

Pharmacognostical and Preliminary Phytochemical Studies of Leaves of *Tridax procumbens* L.

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ABSTRACT

Pharmacognostical parameters for the leaves of *Tridax procumbens* L were studied with the aim of drawing the pharmacopoeial standards for this species. Macroscopical and microscopical characters, physico-chemical constants, extractive values, fluorescence analysis of dry powder and its reaction after treatment with chemical reagents under visible light and UV light at 254 nm and 366 nm were studied. The determination of these characters will aid future investigators in their Pharmacological analyses of this species.

Keywords: Pharmacognostic, Phytochemical, *Tridax procumbens* L, Asteraceae.

INTRODUCTION

A hispid, procumbent herb, with woody base, some time rooting at nodes, up to 60 cm. high^{1, 2}, found as a weed in cultivated and other disturbed habitats throughout India to an altitude of 2,400m³. Leaves cooked as a vegetable²; they are also eaten by cattle¹. It is commonly known as 'Ghamra' in Hindi and in English popularly called 'Coat button' because of appearance of flowers⁴. Aerial parts of TP Reported Immunomodulatory effects⁴. Aerial parts shows Hepatoprotective activity of *Tridax procumbens* against D-galactosamine/lipopolysaccharide-induced hepatitis in rats⁵. Leaves are reported Hemostatic activity⁶, effect on Blood pressure and Heart Rate in rats⁷ and Anti-diabetic activity⁸. The occurrence of β -sitosterol-3-O- β -D-xylopyranoside⁹, lipid constituents¹⁰, and saturated and unsaturated Fatty acid¹¹ from *Tridax procumbens*.

ETHNOPHARMACOLOGY

The leaves are reportedly used to treat bronchial catarrh dysentery and diarrhoea and as a hair restorative. In southern Orissa a paste prepared from the whole plant is taken orally to relieve diarrhoea. A fine paste of the leaves

is applied externally to reduce swelling of hemorrhoids by the Urash in southern Bihar. The leaf powder mixed with that of *Cicer arietium* (fabaceae papilionoideae) in a 2:1 ratio is taken orally to treat diabetes among the tribal inhabitants of Udaipur district in Rajasthan leaf jues possess antiseptic, insecticidal and parasiticidal properties and is used externally to stop bleeding from cuts. It is also taken as male aphrodisiac in Northeastern³. The whole plant and seed being used to treat a variety of ailments the leaves are cooked and eaten as a vegetable.

But no Pharmacognostical work has been done so far. Therefore, an attempt has been made to study the Pharmacognostic parameters on the leaves of *Tridax procumbens* L. in both whole form and powdered form.

Table 1. Macroscopy of *Tridax procumbens* L.

| Parts | Observation |
|-------------|---------------------------|
| Part | Leaves |
| Arrangement | Opposite |
| Size | 3-7 cm long, 1- 4 cm wide |
| Shape | Lanceolate to ovate |
| Colour | Green |
| Odour | Characteristic |
| Taste | Acrid |
| Appearance | Rough & Scabrous |
| Margin | Irregularly toothed |
| Apex | Acute |
| Base | wedge- shaped |
| Petiole | Short |
| Texture | Short |
| Fracture | Easy |

Materials and Methods

Plant material

The plant material was collected from the National botanical research Institute Garden, Lucknow, in the month June 2008. The plant was identified and authenticated by chemotaxonomist, NBRI Lucknow, and the accession No. is **94484**. A herbarium was preserved in the department for further reference. The leaves were separated, dried, coarsely powdered passed through sieve no 40 and stored in a closed container for further use. All reagents used were of analytical grade.

Methods

The macroscopical characters (size, shape colour, odour, texture, margin, base, apex and petiole) of the leaves were observed^{3,1}. Then, anatomical study, powder was identified with routine reagents to study the lignified cells, trichomes, stomata, fibres etc. Quantitative microscopy was determined by methods prescribed by Trease and Evans^{12,13}.

