

# An Analysis of Health benefits of Aloe Vera

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**ABSTRACT:** For ages, the Aloe Vera plant has been recognized and used for its health, beauty, therapeutic, and skin-care benefits. Aloe is a plant with over 300 species that grows mostly in arid areas of Africa, Asia, Europe, and America. Aloe Vera is a natural product that is now often used in the area of cosmetology. Despite the fact that there are many indications for its use, controlled studies are needed to determine its true viability. This article briefly examines the aloe Vera plant, its characteristics, components of action, and therapeutic applications. The Aloe plant is used as a nutritional supplement in a variety of foods as well as a component in restorative products. The wide-ranging human introduction, as well as the possibility for hazardous and carcinogenic experiments, raises security concerns. The Aloe plant includes a variety of polysaccharides and phenolic compounds, including anthraquinones, according to chemical analysis. The consumption of Aloe arrangements has been linked to the flu, hypokalemia, pseudomelanosis coli, and renal failure. Aloe Vera can be used to treat a variety of ailments, including mild to severe burns, erythema, genital herpes, seborrheic dermatitis, psoriasis vulgaris, skin moisturizer, Type 2 diabetes, Verbal lichen planus diseases, Angina pectoris, Ulcerative colitis, UV-induced erythema, kidney stones, and alveolar osteitis. In general, the Corrective Fixing Audit Master Board has regarded topical use of aloe Vera arrangements as secure. However, there have been a few case reports of the development of itchiness reactions and contact dermatitis in response to topically applied aloe gel arrangements.

**KEYWORDS:** Aloe vera, Beauty, Health, Plant, Skin.

## 1. INTRODUCTION

Because the skin is the biggest organ in the human body and serves as a barrier to the body's interior environment, severe injury to it may pose a number of challenges to its existence. The epidermis and dermis are two layers of skin that cover the subcutaneous adipose tissue. The epidermis is mostly made up of keratinocyte layers, through which melanocytes and Langerhans cells have spread. The basal membrane separates the epidermis from the dermis. Extracellular matrix, or the basal material, is made up of collagen, fibrous networks, elastin, and glycosaminoglycans. Dermis is made up of papillary and reticular cells. Despite the availability of many contemporary skin care products and therapies, herbal products such as aloe vera play a significant role in wound healing, particularly in alternative medicine. As a result, the impact of aloe vera on cutaneous wound healing was investigated in this study[1].

In many other plants, Aloe Vera is a very powerful and important home produced plant since it provides a wide range of restorative activities and pharmacological effects for humans and animals. Aloe Vera is also used for healing purposes in a variety of social contexts. Aloe Vera has the potential to be a robust, long-lasting, tropical, drought-resistant, and juicy plant. Aloe Vera has played a significant role in the endemic framework of pharmacological rules such as Siddha, Unani, Ayurveda, and Homeopathy. Aloe Vera is a common, sticky plant that has been debated during dry spells. The aloe name comes from the Arabic "Alloeh" or Hebrew "Halal," which means "sparkly master." It has played a significant role in the inborn course of action of pharmacological systems such as Ayurveda, Siddha, Unani, and Homoeopathy. Aloe barbadensis, a semi-tropical plant, is one of the 250 varieties of Aloe Vera. Aloe Vera is a succulent plant belonging to the Aloe family. Its origins are in the Middle Eastern Promontory,

but it now grows wild in tropical regions all over the globe and is used for rural and medicinal purposes. The species is also used for enriching purposes and grows well as a trimmed plant inside. Currently, aloe Vera is gaining popularity as a result of homegrown development by naturopaths, yoggurus, elective medicine promoters, and all-around healers. The market value of aloe crude cloth is estimated to be about \$125 million dollars. The market for packaged aloe Vera products is estimated to be worth about \$110 billion dollars. In the year 2000, Greek experts regarded Aloe Vera as the all-encompassing remedy. Aloe was known as "the herb of immortality" by the Egyptians. The Aloe Vera plant is now used in dermatology for a variety of reasons. Several studies have shown that Aloe Vera gel has a beneficial effect on the healing of wounds in both normal and diabetic rats. The most often used use of Aloe Vera as a treatment is to improve wound healing and other restorative actions. Its role in wound healing has not been thoroughly investigated. Within the homegrown medication manufacturing and other details, Aloe vera is the most important and useful plant since it provides precious and profitable chemicals[2].

