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A Review on Medicinal Importance of Tridax Procumbens

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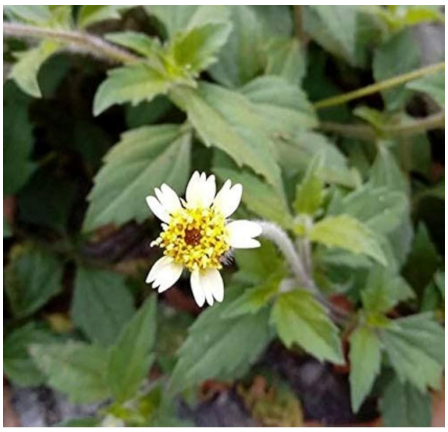
Abstract: *A medicinal plant Tridax Procumbens commonly known as coat button or kansari (Hindi) or Ghamara belonging to family Asteraceae. It is a plant used majorly in Indian traditional medicine and also use by different communities. It is a very promising species that produces secondary metabolites such as alkaloid, steroids, carotenoid, flavonoid (catechins, centaurein and bergenins), fatty acid, phytosterols, tannins and minerals reported to have a variety of medicinal uses including antioxidant, antibacterial, anti-inflammatory, antimicrobial, vasorelaxant, antileishmanial, antianemic, immunomodulatory, hepatoprotective and mosquitocidal activities which have been scientifically screened. Still there is shortage in the studies on isolation, characterization and evaluation of active principle from the extract. This study aims to review the scientific literature regarding medicinal properties, taxonomy, morphology, geographical distribution, phytoconstituents and pharmacological activities to prove and attempt to compile and review them in order to heighlight its medicinal importance and making it a promising ethnobotanical resourse. Also, this study provides comprehensive information of this species and indicates that this species could be an effective, safe and affordable treatment for some ailment especially in tropical areas where this plant is native and widely distributed.*

Keywords: Metabolites, Phytoconstituent, Antioxident, Hepatoprotective, Anti- inflammatory, Antidiabetic, Antimicrobial, Phytoconstituent, Antihypertensive, Antioxidant.

I. INTRODUCTION

Tridax procumbens is a fast-growing, annual or perennial plant native to tropical America that is now found worldwide as a weed. Commonly known as "coat buttons" or "tridax daisy," it belongs to the family Asteraceae and is known for its use in traditional medicine for ailments like wounds, inflammation, and skin diseases. However, it can also compete with crops, making it an invasive pest in some regions.



Fig, 1, Tridax procumben plant

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Tridax procumbens L. is a medicinal plant and used as a drink to treat bronchial catarrh, diarrhea, dysentery and liver diseases. In this study, we evaluated the potential use of T. procumbens to treat hyperuricemia, oxidative stress, and bacterial infection.Tridax procumbens, coat buttons, is a weed of open disturbed habitats widely distributed throughout the tropical and subtropical regions. It is native to Mexico and tropical America but has naturalized elsewhere, partly due to ease of dispersal by wind and as a contaminant in trade.The diverse biological activities are due to various phytochemicals present in the plant. The aim of this review is to critically evaluate T. Procumbens as an important medicinal plant with emphasis on the in-vivo properties of the phytochemicals and their roles in signalling pathways that can be manipulated for specific pharmacological actions. The aim of this review is to highlight the importance of this species as a valuable medicinal plant

Table 1. Classification of *Tridax Procumbens* .

Classification	
Divisions	**Classing**
Kingdom	*Plantae*–Plants
Sub kingdom	Tracheobionta–Vascular plants
Division	Spermatophyta
Subdivision	*Magnoliophyta*–Flowering plants
Class	*Magnoliopsida*–Dicotyledons
Subclass	*Asteridae*
Order	*Asterales*
Family	*Asteraceae*–Aster family
Genus	*Tridax L.*–*Tridax*
Species	*Tridax procumbens L.*–Coat buttons

Table 2. Synonyms of *Tridax Procumbens* .

Synonyms
Chrysanthemum procumbens
Balbisia canescens
Balbisia divericata
Balbisia peduncalata
Tridax procumbens var. Canescenes
Tridax procumbens var. ovatifolia[4]

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Table 3. Vernacular names of *Tridax Procumbens*.

