

The Medical Marvel of Aloe Vera: Harnessing Nature's Healing Power

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ABSTRACT

The Aloe Vera plant have been recognized by people since ancient times, for its remarkable health, medicinal, and skincare benefits. Aloe Vera plant comprises more than 300 varieties and predominantly thrives in arid regions across Africa, Asia, Europe, and the United States. Presently, Aloe Vera is a prevalent ingredient in the cosmetology industry. Despite its diverse indications, organized trials are imperative to ascertain its accurate efficacy. This article offers an overview of Aloe Vera's applications. The plant is utilized as a constituent and nutritional supplement in various foods and restorative products. Extensive human exposure raises security concerns regarding potential damage and carcinogenic effects. Analytical analysis reveals that Aloe has numerous carboxylic compounds, including anthraquinones, as well as polysaccharides. Consumption of Aloe Vera has been linked with renal failure, hypokalemia, diarrhea, and pseudomelanosis coli. Aloe Vera has applications in treating burn wounds, seborrheic dermatitis, psoriasis vulgaris, and erythema, and as a skin moisturizer. It also shows promise in managing Class 2 diabetes, kidney stones, ulcerative colitis, angina pectoris, oral lichen planus disorders, and alveolar osteitis. The Beautifying Component Review Expert Panel has deemed the superficial use of Aloe plant preparations to be non-toxic and secure. Nonetheless, a few case reports have surfaced regarding the development of interaction dermatitis and hypersensitivity reactions following the Superficial application of Aloe ointment preparations.

Keywords: Aloe Vera, Anti-Diabetic, Psoriasis Vulgaris, Seborrheic dermatitis, Genital Herpes

INTRODUCTION

Aloe Vera stands out as one of the most potent and crucial indigenous plants, owing to its numerous medicinal benefits and therapeutic properties for both human beings and other animals (1). Across diverse cultural frameworks, Aloe Vera finds extensive use in pharmaceutical applications. Aloe is a resilient, long-lasting, dearth-tolerant, and succulent tropical plant. Aloe Vera holds a major position in the indigenous systems of medicinal practices, including homeopathy, Siddha, Unani, and Ayurveda. Commonly debated for its resilience in dry spells, the word Aloe is extracted from the Arabic Hebrew or Alloh Halal, signifying a shining, masterful height (2). Aloe encapsulates a substantial portion of the underlying mechanisms of action in herbal remedies like Ayurveda, homeopathy, and Siddha. Aloe barbadensis, among the 250 varieties of Aloe Vera, thrives in semi-tropical climates (3). Aloe Vera represents a succulent species within the Aloe genus. Originating from the Middle East Peninsula, this evergreen plant naturally grows in tropical regions worldwide, serving both therapeutic and agricultural purposes. Additionally, it is cultivated for ornamental purposes and thrives well as an indoor plant (4). The surge in Aloe Vera usage is directly attributed to grassroots movements initiated by yogis, naturopaths, proponents of alternative medicines, and holistic healers. The raw Aloe industry estimates its value at over \$125 million, with the market for packaged goods holding Aloe Vera exceeding \$110 billion. Millennia ago (5). Presently, Aloe Vera finds extensive use in dermatology for various applications. Numerous studies confirm the valuable properties of Aloe Vera lotion on wound curing in both normal and diabetic rats. Although its role in wound healing is widely acknowledged, comprehensive investigation remains necessary (6). Concerning the production of herbal medicines and other aspects, Aloe Vera emerges as the most significant and valuable plant, yielding substances that are both profitable and beneficial. Taxonomy and morphology of Aloe Vera are shown in Table 1.

Table 1: Taxonomy and Morphology of Aloe Vera.

Taxonomy		Morphology	
Kingdom	Plantae	Order	None
Division	Spermatophyte	Size and shape	Plant reaching a length of 60 to 100 cm, lance-shaped and elongated.
Subdivision	Angiospermae	Strands color	The color of the strands is green to grey-green in the leaves.
Class	Monocotyledoneae	Flowers	25-35 cm long, yellow tubular with thin, loose stamens.

Active ingredients and their characteristics

Amino acids, salicylic acids, vitamins, enzymes, minerals, carbohydrates, lignin, and saponins constitute some of the seventy-five potentially active ingredients present in aloe vera (7).

Carbohydrates:

Aloe vera provides long chains of carbohydrate molecules (polymannose and glucomannans) along with the simplest carbohydrates (monosaccharides), collectively termed mucopolysaccharides, distinguishable from the plant's Adhesive layer (8). Mannose-6-phosphate stands out as the supreme prominent, simplest carbohydrate whereas glucomannans emerge as the predominant long chains of carbohydrate molecules. Additionally, acemannan, a distinct glucomannan, has been

identified. Recent discoveries include alprogen, a glycoprotein that relieves allergies, and a novel Non-steroidal anti-inflammatory compound, C-glucosyl chromone, both isolated from aloe gel.

Protein:

Carboxypeptidase, aliase, amylase, bradykinase lipase, peroxidase catalase, and cellulase, are among the 07 compounds discovered in aloe vera (9). Bradykinase assists in alleviating superficial skin irritation when topically applied, while other enzymes facilitate the interruption of carbohydrates and fatty acids.

Vitamins:

Aloe vera has cancer-preventive vitamins such as vitamin A (retinol), ascorbic acid, and tocopherol. Additionally, it harbors vitamin B complex, Vitamin B9, and vitamin B12. The antioxidants within it counteract free radicals (10).

Minerals:

Aloe vera provides minerals including Zn, K, Na, Fe, Cu, Se, Mg, Mn, and Ca (11). A portion of these minerals serves as antioxidants and plays essential roles in the proper functioning of numerous chemical frameworks within various metabolic pathways (12).

