International Journal of Pharmaceutical Drug Design (IJPDD)
Website: https://ijpdd.org/
ISSN: 2584-2897
Vol. 2, Issue 9, September, 2025
Page No.: 32-39

Review

Phytochemical Composition and Pharmacological Activities of *Tridax procumbens:* A Comprehensive Review

Kartik Dhok

B.Pharm (7th Sem) Student, VNS Group of Institution, Faculty of Pharmacy, Bhopal (M.P.)

Corresponding Author:
Kartik Dhok

Email:
kartikdhok40@gmail.com

DOI: *10.62896/ijpdd.2.9.04*

Conflict of interest: *NIL*

Article History
Received: 12/08/2025
Accepted: 05/09/2025
Published: 18/09/2025

Abstract:
As an article of Tridax procumbens, the author Linnaeus presented the Tridax species in 1753. Coat buttons, or T. procumbens, are a member of the Asteraceae family. It thrives in the tropical and subtropical regions throughout the countries of South and Central America. Coat buttons have also proliferated in Asia, Africa, and the Pacific islands. Coat buttons contain flavonoids, carotenoids, alkaloids, tannins, terpenoids, norisoprenoids, volatile oil, lignans, and saponins. For centuries, Ayurvedic medicine in India relied on this plant for curing hundreds of ailments. The above antioxidative, antibacterial, antifungal, anti-inflammatory, wound-healing, antidiabetic, mosquitocidal, anticancer, antihypertensive, and antiparasitic functions of coat buttons are well known pharmacologically. Additionally, it has hepatoprotective, leishmanicidal, immunomodulatory, repellent, and antilithiatic qualities. This review is helpful in giving crucial details about the plant and demonstrates that it may be a safe, effective and reasonably priced treatment for a number of illnesses, particularly in tropical regions where the plant is widely available.

Keywords: Tridax procumbens, Asteraceae, Coat buttons

Introduction

Plants are vital medical resources that enhance world health. It has long been known that medicines and therapeutic procedures are excellent sources of therapeutic plants and herbs. The pharmacological assessment of many plants used in traditional medicine has advanced significantly as a result of the many ongoing investigations on herbal or medicinal plants.[1]

In 1753, “Linnaeus” claimed that the “Tridax species” ancestor was *Tridax procumbens*. The weed Tridax procumbens is a member of the Asteraceae family. The scientific name is "Tridax Procumbens." Other names for it include "Jayanti-Veda" (Sanskrit), "Tikki-Kasa/kamra," "Gharma" (Hindi), "Dagadi Pala," "Kambarmodi" (Marathi), "Vettukkaya-thalai (Tamil/Siddha), "Akala kohadi" (Folk), "Mexican daisy" (Mexican), "Tridax daisy," and "coat buttons" (English).[2]

Since ancient times, coat buttons have been utilised used to treat several kinds of illnesses. Some Indians use this plant as food or medicine. The phytochemistry has been thoroughly investigated. It has been possible to isolate and identify a variety of chemical compounds from this species, including flavonoids, essential oils, saponins, tannins, steroids, alkaloids, carbohydrates, carotenoids, and terpenoids. Coat buttons have many medical applications, including anaesthetic, antidiabetic, and anti-inflammatory properties. This herb has been used as an antiviral, antifungal, antihelminthic, anticancer, antifertility, and antiprotozoal remedy for many civilisations. It is also used as an antimicrobial to treat burns in newly cut wounds and anaemia. buttons for coats This weed's extracts have been demonstrated to prevent hair loss.[3]

International Journal of Pharmaceutical Drug Design (IJPDD)
Website: https://ijpdd.org/
ISSN: 2584-2897
Vol. 2, Issue 9, September, 2025
Page No.: 32-39

Taxonomy

Kingdom : Plantae
Subkingdom : Tracheobionata
Division. : Spermatophyta
Subdivision. : Magnoliophyta
Class : Magnoliopsida
Subclass. : Asteridae
Order : Asterales
Family. : Asteraceae
Genus : Tridax
Species. : Procumbens L [4]