Aloe Vera may be a stemless or very short-stemmed plant that grows to 60–100 cm (24–39 in) tall and spreads through offsets. The clears are thick and plump, green to grey-green in color, with white flecks on the top and lower stem surfaces of a few varieties. The leaf's margin is serrated, with little white teeth. Each bloom is pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long, and is supplied on a spike up to 90 cm (35 in) tall in the summer. Aloe Vera, like other Aloe species, forms arbuscular mycorrhiza, a beneficial relationship that allows the plant to more easily access mineral supplements in the soil[3].

### *1.1 Wound Healing, Classification, and Cell Signalling:*

Burning is a kind of tissue damage caused by a variety of causes including heat, chemicals, electricity, sunshine, and nuclear radiation. Building fires, contact with boiling water, water vapor, liquids, and flammable gases are the most common causes of burning.

Heat-related burns, as well as accidents and other factors, are thought to be the leading cause of death and disability among sufferers. Every year, two million individuals get medical care as a result of burn injuries. The majority of basic therapies, including medication topical dose, are used to prevent infectious substances from penetrating the wound. Improvements in wound treatment and tissue regeneration techniques may improve the quality of life for people with burn injuries while also potentially lowering medical expenditures. Treatment of cutaneous wounds is a complex process that is the consequence of shared functions across different tissues and cellular colonies. During proliferation, migration, matrix construction and contraction, phases and growth factors, and the current matrix signals in the wound site, the behavior of each kind of effective cell has been described. Following a trauma, a sequence of common actions may occur to address the damage. The cells beneath the dermis begin to produce collagen as a consequence of the inflammatory reaction caused by damage, and this continues until the epithelium is completed[4].

A variety of cellular and molecular processes occur after any kind of damage to the skin or other bodily tissues. Thrombosis and inflammation, proliferation and creation of new tissue, and tissue retrieval are the three stages of wound healing. Various kinds of growth factors, such as fibroblastic growth factors (FGFs), epidermal growth factors (EGFs), transforming growth factors (TGFs), and insulin-like growth factors, regulate key cellular signalling events and extracellular matrix activities in the healing process (IGFs). The insulin-like growth factor contains certain peptides that are structurally very similar to insulin and are known as

somatomedin-C because they stimulate growth factor hormone production. These chemicals function in a variety of ways, including autocrine, paracrine, and endocrine[5].

Insulin-like growth factors (IGFs) are produced by a small number of dermis and epidermis cells in normal skin, but most epidermal cells, including macrophages and platelets, secrete them after dermal trauma. This group of growth factors promotes mitogenic fibroblasts and also has a role in the angiogenesis process.

Other research has shown that IGFs, along with other hormones including platelet-derived growth factors (PDGFs), play an essential role in wound healing by thickening the dermis and epidermis. The rate of expression of IGF genes in the epidermal basal layer is modest, but it increases substantially one to three days after the wound occurs. Other studies have shown that an aberrant rise in IGF may enhance the expression and synthesis of pro-alpha-I chain genes from collagen type I and pro-alpha-I of collagen type III in wound fibroblasts, laying the groundwork for scar formation (wound trace)[6].

Generally, a wound is described as a lesion or rupture on the skin's surface produced by physical or thermal stresses that need medical treatment. In humans and evolved animals, wound improvement and healing occurs via a complicated and sophisticated process including many stages such as inflammation, proliferation, healing, and rebuilding [17]. Initially, the wound gap is rapidly healed, epithelium is re-created on the wound surface, and a new matrix is soon replaced for the missing skin. However, if any of the above-mentioned planned occurrences are interrupted for any reason, the healing trend of a skin wound is impacted, and wound healing speed is slowed. Many variables influence the pace and quality of wound healing, including the size of the wound, blood storage on site, the presence of external objects and bacteria, the patient's age, health condition, and nutritional status.

### *1.2 Pharmacognostical Characteristics of Aloe Vera:*

Aloe vera is a Liliaceae plant that thrives in hot and dry climates. The mucilage tissue found in the middle of the leaves of this plant, commonly known as aloe gel, is utilized in a variety of cosmetics and medicinal uses. Aloes is a bitter, yellow-colored latex produced by the plant's peripheral leaf cells. One of the plants that may be seen in this respect is aloe vera.

Aloe vera, often known as yellow aloe, is a perennial herbaceous plant with thick, succulent, and long leaves. The leaves' margins are somewhat curled with thistle. Its blooms are clustered in a lovely cluster at the end of the florescent stem axis, which ranges in color from green to yellow. Aloe vera, commonly known as desert lily (*Hesperocallis*), is a plant native to Africa.

