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A REVIEW ARTICLE ON PHARMACOGNOSTICAL, PHYTOCHEMICAL AND PHARMACOLOGICAL STUDY OF MEDICINAL PLANT

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ABSTRACT

The plants are producing different types of secondary metabolites and are employed either indirectly or directly in the pharmaceutical industries tridax procumbens is belonging to asteraceae family Background. There are many illnesses that can be treated with tridax procumbens in traditional ayurvedic methods. A medicinal plant tridax procumbens commonly known as coat buttons or kansari (hindi) it contains alkaloids, steroids carotenoid, falvonoid fatty acids phytosterols tannins and minerals and it has medicinal uses including antimicrobial, antianemic, immunomodulatory hepatoprotective ,and mosquitocidal activity this review can also be useful for providing important information of this species and indicates that this species could be an effective, safe and affordable treatment for some elements especially in tropical areas where this plants is native and abundantly available .This review offers crucial details about this species and suggests that it may treat some illnesses in a way that is efficient, secure, and reasonably priced, particularly in tropical regions where it is a native and common plant.

Keywords: Tridax Procumbens, Anti-Inflammatory, Anti-Diabetic, Immunomodulatory, Antimicrobial, Hepato Protection, Anti-Hypertensive.

I. INTRODUCTION

Procumbens Tridax Linn, a medicinal plant also known as coat button, kansari (Hindi), or ghamara (in local dialect), is a member of the Compositae family of plants together with Tridax procumbens and T. balbisioides. A healing plant The other species in the genus are Tridax procumbens, often known as Coat Button, Kansari (in Hindi), or trilobata. This herb is primarily utilized in Indian traditional medicine. It is a Central American annual or perennial weed that can be found all over India, but is most common in the states of Maharashtra, Madhya Pradesh, and Chhattisgarh. With solitary, long-stalked, heterogamous, bisexual, yellow flowers with white flower heads and very hairy, coarsely serrated, petiolate, ovate or lanceolate leaves, it frequently roots at nodes. The seeds are used to decrease bleeding, while the leaves provide antisecretory, insecticidal, wound-healing, and hypotensive properties [1]. Additionally, it possesses a range of pharmacological qualities, such as anti-inflammatory, anti-oxidant, anti-hepatotoxic, analgesic, antidiabetic, anti-inflammatory, antifungal, and antibacterial actions (Tables 1-3). This species has been utilized in Indian Ayurveda from ancient times. This species has been used to create a variety of products, including oils, drinks, and skin poultices. The secondary metabolites found in plants that have undergone scientific screening, including flavonoids, alkaloids, tannins, carotenoids, and saponins, are most likely what give the species its useful properties [2]. The numerous phytochemicals found in the plant are the cause of the diverse biological activity. The purpose of this review is to objectively assess T. Procumbens as a significant medicinal plant, with a focus on the in-vivo characteristics of the phytochemicals and their functions in signaling pathways that can be altered for certain pharmacological effects. This review's objective is to emphasize the significance of this species as an important medicinal plant. (Figure 1) [3].

Points to be discuss:

- Pharmacognostical investigation
- Phytochemical investigation
- Pharmacological investigation

II. PHARMACOGNOSTICAL INVESTIGATION

Tridax procumbens is a species of flowering plant in the Asteraceae family, also known as coat buttons or tridax daisy. It is most well-known for being a pervasive weed and pest plant . It is native to the tropical Americas

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including Mexico, but it has been introduced to tropical, subtropical, and mild temperate regions world wide .It has pest status in nine states and is classified as a noxious weed in the US.

Morphology:

T. procumbens is a semi-prostate, annual creeper herb with branched, sparsely hairy stems that reach heights of 30 to 50 cm and are rooted at nodes. Simple, opposite, acute, fleshy, pubescent, exstipulate, lanceolate to ovate in shape, 3–7 cm long, irregularly toothed margin with wedge-shaped base, shortly petioled leaves are opposite, serrate or dentate, acute, fleshy, and hairy on both surfaces (fig. 1). The dorsiventral leaves have a thick cuticle covering a single layer of epidermis on both surfaces. Upper epidermis shows single layered, multicellular covering trichome and lower epidermis is single layered, elongated cell and closely arranged [11]. Xylem vessel shows the presence of calcium oxalate crystals. Vascular bundles are concentric in shape. Meristeel consists of single, centrally located collateral vascular bundle surrounded by some parenchymatous cells [11]

Table 1. Classification of Tridax Procumbens Linn.

