

A Review on Phytochemical and Biological Activity of *Dracaena* Varieties

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ABSTRACT

The Asparagaceae family, which includes the genus *Dracaena*, is a varied and fascinating group of woody-stemmed, evergreen plants that usually grow in tropical and subtropical regions worldwide. Because of their remarkable leaves, intriguing growth patterns, and remarkable adaptability to a variety of conditions, these hardy and adaptable plants captivated alike botanists and horticulturists. This plant has antioxidant, antibacterial, antifungal, anticancer activity have been studied. Many different phytochemical compounds have been produced by this plant. This study investigates the *Dracaena* fiber's tensile, thermal, chemical, structural, and surface morphological characteristics. This study assessed the quality of *Dracaena* plants grown in different potting medium, including peat, sand, coconut coir, farmyard manure, leaf compost, and mushroom compost, in different combinations.

Keywords: *Dracaena* Varieties, Phytochemicals, Biological Activity

INTRODUCTION

Since the beginning of time, therapeutic substances have been discovered in nature. An important part of primary healthcare is provided by plants. In addition to being essential raw materials for the production of both conventional and contemporary medications, they also function as therapeutic agents in the food industry. The present common perception that “green medicine” is safer and more reliable than expensive synthetic pharmaceuticals, most of which have negative side effects, is the primary cause of the return of interest in plant-derived medications. (Almagheribi, E., et al., 2024). Around the world, plants are utilized to treat illnesses, and research on these plants continues to produce novel medications. Medicinal plant preparations have been used for many years all throughout the world and can be made in a variety of forms, including liquids, powders, crystals, and resins. Without a solid scientific foundation to back up claims of safety and effectiveness, using a medicinal plant to treat illness may be harmful or even pointless. Furthermore, improper usage of these therapeutic plants might cause serious poisoning symptoms in people. Using herbal remedies may result in moderate-to-severe adverse effects due to the

complex chemical makeup of medicinal plants. Consequently, it's critical to base the safety of medicinal herbs on carefully monitored and verified scientific toxicity studies or protocols. (Ong, M.G., et al., 2016).

Antioxidant activity:

The DPPH method yielded a scavenging potential of 102.66-2.55 mg Trolox equivalents/g extract for the *Dracaena* n-butanol fraction and 55.61-0.94 mg Trolox equivalents/g extract for the *Dracaena* n-hexane fraction. The *Dracaena* n-butanol fraction's maximum antioxidant potential, as assessed by the ABTS (2, 2'-azinobis (3-ethylbenzothiazoline-6-sulfonic acid) results, measuring 39.22-0.56 mg TE/g extract. (Ghalloo, B.A., et al., 2022). Due to secondary metabolites such as tannins, polyphenols, flavonoids, steroids, alkaloids, and saponins, among (*cordyline fruticosa*) leaf extract exhibited antibacterial and antioxidant activity, which may help treat infectious disorders brought on by climate change. (Bogorriani, N.W. et al., 2011).

Antibacterial activity:

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Extract from the resin of *D. cinnabari* have potent antibacterial properties against a variety of bacterial species. The dichloromethane extract of *D. cinnabari* resin had a potent inhibitory effect against a range of foodborne illnesses, according to studies conducted using the agar disc diffusion method. The greatest antibacterial activity against microbes like *B. subtilis*, *S. aureus*, *M. luteus*, *S. flexneri*, *P. mirabilis*, *E. aerogenes*, *E. coli*, and others was seen in this dichloromethane extract. (Almaghrebi, E., et al., 2024). Methanol extract exhibited significant antibacterial activity against *S. typhi*, *E. coli*, and *S. aureus*, according to antibacterial activity of *D. fruticosa* leaf extracts. Because of the secondary metabolites in methanol extracts are more diverse than those in n-hexane and ethyl acetate, the methanol extract exhibits more antibacterial activity than these extracts. This is due to the fact that non-polar and semi-polar molecules are removed into the n-hexane and ethyl acetate fraction by gradient fractionation. (Elfita E., et al., 2019)

Antifungal activity:

The agar well diffusion method was used to test the methanol crude extract's antifungal activity. *Aspergillus niger* (MTCC 3323) and *Aspergillus flavus* (MTCC 2799) were among the fungi that were cultivated and kept in potato dextrose agar (Hi-media). Using a sterile cotton swab containing fungal spores, a microbial culture of the fungal pathogen was created on the prepared potato dextrose agar media plate. Different concentration of leaf extracts were applied to wells created using sterile cork borer. The plates were kept at 28°C for incubation. The existence of antifungal activity was determined by looking for the zone of inhibition on the cultured plates after 48-72 hours. (Shankar, S., et al., 2018).

