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A Review on Medicinal Importance of Tridax Procumbens

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Abstract: ***Nature has provided plentiful plant sources which provides various medicinal properties. The plant of Tridax Procumbens is belongs to the family Asteraceae and it is also known as Jakham judi, Kambarmodi, Tantani, Gaddi chemanthi etc. These medicinal plants are the rich sources of various natural remedies for the treatment of pathogenic and other diseases. It Consists of Various secondary metabolites in the plants are Alkaloids, Flavonoids, saponins, Tannins, Anthocynins, phenol steroids, proteins, amino acids and carbohydrates have been used for important pharmaceutical compounds .This review paper is attempt to understand the phytochemical constitution of T. Procumbens and it's antilithiatic action. Kidney stones are the major life style disorder in present era and there is wider need scope for the research of better Lithotripsic and antilithiatic drug alternatives. It gives various pharmacological action like antilithiatic, anti-inflammatory, antihypertensive, antimicrobial, antifungal, wound healing, insects repellent activity, hepatoprotective, anticancer, antidiabetic. T. Procumbens known as JAYANTI VEDA in ayurvedic pharmacopoeia is commonly called as coat button.***

Keywords: Tridax Procumbens, Antilithiatic, Kidney stones, Ayurvedic pharmacopoeia, Herbal etc.

I. INTRODUCTION

A plant of Tridax Procumbens Linn. It is a topical plant is native to tropical and subtropical regions it is belongs to Asteraceae family . It is also known as coat buttons And is a species of flowering plants in the daisy family. [1] In India the T. Procumbens is used for treating boils , blisters and cuts for local healer . [2]

Traditionally , T. Procumbens has been used in India for wound healing and as antilithiatic (kidney stones diseases), antifungal, anticoagulant, insect repellent , anti-inflammatory, antihypertensive, antimicrobial , antidiabetic, [3,4] anticancer etc.The juice of these plants is directly extracted from the leaves and directly applied on wounds or infected skin diseases. It is useful in ayurvedic medicine for the treatment of heartburn, gastritis, liverdisorder and hepatoprotection .This plants consists of different parts like leaves , flowers, seeds, stems or roots and these various parts of plants to have important phytochemical constituents are Alkaloids, flavonoids, carotenoids, saponins , fumaric acid and Tannins.[5] This plants are useful in the treatment of bacterial infection which is caused by Escherichia coli, pseudomonas aeruginosa, staphylococcus aureus has shown by desired effects. [6]

A. Botanical Name

Tridax Procumbens Linn.

1) Synonyms

- English: Coat button , Tridax Daisy
- Hindi: Khal muria , Ghamara
- Marathi: Jakham judi, Kambarmodi, Tantani , Gaddi chemanlthi

2) Scientific Categories

- Kingdom: Plantae
- Subkingdom: Tracheobionta
- Class: Magnoliopsida
- Subclass: Asteridae

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- Division: Magnoliopsida
- Order: Asterales
- Family: Asteraceae
- Genus: Tridax
- Species: Procumbens **[7].**

II. CHEMICAL CONSTITUENTS

In many research studies , the different parts of plants shows various phytochemical compounds. Phytochemical screening of this plants , observed that Alkaloids, flavonoids, carotenoids , saponins, fumaric acid, Tannins, Anthocynins phenol and steroids are present . T . Procumbens is sodium, potassium and calcium rich medicinal plants.[8]

In an present research studies, it has been estimated that the leaves of the plant mainly contains crude proteins 26 % , crude fiber 17 % , soluble carbohydrates 36 % , and calcium oxide 5 % . The flower of this plants consists of luteolin, glucoluteolin, quercetin and isoquercetin .[9] Oleanolic acid is obtained from this plant found to be potential antidiabetic agent when tested against alpha – glucosidase. [9]

A. Botanical Morphology

1) *Habitat:* Tridax procumbens is an annual or perennial herbaceous weed found in tropical and subtropical areas of the world, Growing mainly during the rainy season at meadows, croplands, disturbed areas, lawns, roadside (Figure 2) or settled areas. This medicinal herb shows a typical feature of a beneficial weed[10, 11,12,13,14].
2) *Growth:* Plants are prostrate or erect , forming patches, with flowering axis 15 to 35 cm high.
3) *Leaves:* Leaves are opposite, simple, carried by a petiole, 1 to 2 cm long. They are thick, soft and dark green. The lamina is Oval to lanceolate, 2 to 6 cm long and 2 to 4 cm wide, base attenuate in the corner and with strongly and irregularly serrated Margin . Both sides are hispid, with tuberculate based bristles. Pubescence is most abundant on the underside .



