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Review on " Tridax Procumbens Linn " And Study The Antimicrobial Activity Of Alpha And Beta Pinenes.

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ABSTRACT:

Tridax procumbens Linn is a medicinal plant, found *as* weed throughout India. The plant is native to tropical America and naturalised in tropical Africa, Asia, and Australia. It has been extensively used in Indian traditional medicine for wound healing, as anticoagulant, in fungal infection, in diarrhoea and dysentery, as antioxidant, antimicrobial, anti-inflammatory and immunomodulatory.

Tridax procumbens is the most valuable drug which is used in compound preparation included in Ayurveda literature. It also acts against antimicrobial activity like gram positive and gram negative bacteria. It is likewise utilized as adsorbent for chromium.

KEYWORDS:

Tridax Procumbens Linn , Antimicrobial Activity , Coat Button , Wound healing, Antifungal Activity.

INTRODUCTION:

Tridax Procumbens Linn is also known as "Coat buttons" or "Kansari" is a perennial herbal plant belonging to the family Asteraceae, native to central and south america . Since ancient times this species has been used in Ayurveda in India.[1] Traditionally, it is used for treatment of bronchial catarrh, dysentery, malaria, diarrhoea, high blood pressure and to actually take a look at drain from trims, injuries and wounds and to forestall falling of hair. It possesses Anti diabetic , Anti-bacterial , Antiplasmodial, Anti hepatotoxic, Antioxidant and Antimicrobial properties.[2] Some of the medicinal important species of genus tridax are T. angustifolia, T.bicolour, T. dubia, T.erecta . The plants contain yellow centred white flowers and the leaves are basically arrow shaped. The fruit has stiff hairs. It contains flavonoids, alkalides, carotenoids, hydroxycinnamates, lignans, benzoic acid derivatives, phytosterols, tannins, crude proteins, crude fibre, soluble carbohydrates and calcium oxide.[3]

This plant can be tracked down in fields, knolls, croplands, upset regions, yards, and side of the road in regions with tropical or semi heat and humidities. The juice separated from the leaves Is straightforwardly applied on injuries. Its leaf separates were utilised for irresistible skin illnesses in people's prescriptions. It is utilised in ayurvedic medication for liver problems, hepatoprotection, gastritis, and acid reflux. Tridax *procumbens* is also used as a treatment for boils, blisters and cuts by local healers in parts of India.[4]

Tridax is a weak straggling herb about 12-24 cm long with few leaves 6-8 cm long and very long slender solitary peduncles a foot long and more. Leaf is straightforward, inverse, exstipulate, applaud, acute,inflorescence capitulum.[5]

PLANT PROFILE :

Tridax procumbens is a type of blooming plant having a place with family asteraceae and is the most powerful species among 30 species. It is most popular as a far reaching weed and bug plant. It is local to the tropical Americas yet it has been acquainted with tropical, subtropical and gentle mild areas worldwide.[6]

BIOLOGICAL SOURCE :

It comprises dried whole plants of *Tridax procumbens Linn* having a place with family Asteraceae[7]

Fig 1 : Whole Plant of *Tridax procumbens Linn* [8]

Fig 2: *Tridax procumbens* leaf and flower[9]

TAXONOMICAL CLASSIFICATION:

Table 1. Classification of *Tridax Procumbens Linn*.[10]

Sr.no	Divisions	Classing
1	Kingdom	Plantae–Plants
2	Sub kingdom	Tracheobionta–Vascular plants
3	Division	Spermatophyta
4	Subdivision	Magnoliophyta–Flowering plants
5	Class	Magnoliopsida–Dicotyledons
6	Subclass	Asteridae
7	Order	Asterales
8	Family	Asteraceae
9	Genus	*Tridax L.–Tridax*

10	Species	*Tridax procumbens L.*–Coat buttons

SYNONYMS :

Table 2 : Synonyms of *Tridax Procumbens Linn*.[11]

1	Chrysanthemum procumbens
2	Balbisia canescens
3	Balbisiana divaricata
4	Balbisiana pedunculata
5	*Tridax procumbens* var. Canescenes
6	*Tridax procumbens* var. ovatifolia

VERNACULAR NAMES :

Table 3 : Vernacular Names of *Tridax Procumbens Linn.*[12]

1	English	Coat Buttons and Tridax Daisy
2	Hindi	Ghamra
3	Marathi	Dagadi pala
4	Sanskrit	Jayanti Veda
5	Telugu	Gaddi Chamanthi
6	Tamil	That pudu
7	Malayalam	Chiravanak
8	Spanish	Cadillo Chisaca
9	French	Herbe Caille
10	Chinese	Kotobuki Goku

