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Review on -*Draceana Trifasciata*

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Abstract

Dracaena trifasciata (Prain) Mabb. (Asparagaceae) is a perennial herb widely known as mother-in-law's tongue that is grown as a decorative plant in homes and parks. Native to tropical West Africa, In many different regions, the leaves and rhizomes are traditionally used as an analgesic and antipyretic, as well as against acne, fungal infections, skin itches, allergies, ulcers, helminths, earaches, pharyngitis, and urinary illnesses. This review provides a thorough description of this multifaceted herb's botany, traditional use, pharmacognosy, phytochemistry, and pharmacology.

Keywords: *Dracaena trifasciata*, *Asparagaceae*, Herb, Analgesic, Antipyretic, Fungal infections, Skin Itches, Allergies, Ulcers, Helminths, Earaches, Pharyngitis, Urinary Illnesses, Pharmacognosy, Phytochemistry, Pharmacology.

Introduction

Draceana Trifasciata (Sansevieria trifasciata Prain), also known as snake plant or mother- in-law's tongue in English, is a perennial, erect, herbaceous, evergreen succulent plant that is native to tropical West Africa. It can be found in wild tropical and subtropical regions and is also grown as an ornamental plant in many parts of the world. *Dracaena trifasciata (Prain) Mabb.* It is well known that folk medicine uses it to treat a variety of illnesses, including earaches, ulcers, jaundice, pharyngitis, skin irritations, urinary tract infections, and analgesic and antipyretic disorders. The entire plant was utilized in Bangladesh to treat snakebite, alopecia, malaria, and tonic ailments. Insect and snake bites, cough, bronchitis, and asthma were all treated with leaves and rhizomes[1].

Currently, medicinal plants are a worthy alternative to synthetic chemical medications in the medical area when it comes to environmental repair. Less negative effects than synthetic chemical medications are one of the main arguments in favor of alternatives. Additionally, the study of herbal items has made a substantial contribution to the development of medicine and pharmacology. The ability to extract and isolate a broad variety of phytochemicals from a variety of plants continues to spur researchers throughout the world to identify novel bioactive substances and their pharmacological effects[2].

Native to Cameroon, Central African Republic, Congo, Nigeria, and Zairea in tropical West Africa. deposited in the Andaman Islands, Bangladesh, East Himalaya, Fiji, Florida, India, Jamaica, Malaya, Mauritius, Mexico Southwest, Southeast, and Myanmar, among other places[3].

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Morphology

Evergreen perennial plant, growing to a height of 0.5–1.0 m; horizontal rhizome; sympodial; produces aerial shoots in a single clump and intermittent foliage shoots. Simple leaves with an upright, thick, fleshy to rigidly coriaceous tuft; both surfaces shining smooth and dark green; many light or greyish green transverse bands irregularly confined; narrow dark green margin tapering to apex; acute, apiculate, linear-lanceolate or ensiform; 52.5–76.9 cm in length and
3.5–5.5 cm in breadth. raceme of inflorescence; 37 fascicles of flowers with minute bracts on each flower; actinomorphic, regular, bisexual, trimerous, and hypogynous pedicel cylinders. The limbs are linear or narrowly lanceolate, revolute, pale greenish white, inferior, and the tapel tube is short, cylindrical, and pale yellowish green. The tapel tube is connected at the base. Three plus three stamens, epipetalous, filiform filaments, light yellowish green; anther[4].

Root

Rhizomes

Pharmacognosy

Macroscopic characters of leaf

New leaves are erect, linear-lanceolate, sword-shaped, up to one meter tall, in clusters, thick, rigid, dark green with grey or white wavy cross stripes, smooth edge, and pointy tip. Dried leaves have a fibrous sliced surface that is within and are dull green to light brown in color. They also have a bitter flavour and no smell.

Microscopic characters of leaf

A single layer epidermis with square to oval-shaped cells was visible in the cross section of the leaf. Both surfaces have thick cuticles, smooth cuticular ornamentation, and neither surface has any trichomes or other appendages. Tetracytic and amphistomatic stomata. 1 to 5 mm in thickness. Mesophylls are isobilateral, consisting of an inner water-storing parenchymatous cell and an outside area of chlorenchyma. Oval-shaped, closed, collateral, endarch vascular bundles that have a well-developed sclerenchyma cap above the phloem. crystals of raphides found in the central mesophyll cells and the chlorenchyma.

Macroscopic characters of Rhizome

Rhizome cross section has a round contour. The epidermis is made up of several layers of suberized cells with thin walls. Undifferentiated ground tissue is 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. The six to eight vessel elements that make up xylem are metaxylem on the outside and protoxylem on the inside. Just above the metaxylem are companion cells and sieve tubes that make up the phloem.

