

Review on Biological Activity of *Tridaxprocumbens* Linn

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ABSTRACT

*It is now believed that nature has given the cure of every disease in one way or another. The researchers today are emphasizing on evaluation and characterization of various plants and plant constituents against a number of diseases based on their traditional claims of the plants given in Ayurveda. *Tridaxprocumbens* L is a highly valuable drug and is one of the essential ingredients in the most of the compound preparations included in Ayurveda literature. The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids (catechins and flavones), fumaric acid, fl-sitosterol, saponins and tannins. It is richly endowed with carotenoids, saponins, oleanolic acid and ions like sodium, potassium and calcium. Luteolin, glucoluteolin, quercetin and isoquercetin have been reported from its flowers. The leaf juice possesses antiseptic, insecticidal and antiparasitic properties. Leaf extracts can be used to treat infectious skin diseases in folk medicines. In this Review ***Biological Activity of Tridaxprocumbens* Linn.** like hepatoprotective activity, anti-inflammatory, wound healing, antidiabetic activity, hypotensive effect, immunomodulating property, bronchial catarrh, dysentery, diarrhea and to prevent falling of hair, promotes the growth of hair, and antimicrobial activity against both gram-positive and gram-negative bacteria *Tridaxprocumbens*.*

Keywords:

Introduction:-

Tridaxprocumbens L. is a common medicinal herb which is best known as a widespread weed and pest plant distributed throughout India. It grows in open places, coarse textured soils of tropical regions, sunny dry localities, fields, road sides, waste areas, meadows and dunes. It is a semi prostrate, annual, creeper herb. It is a weak straggling herb about 12- 24 cm long with few leaves 6-8cm long, very long slender solitary peduncles. Its widespread distribution and importance as a weed are due to its spreading stems and abundant seed production (Chauhan & Germination, 2008; Khan et al., 2008). Leaves are simple, opposite, exstipulate, lanceolate to ovate, 3-7 cm long irregularly toothed margin, base wedge shaped, shortly petiole, hairy on both surfaces (Salahuddin et al., 2010; W.O.I., 2002; TP., 2013). Stem is ascending 30-50cm height, branched, sparsely hairy, rooting at nodes (Khan et al., 2008). Flowers are tubular, yellow with hairs, inflorescence capitulum. *Tridax* has two types of flower: ray florets and disc florets with basal palcentation (TP., 2013). Flowering- Fruiting throughout the year. Fruit is a hard achene"s covered with stiff hairs and having a feathery, plume like white pappus at one end. The plant is invasive in part because it produces so many achenes and each achene can catch the wind in its pappus and be carried some distance. Calyx is represented by scales or reduced to pappus. Seed have pendulous embryo, endosperm is absent (Ankita&Amita, 2012; Verma& Gupta, 1988). The plant is native of tropical America and naturalized in tropical Africa, Asia, Australia, India etc. (Chauhan & Germination, 2008; Khan et al., 2008)

Common Name:-

*Its common names include coat buttons and tridax daisy in English, Jayanthi in **Kannada**, cadillochisaca in **Spanish**, herbecaille in **French**, Jayantiveda in **Sanskrit**, ghamra in **Hindi**, Bishalyakarani in **Oriya**, Kambarmodi in **Marathi**, GaddiChemanthi in **Telugu**, vettukaayapoonda in **Tamil**, and kotobukigiku in **Japanese**(Saxena& Albert 2005).*

Classifications of *Tridaxprocumbens* :

Kingdom Plantae
Subkingdom Tracheobionta
Superdivision Spermatophyta
Division Magnoliophyta
Class Magnoliophyta
Subclass Asteridae
Order Asterales
Family Asteraceae
Genus *Tridax* L.
Species *Tridaxprocumbens*

Medicinal Uses :-

In our country there are a large number of people suffering of deprivation of even essential need, and the urge to survive has prompt them to explore naturally available resources for therapeutic effects with respect to common ailments including Inflammation. Inflammation is a common reaction of the body to be insult cause by various biological and non biological factors present in the environment. The procumbent is valued for its pharmaceutical properties (W.O.I., 1988; Sahoo& P.K, 1998). 1.6.1 Uses in traditional medicine Commonly used in Indian traditional medicine as anticoagulant, hair tonic, antifungal and insect repellent, in bronchial catarrh, diarrhoea, dysentery, and wound healing (W.O.I., 1995; Srivastava et al., 1984; Udupa et al., 1991; Saraf& Dixit 1991).

