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Review Article

**REVIEW ON PHARMACOGNOSTIC AND
PHARMACOLOGICAL STUDY OF *DRACEANA TRIFACIATA*
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Maharashtra, India-414202**Abstract:**

Dracaena trifasciata (prain) Mabb. (Asparagaceae) is a perennial herb, commonly known as snake plant, native to West Africa, cultivated as ornamental plant in homes and parks. The leaves and rhizomes are traditionally used against acne, fungal infection, skin itches, herpes zooster, allergy, ulcer, helminths, pharyngitis, urinary tract infection, jaundice, analgesic and antipyretic, antimicrobial and antidiabetic in various countries. This review comprehensively describes the Botany, traditional use, Pharmacognosy, and Pharmacology of multidimensional herb.

Keywords: *Dracaena trifasciata*, pharmacology, pharmacognosy, fungal infection, herpes zooster, allergy, anti-microbial

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INTRODUCTION:

In current scenario, medicinal plants are worthy replacement for synthetic chemical drugs as an environment renovation in the medical field. One of the major reasons for alternative is minimum side effects than synthetic chemical drugs. Also, the field of herbal products has significantly contributed to the advancement of Pharmacology and medicine. The extraction and isolation of wide range of phytochemicals from numerous plants are still motivates many researchers globally to discover new bioactive compounds and their pharmacological actions [1]. *Dracaena trifasciata* (prain) Mabb. (Synonym: *Sansevieria trifasciata prain*; Family-*Asparageceae*) commonly known as Snake plant, a perennial, upright, herbaceous evergreen succulent plant, native to tropical West Africa, found in many regions in world. The perennial plant *Dracaena trifasciata* spreads by means of its creeping rhizome, which can be found both above and below ground. It grows in dense strands. Its stiff leaves emerge from a basal rosette and grow vertically. Mature leaves are dark green with light gray-green crossbanding. They typically measure 70 to 90 cm (2.3–3.0 ft) in length and 5–6 cm (2.0–2.4 In) in width, though under the right circumstances, they can grow to heights of more than 2 m (6 ft) in optimal conditions. It is known that this plant contains tannins, phenolics, steroids, and alkaloids. This plant has been shown to have antibacterial, antioxidant, and anti-analgesic properties in earlier research [2-4]. It is used in medicine to treat a variety of conditions, including helminth infections, allergies, pharyngitis, jaundice, urinary tract infections, analgesics, and antipyretics. It is grown for its fiber in a number of tropical nations [5,6]. According to the study by NASA, *D. trifasciata* is among the finest plants for enhancing indoor air quality since it can passively absorb a variety of air contaminants. As a result, it may have a stronger refreshing effect. [7 , 8]. Researchers tested ethanolic extract and its fractions for antibacterial and antidiabetic properties due to the presence of several chemical components. A non-toxic organic solvent called ethanol is utilized to extract bioactive plant components. The multilayer maceration method was used to create the extracts in this study, which is a novel approach to research.

TAXONOMY:

There are about 120 species in the genus *Dracaena* Vand. Ex L. (subfamily *Nolinoideae*; family *Asparagaceae*; order *Asparagales*) [7]. The APG IV system of classifying flowering plants still distinguishes the genera *Sansevieria* and *Dracaena* based on long-standing debates about their taxonomic positions. Yet, new molecular phylogenetic analyses within *Dracaena* included the Species that were formerly assigned to *Sansevieria*. *Dracaena trifasciata* subsp. *Trifasciata* and *Dracaena trifasciata* subsp. *Sikawae* (R.H.Webb & Yinger) Takaw.-Ny. & Thiede are the two infraspecific taxa that belong to the species. Many cultivars of variegated foliage have been created, with popular varieties including *Compacta*, *Goldiana*, *Hahnii*, *Laurentii*, *Silbersee*, and *Silver Hahnii* having leaf margins striped in yellow or silvery-white [8–11].

MORPHOLOGICAL CHARACTERS:

The morphology of *Dracaena trifasciata* (commonly known as snake plant or mother-in-law's tongue) can be described as follows:

The leaves are long, upright, tapering, word-shaped, leaves can measure up to 2 to 3 feet in length and 2 to 3 inches in breadth, depending on the variety. Generally, the leaves are dark green with light grayish-green crossbanding; however, variegated varieties with cream or yellow edges are also frequently seen. Leaves have a thick, waxy, leathery feel. *Dracaena trifasciata* usually lacks a visible aerial stem since the majority of its growth originates from leaves that emerge directly from the base of the plant, where the root system is located. The plant grows from an underground rhizome (horizontal stem) that allows it to expand and produce new shoot, the majority of *Dracaena trifasciata*'s growth originates from its leaves, which emerge straight from the plant's base. The plant's shallow, fibrous root system grows from the rhizomes, which aid in propagation by creating new plants next to the parent plant, though this is uncommon in indoor environments. Small, tubular, greenish-white flowers on a thin stem can be produced by *D. trifasciata*. The flowers are frequently fragrant, especially at night. The plant grows stiffly and uprightly, producing rosettes of vertical leaves.



