



“THE ETHNOMEDICINAL HERITAGE OF TRIDAX PROCUMBEN: A CRITICAL EVALUATION OF TRADITIONAL USES AND SCIENTIFIC EVIDENCE.”

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Abstract :-

Tridax procumbens, a perennial herb valued in Ayurveda for its therapeutic properties, exhibits notable antimicrobial, anti-inflammatory, antioxidant, and wound-healing activities, and while further research is needed, it holds significant promise as a natural remedy that could be integrated into modern healthcare with further clinical studies and pharmaceutical exploration.

Key words :- B-Carboline, phytochemical analysis ,wound healing activity,& Antimicrobial activity

Introduction:-

Tridax procumbens:- The thirty species of flowering plants in the Asteraceae family, Tridax procumbens is the most powerful. Its most well-known use is as a common weed and pest plant. Although it originated in the tropical Americas, it has spread to tropical, subtropical, and mild temperate climates across the globe. In the US, it is classified as a noxious weed and is considered a pest. Is used to treat dysentery and diarrhea. In traditional medicine, its leaf extracts were used to cure infectious skin conditions. In addition to gastritis and heart disease, it is a well-known ayurvedic medication for liver diseases or hepato-protective properties. Tridax contains several species that are used in medicine, including Angustifolia, Serboana, Bicolor, Accedens, Dubia, Erecta, and Rosea. Procumbens is a species of flowering plant in the daisy family that is often referred to as coat buttons or tridax daisy. Most people recognize it as a common weed and nuisance

plant. Although it originated in the tropical Americas, it has spread to tropical, subtropical, and mild temperate climates across the globe.

In India, *Tridax procumbens* has long been used as an insect repellent, anticoagulant, antifungal, and for wound healing. It burns. A study was conducted to confirm the reports that the plant was being used to cure diabetes by tribal residents in Rajasthan's Udaipur area.



Fig- *Tridax Procumbens*

Description:

In tropical or semitropical regions, the plant can be found in fields, meadows, crop lands, disturbed areas, lawns, and roadside vegetation. Up to 1500 of these achenes are produced by each plant, and each one has the ability to catch the wind in its pappus and go a certain distance. The plant has three-toothed ray florets on its white or yellow flowers. Usually anchor shaped, the leaves are toothed. catechol, anthraquinone, and phenols.[5]

INDIAN NAMES:

In Hindi, Ghamra.

This is the Jayanti Veda in Sanskrit. In Marathi, Ghav Pala and DagadiPala

In Telugu, Gaddi Chemanthi.

In Tamil, thatapoodu.

In Malayalam, Chiravanak.

Viridiplantae is a subkingdom of the class Plantae.

Taxonomical classification :-

Spermatophytina is the superdivision.

Magnoliopsida class

The Asteranae superorder

Family: Asteraceae;

Order: Asterales

Tridax procumbens L. is the species of the genus *Tridax* L.-tridax.[5]

Plant profile:-

Tridax procumbens:-

Synonyms:-

Coat button or kansari (Hindi) or Ghamara

Biological source:-

The flowering plant species of *Tridax procumbens* L., belonging to the family Asteraceae.

Chemical constituents:-

Alkaloids, flavonoids, carotenoids, β -sitosterol, fumaric acid, luteolin, quercetin, oxoesters, various fatty acids, including lauric, myristic, palmitic, arachidic, linoleic, and linolenic acids, as well as tannins, are among the diverse range of bioactive compounds found in *Tridax procumbens*. Previous studies have reported the presence of dexamethasone, glucoluteolin, and two water-soluble polysaccharides (WSTP-IA and WSTP-IB), which are characterized by β -(1 $\rightarrow$ 6)-D-galactan main chains that have been purified from the leaves; GC-MS analysis has also identified lipids and sterols, while a unique flavonoid called "Procumbenetin."