Classification	
Divisions	**Classing**
Kingdom	Plantae–Plants
Subkingdom	Tracheobionta–Vascular plants
Division	Spermatophyta
Subdivision	Magnoliophyta–Flowering plants
Class	Magnoliopsida–Dicotyledons
Subclass	Asteridae
Order	Asterales
Family	Asteraceae–Asterfamily
Genus	TridaxL.–Tridax
Species	TridaxprocumbensL.–Coatbuttons

Table 2. Synonyms of Tridax Procumbens Linn.

Synonyms	
Chrysanthemumprocumbens	Balbisiacanescens
Balbisiadivericata	Tridaxprocumbensvar.Canescenes
Tridaxprocumbensvar. Canescenes	Tridaxprocumbensvar.ovatifolia[4]

Figure 1. Whole plant of Tridax Procumbens Linn

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Table 3: Common names of T. procumbens found throughout the world.

Country/Language	Vernacular Names	Source
Chinese	Kotobukigiku	AnkitaandJain2012
English	Coatbuttons, Tridaxdaisy	USDA,AnkitaandJain2012,Kumaretal.,2012; ChauhanandJohnson,2008;Ravikumaretal., 2005b, Bhagwatetal.,2008.
French	Herbe Caille	AnkitaandJain2012
Latin	Tridaxprocumbens(Linn.)	AnkitaandJain2012
Malayalam	Chiravanak	AnkitaandJain2012
Marathi	Dagadi Pala	AnkitaandJain2012
Oriya	Bishalya Karani	AnkitaandJain2012
Sanskrit	Jayanti Veda	AnkitaandJain2012
Spanish	Cadillo, Chisaca	ITIS, ND,Ankitaand Jain 2012
Telugu	Gaddi Chemanthi	AnkitaandJain2012
Tamil	Thatapoodu	AnkitaandJain2012
Australia	Tridaxdaisy	Holmetal., 1997
Brazil	Ervade Touro	Holmetal., 1997
Burma	MiveSokNe-gya	Holmetal., 1997
Burundi	Agatabi	Byavuetal.,2000
Colombia	Cadillo Chisaca	Holmetal., 1997
Cuba	Romerillode Loma, Romerillo	Holmetal., 1997
Dominican Republic	PiquantJambe	Holmetal., 1997
ElSalvador	HierbadelToro	Holmetal., 1997
Fiji	WildDaisy	Holmetal., 1997
Ghana	White-dirty Cream, Nantwibini	Holmetal.,1997;Komlagaetal.,2015
Guatemala	BullGrass, Bull'sherb	Vibrans2009,Gamboa-Leonetal.,2014
Hawaii	Tridax	Holmetal., 1997
Honduras	Hierbadel Toro	Holmetal., 1997
India	Bisalyakarmi,Mukkuthipoo,Phanafuli,Tunki,Ghamara,Javanti Veda,Dhamangrass,Vettukkayapoondu,Vettukaaya	Holm et al., 1997; Kumar et al., 2012; Kethamakka andDeogade,2014;Pareeketal.,2009;Ravikumaretal.,2005b,Bhagwatetal.,2008,SilambarasanandAyyanar, 2015, Yabeshetal., 2014.
Indonesia	Gletang, Gletangan, Sidowlo, TarSentaran	Holmetal., 1997
Japan	Kotobukigiku	Holmetal., 1997
Java	Songgolangit	Petchietal.,2013

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Madagascar	Anganiay	Holmetal., 1997
Malaysia	CoatButtons, Kanching Baju	Holmetal., 1997
Mexico	FlorAmarilla, Panquica, Rosilla,t'ulum	Holmetal.,1997,Gamboa-Leonetal.,2014
Nigeria	Igbalobe, Muwagun, Muriyampachila, Jayanti, Vettukkaaya-thala	Olowokudejoetal.,2008;Soladoyeetal.,2013, Sureshkumaret al.,2017
Taiwan	Kotobuki-giku	Holmetal., 1997
Thailand	TeenTukKae	Holmetal., 1997
Trinidad	Railway Weed	Holmetal., 1997
United States	Tridaxdaisy	Holmetal., 1997

Figure 2: Leaves

Figure 3: Flowers

Figure 4: roots

Figure 5: seeds

Figure 6: Tridax procumbens plant

Courtesy: tools.sugarresearch.com.au

III. PHYTOCHEMICAL INVESTIGATION

It has been demonstrated in numerous scientific investigations that the plant contains a variety of phytochemical substances. Alkaloids, carotenoids, saponins, flavonoids, and tannins were found to be present in this medicinal plant based on the phytochemical screening. The proximate features demonstrated the high salt, potassium, and calcium content of Tridax procumbens. According to a previous study, the plant's leaf mostly comprises crude proteins (26%), crude fiber (17%), soluble carbohydrates (39%), and calcium oxide (5%).On

