

A Review on Medicinal Significance of *Catharanthus pusillus*

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ABSTRACT: Plant species used for medicine are valuable because they are rich in unexplored chemical compounds that have a wide range of therapeutic applications. *Catharanthus pusillus*, often known as small periwinkle, is a scarce plant belonging to the Apocynaceae family. It is extensively employed for the management of many ailments. The plant's roots, leaves, and latex has medicinal properties that are employed in the treatment of many ailments such as skin and liver illnesses, leprosy, dysentery, worms, ulcers, tumors, and earaches. Additionally, this species appears to be a valuable reservoir of the monomeric compounds vindoline and catharanthine. These compounds serve as intermediates in the production of the two crucial anticancer dimeric compounds vincristine and vinblastine, which, however, do not accumulate in this species. Pharmacological assessments of therapeutic plants provide crucial information. *Catharanthus pusillus* has the capacity to produce valuable findings of bioactive natural chemicals, which can contribute to the advancement of novel pharmaceutical goods.

KEYWORDS: Cassia fistula, Amulthus, pharmacological activities, phytochemistry, Sennosides, traditional uses

I. INTRODUCTION

Medicinal and aromatic plant species are inherently interconnected due to their shared chemical makeup. The medicinal properties of plants are attributed to the primary and secondary metabolites they generate. Alkaloids, phenolics, and terpenoids are chemicals of pharmacological significance. Alkaloids are formed from amino acids, phenolics are derived from carbohydrates, and terpenoids belong to a category of lipids [1]. According to the World Health Organization, almost 80% of the global population in impoverished nations relies mostly on herbal medicine for their fundamental healthcare requirements [2]. India and China are renowned for

their diverse traditional systems of medicine that have been established and practiced since ancient times. Approximately 40% of pharmaceutical firms rely on medicinal plants. Medicinal plants serve as the foundation for both the beauty and food sectors. Approximately two-thirds of the 50,000 distinct medicinal plant species utilized in these sectors are gathered as wild species [3]. Utilizing botanical raw materials often proves more cost-effective than employing alternative chemical compounds, resulting in a surge in the consumption and demand for therapeutic plants. The merciless extraction of these plants from natural sources has led to their swift decline. Consequently, several species of medicinal and aromatic plants have become scarce and at risk of extinction [4]. In order to address the importance of preserving biodiversity, the International Union for Conservation and Natural Resources (IUCN) has proposed an integrated approach to conserve medicinal and aromatic plant species. This approach involves the combined use of two different strategies: in-situ conservation, which focuses on preserving the plants in their natural habitats, and ex-situ conservation, which involves protecting the plants outside of their natural habitats. Both of these procedures are advantageous for the preservation of medicinal and aromatic plants. *Catharanthus pusillus* is a significant medicinal plant species that requires conservation to ensure its continued existence and evolution.

Catharanthus pusillus, also known as *Lochnerapusilla*, is a member of the Apocynaceae family. It is commonly referred to as Tiny Periwinkle, Tiny Vinca, Sangkhi, and Tiloni. *Catharanthus pusillus* is a small herbaceous plant indigenous to India and Sri Lanka. Herbal medicine is commonly employed for the traditional treatment of several ailments. The plant's roots, leaves, and latex are utilized for the treatment of many ailments such as skin and liver illnesses, leprosy, dysentery, worms, ulcers, tumors, and earaches. It is a closely related species to

Catharanthus roseus, sometimes known as periwinkle, which has significant potential in treating cancer and diabetes. Given the significant value of plant-based goods, the study focuses on *Catharanthus pusillus*, which is closely related to *Catharanthus roseus*. The latter is a promising therapeutic plant that has been extensively studied in terms of its phytochemical properties [5,6,7,8,9,10,11]. The alkaloids found in *Catharanthus roseus* have demonstrated anti-cancer properties. Furthermore, several studies have been conducted on the bioactivity of secondary metabolites synthesized by plants. Although secondary metabolites are needed in modest amounts to create the active medication, they serve a crucial role in treating illnesses and restoring health. Secondary metabolites have a crucial role not only in pharmacology but also in the identification and categorization of plants. Phytoconstituents are secretions generated by plants in response to both living and non-living stress factors. These secretions are particular to certain organs of the plant. [12, 13]

Catharanthus pusillus is a highly abundant source of secondary metabolites that has antibacterial and chemotherapeutic properties. Locals in various regions of India have long utilized it, although there has been limited investigation into its pharmacognostic investigations, with only one study available.

