

# Aloe Vera: An Ancient Option for Modern Day Dental Problems - A Review

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## ABSTRACT

The magical properties of Aloe Vera have been known to the world since time immemorial. It has inherent properties which help in enhancing the health and well-being of an individual in the most natural way possible. Its medicinal properties like anti-viral, anti-bacterial and wound healing capacity has led to the curiosity of using Aloe Vera in the treatment of various dental problems. This paper presents an overview explaining the use of Aloe Vera in the field of dentistry.

**Keywords:** Aloe Vera, wound healing, dentistry, herb, anti-inflammatory.

## INTRODUCTION

Aloevera is in use since past 2000 years. The medicinal properties of Aloe Vera are well recognized and is also called as the Universal Panacea in Greek. History of using Aloe Vera to treat the wounded soldiers of Alexander and Christopher Columbus is also there.<sup>1</sup>

The word "Alloe" is an Arabic word which means "shining bitter substance" while the "vera" means "true" in Latin. Aloe Vera (*Aloe barbadensis miller*) belongs to the family Liliaceae and is a bright green, shrubby, juicy, xerophytic, continuously growing plant mostly seen in the dry areas of Asia, America, Europe and Africa.<sup>2</sup>

## ALOE VERA: THE PLANT

The plant consists of two different parts, each producing different substances with completely different compositions and therapeutic properties. The innermost part of the aloe leaves produces the Aloe Vera gel which is transparent, thin, has no taste, has jelly-like consistency and the exudates consisting of bitter yellow latex are produced from other part of the plant.<sup>3</sup>

Aloe Vera is not only a powerful detoxifier, antiseptic and tonic for the nervous system but it also possesses immune-boosting and anti-viral properties. Aloe Vera gel (mucilaginous tissue) is formed in the centre of the plant and is responsible for the various cosmetic and medicinal products available in the market today.<sup>4</sup>

The pharmacological actions of Aloe Vera include anti-inflammatory, anti-arthritis, antibacterial and hypoglycemic effects.<sup>5</sup>

## Composition of Aloe Vera gel<sup>6</sup>

**Nutrients:** 75 nutrients have been identified in stabilized Aloe Vera gel. The most important are:

- Cellulose like material known as Lignin provides the ability to penetrate the human skin when added in the topical aloe preparations.
- Approximately 3% of Aloe Vera Gel contains Saponins (soapy substances) and have antiseptics and cleansing

properties.

**Vitamins:** Aloe Vera contains many vitamins, including Vitamin A, C, E, B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub> (niacin), B<sub>6</sub>, choline, folic acid, alpha-tocopherol, beta-carotene. Aloe Vera is one of the few plants that contain vitamin B<sub>12</sub>. Vitamins A, C and E are important antioxidant vitamins, essential to fight against damaging free radicals. Vitamin C not only assists in wound healing but also helps in the formation of collagen thereby maintains the health of bone, skin and joints. Vitamin A is an important vitamin for the maintenance of night vision. Vitamin E is one such vitamin which possesses anti-coagulant properties thereby preventing thrombosis and as well as atherosclerosis and also improves wound healing and fertility.

**Anti-Inflammatories:** Aloe Vera is composed of many antiinflammatories. Bradykinase enzyme found in Aloe Vera, reduces skin inflammation. There are about 12 anthraquinones, commonly known as laxatives. It possesses fatty acids, salicylic acid and hormones called auxins and gibberellins, all of which act as anti-inflammatories. The mechanism of action of these anti-inflammatories is either by stimulating the function of immune system function or by inhibiting the paths of irritants.

**Amino Acids:** The human body requires 20 amino acids to maintain good health, out of which only eight can be formed in the body. The other essential amino acids are taken from the outside source. Aloe Vera has the potential to provide nineteen of the twenty required amino acids.

**Enzymes:** Aloe Vera is a source of multiple enzymes, which can be categorized into two groups,

- Enzymes that help in digestion, like amylase, break down starch and sugar, while others, such as lipase, help break down fats.
- Enzymes that act as anti-inflammatory.

**Sugars:** Glucose, a monosaccharide and glucomannose, often called as the Acemannan, a polysaccharide are present in Aloe Vera.