The ash values, extractive values with various reagents and were determined as per the Indian Pharmacopoeia¹⁴. Extractive values were performed with various solvents like Hexan, alcohol and water was performed as per standard procedure. Measurement of vein islet number, vein termination number, Stomatal number, Stomatal index and length of Trichome were determined¹⁵. The behavior of powdered leaves with various chemical reagents was studied. The fluorescence characters of the powder with various acids were observed under visible light and UV light as per the procedure. Preliminary Phytochemical tests of the powder/extracts were performed using specific reagents through standard procedures^{16,17}.

RESULTS

Analysis and Discussion

Leaves were green, characteristic odour with slight bitter taste. Leaves are of size 3-7 cm in length, lanceolate in shape, acute – apex, wedge-shaped base, irregularly toothed margin, and short petiole. The physical constants such as total ash value (11.88%), acid insoluble ash (3.05%), water soluble ash (2.14%), sulphated ash (20.11) and extractive values are specific identification. The soluble extractive values with different solvents such as Hexan, ethanol and water were (8.90%, 07.17% and 28.16%) respectively, which indicates the nature of constituents present. Quantitative microscopical study also give valuable information regarding specific leaf constants such as vein islet upper and lower epidermis(32.33/mm² and 20.66/mm²),vein termination number upper and lower epidermis (32.66/mm² and 19.66/mm²), Stomatal index upper and lower epidermis (30.12 and 36.31). Trichome number upper and lower epidermis (9.66 and 21.33). Loss on drying (13.00%). The behavior of leaf powder upon treatment with different chemical reagents was also observed and reported in Table -5. Preliminary Phytochemical screening revealed the presence glycoside, flavonoids, Tannins, mucilage, carbohydrate and reducing sugar.

MICROSCOPICAL CHARACTER

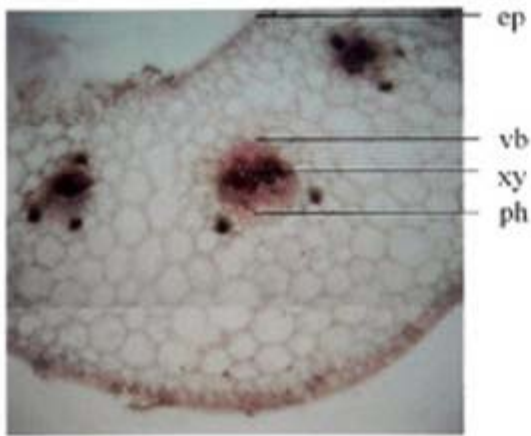
Petiole

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 to small. These are centripetal i.e. xylem surrounded by the phloem.

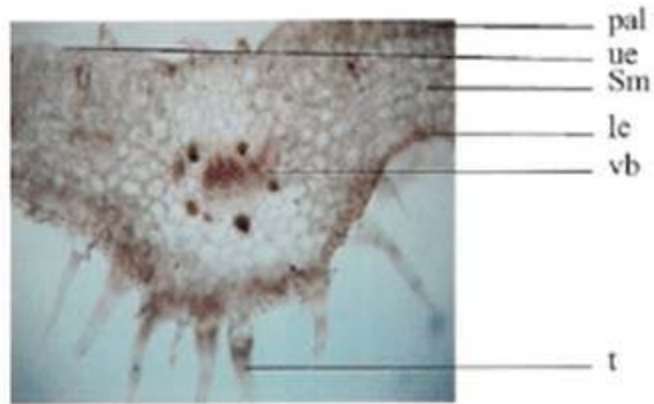
Leaf

T.S. 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 appear epidermis followed by 5-7 celled mesophyll parenchyma mostly devoid of inter cellular spaces.