Figure: 2 . Leaves

4) *Flower:* Capitulum formed of 3 to 8 ligulate daisy like female flowers, creamy white on the periphery of capitulu m, tridentate . In the center of capitulum, flowers are yellow, tubulate bisexual. The tube, 6 mm long, with five short tines at the Top. This plant has two types of the flower as ray florets and disc florets with basal placentation.



Figure : 3. Flower

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5) *Inflorescence:* Inflorescences in solitary capitulum (Figure 5), held by a peduncle, 12 to 32 cm long, abundantly hispid. The Bracts of the involucre are arranged in 2 rows. They are oval to lanceolate; 6 mm long, pubescent and green.



Figure : 4. Inflorescence

6) *Stem and Root:* Stem is cylindrical, hispid, covered with multi- cellular hairs of 1 mm; tuberculation at the base.The Root is a strong taproot system .[15]
7) *Genetics:* The chromosome numbers of Tridax procumbens has been registered as 2n=36 numbers of Tridax procumbens has been registered as 2n=36 .[16

III. PHYTOCHEMICAL ANALYSIS

Test	Chemical Constituents
1.Dragendroff and modified Dragendroff reagent	For Alkaloidal analysis
2 . Baljet test , Kedde test , Raymond test	For Cardiac Glycosides
3 . Sulphuric acid test , lead acetate test , alkali test	For Flavoinoids
4 .5% lead acetate test , Fecl3 test, Ferric chloride test 5 .Salkowaski test	For Tannins For Terpenoids

Table1. Phytochemical testing of Aqueous extract & Alcoholic extract :

Phytochemical Test	Aqueous Extract	Alcoholic Extract
1 .Alkaloids 2. Cardiac Glycosides	Negative Positive	Positive Positive
3. Flavoinoids 4. Tannins	Positive Positive	Positive Positive

A. Pharmacological Action

	COAT BUTTONS	
Antiurolithiatic Activity	Immunomodulatory	Hepatoprotective Activity
Anti-inflammatory Activity	Antiobesity	Repellency Activity
Wound healing	Anticancer Activity	Antidiabetic Activity

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IV. PHARMACOLOGICAL PROPERTIES

A. Anti– Lithiatic Activity (Kidney Stones)

Ethanol extract of the plant was also used for treating kidney stone disorders. It showed activity against 0.75% v/v ethylene Glycol and 2% w/v ammonium chloride induced calcium oxalate urolithiasis, and hyperoxaluria induced oxidative stress in Animal models.

Treatment with the decoctions of the plant was able to reduce calculogenesis induced urinary excretion an Renal deposition of calcium oxalate and resultant lipid peroxidation, indicating anti-urolithiasis and anti-oxidant effects . [17, 18]

Thus, Tridax procumbens has proven it effect is useful in treatment f renal stone disease. Inhibitors (extracts) was lesser than of the control sample. [19]

It was therefore found that extracts used in this study caused potential inhibition of the process of Nucleation, growth and the aggregation of stone formation [20].

B. Wound Healing Activity

The extract derived from the leaves is used in Ayurveda and locally applied on acute wound to arrest Bleeding and improve the process of healing. In this particular study the extract exhibited wound healing Activity in the studied rats. The plant extract also enhances the mRNA content [21]. Leaf juice of Tridax Procumbens L. Was shown to depress lesion contractions in experimental animals. The process of wound Healing are a complex interactions between epidermal and dermal cell . [22]

The plant decoction's ability to cure wounds is attributed to a complex interplay between plasma-derived Proteins, extracellular matrix, controlled angiogenesis, and epidermal and dermal cells, all of which are Regulated by growth factors and cytokines [23].

C. Anti – diabetic Activity

Water and alcoholic decoctions of leaves showed a significant decrease in the blood glucose level in the animal model. The Oral administration of acute and sub-chronic doses of 50% methanol decoctions significantly reduces fasting blood glucose Levels in diabetic rats [24].The plant extracts have been widely used in various herbal drugs and is also reported to possess the Activities of lowering blood glucose levels.