Morphology

The most active of the 30 species is the genus Coat buttons, which is a member of the Asteraceae family of flowering plants. Ray florets with three teeth and a yellow centre are found on the plant's white or yellow flowers. Coat buttons measure 12–24 cm. Simple, opposing petioles that are 1-2 cm long support the leaves of a withering herb that has a few leaves that are 3-7 cm long and very long, slender, solitary peduncles that can reach a length of one foot. Its leaves are capitulum-shaped, oval, pointed, opposite, simple, and exstipulate. and the fruit has stiff hairs and a white pappus at one end that resembles a feather. The conical achene fruit is mature when it is pubescent, 3-6 mm high, and brown to black in colour. When fully developed, it is surrounded by a pappus of fluffy, horizontally prostrate bristles. While the base of the root is tuberculated, the stem is hispid, cylindrical, and covered in solitary multicellular hairs. The taproot system is reliable. [5]

Geographical distribution

Tropical and subtropical regions of Central and South America are home to the immensely helpful natural plant *T. procumbens*. Additionally, it has spread to the Pacific islands, Asia, and Africa. Even though it is common throughout India, some regions such as Maharashtra, Madhya Pradesh, Gujarat, and Odisha have higher rates than others. Because of its hardiness and ability to grow in a variety of settings, such as waste areas, pastures, gardens and roadsides, the plant is a prevalent weed in many areas.[6]

Chemical compositions

The phytochemical examination of Coat buttons showed the presence of flavonoids, carotenoids, alkaloids, tannins, Terpenoids, Norisoprenoids, Volatile oils, Benzoic acid derivatives, lignans and saponins.[8] the specific chemical constituents of plant Coat buttons are listed below.

- **Alkaloids:** An alkaloid found in coat buttons is essential to its therapeutic effects. One major alkaloid is Tridaxin, which assists in treating infections and reducing inflammation because of its potent antibacterial and anti-inflammatory properties. It is frequently utilised to treat many different kinds of bacterial and fungal infections. Betaine is another significant alkaloid that has antioxidant and liver-protective properties. Research suggests that betaine may protect liver cells from oxidative stress-induced damage.
- **Essential oil:** Terpenoids, alcohols, esters, aldehydes, and fatty acids make up the majority of essential oils. The biological characteristics and fragrance of the plant are influenced by numerous highly reactive substances. (3S) −16,17-dihydro falcarinol, a

polyacetylene with important biological properties, is one of the noteworthy compounds present in coat buttons. The anti-inflammatory and anti-cancer properties of the molecule increase the plant's therapeutic value.[7]

- **Carotenoids:** The fat-soluble pigments known as carotenoids are found in plant leaves and are necessary for both photosynthesis and photo Défense. Their photoprotective features are intimately connected to their antioxidant activity. The well-known carotenoids include β-carotene, lutein, violaxanthin, neoxanthin, and astaxanthin.
- **Saponins:** Coat buttons contain a particular kind of secondary metabolite called saponins. Among the saponins found in coat buttons are diosgenin, oleanolic acid, hederagenin, and campesterol.[8]
- **Benzoic acid derivative:** Further, fresh juice extracted from Coat button leaves was found to contain benzoic acid derivatives comprising ferulic acid, vanillic acid, 4-hydroxybenzoic acid, and 4-hydroxybenzaldehyde.
- **Lignans:** The most prevalent organic material, lignan, is found in plants. The subsequent lignans can be observed in coat buttons. Dehydroabietic acid, Apigenin-4,'7-dimethyl ether, Epieudesmin, (9E,12E,15E)-9,12,15-Octadecatrien-1-ol, Retusin, Galgravin, and Epieudesmin.
- **Tannins:** Plant naturally contains water soluble polyphenols known as tannins. The antioxidant properties of tannins may be responsible for their antimicrobial, anticarcinogenic, and antimutagenic effects. Tannic acid was isolated from a methanol extract of the aerial portion of coat buttons. The pedicle and buds of coat buttons contain tannic acid.[9]
- **Flavonoids:** Coat buttons contain the following kinds of flavonoids: quercetin, luteolin, kaempferol, apigenin, and catechin. These substances are found in nature and are important to the biological processes of the plant.
- **Phenolic compounds:** Numerous phenolic compounds, including ferulic acid, chlorogenic acid, and caffeic acid, are found in coat buttons. These substances are found in the plant and add to its overall chemical makeup.[10]

