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ANTI-ASTHMATIC ACTIVITY OF CATHARANTHUS PUSILLUS: A REVIEW

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Abstract

There are eight species in the genus Catharanthus, seven of which are native to Madagascar and one to India (C. pusillus). One of the rare pharmacological plants with a long history of therapeutic use, dating back to Mesopotamian folklore from 2600 BCE to the present, is Catharanthus roseus, or Madagascar periwinkle. It is used extensively in herbal and traditional medicine treatments for a wide range of illnesses. Reviews of Madagascar periwinkle that have already been published have primarily focused on the herb's chemical and pharmaceutical properties, making the lack of knowledge about the species' other characteristics all the more apparent. This well-organized review offered information on the medicinal, biological, ecological, and agrotechnological properties of Madagascar periwinkle, with a focus on its anticancer compounds, as well as potential routes and modes of action. It is now possible to fully utilize the magical herb Catharanthus roseus and focus future research efforts on it due to its diverse medicinal and therapeutic potentials. A member of the Apocynaceae family, Catharanthus pusillus is also known by the names Tiny Periwinkle, Tiny Vinca, Sangkhi, and Tiloni. The tiny herb Catharanthus pusillus is indigenous to Sri Lanka and India. It has long been used as a common herbal remedy for a wide range of illnesses. This plant's roots, leaves, and latex are used to treat tumors, earaches, leprosy, dysentery, worms, ulcers, and skin and liver diseases. It is closely related to periwinkle, or Catharanthus roseus, which shows promise against diabetes and cancer. Considering the overall importance of plant-based products, Catharanthus pusillus is chosen for the study, a close relative of Catharanthus roseus, a potential medicinal plant and well phytochemically investigated species.

Keywords: Catharanthus Roseus, Apocynaceae, Periwinkle, Antiasthamatic, Phytochemically

Introduction

Asthma is a disorder of the conducting airways, which contract too much and too easily spontaneously and in response to a wide range of exogenous and endogenous stimuli. This airway hyperresponsiveness is accompanied by enhanced sensory irritability of the airways and increased mucus secretion. The different clinical expressions of asthma involve varying environmental factors that interact with the airways to cause acute and chronic inflammation, and the varying contributions of smooth muscle contraction, edema and remodeling of the formed elements of the airways. Heterogeneity of asthma also relates to

the different response to therapies. Asthma is considered a good example of gene–environment interactions, although no single gene or environmental factor accounts for the disease. This chapter focuses on the pathophysiologic events underlying the inflammatory and remodeling response.

There are multiple synonyms for Catharanthus roseus L., also known as Madagascar periwinkle, including Vinca rosea, Ammocallis rosea, and Lochnera rosea. The plant is also occasionally referred to by other English names, such as Old Maid, Cape Periwinkle, Rose Periwinkle, and Rosy Periwinkle. This significant Apocynaceae medicinal plant is used to treat diabetes, blood pressure, asthma, constipation, cancer, and menstrual issues. It also contains a large number of beneficial alkaloids. Two potent naturally occurring anticancer products, vinblastine and vincristine, are members of the terpenoid-indole alkaloids group that were isolated from the pantropical plant Catharanthus roseus. These alkaloids are only trace amounts of the complex mixture of approximately 130 alkaloids that this plant produces. Because of their distinct mechanisms of action and efficacy, vinblastine and vincristine have been used to treat and cure thousands of patients over the past 40 years. Traditional Chinese medicine, Ayurvedic medicine, and other healing systems have long used this plant. In the 20th century, Western medicine started studying Catharanthus roseus and its extracts, and it discovered several compounds that could be used to treat cancer. In local herbal medicine, every part of the plant—including the dried root, leaves, flowers, and stalks—has been utilized. The entire dried plant is extracted to extract the alkaloids used in modern medicine.

Catharanthus pusillus:

1. Microscopic Analysis:

- Leaf Structure: Microscopic examination involves studying the leaf's cellular structure, including epidermal cells, stomata, trichomes, and vascular bundles.
- Identification of Specific Cells: Identifying specialized cells or structures unique to Catharanthus pusillus.

2. Macroscopic Analysis:

- Overall Plant Characteristics: This involves observing the plant's size, shape, color, and any distinctive features visible to the naked eye.
- Flower and Fruit Characteristics: Examining the flowers and fruits for specific characteristics that aid in identification.

