

# Pharmacology of *Tridax procumbens* a Weed: Review

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**Abstract:** *Tridax procumbens* Linn. (Compositae) is a weed found throughout India. The plant is native of tropical America and naturalized in tropical Africa, Asia, and Australia. Local people known it as “Ghamara”, in English popularly called ‘coat buttons’ and is dispensed for “Bhringraj” by some of the practitioners of Ayurveda. 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. It has known for its number of pharmacological activities like hepatoprotective activity, antiinflammatory, wound healing, antidiabetic activity, hypotensive effect, immunomodulating property, bronchial catarrh, dysentery, diarrhoea and to prevent falling of hair promotes the growth of hair, and antimicrobial activity against both gram-positive and gram-negative bacteria. The leaf juice possesses antiseptic, insecticidal and parasiticidal properties, as a remedy against conjunctivitis and is used also to check haemorrhage from cuts, bruises and wounds insect repellent. It is also used as bioadsorbent for chromium (VI). This review focus on folk occurrence and the wide pharmacological activities of weed *Tridax procumbens*.

**Keywords** – *Tridax procumbens*, Weed, Pharmacology.

## Introduction

*Tridax procumbens* Linn. (*Tridax*) family Compositae commonly known as ‘Ghamra’ and in English popularly called ‘coat buttons’ because of appearance of flowers has been extensively used in Ayurvedic system of medicine for various ailments and is dispensed for “Bhringraj” by some of the practitioners of Ayurveda which is well known medicine for liver disorders<sup>1</sup>. The plant is native of tropical America and naturalized in tropical Africa, Asia, Australia and India. It is a wild herb distributed throughout India. Coat buttons is also found along roadsides, waste grounds, dikes, railroads, riverbanks, meadows, and dunes. Its widespread distribution and importance as a weed are due to its spreading stems and abundant seed production<sup>2</sup>. *Trida* is a week straggling herb about 12-24cm long with few leaves 6-8cm long and very long slender solitary peduncles a foot long and more. Leaf is simple, opposite, exstipulate, ovate, acute, inflorescence capitulum. *Tridax* has two types of

flowers ray-florets and disk-florets, Basal placentation, fruit is cypsela<sup>3</sup>.

## 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. The proximate profile shows that the plant is rich in sodium, potassium and calcium<sup>4</sup>. 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 the fumaric acid, fl-sitosterol and tannin has also been reported in the plant<sup>5</sup>. Oleanolic acid was obtained in good amounts from *Tridax* and found to be a potential antidiabetic agent when tested against  $\alpha$ -glucosidase<sup>6</sup>.

### Occurrence in Folk Practices

*Tridax* possesses significant antiinflammatory, hepatoprotective, wound healing, antidiabetic activity and antimicrobial activity against both gram-positive and gram-negative bacteria<sup>7, 8, 1, 9, 10</sup>. The leaf juice possesses antiseptic, insecticidal and parasiticidal properties and is used also to check haemorrhage from cuts, bruises and wounds. Its leaves also use for bronchial catarrh, dysentery, diarrhoea and to prevent falling of hair promotes the growth of hair, insect repellent<sup>11, 12, 13, and 14</sup>. Interestingly it also has hypotensive effect and potent immunomodulating property<sup>9, 15, 16</sup>. 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<sup>17</sup>. It is also used as bioadsorbent for chromium (VI) is one of the highly toxic ions released into the environment through leather processing and chrome plating industries<sup>18</sup>.

### Hepatoprotective Activity

The hepatoprotective activity of aerial parts of *Tridax* shows significant protection in alleviation of D-Galactosamine/Lipopolysaccharide (D-GalN/LPS) induced hepatocellular injury<sup>7</sup>. D-GalN/LPS have been proposed to be hepatotoxic due to its ability to destruct liver cells. The multifocal necrosis produced by D-GalN and the lesion of viral hepatitis in humans are similar. 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.

### Immunomodulatory Activity

Ethanollic extracts of leaves of *Tridax* have immunomodulatory effect on Albino rats dosed with *Pseudomonas aeruginosa* also inhibits proliferation of same<sup>16</sup>. Also a significant increase in phagocytic index, leukocyte 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 heamagglutination antibody titer. Study also reveals that *Tridax* influences both humoral as well as cell mediated immune system<sup>15</sup>.

### 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<sup>19</sup>. *Tridax* antagonized anti-epithelization and tensile strength depressing effect of dexamethasone (a known healing suppressant agent)

without affecting anticontraction and antiggranulation 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 immunocompromised (steroid treated) rats in dead space wound healing model. 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<sup>17</sup>.

### Antidiabetic Activity

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<sup>1</sup>.