CHEMICAL CONSTITUENTS :

In different examination studies, it was shown that the plant has different phytochemical compounds. From the phytochemical screening, it was seen that alkaloids, carotenoids, saponins, flavonoids, and tannins are available in this restorative plant.[13] The leaves of *Tridax Procumbens Linn* contain 35% crude protein, 6% crude fibre 51% total carbohydrates and 6% crude lipid, *Tridax Procumbens Linn* also possesses phytotoxic compounds linked to it's invasive nature and weed capacity. The leaves of Tridax procumbens Linn contains 15 mixtures specifically α-pinene, 1,3,6-octatriene, camphene, β-pinene, sabinene, phellandrene, L-limonene, β-ocimene, Trans-β-ocimene, Trans-caryophyllene, γ-elemene, spathulenol, Torreyol and Aromadendrene.[14]

The plant shows different chemical constituent such as2,6-dihydroxyacetophenone 2-O-β-D-glucopyranoside, echioides, pinostrobin, dihydrocodeine, tectochrysin 5-glucoside, methyl salicylate

glucoside, 5,7,2-trimethoxyflavone, echioides, skullcap flavone, 5,7-dimethoxyflavone, andrographidine.From the aerial parts of *Tridax procumbens,* a new flavonoid named as procumbenetin has been isolated and characterised by chemical means and spectroscopic techniques Two new flavones named as 8, 3-dihydroxy-3, 7, 4-trimethoxy-6-O-D-glucopyranosyl and 6, 8, 3-trihydroxy-3, 7, 4-trimethoxy were secluded and portrayed thinking about compound appraisal and creepy strategies. Aside from it, four known compounds puerarin, esculetin, oleanolic corrosive, and betulinic corrosive were likewise secluded from the plant parts.[15]

USE OF *TRIDAX PROCUMBENS LINN :*

Traditionally, *Tridax procumbens* has been used in India for wound healing and as an anticoagulant, antifungal, and insect repellent. *Tridax procumbens* is additionally utilised as treatment for bubbles, rankles, and cuts by neighbourhood healers in pieces of India.[16]

Tridax procumbens Linn is a medicinal plant and used as a drink to treat bronchial catarrh, diarrhoea, dysentery and liver diseases. In this study, we evaluated the potential use of *Tridax Procumbens* to treat hyperuricemia, oxidative stress, and bacterial infection.[17]

PRELIMINARY TEST FOR *TRIDAX PROCUMBENS LINN:*

Phytochemical screening of leaf concentrate of *Tridax procumbens* was led for the subjective location of different phytochemicals like sterols, polyterpenes, polyphenols, flavonoids, quinine substances, saponosides, tannins, alkaloids, glycosides, starches and triterpenes. All phytochemical tests were conveyed by standard examine conventions[18]

Table 4 : Phytochemical Analysis Of Leaves Of *Tridax Procumbens Linn* [19]

Sr.No	Phytochemicals	A.W.E	C.E.	C.W.E.
1	Steroids	+	+	+
2	Tannin			
	Lead acetate	+	-	+
	Ferric chloride	+	-	+
3	Saponin	+	+	+
4	Anthocyanin	+	-	+
5	Coumarins	+	+	+
6	Emodins	-	-	-
7	Alkaloids			
	Wagner Test	+	+	+
	Hager Test	+	+	+
8	Proteins			
	Xanthoproteic Test	-	-	-
9	Amino acids			
	Ninhydrin Test	-	+	+
10	Diterpenes	+	+	+
11	Phytosterol			
	Salkowski Test	-	-	-
12	Phenols	+	+	+
13	Phlobatannin	-	-	+
14	Leucoanthocyanin	-	-	-
15	Cardial Glycosides			
	Kellar-Killiani Test	-	-	-
16	Flavonoids			
	Alkaline reagent test	+	+	-
	NH_4OH	+	+	-
	Mg turning test	+	+	-
	Zn Test	-	+	+

+ = Present; - =Absent; A.W.E- Acetone Water Extract; C.E.- Chloroform Extract, C.W.E.-Chloroform Water Extract

PHARMACOLOGICAL ACTIVITIES OF *TRIDAX PROCUMBENS LINN:*

Tridax procumbens having different potential restorative exercises like Antimicrobial Activity, Antioxidant Activity, Antibiotic Activity , wound healing activity, insecticidal, Anti-inflammatory activity, diarrhoea and dysentery.[20]

Table:5 pharmacological Activities of *Tridax Procumbens Linn*.[21]