Mechanism of Action and Restoring Characteristics

The Glucomannan and the growth hormone gibberellin intermingle with fibroblast growth factor receptors, enhancing their activity and promoting propagation. This ultimately speeds up collagen aggregation following both superficial and oral administration of Aloe Vera. Aloe vera gel modifies collagen formation, favoring more type III collagen, and enhances collagen cross-linking, rather than increasing collagen quantity in wounds (13). Consequently, it expedites the healing process and enhances the durability of newly formed cicatricial tissue. Reports indicate an increased combination of hyaluronic acid and dermatan sulfate in the proud flesh stage following oral or topical medication (14).

Anti-Diabetic:

The kidneys of mice with type 2 diabetes were negatively impacted by the five phytoesters: aloe gel, 24-methylene cycloartenol, lophenol, 24-methyl-lophenol, 24-ethyl-lophenol, and cycloartenol (15). Polysaccharides found in aloe vera have hypoglycemic and aggressive-raising effects.

Impact on the Immune System:

Alprogen obstructed the influx of, leukotriene and histamine from mast cells by inhibiting calcium penetration into the cells (16). This blockade prevented the entry of these substances through the action of antibodies and antigens. In a research involving mice pre-injected with murine sarcoma cells, acemannan facilitated the interaction and influx of interleukin-1 (IL1) and tumor necrosis factor from macrophages in mice (17). Subsequently, this activated an immune response that led to the degeneration and regression of the malignant cells.

Antiseptic effect:

Aloe vera has six aseptic components contributing to its antiseptic effect: sulfur, urea nitrogen, salicylic acid, phenols, and lavender oil (18). All of them demonstrate inhibitory effects on viruses, bacteria, and other organisms.

Anti-Cancer Properties:

The potential of Aloe Vera to prevent cancer has not been fully assessed, despite its significant implication in the disease's development (19). It has been suggested that the prolonged use of intestinal solutions containing anthracoids contributes to colorectal tumors; however, no conclusive evidence linking the abuse of anthracoids diuretics and colorectal cancer has been established. Aloe Vera juice aids the body in self-healing from other side effects, such as the destruction of solid, healthy, immune cells caused by chemotherapy and radiotherapy, which are crucial for the healing process (20).

Chemical Components

Aloe Vera's primary active components include three isomeric forms of aloin (Barbaloin, Isobarbaloin, and Aloesin) which constitute the purported crystalline form of Aloin (21). These forms comprise between 10 and 30 percent of the pharmaceutical's constituents, alongside saponin, and Aloe-emodin. The important set of compound carbohydrates, including acemannan, is present within the leaf gel and exerts imperceptible activating effects. Anthraquinones, found in the outer layer of the skin, exhibit potent laxative effects (22). Additionally, a variety of compounds with broad-ranging activities are present, such as vitamins, minerals, essential, semi-essential, and nonessential amino acids, organic acids, lecithin, enzymes, and hemicellulose.

Aloe Vera's Pharmacological Activity

Numerous revisions have endeavored to correlate the chemical ingredients of the ointment with particular biotic effects as shown in figure 1.

Wound therapy

The wound-curing characteristics of Aloe Vera have been accredited to various processes, including enhanced epithelial cell relocation, accelerated collagen growth, decrease inflammation, and preservation of the wound's moisture content (23).

Anti-Tumour Activity:

Aloe vera holds a range of glycoproteins, thereby preserving the alignment of potentially pathogenic benzopyrene-DNA adducts (24). Aloe gel may present favorable conditions for use as a cancer treatment due to its ability to inhibit the tumor-assisting effects of phorbol myristic acid deduction.

Aloe gel:

The mucilage, or gel, extracted from the leaf tissue has a pH of 4.5 and comprises 99% water (25). Due to its efficacy as a moisturizer for human skin, the polysaccharide glucomannan is a component used in numerous cosmetic products. The most renowned application of aloe vera is in the healing of burns and other ailments (26). When applied to a wound, aloe vera stimulates cell growth, hastening the healing process and enhancing the wound's flexibility. It achieves this by increasing blood flow to the injured area. Aloe stands as the most popular wound dressing ever discovered (27).



Figure 1: Aloe Vera's Pharmacological Activity

Medicinal uses

Aloe Vera possesses several medicinal properties, including anthelmintic, cathartic, relieving gas in the alimentary tract, removing obstructions (deobstruent), diuretic, stomachic, and stimulating blood flow in the pelvic area (emmenagogue effects) (28). A portion of the juice is used for dyspepsia, amenorrhoea, burns, colic, hyperadenosis, hepatopathy, splenopathy, constipation, diarrhea, menorrhagia, ulcers, cancerous growth, edema, carbuncles, ischias, and intestinal gas (flatulence). The Aloe vera lotion is quite helpful for Colitis Gravis and Decubitus ulcers as shown in Figure 2.



Figure 2: Medicinal Application of Aloe Vera

Conclusion

A wealth of information on herbal plants, such as aloe vera, has been reviewed with me. It is a particular plant, that offers numerous potential therapeutic applications, making it indispensable in the medicinal industry. Throughout history, aloe and its preparations have been extensively applied as medicinal remedies. Aloe Vera has demonstrated efficacy in addressing various health issues across numerous studies. There exist numerous ways in which the active healing agents concealed in its succulent leaves can enhance human health and well-being. Apart from its anti-inflammatory and cleansing properties, the aloe plant known as the miraculous plant, also impacts conditions like diabetes and cancer, boasting healing attributes.

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