

# A Descriptive Review On Phytochemistry Of *Tridax Procumbens*

Rohit Kumar Bijauliya<sup>1\*</sup>, Prashant Kumar Singh<sup>2</sup>, Prof.(Dr.) Yasmin Khatoon<sup>3</sup>, Sumit Chaudhari<sup>4</sup>, Yogendra Singh<sup>5</sup>, Satyendra Kumar<sup>6</sup>, Mukesh Kumar Bhardwaj<sup>7</sup>

<sup>1,5</sup>Assistant Professor, BIU College of Pharmacy, Bareilly International University, Bareilly, UP, India.  
Email-rkpharma3791@gmail.com, yogendrasingh866@gmail.com

<sup>2,4</sup>Associate Professor, Department of Pharmacy, AGI College of Pharmacy, Lucknow, UP, India  
Email-prashants845@gmail.com, dynamicsumitchaudhari@gmail.com

<sup>3</sup>Professor, Department of Pharmacy, Shree Ramswaroop Memorial University, Barabanki, Uttar Pradesh, India, Email-yassu.ayaan@gmail.com

<sup>6</sup>Associate Professor, BIU College of Pharmacy, Bareilly International University, Bareilly, UP, India.  
Email-satyendramph@gmail.com

<sup>7</sup>Associate Professor, Rakshapal Bahadur College of Pharmacy, Bareilly Uttar Pradesh, India.  
Email-mukeshbhardwaj1658@gmail.com

\*Corresponding Author:- Rohit Kumar Bijauliya

<sup>1</sup>Assistant Professor, BIU College of Pharmacy, Bareilly International University, Bareilly, UP, India.  
Email-rkpharma3791@gmail.com  
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## Abstract

Over 2000 different types of medicinal herbs and spices may be found in India, which has a great biodiversity. One of the five major kingdoms of living things is the kingdom of plants. It is most well-known for being a common weed, *Tridax procumbens*. Local people known it as "Ghamara", in English popularly called 'coat buttons' and is dispensed for "Bhringraj" by some of the practitioners of Ayurveda. *Tridax procumbens* Linn. is a weed found throughout India. Although it is native to tropical America, *Tridax procumbens* Linn. has been introduced to tropical, subtropical, and temperate parts of the world. *Tridax procumbens* (Asteraceae or Compositae) is a small perennial herb having short, hairy, blade like leaves. Studies on phytochemistry found that the plant component contains a variety of secondary metabolites. This research was done to show the range and value of a certain plant in the pharmaceutical sector. To uncover its potential use in the sphere of pharmaceuticals and medicine, which is the desire of the average man, more research must be done to isolate the phytochemical ingredients of a chosen plant portion.

**Keywords:** Herbal drug, *Tridax procumbens*, Phytochemistry, Chemical constituents

## 1. INTRODUCTION:

Humans have been inspired by nature from the beginning of time, and every member of the human species, regardless of background or faith, holds nature in high regard. Many modern pharmaceuticals have already been isolated from these abundant natural resources, especially those of plant origin, which have provided us with a vast library of therapeutic herbs for thousands of years. Nearly 65% of people worldwide use herbal remedies as their main form of healthcare, according to the World Health Organization (1). Since the beginning of human civilization, medicinal plants have been an integral element of human society's efforts to fight sickness. Both herbal and folklore medicine developing nations frequently use herbal remedies or folkloric medicines to treat a variety of ailments. However, as technology and development have advanced through time, synthetic medications have begun to take the place of natural ones, despite the fact that the former can also cause negative effects. According to statistics, synthetic medication side effects account for roughly 8% of hospital admissions in the United States of America, and about 100,000 individuals pass away each year as a result of these toxicities (2, 3).

Herbal remedies typically have a milder action, attempting to help remove excesses that have gotten dominant while also supporting or uplifting body systems and processes that have become inadequate. They typically have a number of wide complimentary or synergistic effects on physiological systems, all of which are typically therapeutic in nature. Therefore, natural medicines that can lessen the toxicities and side effects of their synthetic equivalents as well as maximise therapeutic potential with powerful and dynamic healing effects should be employed to treat any disease rather than synthetic medicines. It is even known that the majority of people in the globe use drugs made from plants for their basic medical needs. (4)

## 2. PLANT DESCRIPTION

*Tridax procumbens* commonly known as coat buttons. Some of the medicinally important species of the genus *Tridax* are: *T. serboana*, *T. erecta*, *T. angustifolia*, *T. accedens*, *T. bicolor*, *T. rosea*, and *T. dubia* (5). Although it is indigenous to the tropical Americas, it has been spread throughout the world to tropical, subtropical, and mild temperate climates. It has a noxious weed. In regions with tropical or semi-tropical climates, this plant can be found in fields, croplands, meadows, lawns, disturbed areas, and roadsides. It has several pharmacological properties that have been scientifically examined, including insecticidal, hypotensive, leishmanicidal, antibacterial, wound-healing activity, anti-inflammatory, immunomodulatory, hair growth-promoting, and hepatoprotective (6).

