

REVIEW

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Aloe Vera and its uses in Dentistry

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ABSTRACT:

The Egyptians called Aloe the "Plant of Immortality" because it can live and even bloom without soil. Aloe has been used medicinally since at least the first century C.E. and continues to be used extensively worldwide. History of use of aloe vera in medicine, active ingredients, mechanism of action, clinical uses related to dentistry and possible side effects are briefly reviewed in this article.

Key words: Aloe Vera, Aloein, Aloe Sap, Aloe Gel

INTRODUCTION

The Aloe vera plant has been known and used for centuries for its medicinal and skin care properties. The name Aloe vera derives from the Arabic word "Alloeh" meaning shining bitter substance, while "vera" in Latin means true. The Greek scientists regarded Aloe vera as the universal panacea.¹ As anti-inflammatory, antiviral, antibacterial and antioxidative effects are proven in aloe vera, its use as a herbal remedy in dental conditions is increasing.

Aloe vera (Synonym: *Aloe barbadensis* Miller) belongs to the *Liliacea* family, of which there are about 360 species. Aloe vera is a cactus-like plant that

grows readily in hot and dry climates. Cosmetic and some medicinal products are made from the mucilaginous tissue in the centre of the aloe vera leaf and called aloe vera gel. The peripheral bundle sheath cells of aloe vera produce an intensely bitter, yellow latex, commonly termed aloe juice, or sap, or aloes.¹

HISTORY: Aloe is commonly used in both traditional Chinese and Ayurvedic medicine. In Ayurvedic medicine, the traditional medicine of India, Aloe has multiple uses inclusive of laxative, antihelminthic, hemorrhoid remedy, and uterine stimulant. It is used topically, often in combination with licorice root, to treat eczema or psoriasis. Egyptian queens Nefertiti and Cleopatra used it as part of their regular beauty regimes. Alexander the Great, and Christopher Columbus used it to treat soldiers wounds. The first reference to Aloe vera in English was a translation by

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John Goodyew in A.D. 1655 of Dioscoridesí Medical treatise De Materia Medica.^{2,3}

Aloe vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids.^{3,4} These constituents are related to biological effects^{5,6,7} of aloe vera which are as follows:

1) Healing properties: Glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interacts with growth factor receptors on the fibroblast, thereby stimulating its activity and proliferation, which in turn significantly increases collagen synthesis after topical and oral Aloe vera.

2) Protective effects on skin exposed to UV and gamma radiation: Following the administration of aloe vera gel, an antioxidant protein, metallothionein, is generated in the skin, which scavenges hydroxyl radicals and prevents suppression of superoxide dismutase and glutathione peroxidase in the skin. Aloe vera gel has been reported to have a protective effect against radiation damage to the skin

3) Anti-inflammatory action: Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Recently, the novel anti-inflammatory compound called C-glucosyl chromone was isolated from gel extracts.

4) Effects on the immune system: Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated release of histamine and leukotriene from mast cells. Acemannan stimulates the synthesis and release of interleukin-1 (IL-1) and tumor necrosis factor from macrophages which in turn initiates an immune attack that result in necrosis and regression of the cancerous cells.

5) Antiviral and antitumor activity: These actions may be due to indirect or direct effects. Indirect effect is due to stimulation of the immune system and direct effect is due to anthraquinones. The anthraquinone alone inactivates various enveloped viruses such as herpes simplex, varicella

zoster and influenza. In recent studies, a polysaccharide fraction has shown to inhibit the binding of benzopyrene to primary rat hepatocytes, thereby preventing the formation of potentially cancer-initiating benzopyrene-DNA adducts. An induction of glutathione S-transferase and an inhibition of the tumor-promoting effects of phorbol myristic acetate has also been reported which suggest a possible benefit of using aloe gel in cancer chemoprevention.

6) Moisturizing and anti-aging effect: Mucopolysaccharides in aloe vera help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled.

7) Antiseptic effect: Aloe vera contains 6 antiseptic agents as Lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenols and sulfur and have inhibitory action on fungi, bacteria and viruses.

USES OF ALOE VERA IN DENTISTRY: Uses of aloe vera in dental conditions based on its biologic effects are as follows

I. Oral Lichen Planus - Hayes⁹ described first case of treatment of oral lichen planus using aloe vera juice and aloe vera gel for three months. Choonkaran¹⁰ et al carried out a double blind study to explore the efficacy of aloe vera gel in management of OLP and found that aloe vera gel is more effective than placebo. As indicated by other studies,^{11,12,13} aloe vera can be used in dosages of two ounces aloe vera juice three times a day for three months. and for local application aloe vera gel can be used.

II. Applications directly to the sites of periodontal surgery along with periodontal dressing or to gum tissues when they have been traumatized by toothbrush-dentifrice abrasion, sharp foods, dental floss, and toothpick injuries. Existing evidence indicates that aloe vera used in variety of concentrations might be effective in shortening the duration of wound healing.¹⁴

III. Extraction sites heal properly and dry socket formation is prevented when Aloe vera is applied on extraction site.¹⁵

IV. Oral recurrent ulceration: Acute mouth lesions are improved by direct application in gel form on herpetic viral lesions or aphthous ulcers. It has been reported that acemannan hydrogel accelerates the healing of aphthous ulcers and reduces the pain associated with them.¹⁶

V. Studies using aloe vera in toothpastes have shown that aloe vera tooth gel and the toothpastes were equally effective against *Candida albicans*, *Streptococcus mutans*, *Lactobacillus acidophilus*, *Enterococcus faecalis*, *Prevotella intermedia*, and *Peptostreptococcus anaerobius*. Aloe vera tooth gel demonstrated enhanced antibacterial effect against *S. mitis*.¹⁷

CONTRAINDICATIONS: Aloe vera should be used cautiously in pregnancy, lactating mothers and allergy to liliaceae family.⁷

SIDE EFFECTS: Side effects may be categorized into due to topical or systemic routes as follows⁷:

A. Topical: It may cause redness, burning and stinging sensation. Allergic reactions are mostly due to anthraquinones, such as aloin and barbaloin. It is best to apply it to a small area first to test for possible allergic reaction.

B. Systemic: Abdominal cramps, diarrhea, red urine, hepatitis, dependency or worsening of constipation. Prolonged use has been reported to increase the risk of colorectal cancer. Laxative effect may cause electrolyte imbalances (low potassium levels).

CONCLUSION

Aloe vera has been known for its healing properties since ages. Its utilization in oral lesions demands better evidence as there is lack of appropriate studies. Studies with randomized control trials and large sample size are needed to define the clinical effectiveness of this popular herbal remedy in dental conditions more precisely.

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