

Aloe vera: A Review on Its Medicinal Importance

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Abstract

Today, one of the main causes of human infection is the antibiotic resistance of bacteria due to the use of antibiotics which causes the emergence and spread of antibiotic-resistant bacterial strains. The search for the discovery of healthy and effective antimicrobial agents continues. Aloe vera can be used for both therapeutic and preventive purposes in the case of a broad range of bacterial infections. Aloe vera is a medicinal plant used for the management and treatment of various infectious disorders since ancient times due to its anti-inflammatory, anti-microbial, and immune-boosting properties. Herbal medicine has been the basis of treatment and cure for various infectious diseases and physiological disorders in traditional medicine. It is a stemless plant with triangular and fleshy leaves ranging in colour from gray-green to bright green with small white teeth in the margin of its leaves. Aloe vera has very effective properties that have given this plant an almost perfect reputation, and it is intended as a wonderful magical herb in medicine.

Keywords: Infection, antibiotic resistance, antimicrobial, Aloe vera, therapeutic

INTRODUCTION

Aloe vera, commonly known as a medicinal aloe, is a species of succulent plant which originated in Northern Africa probably. Arid climate is suitable for *Aloe vera* and it is widely distributed in Africa continent and other arid areas [1]. The species, being used in herbal medicine is frequently cited.

Aloe vera, an herbal medicine, has been the basis of treatment and cure for various infectious diseases and physiological disorders in traditional medicine. Active components of plants play an important role in infection treatments and pathogens control. *Aloe vera* is a cactus-like plant, although is related to the onion, garlic, and asparagus. The leaves of *Aloe vera* are generally composed of three layers [2]: an inner layer of gel, a yellow sap, and the outer thick layer of 15 to 20 cells called as rind.

The parenchymatous cells in the fresh leaves secrete a colourless mucilaginous gel that contains 98 to 99% water and rich in 1–2% active compounds such as aloesin, aloin, aloe-emodin, aloe-mannan, flavonoids, saponin, sterols, amino acids, and few vitamins [3]. Free anthraquinones and their derivatives like barbaloin-IOaloeemodinanthrone, isobarbaloin, and chromones in *Aloe vera* leaves exert a very good purgative effect explained as *virechak* in Ayurvedic books and are also having potent anti-microbial properties [4].

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The natural habitat of *Aloe vera* is still unclear, as the species has been widely cultivated in various parts of the world [5].

This plant produces antiseptic agents such as salicylic acid, lupeol, cinnamonic acid, sulfur and phenols, all of which are known as growth-inhibiting and/or killing agents for fungi, bacteria, and viruses. *Aloe vera* is also used externally as

external application to cure stomach ache, gastrointestinal problems, skin disease, constipation, radiation injury, inflammation, healing of wounds, burns, ulcer, and diabetes [6].

DESCRIPTION

Various scientific studies of the use of *Aloe vera* have been already undertaken, few of them conflicting. Despite these limitations, there is some scientific evidence that *Aloe vera* extract is useful in the treatment of diabetes, hepatic disorder, menstrual disorder and elevated blood lipids in humans [7]. All these positive effects are thought to be due to the presence of various active compounds such as polysaccharides, mannans, anthraquinones and lectins.

Scientific classification

Kingdom: Plantae
Order: Asparagales
Family: Asphodelaceae
Genus: *Aloe*
Species: *Aloe vera*

Description

Aloe vera is a stemless or very short-stemmed succulent herb, which grows to approximately 60–100 cm (24–39 in) tall, and it spread by offsets [8]. The leaves are thick and fleshy, green to grey-green as shown in Figure 1, with few varieties showing white flecks all over the stem surfaces. The leaf margin is serrated and has small white teeth. Flowering occurs in summer on a spike, up to approximately 90 cm (35 in) tall, each flower pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long. Like other *Aloe* species, *Aloe vera* forms arbuscular mycorrhiza, a symbiosis relation that allows the plant better access to mineral nutrients in soil.



Figure 1. *Aloe vera*.

TAXONOMY AND ETYMOLOGY

The species has a number of synonyms [9]:

- *A. barbadensis*,
- *Aloe indica*,
- *Aloe perfoliata*, and
- *Aloe vulgaris*.

Common Names

There are various varieties which are commonly known with following names such as:

- Chinese Aloe,
- Indian Aloe,

- True Aloe,
- Barbados Aloe,
- Burn Aloe, and
- First aid plant.

The species *Aloe vera* is considered as “true” or “genuine” because word ‘vera’ means true or genuine. There are references in few books about the white spotted form of *Aloe vera* which is considered as *Aloe vera* var. *chinensis*; however, this species varies widely in various facts such as leaf spots and it has been suggested that the spotted form of *Aloe vera* may be conspecific with *A. massawana* as per few other books [10].

Carl Linnaeus was considered as first one to explain *Aloe perfoliata* var. *vera* in 1753, and it was again described and explained by Nicolaas Laurens Burman in 1768. According to Nicolaas, *Aloe vera* in Flora Indica on the 6th of April and by Philip Miller as *Aloe barbadens* is some ten days after Burman in the Gardener's Dictionary [11].

Techniques based on DNA comparison suggest that *Aloe vera* is generally related to *Aloe perryi*, which is considered as a species that is endemic to Yemen.

Various other techniques, which used chloroplast DNA sequence comparison and ISSR profiling suggest that *Aloe vera* can be closely related with *Aloe forbesii*, *Aloe inermis*, *Aloe scobinifolia*, *Aloe sinkatana* and *Aloe striata*. These *Aloe* species are native to Socotra (Yemen), Somalia and Sudan except *A. striata* which is considered as south African species. The lack of obvious natural populations of the species has led some authors to suggest that *Aloe vera* may be of hybrid origin [12].