Microscopic characters of Rhizomes

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Macroscopic characters of Roots

Roots: dark, wiry, rough-surfaced, up to 15 cm long, 1.5–2.0 mm thick; tasteless and odorless.

Microscopic characters of Roots

The root's transverse slice clearly separated into the vascular ring, inner pith, cortex, and outer epidermis. The epidermis is made up of suberized cells with thick walls that are shaped like cubes or triangles. The broad cortex is made up of isodiametric parenchymatous cells with thin walls. The pericycle and endodermis, which clearly divide the vascular zone from the cortex, are present. The vascular zone is circular in shape and is made up of alternating strands of xylem and phloem. There are no calcium oxalate crystals in the pith, which is made up of parenchymatous cells in the center[5].

Phytochemical Screening

Screening for alkaloids

On a steam bath, 0.5 g of the extract was agitated in 5 ml of 1% HCl and then filtered while still hot. The residue was mixed with distilled water, and a small amount of Wagner's reagent was added to 1 ml of the filtrate. The presence of alkaloids is indicated by a reddish-brown precipitate. Checking for Flavonoids To 2 ml of the extract, 2 ml of diluted sodium hydroxide was added. Flavonoids are indicated by the appearance of a yellow color.

Screening for Saponins

1 ml of the extract was mixed with 1 ml of distilled water and thoroughly shaken. The presence of saponins was indicated by a steady, continuous foam. Detecting Phenols The extract and iron (III) chloride were combined in equal parts (1 ml). Phenols were indicated by the presence of a deep bluish green solution.

Screening for tannins

After dissolving some of the extract in water, the mixture was filtered to remove any remaining particles. The resultant filtrate was then treated with a 10% ferric chloride solution. There are tannins present when a blue black color appears.

Screening for anthroquinine

After shaking 0.5 g of the extract with 10 ml of benzene, it was filtered. Filterate was mixed with 10% ammonia solution, and Tube # Volume of ASW (Diluent) # 1 was shaken. the ammoniacal phase developing a pink, crimson, or violet colour[6].

Plant sample	Test for Alkaloids		Test for Tannins		Test for Flavonoids	Test for Anthraquinones	Test for Saponins
	Mayers reagent	Dragen-dorffs reagent	Gelatin test	Ferric chloride test	Smith and Metcalf method	Borntrager's test and modified Borntrager's test	Froth test
Leaves	++	++	++	+	_	+	_
Roots	+++	+++	++	++	_	++	_

Traditional Uses:

The roots and leaves are used in traditional medicine to treat a variety of conditions, including rheumatism, cough, asthma, colic, abdominal aches, diarrhea, hemorrhoids, menorrhagia, piles, hypertension, sexual weakness, foot wounds, leprosy, and nutritional deficiencies. A decoction used for boils, traumatic injuries, bronchitis, detoxifying, and snake bites is utilized in China[7]. In Myanmar, children's sore throats are treated with leaf juice and root juice combined with honey[8].

Pharmacological Activities

Analgesic activity

Using the mice writhing test method, *Anbu Jeba Sunilson et al.* investigated the analgesic efficacy of *S. trifasciata* leaves ethanol and aqueous extracts. There was a notable and dose- dependent inhibition seen in both extracts. When compared to acetylsalicylic acid (100 mg/kg), the inhibition resulting from the greater dose of extracts (200 mg/kg) was considerably ($p<0.01$) lower. Both extracts were found to decrease pain in a dose-dependent manner, with the ethanol extract being more potent than the aqueous extract.

Antipyretic effects

Anbu JS, Jayaraj P et al. investigated the antipyretic properties of *S. trifasciata* leaf extracts. The ethanol and water extracts (100–200 mg/kg) were given orally subsequent to the induction of pyrexia by yeast suspension.

The ethanol extract (200 mg/kg) significantly ($p<0.01$) decreased the fever condition, however the water extract had no discernible effect on fever[9].

Antibacterial activity

S. trifasciata root saponins extract and isolated compounds were tested by *Dewatisari WF et al.* for antibacterial activity against Staphylococcus aureus and Escherichia coli. The root extract and the isolated compounds showed potent antibacterial activity against tested bacteria and the zone of inhibition were observed 18.67 and 24 mm at 200 ppm concentration[10].