Madhumeha is another name of diabetes in which a patient passed sweet urine and exhibits sweetness all over the body in Form of sugar .i.e.,sweat , mucus ,urine blood .from ancient time various other Herbal medicine used for lowering blood glucose levels as such or in juices Form[25]. Aq. And alcoholic extract of leave of Tridax Procumben leave (200mg/kg) orally administered for 7days produced a Significant reduced in the blood glucose level. Tridax Procumben can impart not only by hypoglycemic effect but also by Improving lipid metabolism, antioxidant properties and capillary action in diabetics[26].

D. Anticancer Activity

He plant-derived compounds were used to observe the cytotoxicity against human lung cancer cell line by MTT assay. The Compound showed 90% reduced cell viability. The result of NMR, MS and IR spectra revealed that the compound is Lupeol.

The anti-cancer potential of the Lupeol against human lung cancer cell line has been evaluated by clonogenic survival Determination, cell cycle control, Cell-based assay for inhibition of COX-2 activity and DNA fragmentation. The analysis Showed that 320 µg/ml concentration of Lupeol compound exhibited significant anti-cancer activity [27].

Using the MTT assay, the cytotoxicity of the plant-derived compounds was assessed against a human lung Cancer cell line. The substance displayed a 90% decrease in cell viability. The substance is A according To the results of the NMR, MS, and IR spectra. The evaluation of Lupeol's anti-cancer capability against human Lung cancer cell line has been conducted by many methods, including clonogenic survival determination, cell Cycle control, cell-based assay for COX-2 activity inhibition, and DNA fragmentation. According to the Research, the luteol molecule at a concentration of 320 µg/ml shown strong anti- cancer action [28].

E. Anti-inflammatory Activity

Procumbens tridax has strong anti-inflammatory qualities. The gain in weight indicates that the plant Decoction's anti-inflammatory effect might be the result of a corticotropic influence [29]. It was discovered that The plant's active portion, ethyl acetate fraction, contained moderately polar natural chemicals, such as Flavonoids and alkaloids.

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These bioactive substances have been used to combat reactive oxidant species, which Have been linked to the a etiology of infl0.ammation and associated diseases [30].

Anti-inflammatory Activity of T. Procumbens of aerial parts could be at least in part due to COX 1 and COX- 2 enzyme inhibition and free radicals scavenging activities may be attributed to the presence of Flavonoids and other polyphenols in the extract. The leaves extract of these plants are used for inflammation. [31]. The effect of T. Procumbens along with various dose regimen of ibuprofen shows greater anti-inflammatory Activity than the ibuprofen alone. [32,33].

F. Hypotensive (Antihypertensive Activity)

Animals under anesthesia were used to study the cardiovascular effects of leaf water decoctions. Significant dose-dependent drops in mean arterial blood pressure can be brought on by the water decoctions. When compared to a smaller dose, the greater Dose significantly lowers heart rate while having no effect on it [34].In the rats examined in this particular trial, the T. procumbens leaf extract (aqueous extract) was observed to lower the mean arterial pressure of blood and reduce heart rate .[35]

G. Hepatoprotective Activity

The hepato-protective property of leaves showed significant protection in the alleviation Galactosamine/Lipopolysaccharide-induced hepato-cellular injury. Both the compounds have been proposed to be hepato-toxic Due to its ability to damage liver cells. The multifocal necrosis produced by D-Galactosamine and the lesion of viral hepatitis in Humans is similar. This amino sugar bloc the transcription process and indirectly hepatic protein synthesis and as a Consequence of toxicity; it causes hepatitis within 8 hr after administration [36].

The hepato protective activity of aerial parts of Tridax Procumben shows significant protection in alleviation of D-Galactosamine /Lipopolysaccharide (D-GalN/LPS)induced hepatocellular injury. D-(Galan/LPS)have been proposed to be hepatotoxic due to its ability to destruct liver cells[37].

H. .Repellency (Insecticidal) Activity

In a research study, essential oils were extracted by steam distillation process from leaves and investigated for its local Repellency activities against malaria parasite Anopheles stephensi in mosquito cages [38, 39]. All essential oils were tested at Three various concentrations. The essential oils of the plant exhibited noticeable repellency effect [40]. The essential oil of leaves of Tridax Procumben Linn. Were extracted by steam distillation and they were studies for its Topical repellency effect against material parasite Anopheles Stephensi in mosquito cages. All essential oil were experimental at three different concentrations (2,4,6%)of it. Tridax procumbens are promising as repellent at 6% concentration against Anopheles Stephensi[41].