PHARMACOGNOSY:

The macro and microscopical characters, physicochemical properties And thin layer chromatographic profile of leaf, rhizome and root of *D. Trifasciata* were studied by Babu and Srinivasaprabhu [13].

MACROSCOPIC CHARACTERS OF LEAF:

Fresh leaves are strong, stiff, sword-shaped, erect, linear-lanceolate, clusters, up to 1 m tall, dark green with a grey- or white-wavy cross Sharp point, smooth margin, and stripes. Dried leaves have a harsh taste and no smell. They are dull green to light brown, longitudinally wrinkled, and curled toward the inner, fibrous cut surface;bitter taste, no odour.

MICROSCOPIC CHARACTERS OF LEAF:

Cross section of leaf exhibited a single layer of epidermis with square to oval-shaped cells. Both surfaces have thick cuticles, smooth cuticular ornamentation, and neither surface has any trichomes or other appendages. Tetracytic and amphistomatic stomata. Lamina is D-shaped or curved, with a thickness of 1–5 mm. Mesophylls are isobilateral cells that are divided into an inner water-storing parenchymatous cell layer and an outside region of chlorenchyma. Oval in shape, closed, collateral, endarch, and with a well-developed sclerenchyma cap above the phloem are the vascular bundles. The central mesophyll cells and the chlorenchyma contain raphides crystals.

MACROSCOPIC CHARACTERS OF RHIZOME:

The fresh rhizome is smooth, shiny, mucilage-containing, cylindrical, fibrous, 1-2 cm thick, and 10 cm long. It also has noticeable leaf scars on its exterior surface. The dried rhizome has longitudinal wrinkles, a light brown outer surface, a thin, sliced white surface, and is fibrous. It also has an unpleasant taste and no smell.

MICROSCOPIC CHARACTERS OF RHIZOME:

The cross section of rhizome is circular in outline. The epidermis is made up of several layers of suberized cells with thin walls. Undifferentiated ground tissue made up of parenchymatous cells that are mucilaginous. Numerous, closed, collateral, endarch, and dispersed vascular bundles in the subcutaneous tissue. The Sclerenchyma bundle cap encircles each vascular bundle. Xylem comprises of 6-8 vessel parts, Metaxylem located towards outside and protoxylem towards interior. Sifting tubes and partner cells make up the phloem, which is situated directly above the metaxylem.

MACROSCOPIC CHARACTERS OF ROOT:

The roots have a wiry, rough surface, length of up to 15 cm, and thickness of 1.5-2.0 mm. They are brown in color and tasteless.

MICROSCOPIC CHARACTERS OF ROOT:

The transverse section of roots clearly separated into the vascular ring, inner pith, cortex, and outer epidermis. The epidermis is made up of suberized cells with thick walls that have a cubic or triangle form. The broad cortex is made up of isodiametric parenchymatous cells with thin walls. The pericycle and endodermis, which clearly divide the cortex and vascular area, are present. The vascular zone is circular in shape and is made up of alternating strands of xylem and phloem. Pith comprised of parenchymatous cells placed in the central region and calcium Oxalate crystals are absent.

PHYTOCONSTITUENTS:

The plant *Dracaena trifasciata*, sometimes referred to as mother-in-law's tongue or the snake plant, is rich in phytochemicals, which are substances that plants make to help defend themselves against pests, diseases, and environmental stressors. Among the important phytochemicals present in *Dracaena trifasciata* are:

1. The saponins

These glycosides cause froth when combined with water. Antimicrobial, antioxidant, and anti-inflammatory qualities are possessed by saponins. They aid in bolstering the immune system as well.

2. Plant pigments

It is well known that flavonoids have antioxidant properties. When ingested or applied, they may provide anti-inflammatory, antiviral, and anticancer effects to humans in addition to aiding in the protection of the plant.

3. Glycosides with a stain

The plant's defense mechanisms involve these chemicals. Additionally, steroidal glycosides may have anti-inflammatory and antibacterial properties.

4. Alkaloids

Alkaloids are nitrogenous substances with potential medicinal uses, such as pain relief and anti-inflammatory qualities. In large quantities, they may be harmful though.

5. Phenolics

As antioxidants, phenolic chemicals aid in the elimination of free radicals. They support the plant's defenses against infections and UV rays.

6. Terpenoids

These volatile substances, which also have antibacterial and anti-inflammatory qualities, give the plant its scent.