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the other hand, its blossoms have been shown to contain luteolin, glucoluteolin, quercetin, and isoquercetin. There have also been reports of fumaric acid and beta-sitosterol in the plant. When tested against alpha-glucosidase, oleanolic acid, which was produced in respectable amounts from this plant, was discovered to be a potential anti-diabetic drug. The plant exhibits a variety of chemical components, including tectochrysin, echioidinin, pinostrobin, dihydroechioidinin, and 2,6-dihydroxyacetophenone 2-O-D-glucopyranoside.5,7,8-trimethoxyflavone, 5-glucoside, methyl salicylate glucoside, and skullcap flavone I 2-methyl ether, andrographidine, tectochrysin, androechin, 5,7,2-trimethoxyflavone, echioidin, and skullcappflavone. A novel flavonoid known as procumbenetin has been extracted from Tridax procumbens' aerial parts and studied using chemical processes and spectroscopic methods. Based on chemical analysis and spectral approaches, two novel flavones, 6, 8, 3-trihydroxy-3, 7, 4-trimethoxy and 8,3-dihydroxy-3,7,4-trimethoxy-6-O-D-glucopyranosyl, were identified and described. In addition to it, the plant sections yielded four other recognized substances: puerarin, esculetin, oleanolic acid, and betulinic acid.Tridax procumbens' plant pigments, along with those of a few other ethnomedicinal plants, were estimated in a research study. According to the study, this plant had 1.424 mg/g of total chlorophyll and 0.724 mg/g of total carotenoids. Two further studies on plant pigments found that their contents may vary according to environmental or other biogeochemical conditions, such as the impacts of air pollution, and that they may also vary with the seasons. [7].

Flavonoids, alkaloids, carotenoids, hydroxycinnamates, lignans, benzoic acid derivatives, phytosterols, tannins, crude proteins, crude fiber, soluble carbohydrates, and calcium oxide have all been found in T. procumbens L. leaves and other components. There have also been reports of fumaric acid, β-sitosterol, and oleanolic acid, a pentacyclic triterpenoid. There have been reports of quercetin, isoquercetin, luteolin, and glucoluteolin in flower extracts. Other phytochemicals that are prevalent in T. procumbens include methyl salicylate glucoside, 2,6-dihydroxyacetophenone,2 – O – β -D-glucopyranoside, echioidinin, pinostrobin, dihydroechioidinin, tectochrysin-5-glucoside, and 5,7,2'-trimethoxyflavone, echioidin, skullcapflavone ii, 5,7-dimethoxyflavone, andrographidine, as well as 5,7,8-trimethoxyflavone, skullcapflavone-2-methyl ether, androechin, and tectochrysin.

1. Flavonoids:

Twenty-three flavonoids, totaling around 65 g/kg, were found to be present in T. procumbens, according to a recent study. About 17.59% and 26.3% of the total are made up of kaempferol, catechin, and its derivatives (-)-epicatechin, (+)-catechin, (-)-eigallocatechin, (+)-galocatechin, (-)-Epigallocatechin-3-Gallate (EGCG), and (-)-Epicatechin-3-Gallate. Biochanin, apigenin, naringenin, daidzein, quercetin, butein, robinetin, baicalein, nobiletin, genistin, ellagic acid, luteolin, myricetin, baicalin, isorhamnetin, and silymarin make up the remaining 56.11%. [8]