Vernacular names	
Language	**Names**
English	Coat Buttons and *Tridax* Daisy
Hindi	Ghamra
Sanskrit	Jayanti Veda
Marathi	Dagadi Pala
Telugu	Gaddi Chemanthi
Tamil	Thata poodu
Malayalam	Chiravanak
Spanish	Cadilp Chisaca
French	Herbe Caille
Chinese	Kotobukigiku [5]

Plant Morphology

Tridax procumbens - Leon Levy Native Plant Preserve

Tridax procumbens is a hairy, prostrate or ascending herbaceous plant with a strong taproot, cylindrical stems, and opposite, simple leaves that are hairy and toothed. Its morphology is characterized by solitary or clustered capitulum inflorescences at the end of long, hairy peduncles. Each head contains two types of flowers: peripheral yellow-centered creamy-white, three-lobed ray florets and central yellow, tubular disc florets. The fruit is a conical, dark-colored achene covered in silky hairs, topped with a feathery white pappus.

Plant habit

General: A sprawling, procumbent, and hairy herb that can grow up to 50 cm in diameter, with flowering axes rising 15–50 cm tall.

Root: A strong taproot system.

Stem: Cylindrical, solid, and covered in stiff, multicellular hairs. It can root at the nodes. Leaves

Arrangement: Opposite and simple. Shape: Oval to lanceolate.

Petiole: Hairy, 1–3 cm long.

Margins: Coarsely and irregularly toothed to deeply incised. Surface: Hispid (hairy) on both surfaces, thick, soft, and dark green.

Inflorescence

Type: A solitary capitulum (flower head) held on a long, hairy peduncle (12–32 cm). Ray florets: Located on the periphery; 4–7, cream-colored, female, and three-lobed. Disc florets: In the center; numerous, yellow, tubular, and bisexual.

Bracts: Outer involucre bracts are hairy, while inner bracts are membranous. Fruit

Type: A conical achene.

Appearance: Dark brown to black at maturity and covered in silky, stiff hairs.

Pappus: A tuft of numerous, unequal, feathery white bristles that are horizontally spreading at maturity.

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Figure 2. Seed of *T. Procumbens.*

Figure 3. Stem, Flowers, leaves of T. *Procumbens.*

Figure 4. Stem and Root of *T. Procumbens.*

Botanical description

The plant has an average height of around 20-60 cm and is branched; Leaves are 4-8 cm long, simple, opposite and stipulate. Inflorescence is around 12-32 cm, oval shaped and held by peduncle, with ray florets and disc florets. Flowers are daisy like with yellow centred white or yellow petals.

Numerous, tubular disc florets are surrounded by a ring of short, strap-shaped ray florets. Fruit is cypsela, black or brown in colour at maturity and surrounded with feathery bristles [2]. The stem is cylindrical. and covered with hairs of about 1 num with tap root system[3]. The registered number of chromosomes present in Tridax are 36 (2n) [4]. Growth of plant takes place during monsoon season as it requires abundant water for growth and sustenance

T. procumbens is found in tropical and sub-tropical areas of the world growing with annual crops, along roadsides, pastures, fallow land, and waste areas. The species has a diploid number of 36. It has herbaceous, semi-prostrate habit, and can grow anywhere from 15-40 cm in height. The leaves are elongated, opposite, ovate with serrated margins, hirsute on the abaxial and adaxial sides. The inflorescence is a capitulum with three-toothed white ligulate ray florets female and disc inner flowers yellow, tubular, bisexual, with corolla 6 mm long. T. procumbens is classified as a noxious weed in Alabama, Florida, Minnesota, North and South Carolina and Vermont. It is quarantined in California and Oregon and prohibited in Massachusetts (U. S. Department of Agriculture). In Guatemala, T. procumbens is a weed that has a wide range of growth and can be found in either dry or damp soil, usually on previously cultivated ground from sea level to 2300 m

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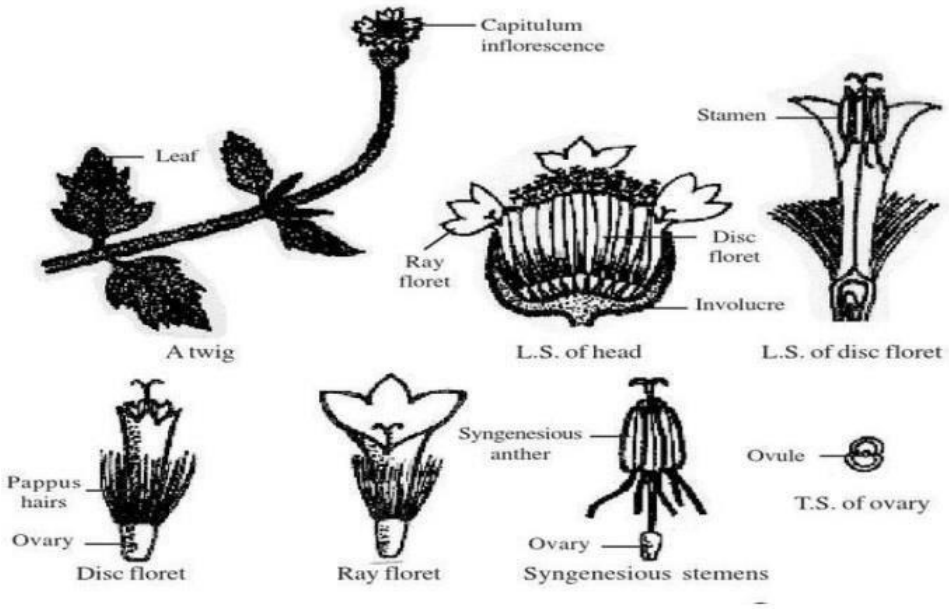
Origin and distribution