Direct:-

Leaves are also used for the treatment of bronchial catarrh, dysentery, diarrhoea and for the restoration of hairs (Gaikwadi et al., 2003). The leaf juice possesses antiseptic, insecticidal and antiparasitic properties.

Indirect:-

Hepatoprotective activity of *Tridaxprocumbens* L. a medicinal herb commonly used in folklore system for wound healing and also against jaundice, was evaluated against paracetamol induced hepatic damage in male albino rats. Paracetamol induced hepatic damage was well manifested by significant increase in the activities of Alanine aminotransferase, Aspartate aminotransferase, alkaline phosphatase in serum and enhanced lipid peroxidation (Udupa et al., 1991; Diwan et al., 1982). On the other hand, the activities of Superoxide dismutase and Catalase in liver tissue were lowered. Consequent to paracetamol induced hepatic injury; the Serum Bilirubin level was increased. Paracetamol toxicity also resulted in, significant reduction in total serum protein and the hepatic glutathione and glycogen contents (Wagh&Shinde., 2010). The dose- dependent nature of the effects of the leaf extract of *T. procumbens* plant on blood pressure and heart rate of the rat suggests a cumulative action of the active substances present in the leaves of the plant. The cardiovascular effect of *Tridaxprocumbens* anaesthetized Sprague- dawley rat on intravenous administration of 3, 6 and 56 9mg/kg of the aqueous extract of *T. procumbens* caused significant decreases in the mean arterial blood pressure in a dose- related manner i.e. the extract caused greater decrease in the mean arterial blood pressure at higher dose than at lower dose. Also, higher doses of the extract 6mg/kg and 9mg/kg caused significant change in the heart rate. The hypotensive and the brady-cardiaceffects were immediate. The hypotensive effects of *T. procumbens* were inhibited by the pretreatment of the animals with atropine sulfate (1mg/kg) (Salahdeen et al., 2004).

Chemical constituents:-

A new flavonoid (procumbenetin), isolated from the aerial parts of *Tridaxprocumbens*, has been characterised as 3,6-dimethoxy-5,7,2',3',4'-pentahydroxyflavone 7-O- β -D-gluco- pyranoside on the basis of spectroscopic techniques and by chemical means.*Tridaxprocumbens*; Flavonoids Plant. Uses in traditional medicine. Commonly used in. Indian traditional medicine as anticoagulant, hair tonic, antifungal and insect repellent, in bronchial catarrh, diarrhoea, dysentery, and wound healing. Previously isolated constituents. Alkyl esters, sterols, pentacyclitriterpenes, fatty acids and polysaccharides. (Pathak et al., 1991; Gaikwadi et al., 2003; Suseel et al., 2002; Abubakaret et al., 2012; Ssanna et al., 2005; Ali et al., 2001; Sunil et al., 2012; Chitra et al., 2011; Singh K., &Ahirwar V., 2010; Jude et al., 2009).

Material and Methods:-

First we identified and collect the plant leaves,stem,roots,flowers and weed from the place of Dundukhera, DisttShamli, Uttar Pradesh, India. After the collection of leaves, the leaves dried in the sun light and extracted in soxhlet in the solvent of ethanol and separate the leaves crude by distillation method. In the leaves crude we add hexane and separate out solution of hexane soluble compound. We separate out the all compound by column chromatography and characterize by the help of spectroscopic technique.