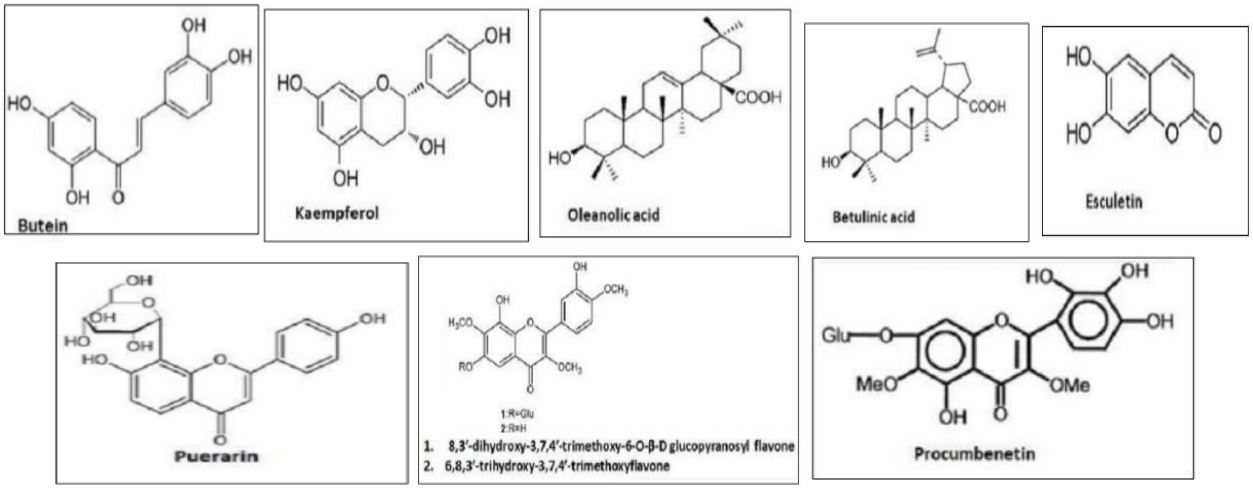

Figure 7. Structure of flavonoid identified in T. Procumbens.

2. Alkaloids:

According to a recent study by Ikewuchi et al., the total alkaloid content of T. procumbens L. leaves was 102.421 g/kg of dry weight and 10.191 g/kg of wet weight, respectively [3]. Any family of nitrogenous organic

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compounds originating from plants that have significant physiological effects on humans is referred to be an alkaloids. T. procumbens has also been reported to contain a few alkaloids. Thirty-nine alkaloids were found in a phytochemical screening examination utilizing an aqueous extraction of the leaves, with Akuamidine (73.91%) and Voacangine (22.33%) being the most prevalent. The extract also included tannins and sterols in addition to alkaloids. The antibacterial activity of T. procumbens' pedicle and buds was seen against Proteus mirabilis and Candida albicans, while the alkaloids derived from the buds shown action against E. coli and Trichophyton mentagrophytes. Alkaloids were present in the pedicles in a total of 32.25 mg/gdw and in the buds in 92.66 mg/gdw. These alkaloids' existence confirms the plant's enormous potential (Figure 8). [2].

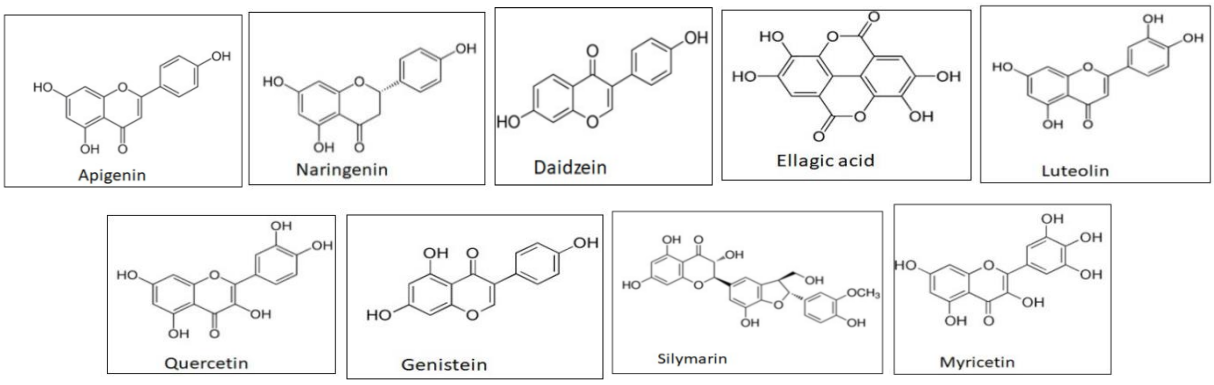

Figure 8. Structure of Some Other Alkaloids Present in T. Procumbens.

3. Saponins:

T. procumbens has been found to contain steroidal glycosides, or saponins, which has pharmacological and therapeutic characteristics. Specifically, the flowers of the species contain pB-Sitosterol-3-O-β-D-xylopyranoside and a steroidal saponin. Another study found that by blocking the sodium glucose co-transporter-1 (S-GLUT-1) in the intestines of male Wistar albino rats, saponins from an ethanolic extract of T. procumbens may have antidiabetic effects. [2].

4. Tannins:

Plants naturally contain water-soluble polyphenols called tannins. Perhaps as a result of their antioxidant qualities, tannins have antimicrobial, anti-carcinogenic, and anti-mutagenic effects.Tannins are present in T. procumbens, according to several studies. Water mixed with acetone or chloroform demonstrated that T. procumbens leaf extracts contained tannins. The pedicle and buds of T. promumbens contain tannins. [2].

