



Review on *Tridax procumbens*

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Abstract

Tridax procumbens is Associate in Nursing nonwoody perennial plant and belongs to the family Asteraceae. It's normally seen within the waste lands and on roadsides. Ethnomedicinally this plant is also utilized in the treatment of varied style of diseases. The plant shows various pharmacologic activities like antidiabetic, anticancer, medicine activity, anti- rheumy activity, anti-inflammatory, immunomodulatory effects, anti-ulcer activity, inhibitor and hepatoprotective activity. The preliminary phytochemical investigation showed the presence of flavonoids, saponins, alkaloids, carotenoids and tannins. Valuable data and literature on *Tridax procumbens* are analyzed and consulted employing a totally different databases cherish Google, Google Scholar, Scopus, PubMed and Science Direct. This critique summarises the pharmacologic properties of *Tridax procumbens*

Keywords: *Tridax procumbens*, Antidiabetic, Anti-cancer activity, AntiParkinson's activity.

1. Introduction

Tridax procumbens (*Tridax*), Compositae unremarkably known as as 'Ghamra' in Hindi and 'coat buttons' in English due to its flowering appearance. It's one in all the remedial herb commonly employed by ethnomedical practitioners. It's best referred to as a pesterer plant and a widespread weed. *Tridax* plant is found throughout India and is employed as a domestic medication for a spread of diseases. *Tridax procumbens* has been wide employed in Indian classical medication for wound healing, antifungal, anticoagulant, and bug repellent property and additionally utilised in treatment of infectious disease and diarrhea [1]. *Tridax procumbens* is distributed as 'Bhringraj' that is a well-known Ayurvedic liver disorder drugs [2]. *Tridax procumbens* is additionally employed by native healers for the treatment of boils, blisters, and cuts in several components of India [3]. The phytochemical investigation unconcealed the presence of flavonoids (catechins and flavones), alkaloids, tannins, saponins and carotenoids [4].

1.1. Origin and distribution *Tridax procumbens* Linn could be a native of equatorial America and adopted in equatorial India, Australia, Africa and Asia. This wild herb spreads throughout India. Coat buttons are detected on dunes, dykes, railroads, roadsides, riverbanks, meadows, and waste grounds. Its increasing prevalence and significance as a weed is as a result of of its plentiful seed production and spreading stems [5].

1.1. Scientific classification Kingdom -

Plantae, Subkingdom - Tracheobionta, Division

- Magnoliophyta,

Class - Magnoliopsida,

Subclass - Asteridae,

Order - Asterales,

Family - Asteraceae,

Genus - *Tridax*Species - *Tridax procumbens* [6]**1.2. Vernacular names** English - *Tridax*

daisy, Hindi - Ghamra, Kannada - Jayanthi,

Tamil - Vettukaayapoondu, Sanskrit -

Jayantiveda, Marathi - Kambarmodi,

Telugu - Gaddichemanthi [7]

2. Morphology [5, 7, 8, 9]

Tridax procumbens grows up to 40 cm or more, it is an herbaceous perennial plant with aspreading basal portion.

Table 1. Morphology characters of *Tridax procumbens*

Stem	Creeping at the base, branched, pilose (densely hairy), suberect, or trailing above.
Leaf	Simple, opposite, acute apex, elliptic-rhomboid, or ovate-lanceolate, or elliptic-rhomboid, cuneate base, patently hispid, and serrated to the coarsely dentate margin, 2.5-7cm long.
Flowers/Inflorescence	Heads are bisexual, pentamerous and actinomorphic solitary with yellowish numerous tubular-campanulate involucre of disc floret per head, 1.2-1.5cm across. The peduncle is 10-30 cm long.
Calyx	Characterized with scales, reduced to pappus.
Fruit	Hard achene fruit covered with stiff hairs and at one end it has feathery, plume-like white pappus.
Seed	The plant seeds have a pendulous embryo so there is no endosperm.
Root	Taproot system.

Figure 1. *Tridax procumbens*

Figure 2. Stem



Figure 3. Leaves



Figure 4. Seed



Figure 5. Flower



Figure 6. Root

3. Phytochemistry

Jude CI *et al.*, evaluated the phytochemical and mineral proximate profile of *Tridax procumbens*. The phytochemical investigation showed the presence of flavonoids (catechins and flavones), alkaloids, tannins, saponins and carotenoids. The mineral proximate composition is depicted in Table number 2-5 [4].