Extraction:-

The extraction of the plant material can be obtained by drying the of the given plant under the shade and is grinded to form a fine powder. The dried powdered material then obtained is percolated with polar solvent hexane for 48 hours in soxhlet extractor followed by non polar solvents hexane.

Procedure of Extraction:-

1. 124 gm. Powdered form of *Tridaxprocumbens* is poured into soxhlet extractor and its level is maintained.
2. One liter of Ethanol is being poured into 5000ml round bottomed flask.
3. Vacuum grease is being used on movable parts to avoid friction.
4. Also cotton and Aluminum foil is being used to cover connectors to prevent oozing.

5. After setting the soxhlet extractor electricity is being supplied through heating mantle and temperature is maintained at 60°C.
6. Then soxhlet extractor is being connected to chiller to provide chilling.
7. This process is continued for 48 hours.
8. After that Ethanol extract obtained is put to distillation to separate the crude extraction.
9. We found the 22.5 gm. crude by the help of ethanol.
10. Add Hexane in crude and separate out the soluble compound and checked by TLC. The total weight of hexane separated crude is 10 gm.

Ethanol is a highly polar solvent all the polar component of the plant are dissolve and are collected in form of crude. But some non polar compounds are also in crude and they are dissolving in hexane and separate out. This solution is used in the experiment and practical work and separate out the compound by column chromatography and characterize by the spectroscopic technique.

Effect of Extract:-

Anti- hepatotoxic or Hepatoprotective Activity:-

TridaxProcumbens had a salubrious effect on the paracetamol- induced hepatotoxicity in Wistar rats. It has been demonstrated the *T. procumbens* possibly activates muscarinic cholinergic receptors, which also protects the liver via efferent vagus nerve (Kumar et al., 2001). The hepatoprotective effect of ethanolic extract of aerial parts of *T. procumbens* and its chloroform soluble and insoluble fractions on acute hepatitis induced in rats by single oral dose of CCl₄, 15ml/kg (1:1 of CCl₄ in olive oil) (Saraf& Dixit 1991). *Tridaxprocumbens* plants are also used to prepare a drug “Bhringraj”; which is a reputed medicine in Ayurveda for liver disorders. Even alcoholic extract of that plant is useful in Liver regeneration; which showed their hepatoprotective action (Pathak 1991; Vilwanathan et al., 2005) reported the effect of *T. procumbens* on liver antioxidant defense system during lipopolysaccharide induced hepatitis in Dgalactosamine sensitized rats (Vilwanathan et al., 2005). The protective effect of *Tridaxprocumbens* against isoniazid (INZ) induced hepatic damage and concluded that plant extract restored the INZ induced changes in liver tissue back to normal and enhanced its ability to undo the damage caused by free radicals (Wagh&Shinde 2011).

Immunomodulatory Activity:-

Ethanolic extracts of leaves of *Tridax* have immunomodulatory effect on Albino rats dosed with *Pseudomonas aeruginosa* also inhibits proliferation of same (Oladunmoye, 2006). Also a significant increase in phagocytic index, leukocyte 58 count and splenic antibody secreting cells has been reported to ethanol insoluble fraction of aqueous extract of *Tridax*. Stimulation of humoral immune response was also observed along with elevation in hemagglutination antibody titer. Study also reveals that *Tridax* influences both humoral as well as cell mediated immune system (Tiwari et al., 2004).

Wound Healing Activity:-

Wound healing involves a complex interaction between epidermal and dermal cells, the extra cellular matrix, controlled angiogenesis and plasma-derived proteins all coordinated by an array of cytokines and growth factors (Bhat et al., 2007). *Tridax* antagonized antiepitelization and tensile strength depressing effect of dexamethasone (a known healing suppressant agent) without affecting anticontraction and antigranulation action of dexamethasone. Aqueous extract was also effective in increasing lysyl oxidase but to a lesser degree than whole plant extract. Further it has been shown that extract of leaves of this plant also promotes wound healing in both normal and immuno compromised (steroid treated) rats in dead space wound healing model (Babu et al., 2003). The plant increase not only lysyl oxidase but also, protein and nucleic acid content in the granulation tissue, probably as a result of increase in glycosamino glycan content (Nia et al., 2003). 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 (Udupa et al., 1991; Diwan et al., 1982).