Pharmacological activities

- **Hepatoprotective activity:** In this study, male albino rats given high doses of paracetamol (2 g/kg of body weight) were used to test the protective effects of an ethanolic Coat buttons extract against liver damage. Increased levels of aspartate aminotransferase (AST) and decreased liver cell activity of antioxidants like catalase and superoxide dismutase were indicators of severe liver damage following paracetamol administration. Additionally, liver damage is indicated by increased susceptibility to infections, including ventilator-associated pneumonia and UTIs, particularly those brought on by the common hospital-acquired pathogen *Pseudomonas aeruginosa*. According to research, Coat buttons not only shield the liver but also demonstrates clear anti-Pseudomonas qualities, suggesting that it could be used to treat hospital-acquired infections as well as medication-induced liver damage.[11]
- **Antifungal activity:** *Aspergillus flavus* and *Aspergillus Niger*, two dangerous fungus strains, were examined using the Tridax Disc diffusion assay. Each active extract's antifungal potential was evaluated further by determining its total activity, minimum fungicidal concentrations (MFC), and minimum inhibitory concentrations (MIC). Alkaloid extracts were found to be ineffective against both test fungi, whereas flavonoid extracts demonstrated notable efficacy against A. Niger. Both free and bound flavonoids from the stems and flowers of A. Niger exhibited strong antifungal activity.[12]

- **Antibacterial activity:** It has been shown that Coat button abstracts have antibacterial properties. Extracts of Hisxyl hydride work well against *Klebsiella sp., Salmonella group C, Salmonella paraphyte, E. coli*, and *Mycobacterium smegmatis.* The ethyl acetate abstract worked well. Gram-negative bacteria such as *Klebsiella sp*. are in opposition to positive bacteria such as *Micrococcus aureus, Bacillus cereus, and Bacillus smegmatis*. against parasites that cure illnesses like malaria and diarrhoea brought on by protozoal infections. Crude extract coming from coat buttons looked to have anti-leishmanial characteristics. Ghana investigated the anti-plasmodial properties of aqueous, ethanolic, chloroform, and ethyl acetate extracts from the stem, leaves, and flowers. It helped protect red blood cells from *P. falciparum's* damaging effects.[13]
- **Anti-diabetic:** In the rat model of diabetes induced by alloxan, the alcoholic and aqueous extracts of Coat buttons leave exhibit antidiabetic action and a notable decrease in blood glucose levels. In another study, oral administration of 50% methanol extract of Coat buttons in acute and sub chronic doses successfully decreased the fasting blood glucose levels of diabetic rats. This might also be the case, especially for men, because they are helpful in lowering blood sugar in its early stages. This plant material has no effect on blood sugar levels in healthy rats. [14]
- **Insecticidal activity:** The powerful essential oils in Coat buttons have a remarkable effect of repelling insects. when tested against house flies, mosquito larvae, and cockroaches using three different ant species. Not assaulted by insects or grazed by animals. which suggests that the plants can either kill or repel insects.[15]
- **Anti-cancerous activity:** The anti-cancer properties of the traditional herb Coat buttons have been investigated using prostate epithelial malignant cells PC3 and crude floral aqueous and acetone extract. Cell viability has been assessed using the MTT method. The readily soluble yellow tetrazolium dioxide salt MTT [3- (4, 5-dimethyl –thiazole-2-yl)-2, 5-diphenyltetrazolium bromide] is broken down by the experiment's mitochondrial succinate dehydrogenase to produce a blue formazan. The study proved the anti-cancer potential of floral crude extracts by converting the yellow soluble salt MTT into a purple blue insoluble formazan precipitate, which can be detected spectrophotometrically at 570 nm, using a variety of mitochondrial enzymes in living cells.[16]
- **Antihypertensive activity:** Regardless of diastolic and systolic blood pressure, elevated pulse pressure is predictive with myocardial infarction (MI), coronary artery disease, and congestive heart failure. On the other hand, an increased heart rate, or tachycardia, is associated with a higher risk of dying from both cardiovascular and non-cardiovascular causes. The aqueous extract of coat buttons leaves diminished heart rate and overall arterial blood pressure in Sprague-Dawley rat models.[17]
- **Antiparasitic activity:** The active component, (3, S)-16,17-Didehydrofalcarinol (an oxylipin), has been isolated using Coat buttons methods in a bioassay-guided fractionation using a methanol extract. This drug has been investigated for the treatment of an array of illnesses associated with protozoal infections, notably vaginitis, colic, and malaria diarrhoea. When crude extracts of the entire plant were used, coat buttons demonstrated anti-leishmanial properties. In a Ghanaian study, the anti-plasmodial properties of water-based extracts, ethanol, chloroform, and acetate of ethyl from the stem, leaves, and flowers of Coat buttons were examined. There is proof that the species' aqueous and ethanolic extracts have anti-plasmodial qualities; a study using a colorimetric assay based on tetrazolium showed that Coat