Table 3. Mineral Element Composition of *Tridax procumbens* Leaves

Mineral	Composition (mg/kg)	
	Dry weight	Wet weight
Calcium	20.96	2.09
Magnesium	3.56	0.35
Potassium	31.92	3.18
Sodium	50.44	5.02
Selenium	0.20	0.02

Phytochemicals which include quercetagenin-3,6,4'-trimethoxy-7-O-neohesperidoside (flavonol diglycoside), 1,2-dihydrodendroarboresol B (a polyacetylene), and (3S,5R,6S,7E)-three-tetradecanoate-5,6-epoxy- β -ionone (ionone derivative) have been pronounced from the ethanolic extract of the plant [10]. The general chlorophyll content material and general carotenoids content material of *Tridax procumbens* have been expected as 1.424 ± 0.017 mg/g tissue and 0.724 ± 0.007 mg/g tissue respectively [11]. The plant include excessive quantity of alkaloids, hydroxycinnamates, flavonoids, tannins and phytosterols [12].

Various compounds which include betulinic acid, esculetin, puerarin, oleanolic acid and new flavones named 6,8,three'-trihydroxy-three,7,4'-trimethoxyflavone and 8,three'-dihydroxy-three,7,4'-trimethoxy-6-O- β -D-glucopyranosyl flavone have been remoted from the plant parts [13]. Oleanolic acid received from *Tridax procumbens* proved α -glucosidase inhibition property [14]. Terpenoids, which include β -amyrenone, oleanolic acids, taraxasteryl acetate, and lupeol in conjunction with a brand new bisbithiophene named as tri-bisbithiophene had been remoted from hexane extract of ethyl acetate soluble a part of *Tridax procumbens* [15]. Two water soluble polysaccharide fractions, WSTP-IA (~1:three molar proportions of l-Araf and d-Galp) and WSTP-IB (most effective d-Galp because the main sugar component) had been purified from *Tridax procumbens* Linn leaves [16]. *Tridax procumbens* hydro distilled important oil includes 1,8-cineole, p-cymen-7-ol, Biformene, Trans-(α)-caryophyllene and Dibutyl phthalate because the main compounds and 9,12,15-octadecatrienoic acid, Z- α -trans Bergamotol, α -Elemene, 2- α -pinene, Tricosane, α -Selinene, α -Amyrin, Caryophyllene oxide, α -humulene, Eicosane, Quercetin 7,three',4'-trimethyl and tau-cadinol because the minor compounds [17].

4. Pharmacological Review

4.1. Anti-cancer activity

Extraction of essential oils from *Tridax procumbens* fresh leaves and flowers has been performed by hydrodistillation and used for the evaluation of anticancer activity using MTT assay against human breast cancer cell line (MCF-7). The essential oil exhibited concentration-dependent activity on the MCF-7 cell line. The IC₅₀ value was found to be 96.6 μ g/ml. The essential oil of *Tridax procumbens* proved to have a significant anticancer activity that might be due to the presence of vital terpenes such as α -pinene and β -pinene [17].

4.2. Antibacterial activity

Ethanolic and aqueous extract of leaves of *Tridax procumbens* had been tested for its antibacterial activity by agar well diffusion technique against different bacteria's, clinical isolates and some standard strains. The aqueous extract does not exhibit any antibacterial activity but the alcoholic extract showed significant antibacterial activity at a concentration of 5 mg/ml against *Pseudomonas aeruginosa*. In comparison with various antibiotics such as augmentin, cefotaxime, and ciprofloxacin, the ethanolic extract exhibited marked activity against the nosocomial strains of *Pseudomonas* [18].

4.3. Antidiabetic activity

Hypoglycemic activity of dried alcoholic, petroleum ether, aqueous (60-80°C) leaves extract of *Tridax procumbens* was evaluated in an alloxan-induced diabetic rat model. Alcoholic and aqueous extracts proved a significant decrease in blood glucose level at a dose of 200 mg/kg and petroleum extract shows a very weak hypoglycemic activity [2].