Antimicrobial or Antibacterial Activity:-

Though a number of antibiotics are available but increasing capability of microbes to develop multi drug resistance has encouraged search for new, safe and effective 59 bioactive agents of herbal origin. The aqueous as well as ethanolic extracts of *Tridaxprocumbens* plant showed antibacterial activity with special reference to nosocomial pathogens. It may be useful for successful therapy against multidrugresistant pathogens like *P. aeruginosa* (Pai et al., 2011). The antibacterial activity of hexane, petroleum ether, chloroform and methanolic extracts obtained from the aerial parts (leaf, flower and stem) of *Tridaxprocumbens* and tested them against both gram positive (*Staphylococcus aureus* and *Bacillus subtilis*) and gram negative (*Enterobacteraerogenesis*) bacteria using the agar well diffusion method (Rizvi

et al., 2011). Extracts of flowers and leaves were used to study their capacity to control bacterial agents that causes urinary tract infections. Therefore, traditional medicine is an important source of potentially useful new drugs (Jadhav et al., 2011). *Tridax procumbens* also possesses antifungal property of against three phytopathogenic fungi i.e. *Helminthosporium oryzae*, *Rhizoctonia solani* and *Pyricularia oryzae* (Acharya et al., 2010). The hexane extract of the flowers showed activity against *E. coli*. The same extract of the whole aerial parts was active against *Mycobacterium smegmatis*, *Escherichia coli* and *Salmonella paratyphi*. The ethylacetate extract of the flowers of *Tridax procumbens* was active against *Bacillus cereus* and *Klebsiella* sp. The aerial parts extract also showed activity only against *Mycobacterium smegmatis* and *Staphylococcus aureus*, while the aqueous extract showed no antimicrobial activity (Taddell & Rosas 2000). Many Scientists also evaluated in-vitro phytochemical screening and anti-bacterial activity of aqueous and methanolic leaf extract of *Tridax procumbens* against Bovine mastitis isolated from *Staphylococcus aureus* and in-vitro antiplasmodial activity in *Tridax procumbens* medicinal plant of South Africa (Dhanabalan et al., 2008; Cailean et al., 2004). In vitro activity of methanolic extract of *T. procumbens* inhibited promastigotes growth of *Leishmania Mexicana* (Causative agent of 60 cutaneous leishmaniasis disease in the new world) i.e. anti-leishmanial activity and found that it is an active herb against leishmaniasis (Zhelmy et al., 2009).

Anti-Cancerous Activity:-

The results of this analysis revealed the fact that flower crude extract has anticancer activity. The effect of anti cancer activity of traditional plant *Tridax procumbens* flower crude aqueous and acetone extract was tested on prostate epithelial cancerous cells PC3 was determined by measuring cell viability by MTT assay (Tiwari et al., 2004; Ravikuma et al., 2005). Experiment consists of cleavage of the soluble yellow coloured tetrazolium salt 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 (Vishnu et al., 2011; Vikram et al., 2012).

Hypotensive:-

The cardiovascular effect of aqueous extract obtained from the leaf of *Tridax procumbens* Linn. Was investigated on anaesthetized Sprague-Dawley rat. The aqueous extract has ability to cause significant dose dependant decreases in the mean arterial blood pressure. The higher dose leads to significant reduction in heart rate where as lower dose did not cause any changes in the same. The leaves of *Tridax procumbens* Linn. Shows hypotensive effect (Salahdeen et al., 2004).