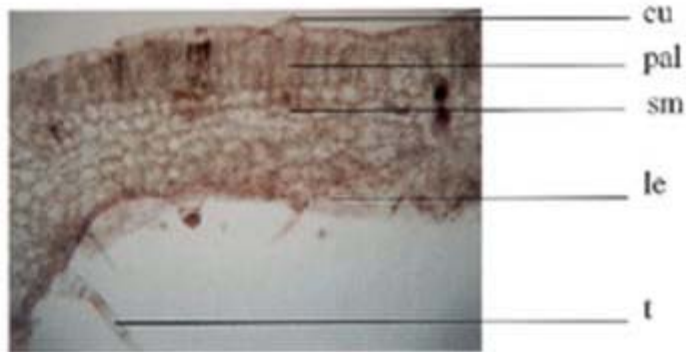
T.S. petiole



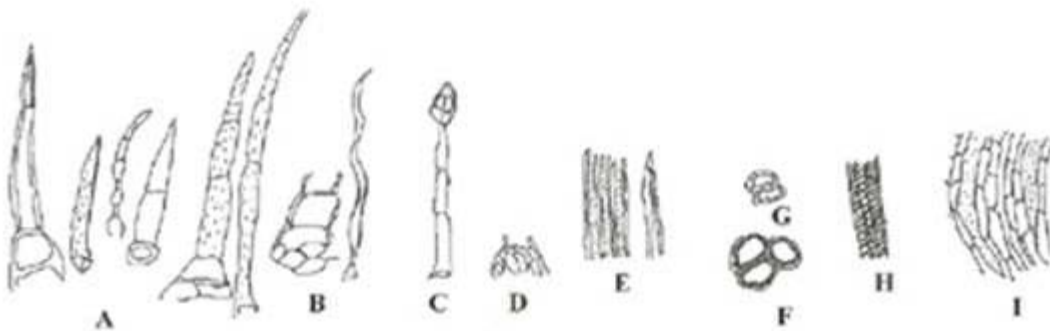
T.S. Leaf passing through midrib region



Tridax procumbens (Whole plant)



T.S. leaf passing through lamina region



Abbreviations: cu, cuticle; le, lower epidermis; pal, palisade cells; sm, spongy mesophyll; t, Trichome; vb, vascular bundle. **Powder** A – I (A and B, simple Trichome; C, glandular Trichome; D, Trichome base; E, laticifers and vessels; F and G, stone cell; H, spiral vascular bundle; I, laticifers and with adjacent parenchyma)

Powder analysis of *Tridax procumbens* L.

It is dark green, 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.

Table 2. Determination of Ash Values *Tridax procumbens* L.

| S. No. | Ash type | Value % (w/w) |
|--------|--------------------|---------------|
| 1. | Total ash | 11.88 |
| 2. | Acid insoluble ash | 3.05 |
| 3. | Water soluble ash | 2.41 |
| 4. | Sulphated ash | 20.11 |

Table 3. Determination of Extractive Values *Tridax procumbens* L.

| S. No. | Solvent | Value % (w/w) |
|--------|---------|---------------|
| 1. | Haxen | 08.90 |
| 2. | Ethanol | 07.17 |
| 3. | Water | 28.16 |

Table 4. Determination of phytoconstants *Tridax procumbens* L.

| Leaf constants | Report |
|---|-----------------------|
| Vein islet number(upper epidermis) | 32.33/mm ² |
| Vein islet number (lower epidermis) | 20.66/mm ² |
| Vein termination number (upper epidermis) | 32.66/mm ² |
| Vein termination number(lower epidermis) | 19.66/mm ² |
| Trichome number (upper epidermis) | 9.66/mm ² |
| Trichome number (lower epidermis) | 21.33/mm |
| Stomatal index (upper epidermis) | 30.12 |
| Stomatal index (lower epidermis) | 36.31 |
| Palisade ratio | 3.62 |

Table 5. Behavior of Powdered leaves of *Tridax procumbens* L. with different Chemical reagents.

| S.No | Reagents | Color of the powdered drug | | |
|------|-----------------------|----------------------------|-------------------|-----------------|
| | | Day light | Ultraviolet light | |
| | | | Near UV | Far UV |
| 1. | Saturated picric acid | Yellowish-green | Dark green | Yellowish-black |

| | | | | |
|----|--|---------------------|-------------|------------|
| 2. | Nitric acid | Radish- brown | Light brown | Brown |
| 3. | Hydrochloric acid | Green | Black | Black |
| 4. | Sulphuric acid (80%) | Black | Black | Black |
| 5. | Glacial acetic acid | Dark green | Green | Black |
| 6. | Iodine solution (N/20) | Dark green | Dark green | Brown |
| 7. | Ferric solution (5% W/V aq. Solution) | Yellowish- brown | Dark green | Dark brown |
| 8. | Powder as such | Green | Green | Dark green |

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