Tridax procumbens Linn is native of tropical America and naturalized in tropical Africa, Asia, Australia and India. This wild herb is distributed throughout India. Coat buttons are found on roadsides, waste grounds, railroads, dykes, riverbanks, meadows, and dunes. Its widespread distribution and importance as a weed are because of its spreading stems and plentiful seed production

Figure 5. Microscopy of *T. Procumbens.*



Macroscopic characters of leaf, flower, stem and root

Phytoconstituent

In various research studies, it was showed that the plant has different phytochemical compounds. From the phytochemical screening, it was observed that alkaloids, carotenoids, saponins, flavonoids, and tannins are present in this medicinal plant. The proximate characteristics showed that Tridax procumbens is rich in sodium, potassium, and calcium. In an earlier research study, it has been estimated that the leaf of the plant mainly contains crude proteins 26%, crude fiber 17%, soluble carbohydrates 39%, and calcium oxide 5%. On the other hand, luteolin, glucoluteolin, quercetin, and isoquercetin have been reported from its flowers. Fumaric acid, β-sitosterol also has been reported in the plant. Oleanolic acid which was obtained in reasonable amounts from this plant found to be a potential anti-diabetic agent when tested against alpha-glucosidase.

The phytochemical composition of Tridax procumbens includes a variety of bioactive compounds such as alkaloids, flavonoids, terpenoids, saponins, tannins, and phenolic compounds. It also contains steroids, carotenoids, glycosides, and fumaric acid. Specific compounds identified include luteolin, quercetin, iso-quercetin, and oleanolic acid, with other fatty acid derivatives and lignans also reported.

Key phytochemicals

Alkaloids: A significant group of compounds that contribute to many of the plant's medicinal properties.

To test for alkaloids in Tridax procumbens, use a plant extract and add a few drops of Mayer's reagent, which is a solution of mercury chloride and potassium iodide. A positive result is indicated by the formation of a white to yellowish or creamy precipitate.

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Method: Mayer's Test Prepare the extract: Obtain a suitable extract from the plant, such as a methanolic or alcoholic extract.Add acid (optional but recommended): Take about 1-2 mL of the extract and add a few drops of dilute hydrochloric acid (\(HCl\)) to make the solution slightly acidic.
Add Mayer's Reagent: Carefully add a few drops of Mayer's reagent to the side of the test tube.
Observe for precipitate: Look for the formation of a white, yellowish, or creamy precipitate. The presence of this precipitate indicates the presence of alkaloids.
Flavonoids: Present in high concentrations, with specific compounds like kaempferol and epicatechin identified.
Qualitative test (Shinoda test) What you'll need:
Ethanolic extract of Tridax procumbens Concentrated hydrochloric acid (HCl)
A small amount of plant material (extract) Procedure:
Add a small amount of the ethanolic extract to a vial.
Add one to five drops of concentrated hydrochloric acid to the extract.
Observe the color change. A rapid development of a red or pink-scarlet color indicates the presence of flavonoids.
Quantitative test (Aluminum chloride method)
What you'll need:
Plant extract
Aluminum chloride solution (10%) Potassium acetate solution (1 M) Distilled water
Methanol Spectrophotometer
Quercetin standard (for comparison)
Procedure:
Mix a specific amount of plant extract with methanol, aluminum chloride solution, and potassium acetate solution.
Add distilled water to bring the total volume to the required amount.
Allow the mixture to stand at room temperature for a specific time (e.g., 30 minutes).
Measure the absorbance of the reaction mixture at a specific wavelength (e.g., 415 nm) using a spectrophotometer.
Compare the result to a calibration curve created using quercetin to determine the total flavonoid content, typically expressed in mg/g.
Terpenoids and Triterpenoids: Found in significant amounts, including oleanolic acid, which has potential antidiabetic properties.
Saponins: Another major class of compounds identified through phytochemical screening.
Tannins and Phenolic compounds: Including caffeic acid and tannic acid, which are known for their antioxidant properties.
Carotenoids: Like lutein, have been identified, contributing to the plant's antioxidant activity.
Steroids and Phytosterols: Such as stigmasterol, found in significant quantities.
Other compounds:
Glycosides Fumaric acid
Benzoic acid derivatives Lignans
Various fatty acid derivatives and esters
Test for others phytochemicals
Test for the detection of glycoside/reducing sugar:
Benedict's test - The extract was mixed added with Benedict's reagent in equal amount and the mixture was heated for 2 minutes. The appearance of brown to red colour indicated the presence of glycoside.
Test for protein Xanthoprotein test:-
A small amount of the extract was mixed with 0.5 ml of concentrated HNO3, appearance of white or yellow precipitate revealed the presence of the protein.
Test: - A small amount of the extract was added to 0.5 ml of 4% sodium hydroxide solution followed by a drop of 1% copper sulphate solution. The development of violet to pink colour indicated the presence of protein.