Systematic position

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Asterales
Family: Apocynaceae
Genus: *Catharanthus*
Species: *pusillus*

Vernacular names

English: Tiny Periwinkle, Tiny Vinca
Hindi: Sangkhi, Teanklo

II. BOTANY

Catharanthus pusillus is classified under the Apocynaceae family. The plant is a perennial herb that grows horizontally and reaches a height of up to 1 meter. It has milky white latex. The taproot is formed like a carrot and may grow up to 70 cm in length. The stem and branches are reddish and have an almost quadrangular shape. The internodes, which are the sections between the leaves, are significantly longer than the leaves

themselves. The leaves exhibit an opposing arrangement, are undivided and have smooth margins. Stipules are present in numbers ranging from 1 to 3 on either side of the leaf base. The length of the blade ranges from 1 to 3 mm and has an oblong to narrowly ovate shape. The blade is 1 to 4.5 cm in width and 3 to 13 mm in height. The base is cuneate, while the apex is either acuminate or rounded. The texture of the blade is herbaceous to thinly leathery, and it is shining on both sides. The blade is also glabrous, meaning it lacks hair or fuzz. The flowers are located in the leaf axils and are both bisexual and regular. They have five parts and have a pleasant fragrance. A pedicel is a stalk-like structure that connects a flower or fruit to the main stem or branch of a plant. The length of the specimen is between 5 and 25 millimeters, with the sepals partially united at the base. The sepals themselves are 5 to 10 millimeters long. The corolla tube has a cylindrical shape. The length of the object is between 15 and 22 millimeters, and it becomes wider toward the point where the stamens are attached. The neck of the object is narrow, and it has a ring of hairs on the inside just below the point where the stamens are attached. The color of the object is green, with a pinkish hue at the base. The lobes of the object are shaped like ovals or inverted ovals. The flowers are 11-22 mm in length and have dense short hairs on the inside. They spread open and can be pink, reddish violet, pale pink-magenta, white, or cream at the base. The stamens are located just below the throat of the corolla and have short filaments. The ovary is superior and consists of two very narrow oblong carpels. The style is slender and measures 10-16 mm in length. The pistil head is cylindrical and the follicles are 1.5-5 cm long. They have striations, are smooth, green, and split open to release 10-20 seeds. The seeds are elongated, measuring 1-3 mm in length, and have a groove on one side. They are black in color. Seedling exhibiting epigeal germination. The medications are obtained from the entire plant or from several parts, including as leaves, stem, bark, root, flower, and seed. Certain medications are derived from exudative botanical substances, such as gum, resins, and latex. The allopathic medical system has incorporated several medications originating from plants, which are a significant component of the current pharmacopoeia. Plant-derived drugs not only have a steady global market but also remain a significant source of novel drugs [12].

III. MEDICINAL IMPORTANCE OF THE PLANT

Catharanthus pusillus extensively utilized for the treatment of numerous disorders and has a long-standing history of usage as a herbal medicine [14]. The roots, leaves, and latex of these plants have medicinal properties and are utilized in the treatment of many ailments such as skin and liver disorders, leprosy, diarrhea, worms, ulcers, tumors, ear pains, meningitis in children, rheumatic and cardiac illnesses, hernia, infantile malnutrition, dyspepsia, and asthma [15]. An oral administration of around 20 grams of powdered fruits for a duration of three months is used to alleviate symptoms of Hysteria. A solution made by boiling dried plant material in oil is applied topically to treat lumbago in lions.

The plant possesses medical attributes such as antibacterial, anticancerous [16], and antioxidant [17] qualities. The current study focuses on examining the anticancer, antibacterial, antioxidant, anthelmintic, and phytochemical properties of *Catharanthus pusillus* (Murray) G. Don.

IV. POTENTIALLY ACTIVE CHEMICAL CONSTITUENTS

Catharanthus pusillus possess carbohydrate, flavonoid, saponin and alkaloids. Alkaloids are the most potentially active chemical constituents of *Catharanthus pusillus*. The presence of various bioactive compounds confirms the application of *C. pusillus* for various ailments. Thirty three compounds were identified in the whole plant extract of *C. pusillus*. Among the identified compounds, Hexadecanoic acid, methyl ester is a fatty acid ester having antioxidant activity [14, 15].

V. CONCLUSION

Before the introduction of modern medications, the treatment of ailments relied only on herbal remedies. Around 80% of the world's population residing in the vast rural areas of developing and undeveloped countries still relies mostly on therapeutic plants. The roots, leaves, and latex of these plants have therapeutic qualities that are efficacious in the treatment of many skin and liver disorders, such as leprosy, dysentery, worms, ulcers, tumors, and earaches. The alkaloids obtained from *Catharanthus pusillus* have been acknowledged in contemporary medicine for their chemotherapeutic properties, which encompass pain relief and anti-cancer effects. Moreover, the

plant has the capacity to impede the formation of cancer, act as antioxidants, combat microbial diseases, and eradicate worms.

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