The aerial parts have yielded 3,6-dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O- β -glucopyranoside and a mineral profile rich in calcium, magnesium, potassium, sodium, and selenium, indicating its potential as a plant-based protein source, potassium supplement, and provitamin A (carotenoid) source. Additionally, several new phytochemicals have been identified, including two new flavones, bis-bithiophene, four terpenoids (taraxasteryl acetate, β -amyrenone, lupeol, and oleanolic acid), and four known compounds: puerarin, esculetin, oleanolic acid, and betulinic acid.[5]

Plant morphology:-

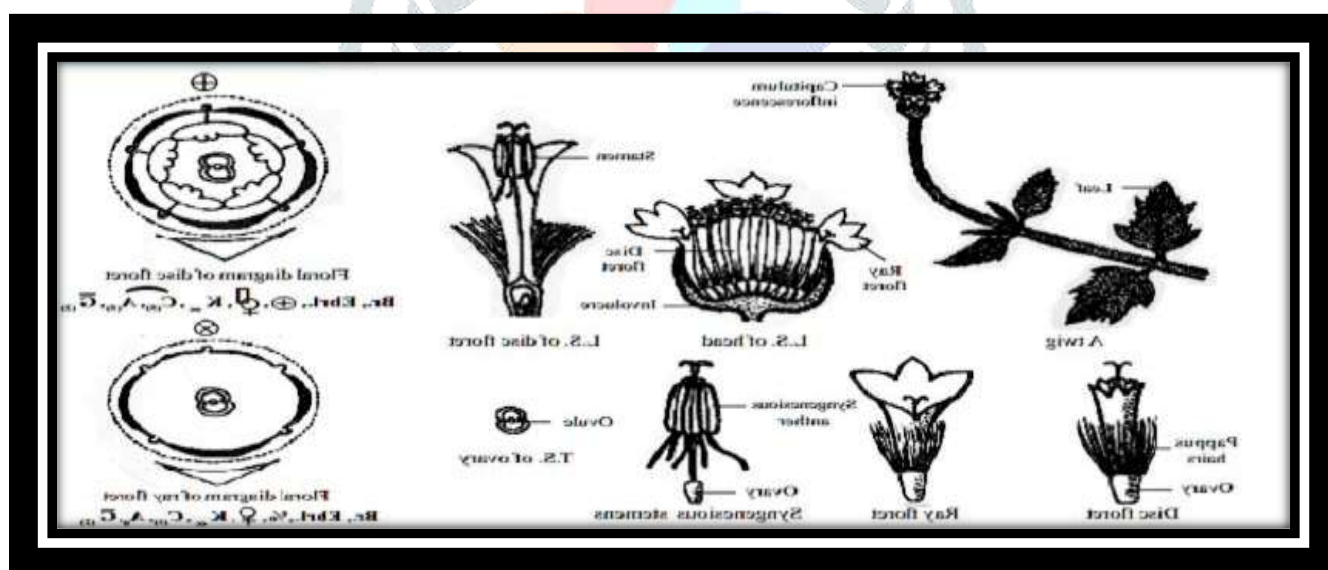


Fig- Morphological Characters of Tridax Procumbens

Appearance:-

The perennial herb *Tridax procumbens* has a creeping stem that can grow up to 8-30 inches (20-75 cm) in length.

Tridax procumbens leaves are opposite, pinnate, oblong to ovate, and 1-2 inches (2.5-5 cm) long. They have sharp apices, coarsely serrated margins, and cuneate bases. Flowers: The flowers of *Tridax procumbens* include yellow disk flowers with white rays. They are supported by a stalk that is 4–12 inches (10–30 cm) long and 0.4–0.6 inches (1–1.5 cm) broad. In the spring, flowers bloom. The plant's blossoms resemble daisies. The flower has three-toothed ray florets and is tubular with a

yellow center. It is called capitulum inflorescence. Ray florets and disc florets with basal palcentation are its two floral kinds.

Flowers-

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Fruits:-

The fruits are oblong, dark brown to black achenes that are 0.08 inches (2 mm) long. The pappus bristles on the head of each achenes range in length from 0.12 to 0.24 inches (3–6 mm). The fruit is a firm, feathery achene with stiff hairs covering it. It features a white pappus-like plume at one end. The fact that the plant produces so many achenes, each of which can catch the wind in its pappus and travel a considerable distance, contributes to its invasiveness.