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Test for carbohydrate

Molisch's test: 100 mg of the substance was dissolved in 1 ml water and 2 drops of 1% alcohols solution of alphanaphthol was added to it. 1 ml of con.H2SO3 was added along the sides of the test tube, so that it formed a heavy layer at the bottom. A deep violet ring at liquid junction indicated the presence of carbohydrate. Phytochemical screening tests are done in 2 extracts of whole plant viz acetone and methanol extracts. Acetone extract of whole plant shows the presence of coumarins, quinines, steroids, alkaloids, tannins, resins, proteins and carbohydrates. Methanol extracts of whole plants showed the presence of coumarins, tannins, alkaloids, quinines, flavonoids, resins, Proteins and carbohydrates

Medicinal uses

Tridax procumbens has a variety of medicinal uses, with the most common being wound healing by applying its juice to cuts and bruises to stop bleeding and promote healing. It is also used in traditional medicine for hair loss, liver disorders, diarrhea, and skin conditions. Modern research supports many of these uses, with studies showing it has antibacterial, anti-inflammatory, antioxidant, and hepatoprotective (liver-protecting) properties.

Traditional and supported medicinal uses

Wound healing: The juice from the leaves is applied to cuts, wounds, and ulcers to promote healing and stop bleeding.
Liver health: In Ayurveda, it is used to treat liver disorders, and studies have shown hepatoprotective effects.
Gastrointestinal issues: It is used for diarrhea, dysentery, and other gastrointestinal disorders.
Skin diseases: Leaf extracts are used to treat infectious skin diseases and other skin ailments.
Antimicrobial properties: Extracts have shown activity against various bacteria and fungi, which supports its traditional use for infections.
Antioxidant activity: Studies confirm the plant has antioxidant properties, which may contribute to its overall health benefits.
Skin conditions: Leaf extracts are traditionally used to treat infectious skin diseases, boils, and blisters.
Hair health: The juice of the leaves is applied to the scalp to strengthen hair follicles and promote hair growth, and to reduce hair loss.
Other uses: Anticoagulant Antifungal Insect repellent
Anti-inflammatory Antioxidant Antidiabetic

Cough and bronchial catarrh Typhoid fever

Traditional uses In Nigeria, the entire plant is used to treat typhoid fever, cough, fever, stomachache, backache, diarrhea and epilepsy. Farmers in Africa use the plant for treatment of livestock for example, Tridax is used along Vigna parkeri to treat chronic mastitis by grinding both plants, and adding salt and water and applying to the udder studied the antibacterial effect of Tridax against mastitis-causing bacteria and found that the ethanolic extract had significant activity against Staphylococcus aureus. However, there was little or no activity from the aqueous extracts against Streptococcus uberis and Klebsiella penumonia, in comparison with Spathodea campanulata extracts. In Benin, breeders complement the feed of rabbits or other livestock combining with other plants; although rabbits consume it in lower amounts than other fodder, probably due to low palatability. In Togo, the fresh, crushed leaves are used for dressing wounds. The decoction of the leaves is used against pain, to treat malaria, and against abdominal and gastrointestinal mycosis. In India it is known as an insect repellent, used to treat diarrhea, and to help check for hemorrhages. In addition, some reports include the use as a cure for hair loss. A study in Tamilnadu, India, revealed that native inhabitants apply the juice from the leaves for the healing of wounds. The same study also infers that T. procumbens is one of the most useful traditional medicinal plants. It has also been shown to have many minerals like calcium, selenium, magnesium, potassium and sodium. The people in Udaipur, India, have traditionally ingested powdered T. procumbens leaves, along with other herbs, to treat diabetes. The species has shown to be a great source of potassium, which is used for the treatment of cramps and a safe source ingredient for future medicinal uses. These traditional uses demonstrate the potential uses of this plant. Tridax procumbens has been extensively utilized in the Ayurvedic system of medication and is well- accepted medicine for a liver disorder. It's been found to possess significant medicinal properties against malaria; dysentery, diarrhoea,

