

TRIDEX PROCUMBENS: PHARMACOLOGICAL ACTIVITIES- A REVIEW ARTICLE

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ABSTRACT

India is a country where very rich culture, folk medicine and nature go hand in hand. Nature has been a source of medicinal agents for thousands of years and an impressive numbers of modern drugs have been isolated from natural resources. Since India is blessed by all kinds of environmental conditions like Himalayan to temperate to tropical, very rich flora is observed throughout the year. In nature many of the plants are present to which we call as Weeds, since their cultivation and economic status is not very high, But such weeds can be of great medicinal value. Traditional medicines or folk medicines are an important source of potentially useful new compounds for the development of chemotherapeutic agents. *Tridax procumbens* Linn. is a spreading herb found throughout India. *Tridax procumbens* is known for several potential therapeutic activities like antiviral, antioxidant, antibiotic efficacies, wound healing activity, insecticidal and anti-inflammatory activity, pharmacological activities like hepatoprotective activity, antidiabetic activity,

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INTRODUCTION

Tridax procumbens, commonly known as **coat buttons** ^[1] or **Tridax daisy**, is a species of flowering plant in the daisy family. It is best known as a widespread weed and pest plant. It is native to the tropical Americas but it has been introduced to tropical, subtropical, and mild temperate regions worldwide. It is listed as a noxious weed in the United States and has pest status in nine states. ^[2] *Tridax procumbens* L. is a small perennial herb having short, hairy blade like leaves. Corolla is yellow in colour. It is a common weed grows in open places, coarse textured soils of tropical regions, sunny dry localities, fields, waste areas, meadows and dunes. It is a semi prostrate, annual, creeper herb. Stem is

ascending 30-50cm height, branched, sparsely hairy, rooting at nodes. Leaves are simple, opposite, stipulate, lanceolate to ovate. 3-7 cm long irregularly toothed margin, base wedge shaped, shortly and petiole, hairy on both surfaces. Flowers are tubular, yellow with hairs, inflorescence capitulum. *Tridax* has two types of flower: ray florets and disc florets with basal placentation. *Tridax procumbens* has been used for wound healing, as anticoagulant, antifungal and insect repellent. It is used in diarrhea and dysentery. Its leaf extracts were known to treat infectious skin diseases in folk medicines. The leaf juice possesses antiseptic, insecticidal and antiparasitic properties. It is a well-known

Ayurveda medicine for liver disorders. It is also used to check hemorrhage from cuts, bruises and wounds. The scientific literatures on this medicinal herb are enormous and have reported to confer activity against gastritis it is also antioxidant, antidiabetic, antimicrobial, antiseptic, insecticidal and antiparasitic^[3]



Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Asterids
Order:	Asterales
Family:	Asteraceae
Tribe:	Heliantheae
Genus:	<i>Tridax</i>
Species:	<i>T. procumbens</i>
	<i>Tridax procumbens</i> ^[4]

CHEMICAL CONSTITUENTS

A new flavonoid (procumbetin), isolated from the aerial parts of *Tridax procumbens*, has been characterized as 3,6-dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O- -D-glucopyranoside (1) on the basis of spectroscopic techniques and by chemical means. Previously isolated constituents. Alkyl esters, sterols,^[5] pentacyclotriterpenes,^{[5][6]} fatty acids^[7] and polysaccharides. named procumbetin. Yield: 0.016% on dried basis.

PHARMACOLOGICAL ACTIVITIES-

Analgesic and anti-inflammatory activity

An analgesic may be defined as a drug bringing about insensibility to pain without loss of consciousness^[9]. Lyophilized extract of *Tridax procumbens* was found to be potent analgesic. *Tridax procumbens* has marked beneficial effects against centrally, peripherally and inflammatory pain model.

Hepatoprotective Activity

The hepatoprotective activity of aerial parts of *Tridax* shows significant protection in alleviation of D-Galactosamine/Lipopolysaccharide (D-GalN/LPS) induced hepatocellular injury^[10]. D-GalN/LPS have been proposed to be hepatotoxic due to its ability to destruct liver cells. The multifocal necrosis produced by D-GalN and the lesion of viral hepatitis in humans are similar. This amino sugar is known to selectively block the transcription and indirectly hepatic protein synthesis and as a consequence of endotoxin toxicity, it causes fulminant hepatitis within 8 hours after administration.

Immunomodulatory Activity

Ethanol extracts of leaves of *Tridax* have immunomodulatory effect on Albino rats dosed with *Pseudomonas aeruginosa* also inhibits proliferation of same^[11]. Also a significant increase in phagocytic index, leukocyte count and splenic antibody secreting cells has been reported to ethanol insoluble fraction of aqueous extract of *Tridax*. Stimulation of humoral immune response was also observed along with elevation in hemagglutination antibody titer.

Wound Healing Activity

Wound healing involves a complex interaction between epidermal and dermal cells, the extracellular matrix, controlled angiogenesis and plasma-derived proteins all coordinated by an array of cytokines and growth factors^[12]. *Tridax*

antagonized antiepitheization and tensile strength depressing effect of dexamethasone (a known healing suppressant agent) without affecting anti-contraction and antigranulation action of dexamethasone. Aqueous extract was also effective in increasing lysyl oxidase but to a lesser degree than whole plant extract. Further it has been shown that extract of leaves of this plant also promotes wound healing in both normal and immune compromised (steroid treated) rats in deadspace wound healing model. The plant increase not only lysyl oxidase but also, protein and nucleic acid content in the granulation tissue, probably as a result of increase in glycosaminoglycan content [13].