Anticancer activity:

The phytochemical composition of *D. trifasciata* may be responsible for its cytotoxic or anticancer properties. Numerous bioactive substances with potential anticancer effects, such as alkaloids, phenolic compounds, Flavonoids, and saponins, have been found in *D. trifasciata* extracts. There is currently limited study being done on *D. trifasciata*'s anticancer potential. Research on this plant's cytotoxic properties concentrated on cervical (HeLa), liver (HepG2), and breast (T47D) cancer cells (IC₅₀

81-18.8 µg/ml) and weak cytotoxic activity in T47D cells (IC₅₀ 537 µg/ml). A limited number of researches explored into the possible anticancer effects of extracts from *D. trifasciata*. in-vitro, the plant extracts have demonstrated cytotoxic effect against specific cancer cell lines (DEWATISARI, W.F. and TO'BUNGAN, N.E.L.S.I.A.N.I. 2014).

Phytochemicals:

Several phytoconstituents of the extracts were subjected to phytochemical analysis utilizing conventional qualitative techniques. The extracts were analyzing for the presence of biologically active substances such as protein, fat and oil, alkaloids, flavonoids, tannins, glycosides, terpenoids, and steroids. (Shukla, A., et al., 2014)

Dracaena fiber:

The research examined on the *Dracaena* fiber's structural, morphological, tensile, thermal, and physico-chemical properties. However, the extracted *Dracaena* fiber's density (790 kg/m³) was slightly higher, it was still lower than the density of carbon fiber (1570 kg/m³) and E-glass (electrical glass) fiber (2500 kg/m³). The results of the FT-IR (Fourier Transform Infrared Spectroscopy) and chemical analysis indicated that *Dracaena* fiber had higher cellulose content and lower hemicellulose content, making it suitable for use as a forcing material in composites made of polymer matrix. According to the results of the single fiber tensile test, the dracaena fiber has good tensile strength and young's modulus, so it's helpful in lightweight applications. The fiber's organic substance is shown by the Energy Dispersive X-ray analysis, which also confirms that carbon and oxygen were the main constituents of *Dracaena* fiber. Through scanning electron microscopy, a natural fiber with a rough surface a essential feature for a connection with the polymer matrix was seen (Manimaran, P., et al., 2019).

Best potting media for quality production of high-value plant:

The medium made from a mixture of sand, mushroom compost, coconut coir, and peat was shown to be the most efficient in promoting root and shoot growth, leaf area, fresh and dry weights of root and shoot, and overall plant quality in relation to the morphological

parameters of *Dracaena reflexa* "Variegata". A mixture made up of sand, peat, mushroom compost, and farmyard manure was the third best, while a mixture of sand and peat was the second best, improved all other criteria except plant height. The lowest quality plants were produced by media that contained either garden soil alone or a mixture of sand and leaf compost, and that drastically decreased the majority of the growth parameters. (Younis, A., et al., 2013).

CONCLUSION:

The studied conducted on several *Dracaena* species demonstrates a variety of useful biological and industrial features. Antioxidant assessments, such as DPPH and ABTS, show that various fraction of dracaena extracts have significant free radical scavenging capacities due to their high concentration of polyphenols, flavonoids, tannins, and other secondary metabolites. Furthermore, *Dracaena* extracts, particularly those derived from its resin and leaves, have significant antibacterial activity against a wide range of pathogens, as well as antifungal characteristics validated by inhibitory zone assays. *Dracaena*, particularly *D. trifasciata*, has been shown to have moderate to significant cytotoxic effects on numerous cancer cell lines, implying that bioactive components, such as alkaloids, phenol, and saponins, may be interesting for future therapeutic applications. Furthermore, phytochemical screening has consistently found a variety of active ingredients that are expected to support various biological functions. Beyond medicinal characteristics, *Dracaena* fiber's physical characterization highlights their suitability for application in composite materials due to their high tensile strength, modulus, and cellulose-rich composition. Finally, customized potting media which incorporates sand, mushroom compost, coconut coir, and peat has been exhibited to significantly enhance the growth and overall quality of high value *Dracaena* plants

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