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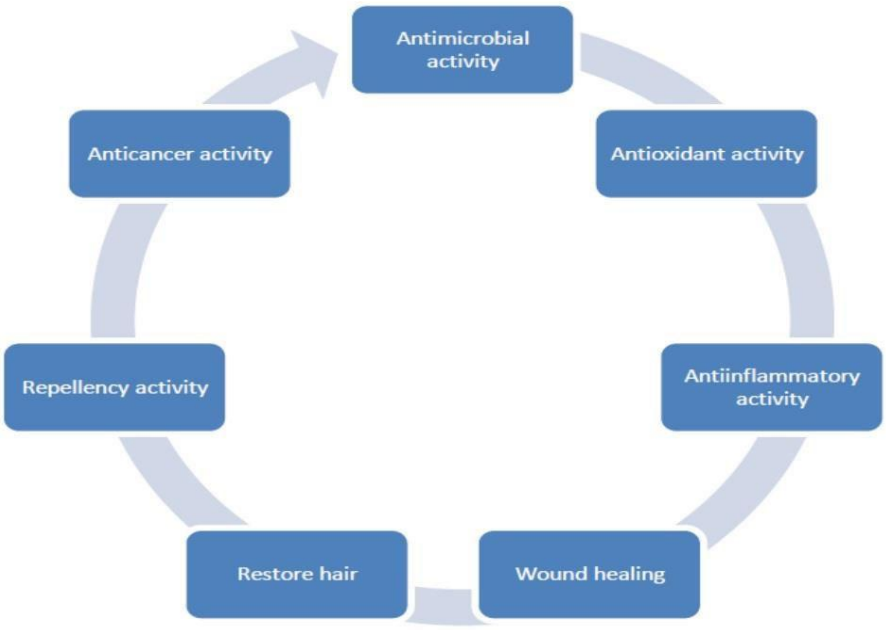
bronchial catarrh, blood pressure, hair fall, stomach ache, headache and hair fall. It also has wound healing properties and check hemorrhage from cuts and bruises. Antiseptic, insecticidal and parasiticidal properties were reported in flowers and leaves. The plant also possesses immunomodulatory, a.ntidiabetic, antihepatotoxic and anti-oxidant, anti- inflammatory, analgesic activity

Pharmacological activities Tridax procumbens having various potential therapeutic activities like antimicrobial activity, anti-oxidant, antibiotic efficacies, wound healing activity, insecticidal, anti- inflammatory activity, diarrhea and dysentery. Leaf juice is used to cure fresh wounds,to stop bleeding, as a hair tonic. In India, Tridax procumbens mainly used for wound healing, as anticoagulant, antifungal and insect repellent. In folk medicines leaf extract were known to treat infectious skin diseases. It is a well-known medicine for liver disorders or hepatoprotective nature besides gastritis and heart burn. Tridax procumbens is used as bioabsorbent for removal of harmful Cr (VI) from the industrial waste water

Figure 6. *Tridax procumbens* having various potential therapeutic activities.



1 **Antibacterial activity**- The Tridax procumbens having antibacterial activity which was tested against the Pseudomonas aeruginosa. Pseudomonas is the nosocomial strain which was isolated from ventilator associated with pneumonia patient secretions like tracheal secretions and broncho alveolar lavage. This study reported that the ethanolic extract showed very good anti-bacterial activity against Pseudomonas aeruginosa. Increased zone of inhibition is at the concentration of 5 mg/ml. The strain was compared to some control antibiotics like augmentin, ciprofloxacin, cephotaxime and even ticarcillin showed resistant whereas the sensitivity only to imipenem. This report was a statistically significant because the ethanol extract of tridax having inhibition zone against the leading gramnegative bacteria associated with nosocomial infections.

Whole plant of Tridax is having antibacterial activity. In this whole plant extract with two Gram positive (Bacillus subtilis, Staphylococcus) and two Gram negative (Escherichia coli and Pseudomonas aeruginosa) bacteria. This report showed that the effective antibacterial activity of Tridax whole plant only against with Pseudomonas aeruginosa by the method of Disc diffusion.The leaf extract of Tridax procumbens used for the analyzing of antibacterial activity by using various solvents like hexane, chloroform, butanol, ethanol and water.