I. .leishmanicidal Activities

In vitro activity of methanolic extract of Tridax Procumben inhibited promastigotes growth of leishmania Mexicana which Is a causative agent of cutaneous leishmaniadisease[42].

The Tridax procumbens whole plant Methanol extracts Prepared from plants collected in the Yucatan peninsula and Evaluated in an in vitro bioassay for leishmanicidal activity Against Leishmania mexicana promastigotes. (IC50 < 50 Mg/ml) [43].

J. Anti-malarial Activity

The water and ethanol decoctions have anti-plasmodial properties against chloroquine- resistant Plasmodium falciparum. The Decoctions have low toxicities to human RBCs though further animal toxicity studies need to be carried out on the plant [45].

K. Other Activities

Leaves extract of Tridax Procumben Linn. Were found to be good hair growth promoters and it has also to reported for Preventing effect on falling of hair .

Tridax procumbens plant was also used for dysentery diarrhea and bronchial catarrh in the west Africa sub region and Tropical zone of the world.

This plant was also used as an effective bio adsorbent for removal of highly toxic ions of Cr from industrial waste water[44].

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V. EXTRACTION OF PLANT MATERIALS (T. PROCUMBENS)

The plant material can be extracted by drying the specified plant in the shade and then grinding it into a fine Powder. After that, the dried powdered material is percolated in a Soxhlet extractor for 48 hours using the polar Solvent hexane, then with the non-polar solvent hexane.

A. Procedure of Extraction

1) Take a dried leaves were ground to a coarse powder.
2) Then, take 500 mg of powder was extracted with solvent like ethanol or aqueous solution.
3) Extraction process was carried out using soxhlet apparatus for 36 hrs.

VI. IDENTIFICATION TEST OF PHYTOCONSTITUENTS OF T. PROCUMBENS

Plant preliminary phytochemical screening: Standard procedures were used to extract different solvents and Check if a plant's phytochemical profile contained any bioactive compounds that were slightly modified [47]. One millilitre of plant extract should be mixed with a few drops of Mayer's reagent to check for alkaloids. Alkaloids were present in precipitate that turned swiftly from white to yellowish in hue [48]. Alkaloids are Precipitated from neutral or slightly acidic solutions using Mayer's reagent [49].

1) *Test for Terpenoids and Steroids:* 4 ml of extracts were treated with 0.5 ml of chloroform and 0.5 ml of Acetic anhydride to check for terpenoids and steroids. Then, concentrated sulphur dioxide was added gradually. Steroid Solution 2 exhibits a green-blue tint, but Terpenoid Solution displays a reddish-violet colour. Rh. Flavonoid and flavone test: 1.5 ml of a 50% methanol solution was added to 4 ml of extracts, the solution was Heated, metal magnesium was added, and finally, 5–6 drops of strong hydrochloric acid were added. The hue Of the flavonoid solution is red, while the avones solution is orange [50].
2) *Test for Tannins:* 0.5 ml of extract solution was mixed with 1 ml of distilled water, and then A few of drops Of the ferric chloride solution were added. Catecholic tannin solution displays green and black hue, while gallic Tannin solution displays blue colour.
3) *Test for Reducing Sugars:* To 0.5 ml of extract solution, add 1 ml of distilled water. Then, add Fehling's Solution in five to eight drops, A and B, at room temperature, respectively. When sugar is reduced, a red-brick Precipitate form.
4) *Test for carbohydrates (Molish's test):* Two drops of α-naphthol solution were added to one millilitre of Extract. The tube was then gently tilted, and dropwise concentrated H SO was added using droper 2 4 along The side to the tube. Violet hue indicates the presence of carbohydrates where two liquids converge.
5) *Test for Glycosides:* A small amount of FeCl is added after One millilitre of glacial acetic acid and one millilitre Of extract are combined. A brown colour ring that appears at the top denotes the presence of three glycosides. [51,52].
6) *Test for Saponins (foam test):* In a test tube, 1 millilitre of the extract was mixed with 2 millilitres of distilled Water and agitated for a few minutes. For ten minutes, a 1-centimetre layer of foam suggests the presence of Saponins.
7) *Test for phenols (Ferric chloride Test):* After dissolving 1 millilitre of extract in 1 millilitre of ethanol or Distilled water and a few drops of ferric chloride solution are added. The phenolic solution has hues of red, Blue, green, and purple.
8) *Test for proteins (Xanthoproteic Test):* There was one millilitre of extract added. Two to six drops of Concentrated HNO Alkali was used to neutralise solution 3. Protein solutions have an orange or yellow tint.