Seeds-

In the presence of 58 to 78% light, *Tridax procumbens* seeds germinate at higher temperatures (35/25 and 30/20). The gametes have 36 diploid and 18 haploid chromosomes, making them extremely susceptible to salt concentration and water stress. Spreading steam and producing seeds are the methods of production.[6]

Pharmacological activity:-

Wound healing activity:-

While the leaf juice has been demonstrated to lessen wound contraction in treated animals, the aqueous extract of *Tridax procumbens* leaves has been found to enhance lysyl oxidase activity and increase nucleic acid levels—indicating cellular-level action—to promote wound healing, including in steroid-depressed conditions in experimental male Wistar rats.[6]

Immunomodulatory activity:

Tridax procumbens's immunomodulatory qualities have been studied, particularly using the ethanol-insoluble portion of its aqueous extract.

Anti-inflammatory activity:

The lyophilized aqueous extract of *Tridax procumbens* leaves has been tested for its anti-inflammatory qualities using excision wound models, rat skin fibroblasts, and rat paw oedema. The lyophilized aqueous extract of *Tridax procumbens* leaves has been tested for its anti-inflammatory qualities using excision wound models, rat skin fibroblasts, and rat paw oedema.

Antibacterial Activity:

Due to its antibacterial properties, *Tridax procumbens* is frequently used as a treatment for bacterial illnesses in rural areas across the globe.

Medicinal Uses:

Since many people today lack access to basic necessities, they turn to naturally occurring resources to treat common conditions like inflammation, which is the body's normal reaction to a variety of biological and non-biological environmental factors. *Tridax procumbens* is especially prized for its medicinal and pharmaceutical qualities.[6]

Traditional Uses:

Traditional medicine makes extensive use of *Tridax procumbens* because of its many medicinal uses, which include treating bronchial catarrh, diarrhea, dysentery, wound healing as well as serving as an insect repellent, hair tonic, antifungal, and anticoagulant.

Global health systems are increasingly acknowledging the usage of plants like *T. procumbens* for medicinal purposes, which date back up to 60,000 years to the Middle Paleolithic era (WHO, 2013). It has long been used in Central America, especially Guatemala, to treat ailments like liver problems, anemia, colds, and inflammation. The entire plant is used to cure protozoal illnesses like malaria, leishmaniasis, and dysentery. *T. procumbens* is well-known around the world for its antibacterial, antifungal, and antiviral activities.[5]

Methods of extraction:-

1.Soxhlet Extraction method:-

Procedure –

After soxhlet extraction, 124 grams of *tridax procumbens* powder are added and maintained at a steady level.

One liter of ethanol is placed on movable parts in a 5000 ml round-bottom flask, and vacuum grease is used to lessen friction.

Cotton and aluminum foil are also used to cover connectors to prevent leaks.

The heating mantle supplies electricity and maintains the temperature at 60°C once the soxhlet extractor is adjusted.

Then, to provide chilling, a chiller is connected to a soxhlet extractor.

The same procedure is repeated for 48 hours.

The ethanol extract is then separated from the crude extraction via distillation.

We found that there were 22.5 grams of crude leaves using ethanol.

To ensure that the full quantity of 10 grams of crude hexane is separated, add hexane to the crude, filter the soluble material, and then use TLC.[5]



Fig- Soxhlet Apparatus

2.Maceration method:-

Tridax procumbens plant leaves were gathered and stored for the best possible drying time in a shed. After drying completely, it is mechanically ground into a coarse powder. The flower powder was macerated for ninety-six hours at room temperature in a methanolic media. & filtered



it.

Fig- Maceration Process

Spectroscopical analysis:-

UV-Visible Spectroscopy: Because of the sharp peaks and appropriate baseline, the UV-VIS profile of the leaf extract was examined spanning the 200–1100 nm wavelength range. [14]

FTIR analysis: Using the peak values in the infrared radiation region, the FTIR spectrum was utilized to determine the functional groups of the active ingredients found in leaf samples. The components' functional groups were separated when the extract was run through the FTIR according to the peaks it produced.[14]

Chromatography Techniques:-

Thin layer chromatography:-

Use silica gel to prepare the TLC plate. Draw the baseline one centimeter from the plate's bottom. Apply a tiny amount of extract using a capillary tube to the baseline. Set up the TLC chamber with the appropriate mobile phase (hexane: ethyl acetate 7:3, for example). Put the TLC plate within the liquid mobile phase chamber. Let the solvent rise to about 1 cm above the plate. Take out and let the TLC plate air dry. See spots when exposed to UV light or when detecting reagents are sprayed. Calculate the RF value and compare it to the norm.[11]

Primary phyto chemical screening:-

The presence of phytochemicals such as alkaloids, terpenoids, anthraquinones, flavonoids, steroids, and saponins was quantitatively tested using standard protocols, identified through characteristic color changes following established procedures.