For the first time, the Egyptians utilized the aloe vera plant to heal wounds, burns, and infections. Following them, Greeks, Spaniards, and Africans utilized the aloe vera plant in a variety of ways for a variety of reasons. Aloe vera has a hot and dry humor, according to Iranian traditional medicine, and its extract is utilized for therapeutic purposes.

### *1.3 Chemical Constituents:*

Aloe vera plants are made up of anthracene hydroxyl derivatives such aloins A and B2, as well as chromone compounds and derivatives like aloe resins A, B2, and C, with a total of 25–40% chromone compounds and derivatives. Other important compounds in aloe vera plants include sugars like glucose, mannose, and cellulose, as well as enzymes like oxidase, amylase, and catalase, vitamins like B1, B2, B6, C, E, and folic acid, and minerals like calcium, sodium,

magnesium, zinc, copper, and chrome, and minerals like calcium, sodium, magnesium, zinc, copper, and chrome.

#### *1.4 Therapeutic and Pharmacological Effects:*

Anti-inflammatory, antiarthritis, antibacterial and antifungal, and hypoglycemic properties are only a few of the pharmacological actions ascribed to the aloe vera plant. Aloe vera inhibits the formation of dandruff on the head due to its antibacterial and antifungal characteristics. The aloe vera plant is also beneficial in the treatment of fungal diseases such as alopecia. Other benefits attributed to aloe vera fresh gel include wound healing and skin surficial damage repair. Similarly, after taking this medication, there is a reduction in pain at the trauma site. Aloe vera's humidifying properties have also been shown in topical aloe vera products. The properties of aloe gel on the skin can enhance medication absorption via the skin. This impact of skin increasing intake was found in a research on the effect of aloe vera rising intake on medicines of caffeine, colchicines, mefenamic acid, oxybutynin, and kinin, which may be attributed to an increase in water content (stratum corneum). The Aloe vera (or yellow aloe) plant resembles a cactus and is a succulent, watery plant with mucilage tissue in its leaves (gel). This mucilage contains glycoproteins that help to reduce inflammation and discomfort while also speeding up the healing process. Polysaccharides are also present, which promote skin development and repair. This plant's mucilage may be used to heal both internal and exterior wounds.

#### *1.5 Healing Mechanism:*

Its anti-inflammatory properties are linked to a substance called glucomannan, which is high in polysaccharides like mannose. The glucomannan increases the activity and proliferation of fibroblasts, which promotes collagen synthesis and secretion. Aloe vera mucilage not only increases the quantity of collagen on the wound site, but it also enhances the transversal connections between these bands rather than changing the collagen structure, which speeds up wound healing. From the outset, medicinal plants have been used in the treatment of various wounds. People are becoming more aware of these plants as a result of their lower cost burden and medicinal benefits. Several plants have been employed historically in the treatment of numerous skin wounds and burns in various parts of the globe; among them are jujube, mountain germander, olibanum, and portulaca, whose impact has been shown during the trend of burning wound healing in rats. Aloe vera, for example, is extensively used as one of the plants having a long history of wound and burn treatment.

It was discovered that giving rats with diabetes type II an oral dose of aloe vera mucilage accelerated the healing of skin wounds in these animals, with the results indicating that aloe vera treatment accelerated the rising rate of expression in the genes of vascular endothelial growth factor (VEGF) and TGF-1 in the wound area of the rats' skin. TGF-1 has encouraged fibroblasts to better rebuild the extracellular matrix at the wound site than ever before in this instance.

Following the formation of a skin wound, cells in the dermal region initiate inflammatory reactions and collagen synthesis, which is followed by epithelial tissue reorganization. This is a physiological process in which various variables, such as growth factors and cytokines, may have a role in the quality of the trend. Wound healing aims to treat wounds in the shortest period feasible, with the least amount of discomfort, anguish, and scarring for the patient.

#### *1.6 The Role of Vitamins:*

Aloe vera mucilage contains some compounds, such as vitamin E and vitamin C, as well as some amino acids, that can play an important role in wound healing. Experiments have shown that vitamin C increases collagen production and prevents the synthesis of these strands, while vitamin E, as a strong antioxidant, also plays a role in wound healing. Aloe vera mucilage, which has antibacterial and anti-inflammatory properties, promotes wound healing. Aloe vera mucilage contains antioxidant enzymes such as glutathione peroxidase and superoxide dismutase, which help to speed wound healing by neutralizing the effects of free radicals generated on the wound site and by acting as an anti-inflammatory.

