



PHARMACOLOGICAL STUDIES OF SANSEVIERIA: A REVIEW

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ABSTRACT

Sansevieria is grown and spread in Africa, especially Madagascar, and South Asia, now included in the genus *Dracaena* based on molecular phylogenetic studies. Currently, there have been many studies that prove that the genus *Sansevieria* has several pharmacological activities, including antibacterial, anti-inflammatory, antioxidant, antidiabetic, wound-healing, analgesic, and antipyretic. Currently, there has been no detailed evaluation report on the potential that shows the effectiveness of plants from the genus *Sansevieria*, therefore this review article discusses the potential pharmacological activities of plants from the genus *Sansevieria*.

KEYWORDS: *Sansevieria*, Antibacterial, Anti-inflammatory, Antioxidant, Antidiabetic, Wound-healing, Analgesic, Antipyretic.

INTRODUCTION

Medicinal plants have played a role as a treatment tool for the management of acute and chronic diseases since ancient times.^[1] Researchers have identified over 300 plants with therapeutic potential.^[2] Worldwide, the use of medicinal plants is on the rise, serving as the primary choice for treating various diseases with minimal side effects.^[3,4] Based on molecular phylogenetic studies, *Sansevieria*, a genus of flowering plants native to Africa, particularly Madagascar, and Southern Asia, is now included in the genus *Dracaena*. *Sansevieria* plants have hard, succulent, upright leaves with tapered tips. This plant has thick leaves and has a succulent water content, making it drought-resistant. However, in humid or wet conditions, *Sansevieria* can thrive. The color of *Sansevieria* leaves varies, from dark green, light green, gray green, and silver to a combination of white and yellow or green and yellow. The pattern of the grooves or lines found on the leaf blades also varies; some follow the direction of the leaf fibers, others are irregular, and some are zigzag. We divide *Sansevieria* into two types: the upward-growing type, which reaches a size of 50-75 cm, and the circular short leaf type, which forms a rosette with a length of 8 cm and a width of 3-6 cm. Because the leaves of the long group taper like a sword blade, some refer to *Sansevieria* as a sword plant.^[5] Reports suggest that *Sansevieria* possesses various properties such as antibacterial, anti-inflammatory, antioxidant, antidiabetic, wound-healing, analgesic, and

antipyretic. As there is currently no comprehensive evaluation report demonstrating the effectiveness of the *Sansevieria* plant, this review article discusses the potential pharmacological activity of this plant.

TAXONOMIC CLASSIFICATION

Kingdom : Plantae
Order : Asparagales
Family : Asparagaceae
Genus : *Sansevieria*

PHARMACOLOGICAL STUDIES

Antibacterial

Antibiotics are one of our most important weapons against bacterial infections and have provided many health-related benefits to human quality of life since their introduction. However, over the past few decades, the emergence of drug-resistant bacteria and the increasing ineffectiveness of commonly used antibiotics against certain diseases have threatened these health benefits.^[6] Medicines derived from natural sources play an important role in the prevention and treatment of human diseases. Natural products with higher levels of plants can provide a source of new antimicrobial agents with possibly novel mechanisms of action.^[7] Administration of *Sansevieria trifasciata* extract at concentrations of 25 and 50 mg/mL has been reported to inhibit the growth of *Escherichia coli* and *Staphylococcus aureus* bacteria.^[8]

Anti-inflammatory

Damage to living tissue due to bacterial, viral, or fungal infections, physical agents, and impaired immune responses typically trigger inflammation. Various nonsteroidal anti-inflammatory drugs can reduce pain and inflammation by inhibiting the metabolism of arachidonic acid by cyclooxygenase enzyme isoforms (COX-1 and/or COX-2) and thereby reducing prostaglandin production. Unfortunately, there are many side effects associated with the administration of nonsteroidal anti-inflammatory drugs.^[9] However, Alkandahri *et al.*, have identified medicinal plants that have anti-inflammatory therapeutic effects, often with minimal or no side effects.^[10] Chinasa *et al.*, reported that oral administration of *Sansevieria liberica* extract at a dose of 400 mg/kg reduced inflammation in mice's feet induced by egg albumen.^[11]

Antioxidant

Free radicals are molecules that lose electrons, causing them to become unstable and attempt to reclaim electrons from other molecules or cells.^[12,13] Free radicals in the body are very reactive and will interact with protein, fat, DNA, carbohydrates, and RNA-based cells or body parts in destructive oxidation reactions. This can lead to the development of many chronic degenerative diseases, such as heart disease, cancer, and getting older.^[14,15] Compounds known as antioxidants can shield cells from the damaging effects of free radicals. Antioxidants interact by stabilizing free radicals, thereby preventing potential damage from free radicals.^[16] Rihanah *et al.*, reported that the administration of *Sansevieria trifasciata* extract exhibited potent antioxidant activity, with an IC₅₀ of 144.568 mg/mL in the DPPH model.^[17]