Tests for Alkaloids:-

Mayer's test:-The acidified plant extract was mixed with one or two drops of Mayer's reagents. Alkaloids are indicated by a white ppt.

Wagner's test :-Few drops of Wagner's reagents were added into 2 to 3 ml in the extract, formulation of reddish brown ppt indicates the presence of alkaloids.

Iodine test:-A few drops of diluted iodine solution added to three milliliters of test solution produced a blue tint that vanished when it boiled and returned when it cooled.

Test for flavonoids:-

Shinoda test :-

After adding two to three milliliters of plant extract and a few pieces of magnesium metal to a test tube, conc. HCl was added dropwise. The development of a magenta color shows the presence of flavonoids.

NaOH test:-A test tube was filled with two to three milliliters of extract and a few drops of sodium hydroxide solution.

The absence of flavonoids is indicated by the formation of a bright yellow color that did not turn colorless when a few drops of HCL were added.

Test for Saponins:-

Foam test:-The extract was shaken in a graduated cylinder for 15 minutes after being diluted with 20 milliliters of distilled water.

Saponins were detected by a 1 cm layer of foam.

Hemolytic test:-The hemolytic zone appears when one drop of extract and one drop of blood are placed on a glass slide for the hemolysis test.

Phenol tests:- When 0.5 ml of fecl₃ (w/v) solution was added to 2 ml of test solution, a strong color formed, indicating the presence of phenols.

Test for steroids:-

To test for steroids, 0.5g of each sample's methanol extract was mixed with 2ml sulfuric acid and 2ml of acetic anhydride.

In certain samples, the presence of steroids was indicated by a color shift from violet to blue or green.

Test for Tannins:

Gelatin Test: The extract was mixed with a solution of gelatin, which dissolves instantly in warm water. White ppt development is a sign that tannins are present.

Lead acetate test: Five milliliters of extract were mixed with a few drops of a 10% lead acetate solution. The presence of tannins is shown by the formation of red or yellow ppt.[11]

Standardization :-

Sample preparation:

The separated compounds (2 and 3) were dissolved in methanol at a concentration of 1.0 mg/mL to make their stock solutions. These substances functioned as benchmarks. By diluting the stock solutions over the ranges of 1.25–20.0 and 0.31–5.0 µg/mL, respectively, standard curves were produced from five calibrants, and 2 and 3 were quantified using the HPLC external standard method. For HPLC analysis, the ethyl acetate, methanol, and 70% ethanol extracts were reconstituted in methanol to produce a solution with a concentration of 5.0 mg/mL.