5. Carotenoids:

Carotenoids are fat-soluble pigments that are primarily used by plants for three purposes: collecting light, shielding against photooxidative damage, and serving as an insect attractant pigment. It has been suggested that carotenoids shield DNA from oxidative stress. Numerous varieties of secondary metabolites, such as beta-carotene—which is crucial for the upkeep of epithelial tissues—have been identified from T. procumbens. A lack of vitamin A can lead to Xerophthalmia, night blindness, and compromised immune system and hemopoiesis. Beta-carotene and lutein are two carotenoids that have demonstrated efficacy in reducing UV-induced erythema. The antioxidant characteristics of carotenoids have also been connected to the photoprotective qualities. [2].

6. Primary metabolites:

All plants include primary metabolites that are a part of metabolic pathways. Several distinct primary metabolites have been isolated from T. procumbens, including: In living things, lipids are necessary because they affect cellular composition, intercellular communication, and the organism's ability to obtain energy. Common fats found in the Asteraceae family are present in T. Procumbens. Additionally, this species has certain lipids that give the plant its distinct qualities and potential medical use. The following special fats have been extracted: 1-(2,2-dimethyl-3-hydroxypropyl) methyl 14-oxooctadecanoate, methyl 14-oxononacosanoate, 3-methylnonadecylbenzene, heptacosanyl Cyclohexane carboxylateβ-amyrone, Δ12-dehydrolupen-3-one, β-amyrin, lupeol, fucosterol, 9-oxoheptadecane, 10-oxononadecane, sitosterol, and -2-isobutyl phthalate are

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among the compounds that are found in dotriacontanol. Additionally, there are 32-methyl-30-oxotetratriacont-31-en-1-ol and 30-methyl-28-oxodotriacont-29-en-1-ol. All of these substances are common to many plant species and serve vital functions in plants. [2].

7. Secondary metabolites:

Plants create substances called secondary metabolites, which are crucial for defense mechanisms, communication, stress reactions, and other aspects of plant life but are not necessary for the plant's regular growth and development. Bioactive substances found in secondary metabolites frequently have significant and helpful therapeutic properties. Compounds include asglycosides, nitrogenous chemical compounds, fat-soluble compounds, polyphenolic compounds, and minerals contain some of the most significant bioactive molecules for medical applications. Secondary metabolites of Procumbens [2].

8. Other phytochemicals:

Other beneficial compounds found in T. procumbens leaves include tannins, lutein, ferulic acid, caffeic acid, and stigmasterol. Studies conducted in vitro have demonstrated the antibacterial, anticancer, anti-inflammatory, and antioxidant properties of ferulic acid and caffeic acid. Numerous health benefits can be derived from tannic acid and other hydrolyzable tannins. Including decreased risk of heart disease, neuroprotection, antiviral, antibacterial, antidiarrheal, antiobesity, and antifibrotic properties. The inhibition of Cl- channels that are triggered by Ca2+ is one of the molecular mechanisms that tannins are thought to have. Pharmacological properties of stigmasterol include anti-inflammatory, anti-hypercholesterolemia, cytotoxic, antitumor, hypoglycemic, antimutagenic, antioxidant, and analgesic properties. Age-related macular degeneration (AMD), age-related cataract (ARC), ischemic/hypoxia-induced retinopathy, light-induced retinal damage, retinitis pigmentosa, retinal detachment, uveitis, diabetic retinopathy, lung and breast cancers, heart disease, and stroke can all be prevented with lutein, a form of xanthophyll carotenoid. [3].