Acemannan is responsible for many actions such as;

- a. It boosts the level of antibodies thus provide immunomodulatory actions.
- b. It acts as an Antiviral specially against tumor producing

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Chemical Composition			
Anthraquinones	Inorganic	Saccharides	Enzymes
1. Aloin 2. Barnaloin 3. Iaobarnaloin 4. Anthranol 5. Aloetic acid 6. Anthracene 7. Easter of cinnamic acid 8. Aloe-emodin 9. Emodin 10. Chrysophanic acid 11. Etheral oil 12. Resistannol	1. Calcium 2. Sodium 3. Chlorine 4. Manganese 5. Magnesium 6. Zinc 7. Copper 8. Chromium 9. Potassium 10. Sorbate	1. Cellulose 2. Glucose 3. Mannose 4. L-Rhamnose 5. Aldopentose	1. Oxidase 2. Amylase 3. Catalase 4. Lipase 5. Alkaline phosphatase
Vitamins	Essential amino acids	Nonessential amino acids	Miscellaneous
1. Vitamin B1 2. Vitamin B2 3. Vitamin B6 4. Choline 5. Folic acid 6. Vitamin C 7. Alpha-tocopherol 8. Beta carotene	1. Lysine 2. Threonine 3. Valine 4. Methionine 5. Leucine 6. Isoleucine 7. Phenylalanine	1. Histidine 2. Arginine 3. Hydroxyproline 4. Aspartic acid 5. Glutamic acid 6. Proline 7. Glycerine 8. Alanine 9. Tyrosine	1. Cholesterol 2. Triglycerides 3. Steroids 4. Beta- sitosterol 5. Lignins 6. Uric acid 7. Gibberellins 8. Lectin like substance 9. Salicylic acid

viruses, such as feline leukemia.

- c. Reduces the occurrence of secondary infections.
- d. Increases the activity of T-lymphocytes by up to 50%.
- e. Increases the activity of macrophages thereby improving the wound healing properties.

**Sterols:** Lupeol a sterol present in Aloe Vera acts as an antiseptic and analgesic agent.

**Salicylic Acid:** Salicylic acid present in Aloe Vera together with lupeol acts as painkiller.

## ALOE VERA AND DENTISTRY

There are eight main uses of Aloe Vera in dental practice<sup>7</sup>

1. Directly at the sites of periodontal surgery.
2. Used on the traumatized gum tissues. Trauma may be due to toothbrush abrasion, sharp foods, dental floss or toothpick injuries.
3. Chemical burns
4. Application at extraction sockets immediately after extraction.
5. Acute oral lesions. Example: aphthous stomatitis, angular cheilitis or herpetic lesions.
6. Chronic oral lesions. Example: Lichen Planus, Pemphigus.
7. Patients suffering with denture stomatitis, or ill fitting dentures.
8. Application around dental implants to control inflammation.

## ENDODONTICS

**Intracanal medicament<sup>8</sup>:** Aloe Vera has an antimicrobial effect against resistant microorganisms like *Enterococcus faecalis* and *Candida albicans* found in pulp space. The extracts of Aloe Vera like water, alcohol and chloroform also show anti microbial efficacy and can be used as an intracanal medicament.

**Can be used in root canals as sedative dressing and as file lubricant:** Aloe Vera helps reduce the sensitivity of the highly sensitive nerve ends present in the root canal by placing the gel

inside the pulp chambers and broaching alongside.

**Canal lubricant material:** Aloe Vera can also be used in lubrication of canal. Camphorated mono-chlorophenol with a drop of aloe Vera gel can be given in closed dressing and then sealed with temporary restorations.<sup>8</sup>

**Decontamination of Gutta-Percha points:** The importance of gutta-percha decontamination to prevent contamination of the root canal with bacteria during the obturation procedure is widely recognized in endodontic practice. Aloe Vera gel is proven to be a potent decontaminant of guttapercha points thereby helping in removal of bacteria within a minute.<sup>9</sup>

**Obturbative material:** Aloe Vera has proved to be an effective obturbative material for primary teeth.<sup>10</sup>

## PERIODONTICS

**Mouthwash:** Aloe Vera due to its wound healing and anti-inflammatory mechanism prevents radiation induced mucositis. It also reduces the incidence of oral thrush in patients undergoing radiotherapy due to its anti-fungal and immunomodulatory properties.<sup>10</sup> As a mouthwash, 1-3 table spoon of Aloe Vera should be used followed by swallowing it. This should be done at least three times a day. When compared with chlorhexidine mouth wash, Aloe Vera has shown to be equally effective anti-plaque agent and can become a potent herbal substitute with the necessary refinement of taste and shelf life at an affordable price.<sup>11</sup>