Pharmacological Properties	Effect	Phytochemical	Extraction
Antimicrobial Activity	Bacillus Faecalis, B. subtilis, E. coli, Pseudomonas aeruginosa, Antibacterial and fungal infections	Alpha and Beta Pinenes, Alkaloids	petroleum, ether and ethanolic extracts from leaves, essences
Antifungal Activity	dermatophytes, Microsporum fulvum, Microsporum gypseum, Trichophyton mentagrophytes, Trichophyton rubrum, Candida albicans, and Trichosporon beigelii	Flavonoids, Monoterpenes, and Alkaloids	Aerial parts- pedicle and buds
Antibacterial Activity	Bacillus cereus, Mycobacterium smegmatis, E. Coli, Staphylococcus aureus, Klebsiella sp., Salmonella group C, Salmonella paratyphi, and Streptococcus pneumoniae	Alpha and Beta Pinenes	N-hexane extracts, ethyl acetate extract, essential oil extract, chloroform extract
Antiparasitic activity	Malaria, dysentery, colic, and vaginitis, anti-Leishmaniasis activity	(3,S)-16,17-Didehydrofalcarinol an oxylipin.	bioassay guided fractionation with a methanol extract
Antioxidant Activity	Antioxidant, anti-inflammatory, anti-cancer.	High phenol content , Flavonoids (in water phase), Carotenoids (in lipid phase), Alkaloids	Ethyl acetate and n-Butanol fractions obtained from methanolic extracts, essential oils
Anticancer Activity	Potent cytotoxic activity against malignant tumor cells.	5(alpha)- cholestane, monoterpenes (alpha and beta pinenes)	Crude flower aqueous and acetone extracts, essential oil extract
Hepatoprotective Activity	Reduction of oxidative stress, lowered levels of serum Aspartate aminotransferase, serum Alanine aminotransferase, serum Alkaline phosphatase, and serum bilirubin in rats	Alkaloids, Flavonoids	Flowers, leaves, and aerial parts. chloroform insoluble fraction of an ethanol extract, petroleum ether, methanol, and chloroform water extracts, Lipopolysaccharide chloroform-insoluble fraction, aqueous extracts
Immunoenhancement Activity	Activation of the immune system with an increase of percent in neutrophils in rats	Sequesterpene and triterpenoids	No Data Found
Antidiabetic Properties	antidiabetic activity that is comparable to the drug Glibenclamide in rats.	Saponins	Ethanolic extract of whole plants, pet ether, methanol, and chloroform extracts
Antihypertensive Activity	Antihypertensive activity comparable to the drug captopril in rats	Flavonoids and potentially alkaloids	ethyl acetate and dichloromethane fractions from the aerial parts of the plant

1 . ANTIMICROBIAL ACTIVITY :

The extracts of *Tridax procumbens* showed antimicrobial activity against gram+ve and –ve bacterial strains. The antimicrobial activity of different extracts is as shown in table 4. This explains the reason for using the plant in traditional folk medicine to treat dysentery, diarrhoea and gastrointestinal disorders of bacterial infections. The active components like tannins, flavonoids (apigenin, quercetin and kaempferol), ethyl esters (9, 12-octadecadienoic corrosive ethyl ester, 5 α-cholestane, hexadecanoic corrosive ethyl ester and 9-octadecenoic corrosive ethyl ester), unsaturated fats, phenols, saponins and sterols are answerable for antimicrobial action observed[22]

Table:6 Antimicrobial activity of different part and extracts of *T. procumbens* [23]

Plant part	Extraction solvent	Microorganism	
Bacteria			
		Gram-positive	**Gram-negative**
Aerial	n-hexane	-	*Escherichia coli*
Flower	n-hexane	*Mycobacterium smegmatis*	*Escherichia coli Klebsiella sp.*
			Salmonella group C
			Salmonella paratyphi
Aerial	Ethyl acetate	*Mycobacterium smegmatis*	-
		Staphylococcus aureus	
Flower	Ethyl acetate	*Bacillus cereus*	*Klebsiella sp.*
Leaf	Ethyl acetate	*Staphylococcus aureus*	*Klebsiella pneumonia*
		Bacillus cereus	*Salmonella typhi Escherichia coli*
Flower (Flavonoids)	Ethyl acetate	*S. aureus*	*E. coli P. mirabilis*
Stem Flavonoids	Ethyl ether, Ethyl acetate	*S. aureus*	-
Root			
Calli			
Leaf	Chloroform	*Bacillus subtilis*	*Escherichia coli*
		Bacillus faecalis	*Pseudomonas aeruginosa*
Whole plant	Ethanol	*Staphylococcus aureus*	*Escherchia coli Klebsiella*
	Methanol		*pneumonia Proteus vulgaris*
	Aqueous		*Pseudomonas aeruginosa*
Fungi			
Flower Flavonoids	Ethyl ether, Ethyl acetate	*C. albicans*	
Stem			
Root			
Calli			
Aerial	Methanol	*C. albicans*	
		Microsporumfulvum	
		Microsporum gypseum	
		Trichophyton mentagrophytes	
		Trichophyton rubrum	
		Trichosporon beigelii	