Alternative Names

In India, the plant is known as ‘Ghritkumari’ or ‘Gheekvar’; and in Pakistan, the plant is known as ‘Quargandal’ and is used in Ayurvedic medicine.

In Tamil Nadu, *Aloe vera* is known as ‘katraazhai’ and it has also a pet name ‘kumari’. Since use of *Aloe vera* extends one's longevity, it has that pet name. The pulp is used extensively in Siddha medicines for treating constipation, enlargement of spleen, zymotic disease, chengamaari (a type of venereal infection) etc.

Biologically Active Compounds

Aloe vera leaves contain a wide range of biologically active compounds, the few of them are acetylated mannans, polymannans, anthraquinone C-glycosides, anthrones and anthraquinones and various lectins.

MEDICINAL USES

Scientific evidence for the medicinal value of *Aloe vera* in cosmetic and therapeutic purposes is limited, and when present, is typically contradictory. Despite this, various cosmetic and alternative medicine industries are regularly using and making claims regarding the soothing, moisturising effect and healing properties of *Aloe vera*, especially via internet advertising. *Aloe vera* gel is frequently used as an ingredient in commercially available lotion, body moisture, yogurt, beverages and even in some desserts. *Aloe vera* juice is used for medicinal consumption and relief of various digestive issues such as heart burn, constipation, hyper acidity disorder and irritable bowel syndrome.

Various cosmetic companies add sap or other derivatives from *Aloe vera* in various products such as makeup, tissues, moisturizers, soaps, sunscreens, incense, razors and shampoos in common. There are other therapeutic uses of extracts of *Aloe vera*, which include the dilution of semen for the

artificial fertilization of sheep, as fresh food preservative, and use in water conservation in small farms.

Aloe vera has a long association with traditional herbal medicine as explained in classical Ayurveda text by name 'Ghrithkumari', although it is still not known when its medical applications were first discovered. *Aloe vera* use appeared in the Ebers Papyrus from 16th century BCE in early records such as Dioscorides' De Materia Medica and Pliny the Elder's Natural History written in the mid-first century CE along with the Juliana Anicia Codex produced in 512 CE. *Aloe vera* is non-toxic herb, with no known side effects; if aloin has been removed by processing. Presence of excess aloin in *Aloe vera* has been associated with various side effects. However, the global use of this species is widely in the traditional herbal medicine of China, Japan, Russia, South Africa, the United States, Jamaica and India.

Aloe vera is proficient effective in wounds healing. Evidence of the effects of *Aloe vera* sap on wound healing, however, is limited and contradictory. Various studies show that *Aloe vera* promotes the rates of wound healing, while in contrast, other studies explain that application of *Aloe vera* gel on wound significantly slows the healing rate than those treated with conventional medical preparations.

Recently in 2007, various studies conclude the cumulative evidence supports the use of *Aloe vera* for the healing of first to second degree burns. *Aloe vera* can be used externally as local application in wound or burn healing or cosmetic purpose along with its internal use, which has been linked with medicinal value in improved blood glucose levels in diabetics, and lowers blood lipids in hyperlipidaemic patients, even also in acute hepatitis (liver disease) as explained in ancient Ayurvedic literature as Yakratsowthhar [13].

Preliminary studies also reveal that oral use of *Aloe vera* gel is also considered as best in reducing symptoms along with inflammation in ulcerative colitis patients. Various compounds extracted from *Aloe vera* work efficiently as immunostimulant and immune booster that aids in fighting carcinoma of various animal species such as cats and dogs; however, in humans, this treatment has not been scientifically tested. In contrary belief, the injection of *Aloe vera* extracts to treat cancer has resulted in the deaths of several patients, but this is needed to validate scientifically.

Topical medicinal application of *Aloe vera* is also effective for genital herpes, psoriasis, eczema, dermatitis and various skin disorders. However, it is not proven scientifically as effective for the prevention of radiation-induced injuries. Although anecdotally useful, its use in protection from sunburn or suntan and various skin allergies has not been proven.

A double-blind clinical trial, its role in gingivitis and plaque has been noticed as the group using an *Aloe vera* containing dentifrice and the group using a fluoridated dentifrice both demonstrated a statistically significant reduction of gingivitis and plaque.

Aloe vera extracts have antibacterial and antifungal properties. *Aloe vera* extract is useful in inhibiting the growth of fungal infections that cause tinea; however, its evidence in control beneath human skin remains to be established. *Aloe vera* is used as a fish tank water conditioner due to its anti-fungal property. *Aloe vera*'s inner leaf gel also shows its antibacterial property by inhibiting growth of *Streptococcus* and *Shigella* species *in vitro*. But *Aloe vera* extracts failed to show antibacterial properties against *Xanthomonas* species.

DISCUSSION

The *Aloe vera* has dramatic capacity to heal wound, ulcer, and burns by putting a protective covering around affected area and speed up healing rate, relieve pain and prevent blister. It boosts circulation and increases availability of oxygen to skin. It also has protection against frostbite. It is

considered as best colon cleanser. *Aloe vera* acts as a general tonic to raise immunity. It releases pepsin, which aids digestion. It also reduces blood sugar. It reduces cholesterol and triglyceride and leads to healthy heart. The phenolic component of *Aloe vera* has been found to have potent anti-lipid peroxidation inhibitory effects in the livers and brains of mice.

CONCLUSION

Aloe vera, a known wonderful medicinal plant produces substances with antimicrobial activity. It also has antimicrobial and anti-tumour effects. *Aloe vera* can be used to promote wound healing because of the presence of some active components like anthraquinones and hormones which possess various antibacterial, antifungal and antiviral activities

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