EXPLORING THE MEDICINAL BENEFITS OF A NATURAL HEALING MARVEL *CATHARANTHUS ROSEUS* (L.) G. DON. - A REVIEW

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Abstract

Catharanthus roseus(L) G. Don, commonly known as Madagascar periwinkle, is a plant with a rich history of medicinal uses in various traditional healing systems. This plant possesses a diverse array of bioactive compounds, making it valuable for numerous therapeutic applications. This abstract provides an overview of the medicinal uses of *Catharanthus roseus* and highlights its potential in modern medicine. This plant has been traditionally employed in herbal medicine for its antidiabetic properties, primarily due to its ability to lower blood sugar levels. It contains alkaloids such as vincristine and vinblastine, known for their potent anticancer properties. These alkaloids inhibit cell division and have shown efficacy in treating various types of cancer. Furthermore, the plant possesses antihypertensive properties attributed to its alkaloid content, making it a potential remedy for managing high blood pressure. Its use in traditional medicine also extends to treating malaria, and in folk medicine the leaves have been utilized to treat diarrhoea and other gastrointestinal disorders. The plant also exhibits analgesic and anti-inflammatory effects, which may offer relief from pain and inflammation. In recent years, research has focused on harnessing the potential of *Catharanthus roseus* for modern drug development. The isolated compounds from this plant have been incorporated into various pharmaceuticals, demonstrating promising outcomes in the treatment of cancer, diabetes, and cardiovascular diseases. In conclusion, Catharanthus roseus stands as a remarkable plant with a wide range of medicinal properties. Its bioactive compounds hold immense potential for modern medicine, offering opportunities for the development of novel drugs to combat various health conditions. However, further research and clinical trials are necessary to fully explore and validate the therapeutic potential of this plant.

Key words: *Catharanthus roseus*, anticancer, antidiabetic, vincristine, vinblastine

Introduction

Medicinal plants, also known as medicinal herbs or phytotherapy, are plants that are used for their therapeutic or medicinal properties to promote healing and maintain health. Throughout human history, various cultures have utilized plants for their medicinal benefits to treat a wide range of ailments and health conditions. These plants contain bioactive compounds, such as alkaloids, flavonoids, terpenoids, and essential oils, which have pharmacological effects on the human body. The use of medicinal plants can be traced back to ancient times, where traditional healers and indigenous communities relied on the knowledge passed through generations to utilize plants for treating illness. Over time, this knowledge has been formalized and integrated in to modern medicine, giving rise to herbal medicine, a branch of complementary and alternative medicine. The benefits of using medicinal plants include their potential to treat specific symptoms, alleviate pain, boost the immune system, reduce inflammation, and improve overall well-being. In recent years, there has been a growing interest in the scientific study and research of medicinal plants, exploring their active compounds, mechanisms of action, and potential applications in modern healthcare. Integrating traditional knowledge with scientific advancements can lead to the development of new drugs and treatments derived from natural sources, contributing to the field of pharmaceuticals and improving global health.

Catharanthus roseus, also known as the Madagascar periwinkle, is a flowering plant with a rich history of medicinal usage across various cultures. This perennial herb is renowned for its remarkable content of alkaloids, which possess significant therapeutic properties. Throughout centuries, traditional healers have harnessed the healing potential of this plant to address a wide array of health conditions. In modern times, scientific research and medicinal investigations have shed light on the diverse medicinal applications of *Catharanthus roseus*. The plant's bioactive compounds have been extensively studied for their potential in treating various ailments, including cancer, diabetes, cardiovascular diseases, and more. Understanding the medicinal attributes of this remarkable plant is crucial for harnessing its benefits for the betterment of human health and the advancement of medical science. In this exploration, we will delve into the distinct medicinal uses of *Catharanthus roseus*, discussing its potential in mitigating health issues and its role in shaping contemporary medical treatments. Knowing the systematics and characteristics of this plant is essential for effectively utilizing its medicinal potential and promoting its conservation and cultivation.

Taxonomical classification

Kingdom- Plantae

Phylum- Tracheophyta

Division: Magnoliophyta

Class – Magnoliopsida

Order – Gentianales

Family – Apocynaceae

Genus – *Catharanthus*

Species **–** *roseus*

SYNONYMS: *Lochnera rosea* (Linn) Reichb; *Vinca rosea* Linn; *Pervinca rosea* (L) Gaterau; *Ammocallis rosea* (L) Small

Vernacular Names

Language	**Name**
Bengali	Nayantara
English	Madagascar periwinkle, red periwinkle, pink periwinkle
Gujarati	Baarmaasi
Hindi	Sadabahar
Kannada	Adasodai, Adasogai, Batlahoo
Malayalam	Ushamalari, Kasithumba, Nityakalyani
Marati	Sadaphuli
Sanskrit	Ushamalari
Tamil	Sudukadu mallikai, Kasithumbai chedi, Cutkattumalli
Telugu	Billaganneru

Plant description

Catharanthus roseus, commonly known as Madagascar periwinkle or rosy periwinkle, is a perennial herbaceous plant belonging to the family Apocynaceae. It is native to Madagascar but has been naturalized in various tropical and sub-tropical regions worldwide. The plant typically reaches a height of about 30 to 80centimetres and features glossy, dark green simple leaves which are opposite and elliptical in shape, measuring around 2 to 7 cm in length. The flowers are typically pink, white or purple and are characterized by a unique shape with a slender tube and a circular arrangement of five petals. Follicle fruit which is cylindrical, narrow, slightly arched-recurved in pairs with numerous tiny blackish brown seeds. The plant blooms throughout the year in favourable growing conditions. The alkaloids present mainly in the leaves, stem, and roots of this plant are the primary compounds responsible for its medicinal significance.

