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REVIEW ARTICLE

A COMPREHENSIVE REVIEW ON MEDICINAL IMPORTANCE OF TRIDAX PROCUMBENS LINN

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ABSTRACT

Tridax procumbens Linn. (Compositae) is a weed found throughout India. Tridax procumbens is a species of flowering plant in the daisy family. It is best known as a universal weed and pest plant. They are commonly known as "Ghamara", in English mainly called 'coat buttons' and some of the practitioners of Ayurveda is dispensed for "Bhringraj". It is rich with carotenoids, saponins, oleanolic acid and ions like sodium, potassium and calcium. Tridax procumbens is having several potential therapeutic activities like antiviral, antioxidant, antibiotic efficacies; wound healing activity, insecticidal, anticancer, Antioxidant and anti-inflammatory activity. Luteolin, glucoluteolin, quercetin and isoquercetin have been reported from its flowers. The phytochemical screening of *Tridax procumbens* indicated the presence of Alkaloids, Reducing sugars, Glycosides, Carotenoids, Flavonoids, Fumaric acid, tannins, Saponins and Gums. It has also known for its number of pharmacological activities like hepatoprotective activity, antidiabetic activity, bronchial catarrh, hypotensive effect, immunomodulating property, dysentery, diarrhea and antimicrobial activity against both gram-positive and gram-negative bacteria. The leaf juice possesses to stop bleeding as a hair tonic, antiseptic, insecticidal and is also used to alleviation haemorrhage from cuts, bruises and wounds insect repellent.

KEY WORDS: Tridax procumbens, Weed, Pharmacological potential.

INTRODUCTION:

Medicinal plants have been a most important source of cure for human diseases since ancient time. It has no doubt that the world's one-fourth population 1.42 billion people are dependent on traditional medicines for the treatment of various diseases [1]. Medicinal herbs are moving from fringe to main stream use with a greater number of people seeking remedies and health approaches free from side effects and harmful effect caused by synthetic drugs.

Tridax procumbens Linn.(Compositae) commonly known as 'Ghamra' and in English popularly called 'coat buttons' because of appearance of flowers has been extensively used in Ayurvadic system of medicine for various disease and some of the practitioners of Ayurveda is dispensed in "Bhringraj" which is well known medicine for liver disorders[2]. It is best known as a universal weed and pest plant. It is built-in to the tropical Americas but it has been introduced to tropical, subtropical and benign temperate regions worldwide. List of its as a noxious weed in the United States and has pest character in nine states. *Tridax procumbens* is known for its wound healing activities. Its widespread distribution and importance as a weed are due to its spreading stems and abundant seed production [3]. Tridax is a spreading annual herb grows up to 20 cm in height and very long slender solitary peduncles a foot long and more. Leaf is simple, opposite, serrate or dentate, fleshy, pubescent**,** ovate, acute, hairy on both surfaces and pubescent. Flowers in head are tubular, yellow with hairs, inflorescence capitulum and whitish. Tridax has two types of flower: ray florets and disc florets with basal palcentation [4]. Seeds are numerous, small with tuft of silky hairs on one side for wind dispersal.

Figure 1: - *Tridax procumbens* Linn. Plant

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The principle aim of the present study was to investigate the scientific basis of the traditional uses of the plant *Tridax procumbens* and in the same time find the chemical groups present in the active plant parts to get preliminary idea about the active constituent [5]. *T. procumbens* is reputed for its wound healing activities [6]. This plant is also traditionally known for its insecticidal and anti-inflammatory activities. In some tribal areas, the leaf juice is used to cure fresh wounds, stop bleeding, as a hair tonic [7]. In Nigeria, *T. procumbens* is traditionally used in the treatment of typhoid fever, cough, asthma, epilepsy, diarrhea [8] and hypertension [9], which is well known Ayurvedic medicine for liver disorders (Hepatoprotective) [10]. Antioxidant properties [11] have also been demonstrated and many other medicinal activities. Tridax procumbens L. is a highly valuable drug and is one of the essential ingredients in the most of the compound preparations included in Ayurvedic literature.