3. Physiological Analysis:

- Metabolic Pathways: Investigating the plant's biochemical pathways, particularly those related to the production of secondary metabolites.
- Environmental Adaptations: Understanding how Catharanthus pusillus responds to various environmental conditions.

Collection of Plant:

1. Selection:
- Identification: Ensuring accurate identification of Catharanthus pusillus.
- Healthy Specimens: Choosing healthy plants for collection.

2. Timing:
- Seasonal Considerations: Collecting plants at the appropriate time of the year when their active constituents are at peak levels.

3. Parts Collected:
- Leaves, Roots, or Flowers: Depending on the specific plant, the relevant plant parts are collected.

Extraction Process:

1. Harvesting:
- Cleaning: Removing any foreign matter from the collected plant material.
- Drying: Allowing the plant material to dry, preserving it for further processing.

2. Extraction Methods:
- Solvent Extraction: Using solvents like ethanol or methanol to extract bioactive compounds.
- Steam Distillation: For essential oils.
- Cold Press Extraction: For oils from seeds.

3. Concentration and Purification:
- Concentration: Removing excess solvent to obtain a concentrated extract.
- Purification: Refining the extract through additional processes if needed.

4. Analysis:

- Chemical Analysis: Identifying and quantifying the chemical components of the extract.
- Quality Control: Ensuring the extract meets quality standards.

Please note that specific details may vary based on the plant species and the intended use of the extracted compounds. For up-to-date and specific information on Catharanthus pusillus, you may need to refer to recent scientific literature or consult with experts in the field.

Catharanthus pusillus

Morphology The plant Catharanthus Pusillus is a herbaceous or subherbaceous evergreen. This herbaceous plant, which is native to Madagascar, can reach heights of 80 cm to 1 m and produces pink, purple, or white flowers all year long (Hogan, 2003) [1]. The leaves are arranged in opposite pairs and are oval to oblong, 2.5–9.0 cm long and 1-3.5 cm broad. They are glossy, green, hairless, and have a pale midrib and a short, 1-1.8 cm long petiole. Two popular cultivars of C. roseus are called after their flower colors: one yields the pink flower "Rosea" (4) and the other produces the white flower "Alba." The flowers are white to dark pink with a dark red centre, with a basal tube about 2.5- 3 cm. long and a corolla about 2-5 cm. diameter with five petal like lobes. The fruit is a pair of follicles about 2-4 cm. long and 3 mm broad.

Circadian rhythms dominate our existence. The function of circadian regulation is to impose a temporal organization on physiologic processes and behavior. In addition to the sleep–wake cycle, other examples of circadian regulation occur in body temperature, multiple hormones, and the autonomic nervous system. Disorders of circadian regulation are typically expressed as sleep disorders.

Sleep

The timing and duration of sleep appear to be regulated by the interactions of two processes: a homeostatic process and a circadian process. The homeostatic process corresponds to the intuitive observation that we become sleepier the longer we are awake, and we become less sleepy the longer we have slept. Circadian events, such as humoral and body-temperature alterations, change rhythmically over a day-night schedule.

The Immune System and Sleep Control

The immune system plays a role in sleep control. It has been shown that sleep-promoting substances accumulate in cerebrospinal fluid (CSF) during wakefulness, and that when transferred to normal recipient animals, this CSF induces sleep. Within the past few years, several sleep-regulatory humoral agents have been identified, the cytokines interleu-kin-1 (IL-1) and tumor necrosis factor-a (TNF-a) are perhaps the best characterized. Administration of IL-1 or TNF-a in-duces increased intensity and duration of non-rapid-eye-movement (NREM) sleep.

Asthma and Sleep

The relative contributions of the circadian and sleep systems to asthma have been debated but not entirely settled. At first, it was thought that sleep systems were primarily responsible. When shift workers rotated shifts, there seemed to be an instantaneous phase shift in the circadian rhythm of peak expiratory flow (PEF), preserving the link between the decline in airway function and the sleep period. Research involving sleep deprivation during the night has produced varying findings and conclusions, though. The most comprehensive information available on this subject has to do with variations in lower-airway resistance during the course of the night. Whether a person sleeps or not, resistance to asthma grows gradually throughout the night, but it increases considerably more during. These results are sup-ported by the observations that the onset of

asthmatic attacks is less common in the first part of the night.