### Antimicrobial Activity

Whole plant of *Tridax* has reported for its antimicrobial activity on various species of bacteria. A whole plant is squeezed between the palms of hands to obtain juice. Fresh plant juice is applied twice a day for 3-4 days to cure cuts and wounds. The extract of whole plant of *Tridax* showed antibacterial activity only against *Pseudomonas aeruginosa*. The disk diffusion method was used to test the antibacterial activity. Four strains of bacteria employed in test were two-gram positive *Bacillus subtilis*, *Staphylococcus aureus* and two gram negative *Escherichia coli* and *Pseudomonas aeruginosa*<sup>10</sup>.

### Miscellaneous

The cardiovascular effect of aqueous extract from the leaf of *Tridax* was investigated on anaesthetized *Sprague-Dawley* rat. The aqueous extract 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 dose leads to significant reduction in heart rate where as lower dose did not cause any changes in heart rate. It means that a leaf of *Tridax* has hypotensive effect<sup>9</sup>. In one study, essential oils extracted by steam distillation from leaves *Tridax* were evaluated for its topical repellency effects against malarial vector *Anopheles stephensi* (*An. Stephensi*) in mosquito cages. All essential oils were tested at three different concentrations (2, 4 and 6%). Of these, the essential

oils of *Tridax* exhibited relatively high repellency effect (>300 minutes at 6% concentration) and concluded that *Tridax* are promising as repellents at 6% concentration against *An. Stephensi*<sup>14</sup>. *Tridax* also reported for its anti inflammatory and anti oxidant activity when DPPD (2,2 –diphenyl-1-picrylhydrazyl hydrate) and HET –CAM (Hen’s egg chorioallantoic membrane) assay were done<sup>17</sup>. Leaves of *Tridax* are used for promotion of hair growth also it is reported for its preventing effect on falling of hairs but this part is open for research work<sup>11, 12</sup>. Interestingly phytoremediation technology is used for the removal of Cr (VI) in industrial wastewater and *Tridax* used as bioadsorbent. Also *Tridax* has been used for bronchial catarrh, dysentery, diarrhoea and 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<sup>17</sup> Chromium (VI) is one of the highly toxic ions released into the environment through leather processing and chrome plating industries. 97 percent Cr (VI) removal in synthetic wastewater sample was achieved when 5g of the bioadsorbent was used. This method is also applied to the removal of Cr (VI) from tannery industry wastewater. Hence, it is recommended that, this bioremediation technology is a

cleaner and useful methodology for the removal of Cr (VI) from the industrial wastewater<sup>18</sup>.

### Conclusion

*Tridax procumbens* Linn. (Compositae) is a weed found throughout India, it is native of tropical America and naturalized in tropical Africa, Asia, and Australia. This plant widely distributed and it’s each and every part having noble pharmacological activity. The work done till todate on its pharmacological activities like hepatoprotective effect, immunomodulating property, promising wound healing activity, antidiabetic, hypotensive effect, antimicrobial, insect repellent activity, anti inflammatory and antioxidant, bronchial catarrh, dysentery, diarrhoea 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 (summarized in Table 1). This is dispensed for “Bhringraj” by some of the practitioners of Ayurveda. In future, there is huge room for research in direction of more pharmacological activities of plant and to elucidate the mechanism of action of same. The studies on plant *Tridax procumbens* Linn. also desired development of novel therapeutic agents isolated from it, as isolation of oleanolic acid a single triterpenoids is reported from this plant.

**Table 1: List of various Pharmacological activity of parts of plant *Tridax procumbenc* Linn.**

Plant part	Pharmacological activity	Reference
Whole plant	Antimicrobial activity against both gram-positive and gram-negative bacteria	R.B. Mahato and R.P. Chaudhary 2005.
	Anti coagulant	Mohammed Ali et.al., 2001.
	Anti inflammatory	R. Nia et.al. 2003
Flowers, leaves	Anti septic, Insecticidal, Parasiticidal	V. K. Saxena and Sosanna Albert, 2005
Aerial parts	Hepatoprotective	Vilwanathan Ravikumar et.al. 2005
Leaves	Wound healing	Rajinder raina, et.al., 2008
	To check haemorrhage from cuts, bruises and wounds	V. K. Saxena and Sosanna Albert, 2005
	Hypotensive activity	Salahdeen H. M. et.al. 2004
	Antidiabetic activity	Bhagwat D.A., et.al., 2008.
	Dysentery, Diarrhoea	V. K. Saxena and Sosanna Albert, 2005.
	To prevent falling of hair and promotes the growth of hair.	V. K. Saxena and Sosanna Albert 2005;
	Against conjunctivitis	V. Rathi et.al., 2008.
	Immunomodulating property	R. Nia et.al. 2003.
	Insect repellent activity	Umesh Tiwari et.al. 2004, M.K. Oladunmoye et.al., 2006.
		Rajkumar, S. and Jebanesan, A., 2007.

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