VII. CONCLUSION

The Tridax Procumbens Linn . has enormous potential of 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 Phytopharmacological activities, as it is briefly discussed in the review paper . This 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.

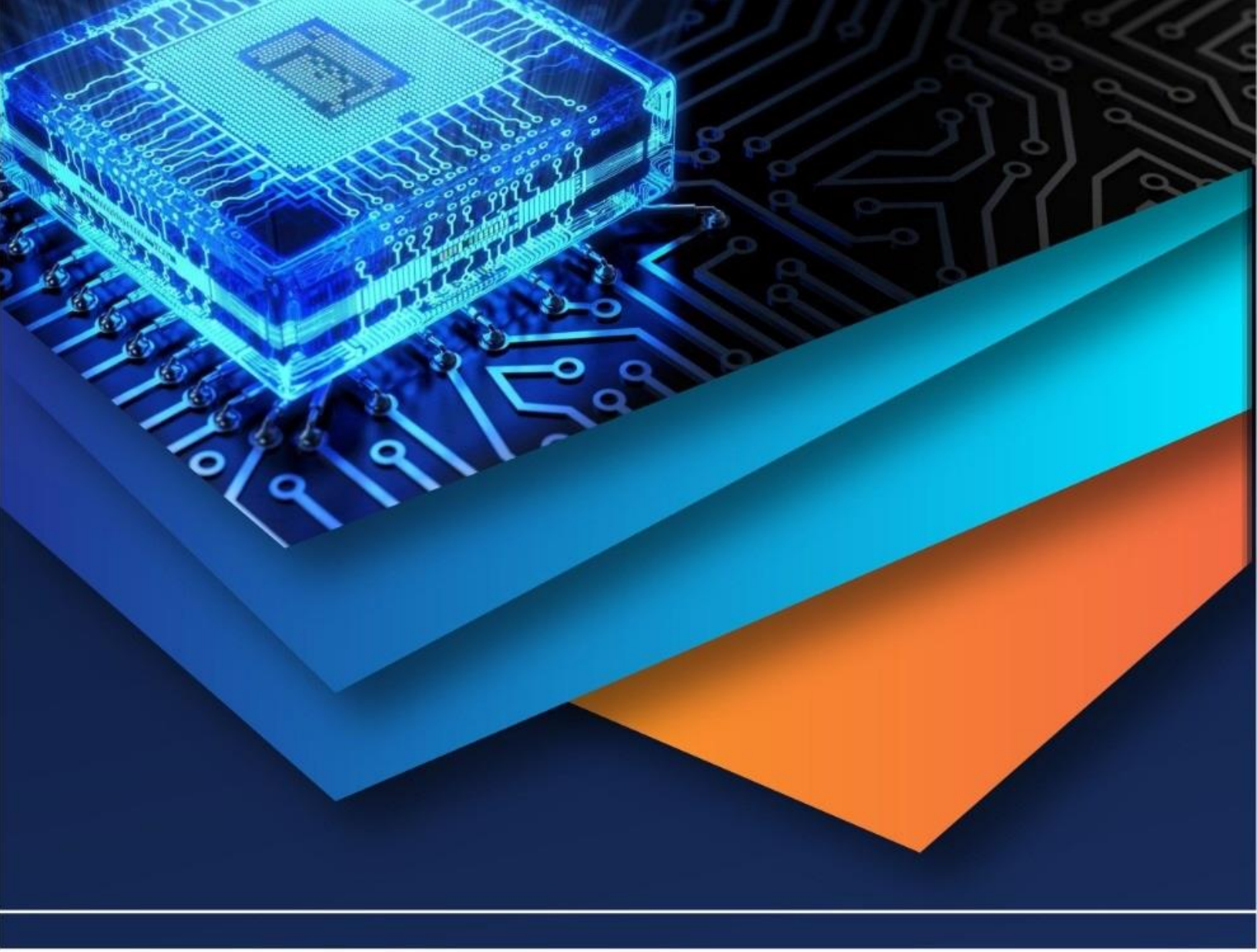
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