Traditional use

Traditional medicinal use of *Draceana trifasciata* includes its applications in wound healing. The plant extracts have been reported to promote wound closure, reduce inflammation and accelerate tissue regeneration. These effects may be beneficial in managing various types of wounds. In traditional medicinal systems such as Traditional Chinese medicine (TCM) and Ayurveda, *D. trifasciata* has been used to alleviate bronchitis, coughs and cold. The plant's mucilaginous properties help to soothe throat irritation and promote expectoration. In Traditional African medicine, various parts of the plant, including the leaves and rhizomes, have been used to treat skin infections, gastrointestinal disorders, and respiratory conditions. Skin infections, gastrointestinal disorders, and respiratory conditions. The *D. trifasciata* has been used as a traditional medicine for treating influenza, ulcers, jaundice, urinary diseases in India, Nigeria, Ghana, Congo, Indonesia, Philippines, Yemen, China, Vietnam, Cambodia, Thailand, and Malaysia.

Pharmacological activities

Analgesic activity

Using the mice writhing test method, [17] investigated the analgesic efficacy of leaves ethanol

and aqueous extracts of *D. trifasciata* in both extracts, there was a notable and dose-dependent mode of inhibition. The suppression brought on by the increased dosage (200 The extracts' mg/kg of the material was considerably ($p < 0.01$) less than the 100 mg/kg of acetylsalicylic acid. Observations revealed that both extracts demonstrated that the ethanol had a dose-dependent effect on pain inhibition. compared to the aqueous extract, the extract was more active.

Antimicrobial activity

The antibacterial activity of *D. trifasciata* leaves methanolic extract was tested by measuring zone of inhibition (ZOI) method in clinical isolates on Muller-Hinton agar plates. The dried extract containing 50 mg/mL-1 100 microliters of concentration were added to the well. The ZOI was measured after a 24-hour incubation period on petriplates. The outcomes demonstrated strong suppression against *Pseudomonas* and *Escherichia* bacteria. *Staphylococcus aureus* and *P. aeruginosa* in ZOI 12 mm, 12 mm, and 15 mm correspondingly [18].

Extract of *D. trifasciata* root saponins and other separated substances were evaluated for *Staphylococcus aureus*-specific antibacterial activity and *Escherichia coli*. The separated components and the root extract demonstrated strong antibacterial action against the investigated microorganisms and the inhibition were seen at 200 ppm concentrations in 18.67 and 24 mm [19].

The antibacterial activity of *S. trifasciata* root saponins extract and isolated components was evaluated against *Escherichia coli* and *Staphylococcus aureus*. The separated components and the root extract demonstrated strong antibacterial action against the investigated microorganisms and the inhibition were seen at 200 ppm concentrations in 18.67 and 24 mm. By using disk diffusion and minimum inhibitory concentration, the crude ethanolic extracts and fractions of *S. trifasciata* and *S. cylindrica* leaves were assessed for their antibacterial activity against *Pseudomonas aeruginosa*. proportions (MIC) approach. *S. trifasciata* displayed a robust antimicrobial activity in comparison to *S. cylindrica* (ZOI 18.3 mm). In MIC, different extract two-fold concentrations, such as 4, 8, 16, 32, 64, After testing at 128 and 256 mg/mL, the findings revealed that the *S. 32 mg/mL* of *trifasciata* extract was found to be able to inhibit development of bacteria [20].

The antibacterial efficacy of several *S. trifasciata*-derived components was assessed by Kasmawati et

al. against two microorganisms, namely *Escherichia coli* and *Streptococcus aureus*. The distinct compound 5 Undecaneperoxoic acid methyl-11-(2-oxopyridin-1(2H)-yl) shown outstanding antimicrobial properties. Significant ($p < 0.05$) results were observed in the extracts, fractions, subfractions, and isolated chemicals. decrease in bacterial growth.

Two kinds of *S. trifasciata* tissue-cultured plants were examined for antibacterial activities by Kaur and Mudgal [20]: *Laurentii* variegated (STV) and *Laurentii* variegated with yellow striped edges (STY). in contrast to those who were raised in fields. The unrefined leaf extracts the corresponding plantlets were examined for *Bacillus subtilis* and microorganism called *Pseudomonas aeruginosa*. The in vitro leaf extract When exposed to B, both cultivars exhibited increased antibacterial activity. Particularly in contrast to plants grown in fields. STV leaf cultivated in the field extract had very little antibacterial effect on *P. aeruginosa*, but leaf extract from both types grown in vitro demonstrated an outstanding inhibition zone.