4.4. Antiparkinson's activity

Ethanolic extracts of *Tridax procumbens* (EETP) leaves were used to evaluate Anti-Parkinson's activity in rotenone-induced locomotor impairment and haloperidol-induced catalepsy in the fruit fly and the rat model respectively. Rotenone (ROT) has been co-exposed with EETP on flies in the fruit fly model for 7 days. Compared with ROT treated flies, EETP treatment have significantly increased the efficiency of locomotor activity in flies. In the catalepsy model, the rats were treated for 15 days with EETP followed by haloperidol. A significant decrease in catalepsy, muscle rigidity and increased locomotor performance had been observed with EETP. A reduction in lipid peroxidation and a substantial increase in the reduced glutathione and the catalase levels were seen with EETP [19].

4.5. Anti-arthritis activity

The ethanolic extract of *Tridax procumbens* whole plant showed significant anti-arthritis activity against Freund's Complete Adjuvant (FCA)-induced arthritis in female Sprague Dawley (SD) rats at doses 250 and 500mg/kg. It is confirmed by observing a reduction in the paw volume. A significant decrease in body weight had been observed in control animals with arthritis as compared to control animals without arthritis. Animal treatment with *Tridax procumbens* helped to regain the body weight in a dose-dependent manner. Anti-arthritis activity of *Tridax procumbens* extract was compared with standard drug indomethacin. The hematological and biochemical changes induced by FCA were significantly altered by *Tridax procumbens* extract [20].

4.6. Anti-ulcer activity

Tridax procumbens ethanolic leaf at a dose of 400 mg/kg showed dose-dependent inhibition of ulcer lesion index, changes in gastric pH and volume in rats with ethanol-induced ulcers. The extract is also involved in restoring the large fibroblast cells and reduces glutathione (GSH), catalase, and superoxide dismutase (SOD) levels in the rat stomach. Hence these results proved the therapeutic potential of *Tridax procumbens* [21].

4.7. Hepatoprotective and antioxidant activity

Ethanolic extract of *Tridax procumbens* was evaluated against hepatic damage induced by paracetamol (acetaminophen) in male albino rats. Lowered Catalase and Superoxide dismutase activities in liver tissue, a significant increase in the activity of aspartate aminotransferase, serum alkaline phosphatase, alanine aminotransferase and enhanced lipid peroxidation has demonstrated hepatic damage caused by paracetamol (2gm/kg body weight). Elevation in serum bilirubin and a significant reduction in total serum protein, hepatic glutathione, and glycogen content were observed due to paracetamol-induced hepatic damage. These altered parameters were reversed to normal levels, after administration of varying doses (100, 200, 300, and 400mg/kg body weight) of *Tridax procumbens* ethanolic extract orally for 7 days. This indicates the hepatoprotective and antioxidant efficacy of *Tridax procumbens* against liver damage induced by paracetamol[22].

4.8. Hypotensive effect

The *Tridax procumbens* aqueous leaf extract was investigated for its cardiovascular effect on an anesthetized Sprague-Dawley rat. Administration of aqueous extract by intravenous route shows a significant dose-related reduction in blood pressure (mean arterial pressure). A significant reduction in heart rate was found at the higher dose whereas the lower dose does not show any effect on heart rate. Hypotensive effects and the bradycardia were instant. Animals pretreated with atropine sulfate (1mg/kg) inhibited the hypotensive effect of *Tridax procumbens*. Therefore, these results continue to justify the hypotensive effect of *Tridax procumbens* leaves and its action which is probably due to the stimulation of the cholinergic muscarinic receptors mechanism [23].

4.9. Anti-inflammatory activity

Ethanol extract of *Tridax procumbens* leaves were subjected to the anti-inflammatory activity in the carrageenan-induced mice model. Parameters such as histopathology and inflammatory oedema was observed and compared with that of a control group. In the treated groups, recovered histology and a considerable decrease in mice paw inflammation were noticed at 24 h. At the inflammatory site, cyclooxygenase (COX2) and Tumour necrosis factor (TNF α) gene expression levels were investigated to examine molecular activity through reverse transcription quantitative polymerase chain reaction (qPCR) and polymerase chain reaction (PCR) analysis. The PCR and relative quantity (RQ) values had been decreased with increasing doses in test groups. In terms of band density, the reduction in real-time polymerase chain reaction (RT-PCR) results were significant in the COX2 and TNF- α gene expression levels of the treated group. Therefore, *Tridax procumbens* shows anti-inflammatory activity at the molecular level [24].