buttons helped shield red blood cells from *P. falciparum* damage. Coat buttons hold great promise in the fight against a disease that kills millions of people worldwide.[18]

- **Urolithiatic activity:** Male albino rats were given ethanol extract of Coat buttons to test against oxidative stress caused by hyperoxaluria and calcium oxalate urolithiasis caused by 0.75% v/v ethylene glycol and 2% w/v ammonium chloride. Urinary excretion and renal deposition of calcium and oxalate caused by caluculogenesis were reduced in a dose-dependent manner by extract treatment, which also restored the pH of the urine to 6.5–7.5. This implies that ETP inhibited the supersaturation of CaOx in the urine, hence preventing the development of CaOx stones. Urine creatinine levels decrease as renal function improves. Mucoproteins have a high affinity for the CaOx surface, according to research, which promotes the growth and solidification of crystals. Saponins inhibit mucoprotiens, which prevents the excretion and deposition of CaOx, the antiurolithiatic effect of ETP, a pentacyclic triterpene saponin derivative of the Lupane type from Coat buttons, may be due to its saponin principles. since it has been demonstrated that saponins pre-coat CaOx crystals, decreasing their adhesion to renal epithelial cells.[19]
- **Immunomodulatory activity:** In albino rats, coat button leaf ethanol extracts suppress *Pseudomonas aeruginosa* growth and have immunomodulatory effects. Furthermore, the aqueous *Tridax* extract's ethanol insoluble fraction has been shown to dramatically raise the splenic antibody-secreting cells, phagocytic index, and leukocyte count. Along with an increase in the titer of hemagglutination antibodies, it was also observed that the humoral immune response was stimulated. Further investigation shows that coat buttons modify the immune system's humoral and cell-mediated components.[20]
- **Repellency activity:** In one study, essential oils were extracted from leaves using a steam distillation process, and their capacity to fend off the malaria parasite Anopheles stephensi locally in mosquito cages was investigated. Each essential oil has been assessed in three different concentrations. The plant's essential oils were extremely repulsive.[21]
- **Anti-inflammatory activity**: Recently, it has been shown that coat buttons have strong anti-inflammatory properties. The plant decoction's corticotropic action initiates the activity. Among the naturally occurring, moderately polar compounds present in the primary fraction, ethyl acetate, are alkaloids and flavonoids. The pathophysiology of inflammation and related disorders can be counteracted by these bioactive fractions.[22] According to the current study, coat buttons are a more effective treatment for COPD because they inhibit HNE [Human neutrophil elastase]. Among the phytochemicals from Coat buttons that are highly active and have excellent pharmacological activity against inflammation by blocking HNE are apigetrin, puerarin, centaureidine, and myricetin.[23]
- **Wound healing activity:** Coat button's ability to promote wound, study gives information that the formulation of nanohydrogel showed dose-dependent effects on cell proliferation, with optimal concentrations promoting migration and growth of cells. The combination of dopamine, chitosan nanoparticles, and coat buttons extract showed promise in hastening wound healing.[24]
- **Anti-oxidant:** By measuring the hydrogen donation or radical-scavenging capacity of the Coat buttons fractions and ascorbic acid using the stable free radical DPPH, their ability to neutralise free radicals was evaluated. A 0.1 mM solution of DPPH in methanol was created and 1.0 ml of this solution was added to 3.0 ml of the extract solution in water at various concentrations (10 to 100 microliters per millilitre). The absorbance measurement was taken at a

wavelength of 517 nm thirty minutes later. A higher degree of free radical scavenging activity is indicated by a lower absorbance of the reaction mixture. By using the equation Scavenging Effect (%) = [1-Abs. of Sample/Abs. of Control] x 100, the ability to scavenge the DPPH radical was calculated. The IC_{50} was used to quantify the fractions' antioxidant activity. The IC_{50} value, which was measured in microgrammes per millilitre, was defined as the concentration of methanolic extract fractions needed to start the production of DPPH radicals by 50%.[25]