Daniel K, Ritika C et al. Studied Zone of inhibition (ZOI) method was used to measure the antibacterial activity of *S. trifaciata* leaves methanolic extract in clinical isolates on Muller- Hinton agar plates. The well was filled with 50 mg/mL-1 dry extract at a concentration of 100 µl. ZOI was measured after the Petriplates were cultured for 24 hours. In ZOI12 mm, 12 mm, and 15 mm, respectively, the results demonstrated excellent suppression against Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus. Root *S. trifasciata*[11.]

Anthelmintic activity

Wambugu FK, et al. Investigated the Leaf extracts from *S. trifasciata* were found to have an in vitro anthelmintic effect against Fasciola hepatica. The experiment showed that the parasites died at varied mean times due to different extract concentrations. Activity that is cytotoxic[12].

Antioxidant activity

Shelah M, et al. Studied the Total phenolic content was also evaluated in this investigation into the antioxidant activity of *S. trifasciata* leaf extracts, both ethanolic and aqueous, using phosphomolybdenum and DPPH techniques. The findings showed that the ethanolic extract had a larger total phenolic content (0.474 mg GAE/g) than the aqueous extract (0.285 mg GAE/g), and at 100 mg/mL, the ethanol extract had superior antioxidant activity (2.417 mg) compared to the aqueous extract (0.999 mg). At greater concentrations, *S. trifasciata's* antioxidant potential was seen in a dose-dependent manner[13].

Antidiabetic activity

Swiss albino male rats were used to test the antidiabetic properties of methanolic extract from S. trifasciata leaves by *Dey B, et al.* For 15 days following streptozotocin (STZ)-induced diabetes induction, the extract was given orally at a dose of 50 or 100 mg/kg BW once daily (60 mg/kg BW). For 15 days, glibenclamide (0.5 mg/kg), a common medication, is also administered once daily. When leaf extract was administered, the enhanced ROS production in the heart tissue of the STZ-induced diabetic rats was seen to decrease. The histological test observation also demonstrated that the leaf extract significantly attenuated the alterations caused by STZ and restored the organ to a nearly normal state[14].

Cytotoxic activity

S. trifasciata's in vitro cytotoxic activity was investigated by *El-Hawarya SSE,et al.* using three distinct cell lines: A-549, HepG-2, and CACO2. These cell lines were examined with different twofold concentrations of alcoholic extract, namely 0, 3.9, 7.8, 15.6, 31.25, 62.5, 125, 250, and 500 µg/ml. The findings demonstrated that there was no discernible activity against CACO2 cell lines and that low cytotoxic activities were seen against A-549 (IC50 = 77.8 µg/ml) and HepG-2 (IC50 = 81.0 µg/ml)[15].

Wound healing activity

The incision wound model (mice) was studied by *Nia Y,et al*. to assess the wound healing efficacy of hydrogel formulations containing *S. trifasciata* leaf extract. For fifteen days, three distinct leaf extract hydrogel formulation concentrations—namely, 15%, 20%, and 25% (w/w)—were administered. A positive control was octenidine gel. The outcomes shown that from day 2 to day 16, the hydrogel formulations containing 20% and 25% of leaf extract demonstrated considerable ($p<0.05$) wound closure, but the 15% formulation showed no discernible wound healing activity. However, the 15% formulation showed a greater closure area in comparison to the negative control, suggesting that the leaves extract of *S. trifasciata* has the potential to cure wounds[16].

Toxicity and safety

Laksmindra Fitria et al. assessed the oral acute toxicity and safety of a chloroform extract derived from S. trifasciata leaves in female Wistar rats administered at a single dose (2000 mg/kg bw). The experiment's outcomes showed that there were no significant variations in clinical biochemistry measures between the treatment and control groups, nor were there any deaths or sublethal consequences[17].

Anti-alopecia activity

Kasmawati et al.'s study used docking and dynamics tests with the synthetic medication minoxidil to examine the molecular level inhibitory action of *S. trifasciata* leaf extract against androgen receptors. Their LC-MS/MS study revealed seven novel compounds, with lower docking scores for one flavonoid (Oliveramine) and three alkaloid compounds (Methyl pyrophaeophorbide A, (2S)-30,40Methylenedioxy-5,7-dimethoxyflavane, 1-Acetyl-β- carboline). The four compounds' efficacy was shown to be superior than minoxidil, as supported by the binding energy prediction of the MMPBSA method[18].

Conclusion

Dracaena trifasciata leaves and rhizomes have long been used as remedies for a variety of illnesses. Current scientific research has also demonstrated the important pharmacological actions in wound healing, antialopecia, antidiabetic, and other pharmacological activities. Flavonols, isoflavones, steroidal saponins, and

other phenolic chemicals are abundant in the plant. To investigate the additional biological activities of their phytoconstituents and potential mechanisms of action, more research is necessary.

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