Biochemical constituents

The plant contains various biochemical constituents that include alkaloids such as vincristine, vinblastine, serpentine, ajmaline, catharanthine, catharanthinole, vindoline, leurosidine, vindolinine; Terpenoides like Iridoids, diterpenoids; Flavonoids, Tannins, Phenolic compounds, saponins, coumarins and glycosides.

The plant possesses a wide range of phytochemicals with various biological activities such as antibacterial, antifungal, antioxidant, antidiabetic and anti-cancerous properties.

Anti-cancer activity

Catharanthus roseus is most renowned for its ant-cancer properties. It contains alkaloids such as vincristine and vinblastine, which are crucial in the treatment of various types of cancer, including Hodgkin's lymphoma, leukaemia, and certain types of solid tumours. These alkaloids inhibit cell division, making them effective in combating cancerous cell growth. (Kutney et al, 2000; Magnotta, 2006; Heijden et al, 2004; Gansäuer,et al, 2007; Nirmala et al,2011; Moudi, 2013; Junaid et al, 2014; Rai et al , 2014; Cooper, 2016)

Antidiabetic Activity

Extracts from *Catharanthus roseus* have been studied for their potential in managing diabetes. The plant's alkaloids have shown hypoglycemic effects, helping to lower blood sugar levels. This property is valuable in diabetes management and research for future diabetes treatments. Reports are available for the isolation of the

chemical compound vincoline, from this plant that stimulate insulin production (Aynilian et al, 1974; Yao et al,2013; Ghosh, and Suryawanshi, 2001)

Antimicrobial and Antiviral Activity

Catharanthus roseus exhibits antimicrobial properties making it useful in fighting a range of bacterial and fungal infections. The plant's extracts have been shown inhibitory effects against various microorganisms, highlighting its potential as a natural antimicrobial agent. Ethanolic extracts of the leaf, stem, root and flowers of *Catharanthus roseus* showed antimicrobial activity (Nayak and Pereira, 2006). A single alkaloid yohimbine, obtained from this plant showed antimicrobial and antiviral activities. (Ozçelik et al. 2011)

Antioxidant Activity

Phenolic compounds are antioxidants that contribute to the plant's ability to combat oxidative stress. The plant contains antioxidants that help to neutralize harmful free radicals in the body, potential reducing oxidative stress and lowering the risk of chronic diseases linked to oxidative damage. (Tiong et al, 2013)

Analgesic and Anti-Inflammatory activity

Extracts from *Catharanthus roseus* possess analgesic (pain -relieving) and anti-inflammatory properties. These properties may be valuable in managing pain and reducing inflammation associated with various health conditions. (Manigandan et al,2014)

Wound healing activity

Traditional medicine uses *Catharanthus roseus* for treating wounds and various skin conditions. Its antimicrobial properties can aid in preventing infections and promoting healing. Several reports are available regarding the wound healing properties of this plant. (Nayak and Pereira, 2006; Nayak et al, 2007)

Blood Pressure Regulation Activity

Certain compounds present in *Catharanthus roseus* have demonstrated antihypertensive effects aiding in the regulation of blood pressure. These effects can be beneficially for individuals with hypertension and related cardiovascular conditions (Naznin et al, 2009)

Conclusion

Catharanthus roseus, commonly known as Madagascar periwinkle, is a plant of significant medicinal importance due to its abundant alkaloid content, particularly vincristine and vinblastine. These alkaloids serve as the foundation for its diverse array of medicinal applications. Foremost among its uses is cancer treatment, where vincristine and vinblastine have proven highly effective against various forms of cancer, making Catharanthus roseus an invaluable resource in oncology. Additionally, the plant's potential in managing diabetes by helping regulate blood sugar levels showcases its antidiabetic properties. It holds promise for individuals dealing with hypertension through its antihypertensive effects, aiding in blood pressure control. Furthermore, *Catharanthus roseus* exhibits antimicrobial properties, making it a candidate for combating bacterial and fungal infections, there by contributing to overall health and wellness. Its analgesic and anti-inflammatory effects suggest applications in pain relief and inflammation management. The plant's antioxidant capabilities are crucial in mitigating oxidative stress and reducing the risk of chronic diseases. Traditionally it has been used to heal wounds and address various skin conditions. Moreover, *Catharanthus roseus* may hold potential in managing respiratory disorders, such as asthma and bronchitis, showcasing its versatility in addressing a wide spectrum of health concerns. Future research and continued exploration of its medicinal properties hold promise for further advancements in healthcare and the development of innovative treatments.

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