Repellency Activity:-

In other study, essential oils were extracted by steam distillation from leaves *Tridax procumbens* Linn. And they were examined for its topical repellency effect 61 relatively high repellency effect (> 300 minutes at 6 % concentration) and concluded that *tridax* are promising as repellents at 6 % concentration against *An. stephensi* (Rajkumar & Jebanesan, 2007).

Antidiabetic :-

Madhumeha another name of diabetes in which patient passes sweet urine and exhibits sweetness all over the body in the form of sugar, i.e., in sweat, mucus, urine blood, etc. from ancient time various herbs were practically used for lowering of blood glucose level as such or in juices form. Aqueous and alcoholic extract of leaves of *Tridax* showed a significant decrease in the blood glucose level in the model of all oxan-induced diabetes in rats (Vyas et al., 2004). The knowledge of diabetes mellitus, as the history reveals, existed with the Indians since from prehistoric age. Madhumeha another name of diabetes in which a patient passes sweet urine and exhibits sweetness all over the body in the form of sugar, i.e., in sweat, mucus, urine blood, etc. from ancient time various herbs were practically used for lowering of blood glucose level as such or in juices form. Aqueous and alcoholic extract of leaves of *Tridax* showed a significant decrease in the blood glucose level in the model of alloxan-induced diabetes in rats (Bhagwat et al., 2008). The oral administration of acute and sub chronic doses of 50 % methanol extract of *T. procumbens* significantly reduces fasting blood glucose levels in diabetic rats. This plant material does not affect the sugar levels in normal rats (Pareek et al., 2009; Salahdeen et al., 2004). Anti diabetic activity of leaf extract of *Tridax* plants have been reported (Bhagwat et al., 2008). The leaves are reported to be employed in bronchial catarrh, dysentery or diarrhea and for storing hair. An aqueous extract of plant produces reflex tachycardia and showed a transient hypotensive effect on the normal blood pressure (W.O.I., 1976).

Anti-Urolithiatic Activity:-

Ethanol extract of *Tridax procumbens* L. was also used for treating kidney stone disorders. It was evaluated against 0.75% v/v ethylene glycol and 2% w/v ammonium chloride induced calcium oxalate urolithiasis and hyperoxaluria induced oxidative stress in male albino rats. Treatment with the extract was

able to reduce calcinogenesis induced urinary excretion and renal deposition of calcium oxalate and resultant lipid peroxidation, indicating its anti-oxidant and antioxidant effects (Sailaja et al., 2011; Ingeborg et al., 1998).

Anti-Inflammatory Activity:-

Tridaxprocumbens possess significant anti-inflammatory activity as its action influences exudates leucocytes migration, rat paw oedema and granuloma tissue. The anti-inflammatory action of *T. procumbens* may possibly be due to corticotrophic influence as evident from increase in weight (Diwan et al., 1989). The most active fraction of *T. procumbens* was ethyl acetate (ETA) fraction and was found to contain moderate polar natural products: alkaloids and flavonoids as earlier reported. These bioactive natural principles have been implicated in counteracting reactive oxidative species (ROS) indicated in the pathogenesis of inflammation and related ailments in biological systems (Nia et al., 2003).

Conclusions:-

Tridaxprocumbens Linn. is widely distributed weed. Each and every part of it is useful having pharmacological activity. The plant product over synthetic compound is the need in treatment of diseases, as it does not have any deleterious effect in higher animals including man. The work done showed that the different extracts of plant have potential antibacterial activity. The qualitative analysis revealed the presence of the **biomolecules** such as flavonoids, Phlobaphenins, resins, lipids and fats, phenolic compounds, saponins, steroids, tannins and terpenoids. The studies on plant *Tridaxprocumbens* also desire development of novel therapeutic agents from the various types of compounds by means of modification and derivatization to design more potent and selective therapeutic agents. Therefore, there is huge room for research in direction of more pharmacological activities of plant and to elucidate the mechanism of action of same in future.

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