Antidiabetic Activity

The aqueous and alcoholic extract of leaves of *Tridax procumbens* Linn. shows significant decrease in the blood glucose level and it shows antidiabetic activity in the model of alloxan induced diabetes in rats. [14].

Antimicrobial Activity

Whole plant of *Tridax* has reported for its antimicrobial activity on various species of bacteria. A whole plant is squeezed between the palms of hands to obtain juice. Fresh plant juice is applied twice a day for 3-4 days to cure cuts and wounds. The extract of whole plant of *Tridax* showed antibacterial activity only against *Pseudomonas aeruginosa*. The disk diffusion method was used to test the anti-bacterial activity. Four strains of bacteria employed in test were two gram positive *Bacillus subtilis*, *Staphylococcus aureus* and two gram negative *Escherichia coli* and *Pseudomonas aeruginosa*. [15]

Antimalarial activity

The aqueous and ethanolic extracts have antiparasitic activity against chloroquine resistant *P. Falciparum* parasites. The extracts have

considerably low toxicities to human RBCs. These results lend support to claims of herbalists that decoctions of either TP or PA are useful medicines. These notwithstanding, more comprehensive animal toxicity studies need to be carried out on the plants, especially since humans are currently using them to treat malaria and other diseases [16].

Anticancer activity

Tridax procumbens is a semi prostrate annual or short lived perennial herb. The phytochemicals in dried leaves of *T. procumbens* has been investigated. *T. procumbens* compounds were tested for cytotoxicity against human lung cancer by MTT assay. The compound of Rf value 0.66 showed 90% reduced cell viability. NMR, MS and IR spectra revealed the compound as Lupeol. The anticancer potential of the Lupeol against human lung cancer has been evaluated by colonogenic survival determination, cell cycle control, Cell based assay for inhibition of COX-2 activity and DNA fragmentation analysis, an amount of 320 µg/ml concentration of Lupeol compound exhibited potential anticancer property [17].

Antifungal activity

Tridax procumbens L. Disc diffusion assay was performed against two pathogenic fungal strains (*Aspergillus flavus* and *Aspergillus niger*). Minimum inhibitory concentrations (MIC), minimum fungicidal concentrations (MFC) and total activity were also evaluated for determination of antifungal potential of each active extract. The flavonoid extracts showed remarkable activity against *A. niger* whereas alkaloid extracts were found inactive against both the test fungi. Excellent antifungal potential was recorded for free flavonoid of stem and bound flavonoid of stem and flower *A. niger*. Study indicated that *T. procumbens* can be used as a source of formulations

of antifungal drug for treatment of diseases caused by *A. niger*^[18].

Antibacterial activity

The herb *Tridax procumbens*, found growing commonly in tropical countries, is endowed with antibacterial properties. Our study demonstrated that this activity was associated only with the ethanolic extract and was prominently seen only against *Pseudomonas aeruginosa* strains. Multi drug resistant nosocomial strains of *Pseudomonas* isolated from ventilator associated pneumonia, urinary tract infection as well as blood stream infection showed significant sensitivity to *Tridax* extracts. Our study corroborates the efficacy of *Tridax* as an anti pseudomonal agent and its value as a source of formulations for treatment of nosocomial infections caused by *Pseudomonas aeruginosa*^[19].

Antioxidant activity

Antioxidant may be defined as compounds that inhibit or delay the oxidation of other molecules by inhibiting the initiation or propagation of oxidizing chain reactions⁴. *Tridax procumbens* plant extracts were evaluated for *in vitro* antioxidant activities. DPPH method provides a good assessment for evaluation of *in vitro* antioxidant activity. It is based on reaction between antioxidant (AH) with nitrogen centered free radical i.e. DPPH (1, 1- diphenyl, 2-picryl hydrazyl). The Ethyl acetate and n-Butanol fractions from methanolic extract have shown significant activity which is comparable to the activity of Ascorbic acid. Fractionation of the parent extract reduced the complexity of material and provided more accurate idea related to the Phytochemicals, responsible for antioxidant activity of *Tridax procumbens*.^[20]

CONCLUSION

Tridax procumbens Linn.is widely distributed weed. Each and every part of it is useful having pharmacological activity. The plant product over synthetic compound is the need in treatment of diseases, as it does not have any deleterious effect in higher animals including man. India is home to a variety of traditional medicinal systems that rely to a very large extent on native plant species for their raw drug material. *Tridax procumbens* Linn.is widely distributed weedfound everywhere in India, America, TropicalAfrica, Asia, and Australia. All plant parts havenoble pharmacological activities. its pharmacological activities like hepatoprotective effect, immune modulatingproperty, promising wound healing activity,antidiabetic, hypotensive effect, antimicrobial, insectrepellent activity, anti-inflammatory and antioxidant,bronchial catarrh, dysentery, diarrhea. The plant alsoprevents falling of hairs and used as hair growthpromoter. This plant is used as bio-absorbentforremoval of harmful Cr (VI) from the industrial wastewater.

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