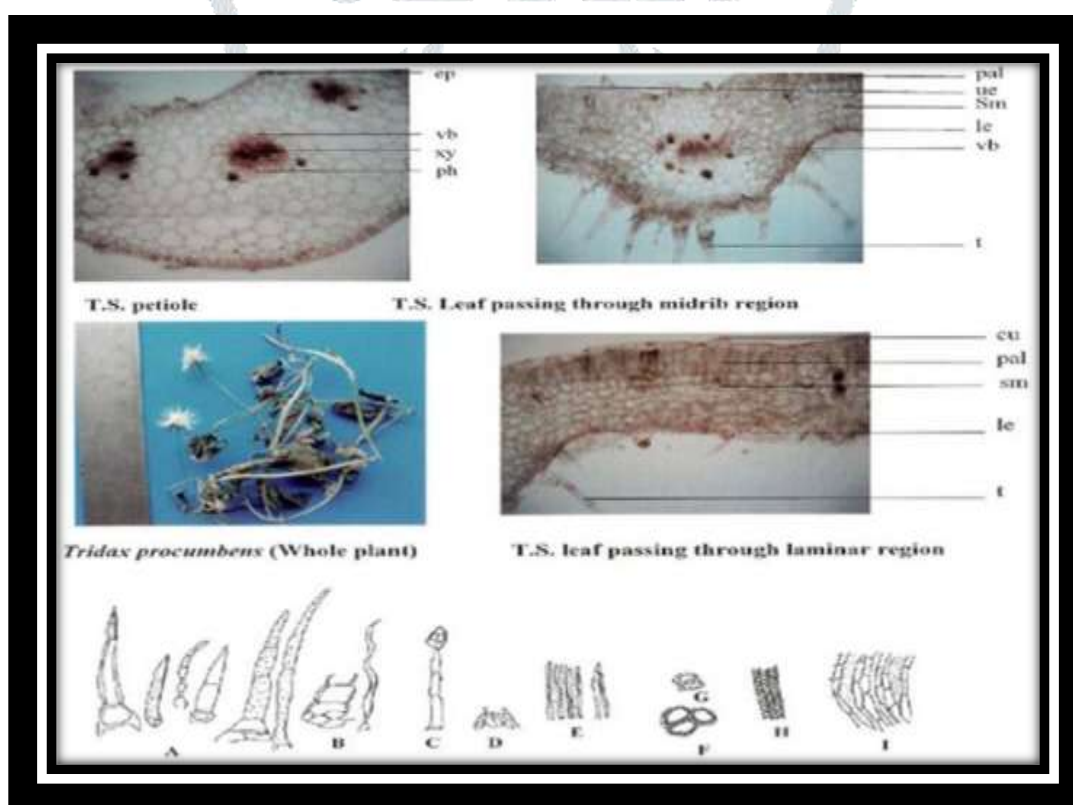


Fig-Microscopical Overview of Tridax Procumbens

Physico-Chemical

Constants

The Physico-chemical properties of the powdered leaves were determined using standard procedures:

- Loss on Drying:** Moisture and volatile oil content were measured by drying the powder at 105 °C for 5 hours, and the percentage weight loss was recorded.

- **Total Ash:** The total ash content, representing the inorganic residue left after combustion, was calculated as a percentage.
- **Acid-Insoluble Ash:** This parameter measured the silica content (e.g., sand and siliceous matter) in the ash, expressed as a percentage.
- **Water-Soluble Ash:** The water-soluble ash fraction was determined as the difference between total ash and the residue remaining after treatment with water.
- **Sulphated Ash:** The sample was ignited with sulphuric acid, and the remaining ash was weighed to determine sulphated ash content.
- **Alcohol-Soluble Extractives:** The amount of ethyl alcohol-soluble constituents extracted from the powdered material was quantified.[1]

CONCLUSION:-

According to this assessment, *Tridax procumbens* is a popular herbal remedy in India. with a long history of treating various ailments, warrants continued research to uncover its full potential, as its diverse phytochemicals have shown promise in experimental studies, but further investigation is needed to optimize extraction methods and explore its untapped pharmacological properties.

Result:-

Because of its rich phytochemical composition, *Tridax procumbens* (*Gadadh pala*) has a wide variety of pharmacological and therapeutic capabilities, according to a study of numerous research investigations on the plant. Numerous bioactive substances, including alkaloids (B-Carboline, Quercetin), flavonoids, tannins, glycosides, sterols, and essential oils, have been found through phytochemical studies to contribute to its wide range of biological activity. Several extracts of *tridax procumbens* including ethanolic, methanolic, and aqueous extracts, showed notable antioxidant, antibacterial, anti-inflammatory, Wound Healing, antidiabetic, hepatoprotective, and anticancer properties in experimental investigations. High levels of free radical scavenging activity were seen in the leaves, suggesting that they may help prevent Wound Healing linked to oxidative stress. *Tridax procumbens* has also demonstrated encouraging results in lowering blood sugar levels, shielding liver cells from toxins, and preventing the formation of harmful bacteria and fungi. All of these results point to *Tridax procumbens* significant potential for use in the creation of herbal formulations and nutraceutical goods. *Tridax procumbens* traditional use in Ayurveda is validated by the literature, which also emphasizes the need for additional clinical and formulation-based research to fully investigate its pharmacological potential.

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