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Antibiotic test carried out with Escherichia coli, Pseudomonas aeruginosa, Micrococcus sp., Staphylococcus aureus, Proteus vulgaris, Klebsiella pneumoniae, Bacillus subtilis, Citrobacter sp.and Serratia marcescens by disc diffusion method. Gram negative bacteria showed the more zone of inhibition reported in this study. Antibacterial activity was carried out with different solvent extracts Tridax procumbens leaf against Staphylococcus aureus, Escherichia coli, Proteus mirabilis and Vibrio cholerae. In this study 5 different solvents like hexane, petroleum ether, chloroform and methanol were used. Antibacterial activity tested against both gram positive (Staphylococcus aureus and Bacillus subtilis) and gram negative (Enterobacter aerogenes) by using Agar well diffusion method. Results indicated that more bioactive compound present in methanol than in hexane extract. Three different enteropathogens are tested against methanol extract of Tridax procumbens by disc diffusion method. The methanol extract showed highest activity against Salmonella typhi, Shigella flexneri and least activity against Escherichia coli

2. **Antifungal Activity**– Antifungal activity of Tridax procumbens with whole plant extract used against the phytopathogenic fungi, Aspergillus niger and the leaf extract was tested against Fusarium oxysporum and the results showed that good antifungal activity. Essential oil extracted from Tridax procumbens have reported to antifungal activity against 3 different fungi Candida albicans, Candida tropicalis and Candida parapsilosis about 12 –15 mm zone of inhibition. The bioactive compound of flavonoids from Tridax procumbens tested for potential antifungal activity against niger, Aspergillus flavus, Candida albicans an Trichophyton sp. and the report showed higher sensitivity of Candida albicans indicating the antifungal potential of flavonoids from the plant.

Methanol extract of Tridax procumbens prepared from different parts of plant like leaf, stem, flower and root showed significant inhibitory activity against Candida albicans (MTCC 227 and MTCC 3017). The inhibition zone ranging is from 8 mm to 13 mm at 100 mg/ml concentration. The methanol extract of root exhibited antifungal activity against Candida tropicalis and Candida glabrata. While the methanol leaf extract of Tridax procumbens L, exhibited the susceptibility of Candida albicans and Candida tropicalis. This evidence supports for the presence of bioactive compounds in the root extract of methanol possess the better and effective anti-candidial drug in future. By using natural fungicidal agents, we reduce the usage of commercial chemical fungicides and its hazardous side effects. In future the extract of Tridax procumbens become effective therapeutic management of Candida infections

3. **Hypotensive effect**- The hypotensive effect of Tridax procumbens leaf was investigated on anaesthetized Sprague-Dawley rat. They showed that leaf of aqueous extract having cardiovascular effect and it has ability to cause significant dose dependant decreases in the mean arterial blood pressure. The higher dose indicates significant reduction in heart rate whereas lower dose did not cause any changes in the same. They were reported that leaves of Tridax procumbens Linn. possess hypotensive effect

4. **Immunomodulatory**- The ethanol leaf extract of Tridax have immunomodulatory effect which wascarried out in Albino rats dosed with Pseudomonas aeruginosa also inhibits proliferation of same Tridax procumbens aqueous extract tested for immunomodulatory activity. Phagocytic index, leukocyte count and spleenic antibody secreting cells are significantly increased which was reported to aqueous extract of Tridax in ethanolic insoluble fraction. Stimulation of humoral immune response was also observed along with elevation in heamagglutination antibody titer. Also, this study reveals that Tridax influences both humoral as well as cell mediated immune system

5. **Antidiabetic activity**- The alcohol and water extract of Tridax procumbens Linn. leaves having antidiabetic activity which is significantly decrease in the blood glucose level. Antidiabetic activity tested in the model of alloxan induced diabetis in rats T. procumbens methnol extract of 50 percent of acute and sub chronic dose administrated by oral shows to reduces fasting blood glucose levels in diabetic rats. This plant material does not affect the sugar levels in normal rats