CHEMICAL CONSTITUENTS:

The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids (catechins and flavones) and tannins. It is richly endowed with carotenoids and saponins [12]. Mineral composition of *T. procumbens* reported from leaves is calcium, magnesium, sodium potassium and selenium [13]. Leaf of Tridax mainly contains croud proteins 26%, crude fiber 17% soluble carbohydrates 39% calcium oxide 5%, Luteolin, glucoluteolin, quercetin and isoquercetin have been reported from its flowers. Whereas they also having fumaric acid, fl-sitosterol and tannin which reported in the plant [14]. Tridax procumbens L. contain large amound of Oleanolic acid and they are having a potential anti-diabetic agent when tested against aglucosidase [15]. Linolenic acid was also reported in the aerial parts. Two water soluble polysaccharide; WSTP-IA and WSTP-IB containing β-(1->6)-DGalactan main chain has also been purified from the leaves of the plant [16].

PHARMACOLOGICAL ACTIVITIES:

HEPATOPROTECTIVE ACTIVITY:

The hepatoprotective activity of aerial parts and chloroform insoluble fraction from ethanolic extract of Tridax procumbens Linn. shows significant protection in alleviation of D-Galactosamine/ Lipopolysaccharide (D-GalN/LPS) induced hepatocellular injury of liver cells. Tridax procumbens Linn. having positive effect and has ability to regenerate liver cells. The multifocal necrosis produced by DGALN and the lesion of viral hepatitis in humans are generallyor mostly similar. In this recovery process the amino sugar selectively blocks the transcription and this process of the hepatic protein synthesis is achieved as a consequence of endotoxin toxicity, which example to hepatic injury within few hrs after administration. This is most widely reported method for to study Hepatoprotective activity. 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 hr after administration [17].

ANTIDIABETIC ACTIVITY:

The aqueous and alcoholic extract of leaves of Tridax procumbens Linn. in oral administration shows significant decrease in glucose level in the blood and it shows antidiabetic activity in the model of alloxan-induced diabetes in rats [18]. The oral administration of acute and chronic doses of 50 percent methanol extract of T. procumbens significantly decrease fasting blood glucose levels in diabetic rats. This plant material does not affect the sugar levels in normal rats [19], [20].

WOUND HEALING ACTIVITY:

Leaf juice of Tridax procumbens L. was shown to depress wound contraction in experimented animals. The process of Wound healing are a complex interaction between epidermal and dermal cell, the extra cellular matrix, controlled angiogenesis and plasma-derived proteins all coordinated by an array of cytokines and growth factors [21]. It has ability to restore the cellular structures and tissue layers. The Aqueous extract of whole part of plant Tridax procumbens L. has ability to set the normal and immunecompromised wound healing in rats [22]. Aqueous extract was also effective in increasing lysyl oxidase but to a small degree than whole plant extract. The plant not only increase lysyl oxidase but also increase nucleic acid and protein content in the granulation tissue, mainly due to increase of glycosamino glycan content[23, 24].

ANTIMICROBIAL ACTIVITY:

Whole plant of *Tridax procumbens L*. having an antimicrobial activity on various species of bacteria. The extract of whole part of plant showed antibacterial activity only against *seudomonas aeruginosa.* The disk diffusion method was used to study the antibacterial activity of Tridax for two-gram positive *Staphylococus aureus, Bacillus subtilis* and two gram negative *Escherichia coli* and *Pseudomonas aeruginosa* [25]. Fresh plant juice is applied twice a day for 3-4 days to cure cuts and wounds. The methanolic extract of whole plant of *Tridax procumbens* Linn. show antibacterial activity with expressive MIC value. This property was examined for Soxhlet extracts of chloroform, acetone, ethanol and water in ascending order

of polarity [26]. The n-hexane extract of the flowers showed activity against *E coli*, ethyl-acetate extract of the flowers shows activity against *Bacillus cereus* and *Klebsiella sp.* whereas the ethyl-acetate extract of aerial parts showed activity only against *Staphylococcus aureus and Mycobacterium smegmatis*. The n-hexane extract of the whole aerial parts was reported to be effective against *Mycobacterium smegmatis, Escherichia coli, Salmonella* C and *Salmonella paratyphi* [27].