**Table 1:** Botanical and Scientific Classification of *Tridax Procumbens* (7)

Classification	Scientific name	Biological name
Kingdom	Plantae	Plants
Subkingdom	Tracheobionta	Vascular plants
Division	Spermatophyta	-
Subdivision	Magnoliophyta	Flowering plants
Class	magnoliopsida	Dicotyledons
Subclass	Asteridae	-
Order	Asterales	-
Family	Asteraceae	Aster family
Genus	<i>Tridax</i> L	<i>Tridax</i>
Species	<i>Procumbens</i>	Coat buttons

**Table 2:** Vernacular Names of *Tridax Procumbens* Linn. (8)

S. No.	Language	Name
1	Hindi	Ghamra
2	Sanskrit	Jayanti Veda
3	English	Coat Buttons and <i>Tridax</i> Daisy
4	Telugu	Gaddi Chemanthi
5	Marathi	Dagadi Pala
6	Malayalam	Chiravanak
7	Tamil	Thata poodu
8	French	Herbe Caille
9	Chinese	Kotobukigiku
10	Spanish	Cadilp Chisaca

## 3. MORPHOLOGY:

**Appearance:** A perennial herb known as *Tridax procumbens* has a creeping stem that can grow to be 8-30 inches (20-75 cm) long.

**Foliage:** *Tridax procumbens* has opposite, pinnate leaves that are 1-2 inches (2.5–5 cm) long, oblong to ovate, and have cuneate bases, coarsely serrated margins, and sharp apexes.

**Fruits:** Achenes are the fruits, which are rectangular, dark brown to black in colour, and 0.08 inches (2 mm) long. Each achene has a head of pappus bristles, which can range in length from 0.12-0.24 inches (3-6 mm). Fruit is a firm, feathery achene with stiff hairs covering it. It features a white pappus-like plume on one end.

**Leaves:** Leaves are irregularly toothed and generally arrow head shaped. They are simple, ovate, opposite, exstipulate, and lanceolate and they are 3-7 cm. Wedge shaped base leaf, shortly petioled, hairy on both surfaces.

**Stem and root:** The stems are spherical, hispid, and coated in mm-long multicellular hairs. The base root has a strong taproot system with tuberculation. The plant stem rises to a height of 30 to 50 cm, is branching, has little hair, and roots at nodes.

**Seeds:** In the presence of 58 to 78% light, *Tridax procumbens* seeds germinate at higher temperatures (35/25 and 30/20). This has chromosome numbers of 36 (diploid) and 18 (haploid) in gametes, making it extremely susceptible to salt concentration and water stress. Spreading steam and seed production are the production methods.

**Flowers:** The plant's blossoms resemble daisies. The tubular flower has three-toothed ray florets and white or yellow blossoms with a yellow centre. Capitulum is inflorescence. It has two different flower types: disc florets with basal palcentation and ray florets. The flowers can occasionally have three lobes and lengthy, pendulous crowns. Black, 2.0–2.5 mm length, narrowly obconical achenes with feathery pappus. Flowering and fruiting all year long (9, 10, 11).



**Figure 1:** *Tridax procumbens* Seed, Leaves, Flower and Stem

#### 4. PHYTOCHEMISTRY

It has been demonstrated in numerous scientific investigations that the plant contains a variety of phytochemical substances. Alkaloids, flavonoids, saponins, tannins, and carotenoids 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 fibre (17%), soluble carbohydrates (39%), and calcium oxide (5%). On the other hand, its blossoms have been shown to contain quercetin, glucoluteolin, luteolin, and isoquercetin. There have also been reports of fumaric acid and -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 shows different chemical constituents such as 2,6-dihydroxyacetophenone 2-0-- D-glucopyranoside, echioidinin, pinostrobin, dihydroechioidinin, tectochrysin 5-glucoside, methyl salicylate glucoside, 5, 7, 8-trimethoxyflavone, skullcapflavone 1, 2-methyl ether, androechin, tectochrysin, 5, 7, 2-trimethoxyflavone, echioidin, skullcapflavone, 5, 7-dimethoxyflavone, andrographidine. From the aerial parts of *Tridax procumbens*, a new flavonoid named as procumbenetin has been isolated and characterized by chemical means and spectroscopic techniques. Two new flavones named as 6, 8, 3-trihydroxy-3, 7, 4-trimethoxy and 8, 3-dihydroxy-3, 7, 4- trimethoxy-6-0-D-glucopyranosyl were isolated and characterized based on chemical analysis and spectral methods. Apart from it, four known compounds oleanolic acid, puerarin, esculetin, and betulinic acid were also isolated from the plant parts.