In order to improve the periodontal condition, Aloe Vera gel can be administered sub-gingivally. It helps in reduction of pocket depth by filling the pockets with Aloe Vera gel and placing coe-pack over it. Aloe Vera helps control bleeding of gums due to its soothing and healing properties thereby reducing swelling and soft tissue edema and hence restore the gum health along with reducing plaque and calculus formation.<sup>8</sup>

**Bad Breath:** *A.vera* naturally possesses anti-fungal and

antibacterial properties. It not only protects the sensitive tissue of the mouth but also kills bacteria and fights tooth decay. It Boosts body's ability to form collagen thereby strengthening weak and swollen gums. Mixing 1/4 cup of pure Aloe Vera gel with 1/2 cup of water or apple juice helps soothe acid digestion, which is a very common etiological factor of halitosis.<sup>8</sup>

It is also used directly at the site of periodontal surgeries, as an adjunct to scaling and root planning.

### ORAL SURGERY: HEALING OF EXTRACTION SOCKETS

**Acemannan hydrogel**, a component of the Aloe Vera, when used immediately after extraction at the extraction site has proved to reduce the incidence of alveolar osteitis.<sup>12</sup>

**SaliCept Patch**, a freeze-dried pledget containing Acemannan Hydrogel when placed in socket after extraction has proved to fasten the process of healing and clot formation.<sup>2</sup>

### PROSTHODONTICS

**Denture Adhesive:** Acemannan, a complex mannose carbohydrate, an important component of the Aloe Vera gel has an inherent property of stickiness/ viscosity. This property of Aloe Vera led to the production of prototype acemannan denture adhesives. These denture adhesive formulations were evaluated for pH changes, cytotoxicity to human gingival fibroblasts and adhesive strength in both dry and wet conditions. A pH value of 6.0 or more in Acemannan denture adhesive formulation was found to be a herbal substitute for traditional denture adhesives.<sup>13</sup>

**Denture Care:** Applying Aloe Vera gel onto the denture once or twice a day helps prevent denture stomatitis and other fungal infections. It can also be used in combination with soft liners.<sup>8</sup>

### DENTAL IMPLANTS

Aloe Vera gel when placed around dental implants is found to be effective in reducing inflammation due to its antimicrobial and anti-inflammatory effects.<sup>8</sup>

### MISCELLANEOUS

**Oral Lichen Planus:** The topical application of Aloe Vera, three times a day controls the pain and improves the overall oral quality of life of patients suffering from oral lichen planus.<sup>14</sup> As shown by other studies, Aloe Vera can also be used in dosages of two ounces of Aloe Vera juice three times a day for a period of three months.<sup>15</sup> When compared with steroids like triamcinolone, topical use of Aloe Vera has shown better and effective results in treating oral lichen planus.<sup>10</sup>

**Apthous Ulcers:** Acemannan hydrogel not only heals the apthous ulcers but also helps reduce the pain associated with it. Acemannan has been used for the treatment of oral apthous stomatitis in patients who don't wish to use steroids. Aloe Vera derivative is also an effective treatment option in the treatment of oral ulcers according to U.S Food and Drug Administratin.<sup>10</sup>

**Oral Sub Mucous Fibrosis:** A preliminary study to compare the effectiveness of Aloe Vera and that of antioxidants in the treatment of oral submucous fibrosis (OSMF) was carried out by Sudarshan et al. He concluded that Aloe Vera when applied topically, three times a day for three months was much more effective in reducing the burning sensation and improving

mouth opening in cases with OSMF when compared with antioxidant therapy.<sup>16</sup>

### CONTRAINDICATIONS TO USE ALOE VERA

1. Diabetics: it decreases the blood sugar levels and, thus, may interact with oral hypoglycaemic drugs and insulin.<sup>2</sup>
2. Pregnancy and Lactation.
3. Patients allergic to Liliacea Family plants.
4. Children under 10 years of age.

### SIDE –EFFECTS<sup>2</sup>

When used topically, it may cause redness, burning sensation and rarely generalized dermatitis in sensitive individuals. It is thus advised to test for any possible allergy before starting its use.

When used orally, there may occur abdominal cramps, diarrhoea, red urine, hepatitis or constipation. Prolonged oral use of Aloe Vera has been reported to increase the risk of colorectal cancer. Laxative effect may cause imbalances in the levels of electrolytes.

### CONCLUSION

Aloe Vera is most definitely a promising herb in the field of dentistry and does require a lot of research in order to prove its worth. It is important to compare and evaluate the various properties of Aloe Vera to use it to its fullest. Aloe Vera being economical and easily available can prove to have a future in modern dentistry.

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