Anti-ulcerative activity

The ethanolic extract of *S. trifasciata* leaves was tested for its antiulcerative properties using an indomethacin-induced (i.p., single dose) ulcer model in Wistar rats (40 mg/kg BW). The extract was tested at two distinct concentrations (twice daily, 200 and 400 mg/kg BW) for 7 days prior to administration of indomethacin. Animals were pretreated with the leaf extract shown some progress in preventing ulcers. Furthermore, the extract decreased the reduction of total acidity (35.6%), Gastric volume (36.1%) and indomethacin-induced free acidity (55.3%). Additionally, the extract showed ulcer rates of 17.92% and 14.96%. potential for protection at evaluated levels. Here is *S. trifasciata*. The ethanolic extract of leaves exhibits encouraging promise in treating ulcers [21].

Antioxidant activity

The study conducted on the antioxidant activity of *D. trifasciata* ethanolic and aqueous leaf extracts by phosphomolybdenum and DPPH methods and total phenolic content also measured.. The results revealed that there was a greater overall phenolic content is greater than the aqueous extract (0.285 mg GAE/g) in the ethanolic extract (0.474 mg GAE/g) and the extract of ethanol had superior antioxidant activity (2.417 mg) at 100 mg/mL more than the aqueous extract (0.999 mg). At greater concentrations, *S. trifasciata*'s antioxidant potential was seen in a dose-dependent way. *D. trifasciata*'s in vitro antioxidant activity was assessed using DPPH radical scavenging

technique with vitamin C serving as a positive control. The Assays revealed that the crude extract's IC₅₀ value was five times more than the vitamin C value [22].

Antidiabetic activity

Antidiabetic activity of *D. trifasciata* leaf methanolic extract was studied in Swiss albino male rats. The extract was administered orally at a dose of 50, 100 mg/kg BW once a day for 15 days after diabetic induction by Streptozotocin (STZ) (60 mg/kg BW) Glibenclamide (0.5 mg/kg) standard drug also administered once a day for 15 days. The STZ mice with diabetes showed elevated production of ROS in heart tissue, which was observed to be diminished following the administration of leaf distillate. The findings from the histopathology test also demonstrated the STZ-induced alterations were significantly diminished by the leaf extract This made the organ nearly resemble one in normal state [23].

Wound healing activity

D. trifasciata leaf extract hydrogel formulations and its wound healing activity was evaluated in the incision wound model (mice). The different concentrations of leaf extract hydrogel formulations such as 15%, 20% and 25% (w/w) were given for 15 days. Octenidine gel was used as a positive control. The results revealed that the leaf extract hydrogel formulations 20% and 25% showed significant ($p < 0.05$) wound closure from day 2 to 16 and no significant wound-healing activity [24].

Toxicity and safety

The acute toxicity of ethanolic and water extracts of leaves have been studied by [20]. The LD₅₀ values of ethanolic and water extracts in mice was estimated as 1513.5 and 1426.0 mg/kg respectively. [25] evaluated the *D. trifasciata* leaves chloroform extract in female Wistar rats with single-dose administration (2000 mg/kg bw) for oral acute toxicity and its safety. Results revealed that during the experiment neither mortality nor sublethal effects and no significant differences in clinical biochemistry parameters were detected between control and treated group.

Anthelmintic activity

An in vitro anthelmintic activity was studied in *D. trifasciata* leaf extracts against *Fasciola hepatica*. The experiment revealed that different concentration of the extract caused to death of the parasites at different mean time [26].

Antipyretic activity

The antipyretic activity of *S. trifasciata* leaves extracts were studied in rats. The ethanol and water extracts (100-200 mg/kg) were administered orally after yeast suspension induced pyrexia. The water extract did not show any significant effect on fever, but the ethanol extract (200 mg/kg) significantly ($p < 0.01$) reduced the fever condition.

Hepatoprotective activity

The hepatoprotective activity of *S. trifasciata* leaf and root extracts was evaluated in Thioacetamide-induced liver fibrosis rat model. The leaf and root extracts (at doses of 200 and 100 mg/kg/day) treated group showed significant decrease in aspartate transaminase, serum alanine transaminase and malondialdehyde level when compared with Thioacetamide-induced group. Moreover, the reduced level of glutathione content, hepatic mRNA levels of NQO-1, Nrf2, HO-1 and -1 were significantly increased. Histological studies further confirmed the protective role of the leaf and root extracts against Thioacetamide-induced liver fibrosis by activating Nrf2-ARE signalling pathways [27].

CONCLUSION:

The leaves and rhizomes of *Dracaena trifasciata* are traditionally used against various ailments. The modern scientific studies also proved the significant pharmacological activities in antibacterial, wound healing, antidiabetic, hepatoprotective, antipyretic, anthelmintic etc. The plant is rich source of steroidal saponins, and other phenolic compounds. However, furthermore studies are required to explore the more biological activities of their phytoconstituents with possible mechanism of action.

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