Petroleum, ether and ethanolic extracts of leaves of *Tridax procumbens* showed antibacterial activity against Bacillus faecalis. This activity was reported to be likely because of the presence of alkaloids. The chloroform separates showed antibacterial activity against B. faecalis, B. subtilis, E. coli, and Pseudomonas aeruginosa however the analyses need better controls and description of the methodology.. Essentials from *Tridax procumbens* show the presence of alpha and beta pinenes, utilised in little amounts can help in treating bacterial and fungal contaminations. There are a few contradictory results about the antimicrobial action of this species. Some studies did not include significant biological activity compared to the antibiotic control but there is proof for the capability of this species anti-microbial so more studies need to be done in this area[24]

2. ANTIBACTERIAL ACTIVITY:

The herb *Tridax procumbens*, found in tropical nations, is supplied with antibacterial properties.Our study demonstrated that this activity was associated only with the ethanolic extract and was prominently seen only against Pseudomonas aeruginosa strains. Multi drug safe nosocomial kinds of Pseudomonas isolated from ventilator related pneumonia, urinary tract infection as well as blood stream infection shows significant sensitivity to Tridax extricates. Our review proves the viability of Tridax as an enemy of pseudomonas

specialist and its worth as a wellspring of definitions for treatment of nosocomial diseases brought about by Pseudomonas aeruginosa.[25]

3. ANTIOXIDANT ACTIVITY :

The Tridax procumbens having the complete phenol communicated as Gallic Corrosive Same (GAE) show a high phenolic content of 12 mg/g GAE. The result indicates that there is some relationship between the content of phenols in medicinal plants and antioxidant activity. A large number of the previous reports support this finding that plant optional metabolites like flavonoids, tannins, catechins and other phenolic compounds has potential cell reinforcement activity.[26]

4. ANTIFUNGAL ACTIVITY:

Tridax procumbens Linn Plate dissemination examine was performed against two pathogenic contagious strains. Minimum inhibitory concentrations (MIC), minimum fungicidal concentrations (MFC) and absolute movement were additionally assessed for assurance of antifungal capability of every dynamic concentrate. The flavonoid removes showed surprising action against A. niger though alkaloid removes were viewed as inert against both the test parasites. Incredible antifungal potential was recorded with the expectation of complimentary flavonoid of stem and bound flavonoid of stem and flower A. niger. Study indicated that T. procumbens can be used as a source of formulations of antifungal drug for treatment of diseases caused by A. niger.[27]

5. WOUND HEALING ACTIVITY :

Wound healing includes a perplexing communication among epidermal and dermal cells, the extracellular lattice, controlled angiogenesis and plasma-inferred proteins generally organised by a variety of cytokines and development factors. *Tridax* antagonised anti-epithelization and tensile strength by depressing the effect of dexamethasone (a known healing suppressant agent) without affecting anti contraction and anti granulation action of dexamethasone. Watery concentrate was likewise viable in expanding lysyl oxidase yet less significantly than entire plant remove. Further it has been shown that extract of leaves of this plant also promotes wound healing in both normal and immunocompromised (steroid treated) rats in the dead space wound healing model. The plant increment lysyl oxidase as well as, protein and nucleic corrosive substance in the granulation tissue, likely because of expansion in glycosaminoglycan content.[28]

CONCLUSION :

The broad survey of literature reviews that *Tridax Procumbens Linn* has shown many significant Antimicrobial Activity. Few isolated chemical constituents show Antibacterial property, Antifungal property, and Wound healing properties also. *Tridax Procumbens* shows presence of a number of valuable constituents such as flavone Glycoside, glycoside, bithiophene, flavonoid, sterols, terpenoids, lipids and polysaccharides. The plant also prevents hair fall and is used as a hair growth promoter.

Tridax Procumbens Linn is a widely distributed weed found everywhere in India, America, Tropical Africa, Asia, and Australia. Number of studies have been conducted on different parts of *Tridax Procumbens Linn* which prove that *Tridax Procumbens Linn* is a beneficial medicinal plant.

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