- **Toxicology:** The pharmacological effects of Coat buttons decoctions varied, according to several studies. Using the Lorkes technique, the acute toxicity reading was completed. Even if the test animal was given the decoctions orally, the LD_{50} might be much higher because they will be metabolised to produce a new invention that might be less harmful. Following acute dosing, toxicity symptoms such as restlessness and salivation, nose and mouth on the cage floor are seen. When compared to the untreated control, the surviving animals' body weight and organ ratio increased, and the decoctions' LD_{50} was 2100 mg/kg body weight.[26]

Conclusion:

Medicinal plants are considered the foundation of traditional medicine and include all plant species used in herbal therapy. The importance of recent coat button research is emphasised in this review. Numerous secondary metabolites, such as flavonoids, carotenoids, alkaloids, tannins, terpenoids, norisoprenoids, volatile oils, benzoic acid derivatives, lignans, and saponins, contribute to the remarkable pharmacological properties of coat buttons. Coat buttons' antioxidative, antibacterial, antifungal, hepatoprotective, antidiabetic, mosquitocidal, anticancer, antihypertensive, and antiparasitic properties all work well to encourage wound healing. It also has antilithiatic, immunomodulatory, repellent, leishmanicidal, and anti-inflammatory properties, making Coat buttons a more effective treatment for COPD. Anaemia and jaundice are treated locally using Coat buttons extract, which also has the capacity to promote hair growth. Included here are the comprehensive pharmacological reports of Coat buttons. Future studies have a lot of potential to elucidate the plant's mode of action and uncover additional therapeutic applications.

Reference:

1. Evbuomwan S.A., Omotosho O.E., Akinolo O.O., “A mini review on some known medicinal uses of *Tridax procumbens*”, Tropical journal of natural product research, August 2022; 7(8): 3573-3584.
2. Ingole V.V., Mhake P.C., Katade S.R., “Phytochemistry and Pharmacological expect of *Tridax procumbens* (L): A systematic and comprehensive review”, Phytomedicine Plus, 2022; (2): 1-26.
3. Sivakumar T., Deepa B., “A review on traditional and pharmacological application of *Tridax procumbens L.*”, Journal of Xidian University, 2023; 17(7): 758-767.
4. Tade S.R., Singhal N.S., “Pharmacological properties of *Tridax procumbens Linn”*, World Journal of pharmaceutical research, 2023; 12(7): 976-989.
5. Bijauliya R.K., Singh P.K., Khatoon Y., Chaudhari S., Singh Y., Kumar S., Bhardwaj M.K., “A descriptive review on phytochemistry of *Tridax Procumbens”*, Journal of Pharmaceutical Negative result, 2022; 13(8):2646-2653.
6. Dattaray D., “Traditional uses and pharmacology of plant *Tridax Procumbens*: A review”, A multifaceted review Journal in the field of pharmacy, 2022; 13(5): 511-517.
7. Aarefoddin K. K., Altamash M., Danish A., “Morphological and Phytochemical Attributes of *Tridax procumbens(l.)*: A Review”, International Journal of Research in pharmacy and Allied Science (IJRPA), March 2025; 4 (3): 95-102.
8. Sarkar M., Naaz A., “*Tridax procumbens*: A comprehensive review of its botany, ethanomedicine, phytochemistry and pharmacological significance”, Vison publication, 15 Mar 2025; 3(3): 78-92.