4.10. Immunomodulatory effects

The insoluble ethanolic fraction of *Tridax procumbens* Linn (TPEIF) aqueous extract was used to study the immunomodulatory activity in Swiss male albino mice. After intraperitoneal administration of TPEIF, a significant increase in the splenic antibody-secreting cells, leukocyte count, and the phagocytic index was observed. Additionally, activation of the humoral immune response with an enhancement of the haemagglutination antibody titer was noticed. Prominent information for cellular immune system activation was reported with an enhanced type IV (delayed) hypersensitivity reaction. TPEIF also stimulates both cell-mediated as well as the humoral immune system. Thus it helps in the generation of an enhanced antibody response to particular clinical antigens [25].

4.11. Anti-obesity

Tridax procumbens methanolic extracts were administered to atherogenic diet-induced obesity rats. Parameters like triglycerides, total cholesterol, High-Density Lipoprotein (HDL) cholesterol, total protein, and free fatty acids were assessed. Elevation of HDL cholesterol and a significant decrease in triglycerides, total cholesterol, total protein and free fatty acids were observed in extract-treated rats. Hence *Tridax procumbens* proved significant anti-obesity activity [26].

4.12. Anti-malarial activity

In this study, essential oil had been extracted from the leaves of *Tridax procumbens* L by steam distillation method. Antimalarial activity of essential oil was evaluated in mosquito cages against the *Anopheles stephensi*, the malarial vector. *Tridax procumbens* had been at three different concentrations of the oils (2, 4, and 6 %). Comparatively a significant repellent effect was observed at 6 % concentration (> 300 minutes) [27].

4.13. Antidiarrhoeal activity

Antidiarrhoeal activity of petroleum ether, dichloromethane and ethanolic extract of the whole plant of *Tridax procumbens* had been carried out on prostaglandin-E2 induced enteropooling, gastrointestinal motility and castor oil-induced diarrhoea in experimental

animals. The lower dose of petroleum ether extract shows better anti-diarrhoeal activity relative to the higher dose by reducing the amount of intestinal fluid in the prostaglandin-E2 induced diarrhoeal model. The dose-dependent anti-diarrhoeal activity was observed by all extracts of *Tridax procumbens* by reducing the propulsion of charcoal meal in the gastrointestinal motility test model and reducing the frequency of defecation and the total weight of wet diarrhoea in the castor oil-induced diarrhoea model compared to the control group [28].

4.14. Wound healing activity

Here, a simple ointment base (5% and 2.5% w/w) formulated from *Tridax procumbens* ethanolic extract was evaluated for wound healing activity in diabetic (streptozotocin- induced) and non-diabetic rats by burn wound, excision and incision model. In the burn model, epithelization period contraction rate, and wound contraction (%) was evaluated. In the excision wound model, total protein, epithelization period, wound index, % contraction area, DNA estimation, hydroxyproline content, and histopathological evaluations have been made. Whereas in the incision wound model, tensile strength was evaluated. A marked result with wound index, epithelization period and wound contraction has been shown by 5% and 2.5% w/w EETP treated animals. In both diabetic and non-diabetic groups, a potent wound healing activity was reported in 5% w/w simple ointment base of *Tridax procumbens* ethanolic extract. Compared to the diabetic group a highly noticeable and remarkable wound healing activity by 5% w/w *T. procumbens* ointment was found in the non-diabetic group [29].

4.15. Analgesic activity

Lyophilized decoctions of *Tridax procumbens* leaves were used to investigate analgesic activity in rats by using Acetic acid-induced Writhing test, Formalin induced persistent pain, and Complete Freund's adjuvant (CFA) induced hyper analgesia. A significant and dose-dependent decrease in the abdominal writhing was observed in the Acetic acid- induced abdominal constriction test. Extract administration significantly inhibits the late phase of moderate pain in the Formalin test. A significant decrease in mechanical hyper analgesia was found in CFA-injected rats treated with extract orally. Hence the results revealed the analgesic property of *Tridax procumbens* which might be due to both centrally and peripherally mediated mechanisms [30].

5. Conclusion

This review reveals that the plant *Tridax procumbens* is thick in varied bioactive compounds that have various medicine properties. It's an ethnomedicinal herb that may be used to manage various diseases. This means the medicative significance of the plant. Many studies are conducted on totally different elements of the plant like leaves, stem, flower and roots. Thus, advanced analysis studies are necessary to verify the therapeutic significance of *Tridax procumbens* at the molecular level.

6. References

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