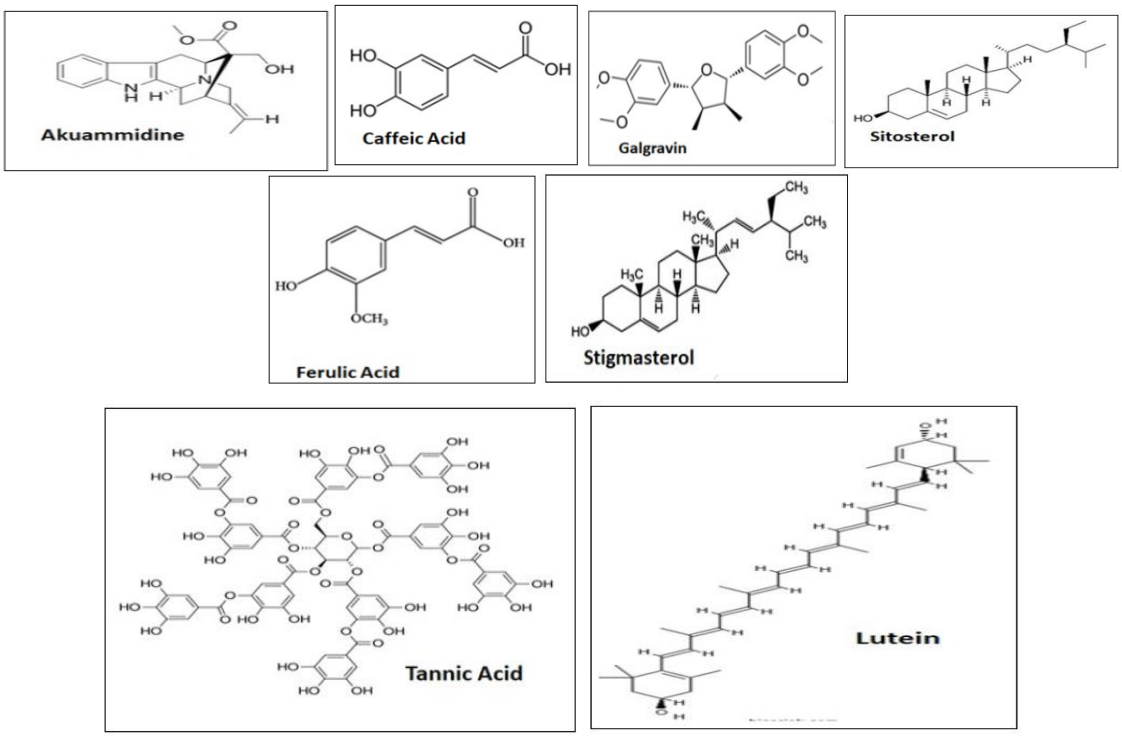

Figure 9. Other phytochemicals present in T. procumbens.

IV. PHARMACOLOGICAL INVESTIGATION:

1. Anti-cancer activity:

The hydrodistillation method was used to extract the essential oils from fresh Tridax procumbens leaves and flowers, and they were then tested for anticancer activity using the MTT assay on the human breast cancer cell line (MCF-7). On the MCF-7 cell line, the essential oil shown concentration-dependent action. 96.6 g/ml was discovered to be the IC50 value. Tridax procumbens' essential oil shown considerable anticancer activity, which

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may be attributable to the compound's inclusion of important terpenes including - and -pinene. [17]. The acetone extract of flower showed an apoptotic effect within 24 h of treatment [12-15]. Triterpenoid lupeol, which was discovered in the dried leaves of the plant T. procumbens demonstrated in vitro anticancer activity using the MTT assay. It showed more than 90% of cytotoxic potential against human lung cancer cell line A-549 by colony formation inhibition assay. The mode of action is through inhibiting COX activity and increasing the DNA fragmentation by activation of endogenous endonucleases causing apoptosis.

2. Antibacterial activity:

Agar well diffusion technique was used to investigate Tridax procumbens leaf extract for its antibacterial activity against various bacteria, including clinical isolates and some standard strains. The alcoholic extract had substantial antibacterial activity at a dosage of 5 mg/ml against Pseudomonas aeruginosa while the aqueous extract did not show any antibacterial activity. The ethanolic extract demonstrated notable effectiveness against the nosocomial strains of Pseudomonas in comparison to several antibiotics such augmentin, cefotaxime, and ciprofloxacin. [18].

3. Antidiabetic activity:

An alloxan-induced diabetic rat model was used to assess the hypoglycemic efficacy of dried alcoholic, petroleum ether, and aqueous (60–80°C) leaves extract of Tridax procumbens. At a dosage of 200 mg/kg, both alcoholic and aqueous extracts significantly reduced blood glucose levels, but petroleum extract only had very moderate hypoglycemic effects. [4] The T. procumbens hexane extract's active ingredient, dihydroxy-olide, is what gives the substance its anti-diabetic properties. This lowers the postprandial rise in blood glucose levels in Type-II diabetes mellitus and reduces the absorption of glucose.

4. Antiparkinson's activity:

Using fruit fly and rat models, respectively, rotenone-induced locomotor impairment and haloperidol-induced catalepsy were employed to test the anti-Parkinson's activity of Tridax procumbens (EETP) leaves. In the fruit fly model, rotenone (ROT) and EETP have been co-exposed on flies for 7 days. The effectiveness of locomotor activity in treated flies was substantially higher than in ROT-treated flies. The rats were given EETP and then haloperidol for 15 days as part of the catalepsy experiment. With EETP, a considerable reduction in catalepsy, a reduction in muscle rigidity, and an improvement in locomotor ability had been noted. With EETP, lipid peroxidation was decreased, and reduced glutathione and catalase levels were markedly elevated. [19].