## 2. LITERATURE REVIEW

Maan A et al. discussed the therapeutic properties and applications of Aloe vera in which they discussed how Aloe vera, a succulent perennial that can withstand dryness, is well-known for its medicinal properties. Aloe vera has been shown to have immunomodulatory, wound and burn healing, hypoglycemia, anticancer, gastro-protective, antifungal, and anti-inflammatory properties, among others. Aloe vera's helpful medicinal qualities have been used in a variety of commercial applications. The current study includes a literature assessment on its composition, rheology, processing, and medicinal applications, as well as an overview of its usage in foods and cosmetics. In addition, the risks and precautions connected with the usage of Aloe vera are discussed. The chemical characterisation of Aloe vera is being worked on thanks to recent advances in analytical chemistry. In the near future, more information is anticipated to become accessible at a quicker pace, resulting in improved applications[7].

Khatkar B et al. discussed Processing, food applications and safety of aloe vera products in which they discussed how since rigvedic times, aloe vera has been utilized for vitality, health, and medical reasons. Aloe vera's health benefits include its use in wound healing, treating burns, minimizing frost bite damage, protecting skin from x-ray damage, lung cancer, intestinal problems, increasing high density lipoprotein (HDL), reducing low density lipoprotein (LDL), lowering blood sugar in diabetics, fighting acquired immune deficiency syndrome (AIDS), allergies, and improving immune system function. Aloe vera gel phytochemistry showed the presence of over 200 bioactive compounds. Aloe vera gel is collected from the plant's leaves, and processing methods for stability and final product production are required. Aloe vera processing businesses need government oversight to verify that aloe vera products include helpful bioactive compounds, as claimed by the producers. Regulatory agencies must also investigate the safety and toxicological aspects of aloe vera products used in food. Claims about aloe products' medical efficacy should be backed up with real, authorized clinical study evidence. It is speculative to state that the producers of aloe products make many nutraceutical claims. Only for reducing LDL, raising HDL, lowering blood glucose, and treating genital herpes and psoriasis are authorized clinical evidences available[8].

Mukherjee P et al. discussed Phytochemical and therapeutic profile of Aloe vera in which they discussed how Aloe vera (L.) Burm. f. (Family Liliaceae) is a perennial succulent plant that has been utilized since ancient times. Aloe vera includes glucomannans, among other carbohydrate polymers, as well as a variety of other chemical and inorganic components. Chromone, anthraquinone, and anthrone derivatives have all been discovered as phenolic chemicals thus far. Aloe latex (aloe), aloe gel (Aloe vera), and aloe whole leaf are three different preparations of aloe plants that are mainly employed in medical practices and have very diverse chemical compositions and therapeutic effects (aloe extract). Aloe latex is used for its laxative effect; aloe gel is used topically for skin ailments such as wound healing, psoriasis, and genital herpes; aloe extract is potentially useful for cancer and AIDS; and aloe

extract is used internally by oral administration in diabetic and hyperlipidaemic patients and to heal gastric ulcers. Aloe vera has a number of pharmacological characteristics, including wound and burn healing, frost-bite healing, and antiinflammatory, antifungal, hypoglycemic, and gastroprotective qualities. This review looked at what we know about aloe's phytochemical and pharmacological properties, as well as some interesting areas for future study[9].

Radha M et al. discussed Evaluation of biological properties and clinical effectiveness of Aloe vera in which they discussed how the aloe vera plant (l hu) is widely recognized for its therapeutic qualities. This plant is one of the most abundant natural sources of health for humans. The existence of more than 200 distinct physiologically active compounds has been discovered in the plant's chemistry. The interior gel of the leaves contributes to several biological characteristics connected with Aloe species. The majority of study has focused on the biological activities of different Aloe species, which include antibacterial and antimicrobial properties of the leaf gel's nonvolatile components. Aloe species may be found throughout the African and Eastern European continents, as well as nearly everywhere else on the planet. Although the genus Aloe has over 400 species, only a handful, such as Aloe vera, Aloe ferox, and Aloe arborescens, are widely traded. Antitumor, antiarthritic, antirheumatoid, anticancer, and antidiabetic activities are among the therapeutic qualities of A. vera. A. vera has also been touted as a treatment for constipation, gastrointestinal problems, and immune system deficits. However, there isn't a lot of compelling information on the gel's characteristics. The current study examines the precise composition of Aloe gel, as well as the different phytocomponents that have diverse biological characteristics that aid in improving health and preventing illness[10].