Tri-bisbithiophene, a brand-new bisbithiophene, was found in the ethyl acetate-soluble portion of hexane decoctions of this plant together with four other terpenoids, including lupeol, P-amyrenone, taraxasteryl acetate, and oleanolic acids. Two water-soluble polysaccharide fractions, WSTP-IA and WSTP-IB, were isolated from *Tridax procumbens* leaves using graduated ethanol precipitation, mild delignification, and size-exclusion chromatography.

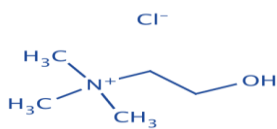
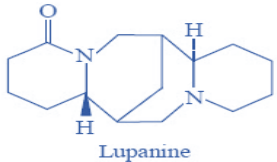
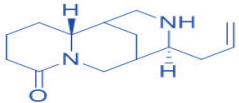
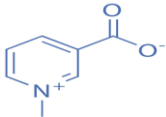
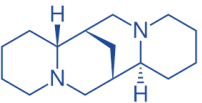
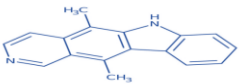
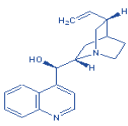
*Tridax procumbens* Linn's leaf and other components. are said to include calcium oxide, crude proteins, flavonoids, lignans, carotenoids, hydroxycinnamates, alkaloids, phytosterols, flavonoids, and soluble carbohydrates. There have also been reports of fumaric acid, P-sitosterol, and the pentacyclic triterpenoid oleanolic acid. Luteolin, glucoluteolin, quercetin, and isoquercetin have been reported in flower extracts. Some of the other phytochemicals present abundantly in *Tridax procumbens* are 2, 6- dihydroxyacetophenone, dihydroechioidinin, androechin, tectochrysin-5- glucoside, 2-0-P-D-glucopyranoside, echioidinin, echioidin, 5, 7-dimethoxyflavone, kullcapflavone ii, pinostrobin, skullcapflavone-2-methyl ether, methyl salicylate glucoside, 5,7,8- trimethoxyflavone, tectochrysin, 5,7,2' - trimethoxyflavones, and andrographidine. (12-16)


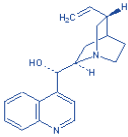
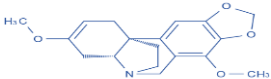
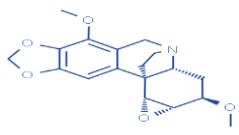
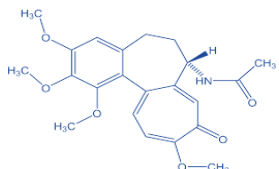
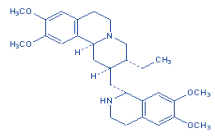
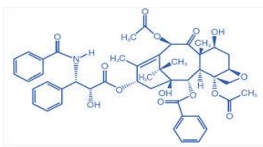
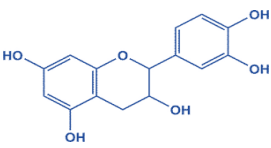
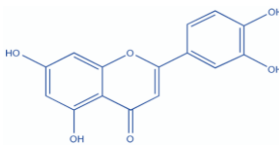
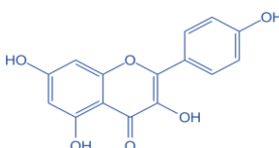
**Table 3.** Phytochemicals Found in *Tridax procumbens*

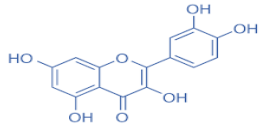
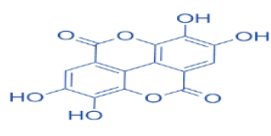
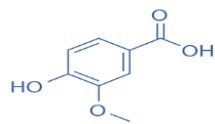
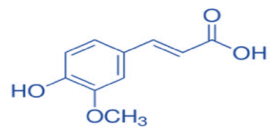
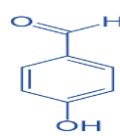
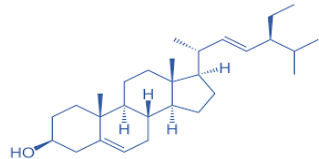
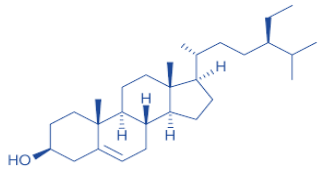
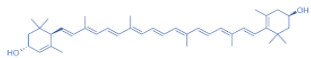
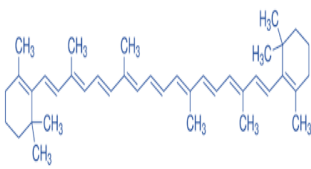
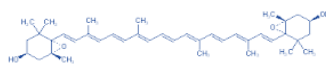
Plant Parts	Extraction	Compound	Activity	References
Aerials parts	Aqueous	-	Antidiabetic	(17, 18)
Leaves	Chloroform and acetone	Tannin	-	(19)
Leaves, Stem, roots & Flower	Aqueous, Ethyl acetate, ethanol	Flavonoids, kaempferol, isoquercetin, glucoluteolin	-	(20, 21)
Leaves	Aqueous	Alkaloids, akuammide, vaucagine	-	(18)
Aerial parts	Methano-dichloromethane	Bioactive compound	Antifungal	(22)
Pedicle and buds	Ethanol-acetic acid	Alkaloids	Antimicrobial, antioxidant, hepatoprotective	(23, 24)
Dried plants	Petroleum ether	-	antioxidant	(25)
Aerial parts	Distilled water-ethanol	-	Immunomodulatory	(26)