6. **Anti-inflammatory**- The anti-inflammatory activity of Tridax procumbens extract was assessed oncarrageenin induced paw edema along with standard drug, lbuprofen. The inhibition zone was comparable with extract of Tridax and. The Tridax extract increased the inhibition of edema if treated with standard drug lbuprofen. Drug Ibuprofen with extract of Tridax showed significant anti- inflammatory activity. Water soluble powder of Tridax leaf extract was administrated orally at different doses to rats. The results demonstrated that the extract possessed analgesic activity. Tridax procumbens L. dose reduced the abdominal writhing Tridax alcoholic and hydro alcoholic extract of anti-inflammatory activity by using the rat-paw edema assay and showed edema inhibition in the percentage of 10.82, 16.80 and 11.39

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7. **Hepatoprotective activity**- The aerial parts of Tridax shows hepatoprotective activity. The plant posse's significant protection in alleviation of D-Galactosamine/Lipopolysaccharide (DGalN/ LPS) induced hepatocellular injury. DGalN/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 hrs after administration

8. **Hemostatic activity**- Tridax procumbens leaves of different extract were tested for hemostatic activity. This process carried out by studying the clotting time of 10 human volunteers by in vitro method. Ethanol extract of plant showed positive activity. The ethanolic extract of the Tridax procumbens leaf reduces the clotting time uniformly in the blood samples. This study showed that the hemostatic activity, thus affecting haemostasis

9. **Wound healing activity**- Wound healing is a complex and dynamic process has the ability to restore the cellular structures and tissue layers. Whole plant of Tridax procumbens L. Water extract has ability to set the normal and immune compromised wound healing in rats. Tridax antagonized antiepithelization and tensile strength depressing effect of dexamethasone (a known healing suppressant agent) without affecting anticontraction and antigranulation action. The mechanism of wound healing process of this plant material involves complex interaction between dermal and epidermal cells, the extra cellular matrix, controlled angiogenesis and plasma-derived proteins all coordinated by an array of cytokines and growth factors.

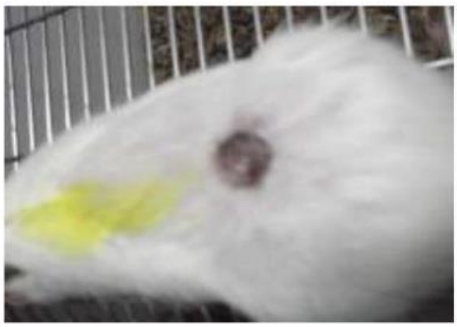
The plant not only increase lysyl oxidase but also, protein and nucleic acid content in the granulation tissue, probably due to increase of glycosamino glycan content. Wound healing property of Tridax procumbens aqueous and ethanol extract of whole plant by using animal models. In this study both excision and incision wounds are treated with both extracts of plant. Incision wound treated with extract for 14 days. On 14th day after wound healing capacity is measured by using Tensiometer. A small portion of the incised skin was sent for histopathological examination for assessing reepithelization and collagen formation. In excision wound treated with plant extract for 15 days. Every three days once the changes in wound area were monitored. The wound area was evaluated by using graph paper. Tridax procumbens showed significant increase in Hydroxyproline, Collagen and Hexosamine content which shows the effective wound healing action

Figure 7 . Wound healing activity of *Tridax procumbens*.

Wound in animal model

Wound treated with extract of *T. procumbens*

Control wound on 15thday



T. procumbens extract treated wound on 15th day

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10. **Anti-cancerous activity**- The anticancer activity of Tridax procumbens was tested on prostate epithelial cancerous cells PC3. Tridax flowers were extracted with water and acetone. Anticancer activity was determined by MTT assay with cell viability. Both extracts were tested on cell viability assay. In this experiment the basic process based on the yellow soluble salt MTT changed into to purple blue insoluble Formazan precipitate. This process carried out by the mitochondrial succinate dehydrogenase which is produced by viable cells. Viable cells are quantified spectrophotometrically at 570 nm. The acetone flower extract showed 82.28 % cancer cell death within 24 hrs and water extract exhibited a very weak anticancer activity. The results of this analysis revealed the fact that flower crude extract has anti-cancer activity

11. **Antimicrobial activity**– Antimicrobial screenings have been done, but additional studies are needed to corroborate some of the results. Various species of bacteria and fungi have shown sensitivity to the antimicrobial properties of T. procumbens. More recently, callus of stem and leaf has shown to be useful for the synthesis of silver nanoparticles that showed some antimicrobial activity against E. coli, V. cholerae, A. niger, and A flavus. However, this activity was lower than the activity shown by silver nitrate so these results are not conclusive. Petroleum, ether and ethanolic extracts of leaves of T. procumbens showed antibacterial activity against Bacillus faecalis.This activity was reported to be probably due to the presence of alkaloids. The chloroform extracts showed antibacterial activity against B. faecalis, B. subtilis, E. coli,and Pseudomonas aeruginosa but the experiments need better controls and descriptions of the procedures. Essences from T. procumbens show the presence of alpha and beta pinenes, used in small quantities can help in treating bacterial and fungal infections. There are some contradictory results about the antimicrobial activity of this species. Some studies did not include significant biological activity compared to the antibiotic control but there is evidence for the potential of this species as antimicrobial so more studies need to be done in this area