5. Anti-arthritic activity:

In female Sprague Dawley (SD) rats, the ethanolic extract of Tridax procumbens whole plant significantly inhibited Freund's Complete Adjuvant (FCA)-induced arthritis at doses of 250 and 500 mg/kg. By noticing a decrease in the paw volume, it is proven. In comparison to control animals without arthritis, a considerable drop in body weight has been seen in control animals with arthritis. Animals receiving Tridax procumbens therapy experienced a dose-dependent increase in body weight. Indomethacin, a common medication, and Tridax procumbens extract were evaluated for anti-arthritic efficacy. Tridax procumbens extract dramatically changed the hematological and biochemical alterations brought on by FCA. [20].

6. Anti-ulcer activity:

In rats with ethanol-induced ulcers, 400 mg/kg of Tridax procumbens ethanolic leaf demonstrated dose-dependent reduction of ulcer lesion index, changes in gastric pH, and volume alterations. Large fibroblast cells are also restored by the extract, which also lowers glutathione (GSH), catalase, and superoxide dismutase (SOD) levels in the rat stomach. Therefore, these findings demonstrated Tridax procumbens' medicinal potential. [21].

7. Hepatoprotective and antioxidant activity:

In male albino rats, the effectiveness of Tridax procumbens ethanolic extract against liver damage brought on by paracetamol (acetaminophen) was examined. Hepatic damage brought on by paracetamol (2gm/kg body weight) has been shown by decreased Catalase and Superoxide dismutase activities in liver tissue, a considerable rise in the activity of aspartate aminotransferase, serum alkaline phosphatase, and alanine aminotransferase, and enhanced lipid peroxidation. Hepatic damage brought on by paracetamol was seen as an increase in blood bilirubin and a significant decrease in total serum protein, hepatic glutathione, and glycogen content. After being given different doses (100, 200, 300, and 400mg/kg body weight) of Tridax procumbens

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ethanolic extract orally for 7 days, these changed parameters were restored to normal levels. This demonstrates Tridax procumbens' ability to protect the liver from harm brought on by paracetamol and to act as an antioxidant. [22].

8. Hypotensive effect:

An anesthetized Sprague-Dawley rat was used to test the cardiovascular effects of the Tridax procumbens aqueous leaf extract. Blood pressure (mean arterial pressure) is significantly lowered after intravenous administration of an aqueous extract. At the greater dose, there was a discernible decrease in heart rate while there was none at the lower level. The bradycardia and hypotensive effects happened immediately. Atropine sulfate (1 mg/kg) pretreatment of the animals prevented Tridax procumbens' hypotensive effects. The hypotensive effect of Tridax procumbens leaves and its action, which is likely caused by the stimulation of the cholinergic muscarinic receptors mechanism, are therefore still justified by these data. [23].

9. Anti-inflammatory activity :

In the carrageenan-induced mice model, the anti-inflammatory efficacy of an ethanol extract of Tridax procumbens leaves was tested. Histopathology and inflammatory oedema parameters were measured and compared to those of a control group. At 24 hours, the histology in the treated groups had recovered, and the inflammation in the mouse paws had significantly decreased. Cyclooxygenase (COX2) and Tumor Necrosis Factor (TNF) gene expression levels at the inflammatory site were examined using reverse transcription quantitative polymerase chain reaction (qPCR) and polymerase chain reaction (PCR) analysis to look at molecular activity.. The test groups' PCR and relative quantity (RQ) values dropped as dosages increased. Real-time polymerase chain reaction (RT-PCR) results showed a significant decrease in band density for the COX2 and TNF- gene expression levels in the treated group. As a result, Tridax procumbens has molecular anti-inflammatory action. [24].

10. Immunomodulatory effects :

ale albino mice were utilized to evaluate the immunomodulatory activities of the Tridax procumbens Linn (TPEIF) aqueous extract. TPEIF was administered intraperitoneally, and we saw a considerable rise in the number of leukocytes, phagocytic index, and antibody-secreting cells in the spleen. Additionally, an increase in the haemagglutination antibody titer was seen along with humoral immune response activation. An elevated type IV (delayed) hypersensitivity reaction was described together with prominent information for cellular immune system activation. TPEIF also stimulates the humoral immune system in addition to the cell-mediated immune system. As a result, it facilitates the development of an improved antibody response to specific clinical antigens. [25].

11. Anti-obesity:

Atherogenic diet-induced obesity rats were given methanolic extracts of Tridax procumbens. Triglycerides, total cholesterol, HDL cholesterol, total protein, and free fatty acids were among the parameters measured. In rats fed with the extract, there was an increase in HDL cholesterol and a significant decline in triglycerides, total cholesterol, total protein, and free fatty acids. Hence There was a strong anti-obesity effect from Tridax procumbens. [26].