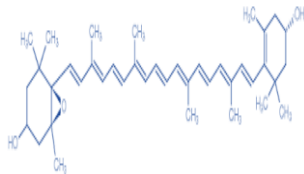

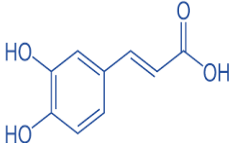
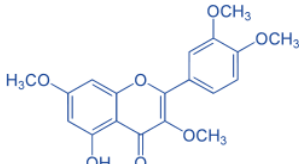
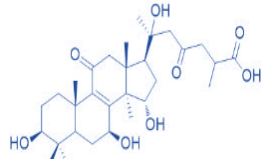
Dried leaves	Methanol-butanol	Flavonoids and saponin	Antioxidant	(27)
Dried leaves	Methanol-ethyl acetate	Flavonoids and saponin	Antioxidant	(27)
Flowers and aerial parts	n-hexane	-	antimicrobial	(28)
Flowers	Ethanol	Saponin B-sitosterol-3-O- $\beta$ -D-xylopyranoside	-	(25)
Leaves	Petroleum ether, ethanol	-	Antiulcerogenic effect	(29)
Leaves	Hydrodistillation	Essential oil	Anti-inflammatory and antimicrobial	(30)
Whole dried plant	Ethanol	Alkaloids, glycosides	-	(31)
Leaves	Chloroform, water	-	Antibacterial	(32)
Whole plant	Methanol	-	Hyperuricemia, Oxidative Stress, and Bacterial Infection	(33)
Leaves	Methanol, Ethanol, Chloroform and Water	Glycosides, flavonoids, alkaloids, carbohydrates, polyphenols	Antibacterial, Antioxidant	(34)
Whole plant	Methanol, petroleum ether, and ethyl acetate	-	Antidiabetic	(35)

**Table 4:** Name Chemical Constituents with Structure of *Tridax procumbens*

Chemical Constituents	Structure
<b>Alkaloids</b> Choline	
Lupanine	
Angustifoline	
Trigonelline	
Sperteine	
Ellipticine	
Cinchonidine	

Lupanine	
Cinchonine	
Buphanidrine	
Undulatine	
Colchicine	
Emetine	
Paclitaxel	
<b><u>Flavonoids</u></b> Catechin	
Luteolin	
Kaempferol	

Quercetin	
Ellagic acid	
<b><u>Benzoic Acid Derivatives</u></b> Vanillic acid	
Ferulic acid	
4-Hydroxy benzaldehyde	
<b><u>Phytosterols</u></b> Stigmasterol	
Sitosterol	
<b><u>Carotenoids</u></b> Lutein	
Carotene	
Viola xanthin	

Anthera xanthin	
<b>Tannins</b> Tannic acid	
<b>Hydroxy Cinnamates</b> Caffeic acid	
<b>Lignins</b> Retusin	
Galgravin	

## 5. CONCLUSION:

This review shows that the *Tridax procumbens* Linn. is a rich medicinal plant. Phytochemically, pharmacologically as well as traditional medicinal systems also proves this. Every part of plant, phytochemical study reveals presents of site and sources of phytomolecules. *Tridax procumbens* shows presence of a number of valuable constituents such as flavone glycoside, bithiophene, flavonoid (Procumbenetin), terpenoids, sterols, lipids and polysaccharides with significant pharmacological activities such as antidiabetic activity, anti-inflammatory, antimicrobial, wound healing, cardiovascular, antioxidant, insecticidal, anti-diarrhoeal, leishmanicidal, hepatoprotective. Additionally, it has antitubercular, anticancer, and immunomodulatory properties, which can be used to isolate and develop novel phytochemicals that can be used to treat both acute and chronic illnesses as a global issue. Compared to a man-made molecule because phytomolecules are less harmful, we can conduct fresh research in this area and create new active phytomolecules.

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