12. **Anti-ulcer activity**- The antiulcer activity of methanolic extracts of Tridax procumbens was screened by Aslam Pathan et al. During this study albino rats were treated with methanol extract 100 mg/kg of Tridax procumbens Linn and ulcer protection activity using myeloperoxidase activity was evaluated. The results revealed that the myeloperoxidase activity of methanol extract 100 mg/kg (2.74 U/g) is lower than experimental control (4.74 U/g). From this study, it can be concluded that the methanolic extract (100 mg/kg) of the whole plant of Tridax procumbens Linn possesses ulcer prevention and protection activity and should be helpful for the hindrance of ulcerative colitis

13. **Anti-obesity activity**- In a research investigation, the animal receiving treatment with the plant decoctions showed a significant reduction in total cholesterol, triglycerides, total protein, free fatty acids and elevation of highdensity lipoprotein cholesterol level

14. **Anti-malarial activity**- The water and ethanol decoctions have anti-plasmodial properties against chloroquineresistant Plasmodium falciparum. The decoctions have low toxicities to human RBCs though further animal toxicity studies need to be carried out on the plant .

The aqueous and ethanolic extracts of PA and TP have ant plasmodial 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

II. CONCLUSION

Tridax procumbens Linn. (Compositae) is a weed found throughout India, it is native of tropical America and naturalized in tropical Africa, Asia, and Australia. This plant widely distributed and it's each and every part having noble pharmacological activity. The work done till todate on its pharmacological activities like hepatoprotective effect, immunomodulating property, promising wound healing activity, antidiabetic, hypotensive effect, antimicrobial, insect repellent activity, anti- inflammatory and antioxidant, bronchial catarrh, dysentery, diarrhoea also prevent falling of hairs and leads to hair growth promotion. This plant also used as bioadsorbent for removal of Cr (VI) from the industrial wastewater. This is dispensed for "Bhringraj" by some of the practitioners of Ayurveda. In future, there is huge room for research in direction of more pharmacological activities of plant and to elucidate the mechanism of action of same. The studies on plant Tridax procumbens Linn. also desired development of novel therapeutic agents isolated from it, as

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isolation of oleanolic acid a single triterpenoid is reported from this plant. This is a comprehensive review that highlights the various phytochemicals identified in T. procumbens together with their diverse pharmacological attributes. Since, most of the small molecules approved by FDA are derived from plant sources, it is essential to evaluate the plant in a systematic manner to identify bioactive which could lead to the discovery and development of new drugs against various ailments. Though, T. procumbens has been used in many traditional medicines, scientific data relating their phytochemicals with published pharmacological properties are lacking. Many of the studies have used plant extracts followed by qualitative analysis of its phytochemical constituents. Researchers should try to employ new drug discovery principles like bio-assay guided phytochemical identification, phenotypic screening using relevant cell culture models and if possible, demonstrate Pharmacokinetic-Pharmacodynamic correlation (PK-PD) to show the efficacy of the preparation. Attempts should also be made to identify the active metabolites mediating the in vivo efficacy to ensure standardized extract preparation. In addition, a battery of enzyme targets can be identified for different diseases and the partially purified bioactive checked for inhibitors or activators. Identification of new bioactive may serve as a chemosphere or pharmacophore to be developed as a drug using Molecular Modeling, Medicinal Chemistry and Bioinformatics approaches. Since, T. procumbens is reported to have many pharmacological properties; researchers should try to evaluate their properties using modern technologies. Tridax procumbens Linn. has enormous potential for botanical, phytochemical, nutritional and pharmacological properties. From the above review study and explanation, it is observed that the plant has been extensively used in the ancient system of medicine for various biological disorders and it possess various prominent psychopharmacological activities, as it is briefly discussed in the review article. There is vast scope for research in the direction of more pharmacological activities of this plant and to elucidate the mechanism of action of the same in the future. This medicinal plant can be a vital source of herbal drugs for the pharmaceutical industry in the future as well. The present review revealed that the plant Tridax procumbens, Possesses varied pharmacological properties. The phytoconstituents present in them are responsible for the biological activities. The diversity of phytochemicals present in this plant provides drug lead for the development of novel therapeutic agents.

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