### 3. DISCUSSION

The treatment of wounds is crucial and has been the topic of many studies. Natural substances have an important function as supplementary medicine in this respect. Several studies have shown that aloe vera may help wounds heal, particularly cutaneous wounds. As a result, we investigated the impact of aloe vera on cutaneous wound healing in the present review and found that, although aloe vera promotes wound healing as well as other treatments both clinically and experimentally, further research is required to confirm the findings. The use of aloe vera gel ethanolic extract reduced the diabetic foot wound in rats, according to a research by Daburkar et al. Aloe vera may be an effective therapy for burn injuries, according to another study. Topical use of aloe vera improved the biochemical, morphological, and biomechanical aspects of healing cutaneous lesions in rats, according to Oryan and colleagues. Aloe vera and Calendula ointment were shown to enhance the pace of episiotomy wound healing in a clinical study, thus they may be used to speed up episiotomy healing.

### 4. CONCLUSION

Aloe vera is now gaining a lot of attention as a possible source of functional dietary supplements. This is most likely due to the presence of bioactive components of interest, such as polysaccharides and phenolic chemicals. Acemannan, a storage polysaccharide mostly comprised of acetylated mannose units, has long been thought to be Aloe vera's primary bioactive component. Furthermore, many phenolic compounds, particularly anthrone C-glycosides like aloin, have been linked to intriguing pharmacological characteristics. Another important argument for using Aloe vera as a dietary supplement is the broad range of beneficial qualities connected with the Aloe vera plant. Intake of Aloe vera has been shown to have many health benefits, ranging from the suppression of colitis-related colon carcinogenesis in animal

models to an improvement in the glycemic index and a reduction in total cholesterol levels in diabetic individuals. Within this context, this chapter presents the most recent scientific knowledge on the major bioactive components in Aloe vera, as well as the most important characteristics that have been scientifically linked to Aloe vera use as a dietary supplement.

#### REFERENCES:

- [1] R. Minjares-Fuentes and A. Femenia, "Aloe vera," in *Nonvitamin and Nonmineral Nutritional Supplements*, 2018.
- [2] A. Surjushe, R. Vasani, and D. Saple, "Aloe vera: A short review," *Indian Journal of Dermatology*. 2008, doi: 10.4103/0019-5154.44785.
- [3] D. I. Sánchez-Machado, J. López-Cervantes, R. Sendón, and A. Sanches-Silva, "Aloe vera: Ancient knowledge with new frontiers," *Trends in Food Science and Technology*. 2017, doi: 10.1016/j.tifs.2016.12.005.
- [4] S. Rahman, P. Carter, and N. Bhattarai, "Aloe Vera for Tissue Engineering Applications," *J. Funct. Biomater.*, 2017, doi: 10.3390/jfb8010006.
- [5] P. Tippayawat, N. Phromviyo, P. Boueroy, and A. Chompoosor, "Green synthesis of silver nanoparticles in aloe vera plant extract prepared by a hydrothermal method and their synergistic antibacterial activity," *PeerJ*, 2016, doi: 10.7717/peerj.2589.
- [6] X. Guo and N. Mei, "Aloe vera: A review of toxicity and adverse clinical effects," *J. Environ. Sci. Heal. - Part C Environ. Carcinog. Ecotoxicol. Rev.*, 2016, doi: 10.1080/10590501.2016.1166826.
- [7] A. A. Maan *et al.*, "The therapeutic properties and applications of Aloe vera: A review," *Journal of Herbal Medicine*. 2018, doi: 10.1016/j.hermed.2018.01.002.
- [8] K. S. Ahlawat and B. S. Khatkar, "Processing, food applications and safety of aloe vera products: A review," *Journal of Food Science and Technology*. 2011, doi: 10.1007/s13197-011-0229-z.
- [9] P. K. Mukherjee, N. K. Nema, N. Maity, K. Mukherjee, and R. K. Harwansh, "Phytochemical and therapeutic profile of Aloe vera," *J. Nat. Remedies*, 2014, doi: 10.18311/jnr/2014/84.
- [10] M. H. Radha and N. P. Laxmipriya, "Evaluation of biological properties and clinical effectiveness of Aloe vera: A systematic review," *Journal of Traditional and Complementary Medicine*. 2015, doi: 10.1016/j.jtcme.2014.10.006.