Potentially active chemical constituents

Alkaloids, saponins, carbohydrates, and flavonoids are all present in C. pusillus. The most potentially active chemical components found in Catharanthus pusillus are called alkaloids. The application of C. pusillus for a range of illnesses is confirmed by the presence of multiple bioactive compounds (Nithya et al., 2018). Thirty three compounds were found in the C. pusillus whole plant extract. One of the compounds that was found to be active against free radicals is hexadecanoic acid methyl ester.

The pyrrolizidine alkaloids are a significant and well-known class of naturally occurring chemicals found in food. Plants that grow in the majority of environments on Earth contain pyrrolizidine alkaloids, or PAs. The potential number of PAs-containing species is as high as 6000, or 3% of the world's flowering plants. (R)-petranine (pyrrolizidine alkaloids) is a novel compound isolated from the Catharanthus pusillus and it is supposed to have some medicinal activity.

Medicinal importance of the plant

A member of the Apocynaceae family, Catharanthus pusillus is also known by the names Tiny Periwinkle, Tiny Vinca, Sangkhi, and Tiloni. The tiny herb Catharanthus pusillus is indigenous to Sri Lanka and India. It has long been used as a common herbal remedy for a wide range of illnesses. This plant's roots, leaves, and latex are used to treat tumors, earaches, leprosy, dysentery, worms, ulcers, and skin and liver diseases. It is closely related to periwinkle, or Catharanthus roseus, which shows promise against diabetes and cancer. A close relative of Catharanthus roseus, a potentially medicinal plant and well-researched species in terms of phytochemistry, Catharanthus pusillus is selected for the study in light of the general significance of plant-based products. There is evidence of anticancer activity for the alkaloids found in Catharanthus roseus. In a similar vein, numerous reports have examined the bioactivity of secondary metabolites that plants produce. Even though these secondary metabolites are only slightly needed to make the active medication, they are extremely important for healing illnesses and restoring health. In addition to being significant from a pharmacological perspective, secondary metabolites are crucial for the identification and categorization of plants. These phytoconstituents are secretions that are specific to certain organs that the plant produces in reaction to biotic and abiotic stressors. About 20g of fruits powder administered orally for 3 months to relieve Hysteria. Decoction of dried plant is boiled in oil and rubbed on thelions in case of lumbago. The plant have medicinal properties like antimicrobial, anticancerous antioxidant activity.

Major depression is characterized by extreme sadness and despair, a sluggish mind and difficulty concentrating, pessimistic worry, a lack of enjoyment, self-deprecation, and varying agitation or hostility. There are also physical changes, particularly in cases of melancholic, vital, or severe depression. Hypersomnia or insomnia, eating disorders like anorexia, weight loss, or overeating, low libido and energy, and abnormalities in the normal circadian and ultradian rhythms of activity, body temperature, and multiple endocrine processes are some of the symptoms. Seasonal affective disorder, psychotic depression, postpartum depression, and dysthymic disorder—also referred to as dysthymia—are some additional types of depression. There is no one known cause of depression. Instead, a confluence of genetic, biochemical, environmental, and psychological factors most likely causes it. Some types of depression tend to run in families, suggesting a genetic link. However, depression can occur in people without family histories of depression as well.

Conclusion:

For most people in the world, medicinal plants are the only source of life-saving medications. They still serve as a crucial therapeutic tool for treating human illnesses. Early man explored these immediate natural surroundings in search of defense mechanisms, long life, and ways to relieve pain and discomfort. It resulted in the creation of numerous medicinal agents as well as the use of minerals, plants, and animal products, among other things. Due to the fact

that green medicine is more dependable and safe than expensive synthetic drugs, many of which have unfavorable side effects, there is a resurgence of interest in traditional medicine today and a growing demand for more drugs derived from plants. Since ancient times, Catharanthus roseus has been studied for its phytochemical components and potential medicinal uses. The plant is rich in phytochemicals that have a wide range of therapeutic uses. The plant also has a number of other properties, including antimicrobial, anti-helmintic, anti-diarrheal, and anti-asthmatic properties. Therefore, there is a lot of room for research on the aforementioned plant to solve the puzzles and meet the demands of the modern pharmaceutical industry.

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