9. Ikewuchi C.C., Ikewuchi, J.C. and Ifeanacho, M.O., "Phytochemical Composition of *Tridax procumbens* Linn Leaves: Potential as a Functional Food", *Food and Nutrition Sciences*, 2015; 6: 992-1004.
10. Baile B. S., Parmar R., G., "A Review: Investigating the Pharmacognostic, Phytochemical and Therapeutic Properties of *Tridax procumbens* from the Asteraceae Family", Pharmacognosy Research, March 2025; 17(1):18-30.
11. Khaikar M., Dr. Darekar A., "*Tridax Procumbens Linn*.: A Review of Pharmacognostical, Phytochemical, and Pharmacological Properties", A Multidisciplinary peer-reviewed Journal, 2025; 2(4):79-84.
12. Jaiswal R., Jaiswal Y., Gajbhaye A., "A Review Study of Various Pharmacological Activity of *Tridax Procumbens Linn* Plant", IOSR Journal of Pharmacy and Biological Sciences, Oct. 2020; 15(5): 25-27.
13. Mande A., Mulani S., Mujawar M., Jagtap T., Gaikwad O., "Traditional uses and pharmacological activity of medicinal plant *Tridax Procumbens Linn*: A review", World Journal of pharmaceutical research, April 2023; 12(7): 925-931.
14. Adelowo F., Oladeji O., "A review on *Tridax procumbens*: a weed with immense phytochemical and pharmacological activities", Communications in Plant Sciences, Dec. 2016: 1-9.
15. Shingage M. V., Karadikar N. N., "A Review on Pharmacological &Biological Activity of *Tridax Procumbens Linn* (*Bhringraj)*", World Journal of Pharmaceutical Research, May 2021; 10(6): 705-715.
16. Singh S., Roy S., "A Review on Pharmacological and Therapeutic Potential of *Tridax Procumbens*", Hosp. Pharmacy, March, 2019 ;14(1): 131-142.
17. Gubbiveeranna V., Nagaraju S., "Ethnomedicinal, Phytochemical Constituents and Pharmacological Activities of *Tridax Procumbens*: A Review", International Journal of Pharmacy and Pharmaceutical Sciences, 2016; 8(2):1-7.
18. Beck S., Mathison H., Todorov T., Juarez E. A. C., Kapp O. R., "A Review of Medicinal Uses and Pharmacological Activities of *Tridax Procumbens (L.)*", Journal of Plant Studies, Jan. 2018; 7: 19-35.
19. Maurya S. K., Verma D. K., "Phytochemical and Pharmacological Review of *Tridax Procumbens L.",* World Journal of Pharmaceutical Research, 2021; 10(1): 340-357.
20. Mnaje K., Shinde O., Jawale S., Minaj I., "A review of *Tridax procumbens* a weed: review", International Journal of advanced research in science, communication and technology (IJARSCT), December 2022; 2(2): 32-38.
21. Ghosh P., Biswas S., Biswas M., Dutta M., Sil S., Chatterjee S., "Morphological, Ethnobiological and Phytopharmacological Attributes of *Tridax procumbens Linn. (Asteraceae)*: A Review", International Journal of Scientific Research in Biological Sciences, Apr. 2019; 6(2): 182-191.
22. Ahmed S. S., Mani R. K., Kiran S., Bharthi D. R., Shaji A., Sunny A., Raveendran A., "*Tridax procumbens* pharmacological activities - An updated review, UPI Journal of Pharmaceutical Medical and Health Sciences, 2021; 4(3): 6-12.
23. Nagarajan S., D. Arun, M. Divya Jayalakshmi K., Gupta P.S., Pal A.K., Rani S., "In- silico screening of phytochemicals from *Tridax Procumbens* against human neutrophil elastase targeting Chronic obstructive pulmonary disease", Trends in Immunotherapy, 2024;8(2): 1-12.
24. Tripathi N., Makode D., Jawade V., Verma M., Kanwar J. R., Chowdhary R., Choudhary A., Chandurkar P., Yadav A.K., Patil V.D., "Exploring the wound healing potential of *Tridax Procumbens* Extract: A comprehensive analysis though in vitro cytotoxicity and scratch assay studies", SSR

institute of international Journal of life sciences, February 2024;10(2): 5146-5151.

25. Adelowo F., Oladeji O., "A review on *Tridax procumbens*: a weed with immense phytochemical and pharmacological activities", Communications In plant science, 16 Feb. 2016;7: 1-9.
26. Selvakumar P., "Pharmacognostical and Phytopharmacological Review on Coat buttons", J Prev Diagn Treat Strategies Med, 2022; 1:202-208.

*****