12. Anti-malarial activity:

It is the work about essential oil was obtained using the steam distillation method from the leaves of Tridax procumbens L. Anopheles stephensi, the malarial vector, was tested for antimalarial action of essential oil in mosquito cages. There were three distinct oil concentrations for Tridax procumbens (2, 4, and 6%). At 6% concentration, a discernible repellent effect was seen for more than 300 minutes. [27].

13. Antidiarrhoeal activity:

Researchers have tested the antidiarrheal effects of petroleum ether, dichloromethane, and an ethanolic extract of the entire Tridax procumbens plant on enteropooling, gastrointestinal motility, and castor oil-induced diarrhea in experimental mice. By lowering the amount of intestinal fluid in the prostaglandin-E2 induced diarrhoea model, the lower dose of petroleum ether extract exhibits greater anti-diarrheal efficacy than the larger dose. The propulsion of charcoal meal in the gastrointestinal motility test model and the frequency of defecation and the total weight of wet diarrhea in the castor oil-induced diarrhoea model were both reduced by

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all Tridax procumbens extracts when compared to the control group, demonstrating the dose-dependent anti-diarrheal activity[28].

14. Wound healing activity :

In this study, the ability of a straightforward ointment base (5% and 2.5%w/w) made from an ethanolic extract of Tridax procumbens to promote wound healing in diabetic (streptozotocin-induced) and non-diabetic rats using burn wound, excision, and incision models was examined. The epithelization period contraction rate and wound contraction (%) were assessed using the burn model. Total protein, epithelization duration, wound index, percent contraction area, DNA estimation, hydroxyproline content, and histological evaluations have all been done in the excision wound model. whereas tensile strength was assessed in the incision wound model. Animals treated with 5% and 2.5%w/w EETP had a significant improvement in wound index, epithelization time, and wound contraction. A powerful wound healing activity in both diabetes and non-diabetic groups was noted for the 5% w/w simple ointment base of Tridax procumbens ethanolic extract.A highly obvious and amazing wound healing activity by 5% weight/weight T. procumbens ointment was reported in the non-diabetic group compared to the diabetes group. [29].

15. Analgesic activity:

Rats were utilized to assess the analgesic effects of lyophilized decoctions of Tridax procumbens leaves using the Writhing test, Formalin-induced persistent pain, and Complete Freund's adjuvant (CFA)-induced hyper analgesia. The Acetic acid-induced abdominal constriction test revealed a significant and dose-dependent reduction in the abdominal writhing. In the Formalin test, extract administration greatly reduces the late phase of moderate pain. Rats that had received CFA injections and were given the extract orally showed a considerable reduction in mechanical hyperalgesia. Thus, the findings indicated that Tridax procumbens has analgesic properties that may derive from both centrally and peripherally mediated pathways. [30]

V. TRADITIONAL USES

1. Traditional and complementary medicine is being increasingly recognized as an integrative approach to health care in many countries (WHO, 2013).
2. The use of plants for medicinal purposes may date back to the Middle Paleolithic age, approximately 60,000 years ago (Solecki, 1975).
3. T. procumbens is found throughout the world and it has been used to treat anemia, colds, inflammation, and hepatopathies in Central America (Taddei and Rosas-Romero, 2000).
4. In Guatemala T. procumbens is used to treat bacterial, fungal, and viral infections as well as vaginitis, stomach pain, diarrhea, mucosal inflammations, and skin infections (Caceres et al., 1998). (Taddei and Rosas-Romero, 2000).
5. The leaf juice is used to treat wounds and stop bleeding (Caceres et al., 1998).
6. A study done in Chiquimula, Guatemala, showed that lactating pregnant women suffering from anemia could reduce their symptoms by using Tridax (Calderón, unpublished results).
7. This species is also used in the treatment of gastrointestinal and respiratory infections, high blood pressure, and diabetes (Pöll, 2005, Giovannini et al., 2016. Pardeshi and Bhiungade, 2016).
8. In the states of Alabama, Florida, Minnesota, North and South Carolina, and Vermont, T. procumbens is regarded as a noxious weed.. It is quarantined in California and Oregon and prohibited in Massachusetts (U. S. Department of Agriculture). T. procumbens is a weed that grows in a variety of habitats in Guatemala, typically on previously cultivated land between sea level and 2300 m. (Pöll, 2005).

VI. CONCLUSION

Tridax Procumbens Linn. (Compositae) is a weed that is native to tropical America and has naturalized in tropical Africa, Asia, and Australia. It is present throughout India. This plant is widely used, and every part of it possesses admirable pharmacological properties. The diversity of phytochemicals present in this plant provides drug lead for the development of novel therapeutic agents. Tridax procumbens Linn has great potential for pharmacological, nutritional, and phytochemical 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 has a number of notable psychopharmacological effects, as the review article briefly mentions.

VII. REFERENCE

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