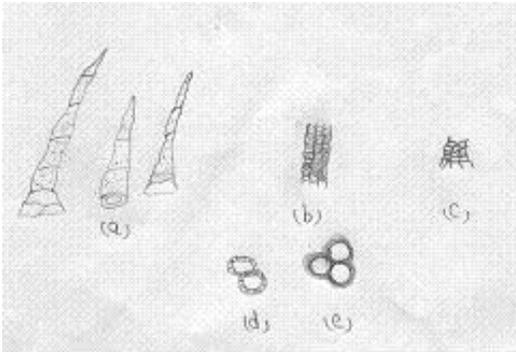
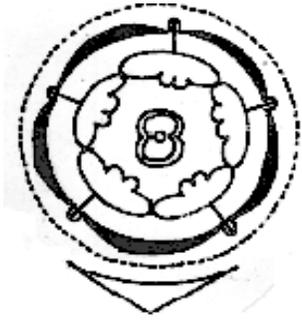
<p>9.</p>	<p>Stomata of upper surface of leaves</p>		<p>→ Guard cells → Stomata(anomocytic)</p>
<p>10.</p>	<p>powder microscopy</p>		<p>a) Simple trichomes b) Spinal vascular bundle c) Trichome base d) Stone cell e) Stone cell</p>

Table-3 Quantitative microscopy of *Tridax procumbens* leaves parameters

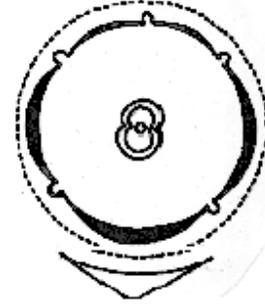
<p>Quantitative microscopy of <i>Tridax procumbens</i> leaves parameters</p>	<p>Range</p>
<p>Palisade ratio</p>	<p>1:8</p>
<p>Vein islet number</p>	<p>8 - 10</p>
<p>Vein termination number</p>	<p>2 - 3</p>
<p>Stomatal number (lower surface)</p>	<p>3 - 4</p>
<p>Stomatal index (upper surface)</p>	<p>13.3 - 22.2</p>
<p>Stomatal index (lower surface)</p>	<p>12.0 - 13.7</p>

FLORAL DIAGRAM: ⁵



Floral diagram of disc floret

Br., Ebrl., \oplus , \ominus , K_{∞} , $C_{(5)}$, $A_{(5)}$, $G_{(2)}$



Floral diagram of ray floret

Br., Ebrl., $\%$, \ominus , K_{∞} , $C_{(5)}$, A_0 , $G_{(2)}$