ANTI-CANCER ACTIVITY:

The traditional plant Tridax procumbens flower showed anti cancer activity when aqueous and acetonic extract of flower was tested on prostate epithelial cancerous cells PC3. It was determined by measuring cell viability by MTT assay. Experiment consists of cleavage of the soluble yellow coloured tetrazolium salts MTT [3-(4, 5-dimethyl – thiazole-2-yl)-2, 5- diphenyl tetrazolium bromide] to a blue coloured formazan by the mitochondrial succinate dehydrogenase. The assay was based on the capacity of mitochondrial enzymes of viable cells to reduce the yellow soluble salt MTT to purple blue insoluble formazan precipitate which is then quantified spectrophotometrically at 570nm. The results of this analysis revealed the fact that flower crude extract has anti-cancer activity [28].

IMMUNOMODULATORY ACTIVITY:

Ethanolic extracts of leaves of Tridax have immunomodulatory effect on Albino rats dosed with Pseudomonas aeruginosa also inhibits proliferation of same [29].Ethanol insoluble fraction of aqueous extract of Tridax procumbens has been reported for immunomodulatory activity when intraperitoneal administration. It indicate increases the leukocyte count, phagocytic index and antibody secreting cells of spleen. The immunomodulatory activity of Ethanolic leaves extracts of Tridax procumbens Linn. have been also investigated in Albino rats with Pseudomonas aeruginosa, which has ability to inhibit the proliferation of this microorganism [30].

HYPOTENSIVE EFFECT:

The cardiovascular effect of aqueous extract obtained from the leaf of Tridax procumbens Linn. was investigated on anaesthetized Sprague-Dawley rat.Aqueous extract of Tridax procumbens also reduced significantly the heart rate of rats at high dose where as lower dose did not cause any changes in the same. The aqueous extract of the leaf of *T. procumbensat* dose dependant lowered mean arterial blood pressure and heart rate in rats. So, the leaves of Tridax procumbens Linn. show hypotensive effect [31].

REPELLENCY ACTIVITY:

The essential oils of leaves of Tridax procumbens Linn were extracted by steam distillation and they were studies for its topical repellency effects against malerial parasite *Anopheles stephensi* in mosquito cages. All essential oils were experimented at three different concentrations (2, 4 and 6 percent) of it. The essential oils of Tridax procumbens exhibited relatively high repellency effect (> 300 minutes at 6 percent concentration). Tridax are promising as repellents at 6 % concentration against *Anopheles stephensi* [32].

ANTI-INFLAMMATION ACTIVITY:

The extract of *Tridax procumbens* Linn. was additionally reported for its anti inflammatory activity when DPPD (2,2 –diphenyl-1-picrylhydrazyl hydrate) assay was done [33].

ANTIOXIDANT ACTIVITY:

T he extract of *Tridax procumbens* Linn. was additionally reported for its anti oxidant activity when HET –CAM (Hen's egg chorioallanthoic membrane) assay were done [33].

OTHER ACTIVITIES:

Leaves extract of Tridax *procumbens* Linn. were found to be good hair growth promoters and it has also to reported for its preventing effect on falling of hairs falling of hairs [34], [35]. Tridax plant was also used for dysentery, diarrhoea and bronchial catarrh in the West Africa sub-region and tropical zone of the world. Traditional medical practitioners and the native peoples of these areas use the leaves of the plant as a remedy against conjunctivitis [35], [36]. This plant was also used as an effective bioadsorbent for the removal of highly toxic ions of Cr (VI) from industrial waste water. Hence Tridax procumbens recommended for bioremediation [37].

CONCLUSION:

Tridax procumbens Linn. (Compositae) is universally distributed weed. It found everywhere in India, America, Tropical Africa, Asia, and Australia. This plant extensively used and it's each and every part having noble and effective pharmacological activity. The plant product is the need in treatment of diseases over than synthetic compound. it does not have any harmful and toxic effect in animal and man. The work done now days on its having various pharmacological activities like hepatoprotective effect, immunomodulating property, promising wound

healing activity, antidiabetic, hypotensive effect, antimicrobial, insect repellent activity, anti inflammatory, antioxidant, dysentery, diarrhea, bronchial catarrh and 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. The qualitative analysis revealed the presence of the biomolecules such as anthraquinone, catachol, flavonoids, phenolic compounds, steroids, tannins, terpenoids and saponins. This is dispensed for "Bhringraj" by some of the practitioners of Ayurveda. This studies on plant Tridax procumbens Linn. also desired development of novel therapeutic agents which are isolated from it, as isolation of oleanolic acid a single triterpenoids is reported from this plant. In future, there is tremendous scope in research for this plant.

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