Antidiabetic

Diabetes mellitus (DM) is one of the major public health problems in the world. Failure of glucose homeostasis, which results in impaired carbohydrate, fat, and protein metabolism due to defects in insulin secretion and/or insulin action, causes this disease.^[18,19] Modern drugs currently available for the treatment of DM are often associated with limitations such as inadequate efficacy, high cost, and various side effects.^[20] Given the aforementioned weaknesses of conventional drugs, medicinal plants with antidiabetic activity are gaining popularity as an alternative approach to DM management, particularly in developing countries, due to their cost-effectiveness, accessibility, broad cultural acceptance, and lower side effects.^[21] Bhattacharjee *et al.*, reported that oral administration of *Sansevieria roxburghiana* extract at doses of 50 and 100 mg/kg reduced blood glucose levels in streptozotocin-induced mice.^[22]

Wound-Healing

A wound can be defined as a disruption of cellular and anatomical continuity that results in loss of protective or physiological tissue function. Physical, chemical,

microbial, thermal, or immunological injury to the affected tissue typically causes this disruption.^[23] After injury, an inflammatory response occurs, and cells beneath the dermis increase collagen production. In addition, epithelial tissue (the outer layer of the skin) regenerates.^[24] Wound healing is a natural response of the body to restore the structural and functional integrity of injured tissue.^[25] The rate of healing depends on several factors, including the size of the wound, blood supply to the affected area, infection, and foreign bodies. Wound care may involve the administration of local and systemic medications. In addition, several growth factors, such as macrophage-derived, monocyte-derived, and platelet-derived growth factors, are required to accelerate wound healing.^[26] Wound care aims to shorten healing time and reduce the risk of unwanted complications.^[27] Researchers reported that administering *Sansevieria trifasciata* extract at concentrations of 15%, 20%, and 25% w/v exhibited wound healing activity in a mouse model of incision wounds.^[28]

Analgesic

Pain is an unpleasant sensation that originates from complex neurochemical processes in the central and peripheral nervous systems. We use nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids to treat mild to moderate and severe pain. These drugs have limitations due to their serious side effects. Opioids can cause respiratory depression, euphoria, tolerance, and dependence, while NSAIDs can cause gastrointestinal irritation and kidney disorders. Therefore, it is crucial to discover and create low-toxicity drugs, with one potential source being medicinal plants.^[29] Anbu *et al.*, reported that oral administration of *Sansevieria trifasciata* extract at doses of 100 and 200 mg/kg reduced the number of rats writhing in response to acetic acid, indicating analgesic activity in the central and peripheral nervous systems.^[30]

Antipyretic

Fever is a common clinical sign, characterized by an increase in body temperature beyond normal limits. Through this process, the body creates a suitable environment for natural defense mechanisms, facilitating the repair of damaged tissues or making infectious agents inviable. Different inflammatory mediators are released when tissues are infected or damaged. This leads to more prostaglandin E₂ (PGE₂) being made in the hypothalamus, which raises body temperature.^[31] Pain (myalgia), lethargy, anorexia, inability to concentrate, increased muscle tone, and shivering typically accompany fever.^[32] Almost all antipyretic drugs on the market today stop the production of PGE₂ by stopping the enzyme cyclooxygenase-2 (COX-2). These man-made chemicals also stop COX-2 from working in a way that can't be undone. They are very bad for liver cells, glomeruli, the brain, and heart muscle.^[33] Meanwhile, Pokala *et al.*, reported that natural COX-2 inhibitors have relatively fewer side effects.^[34] Therefore, natural

antipyretic agents with reduced or no toxicity are of extreme importance. Anbu *et al.*, reported that oral administration of *Sansevieria trifasciata* extract at doses of 100 and 200 mg/kg reduced yeast-induced rectal temperature in rats.^[30]

CONCLUSION

The use of herbal medicines, particularly in pharmacological practices for disease prevention and treatment, is currently on the rise. Through the exploration of plant biopharmaceuticals and nutraceuticals, herbal medicines have reached the international market. Some plants of the genus *Sansevieria* demonstrate versatility through a variety of pharmacological activities. Information on the current *Sansevieria* genus plants can be used as basic data for further research to find the active compounds contained and newer and more complete pharmacological activities.

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