

Aloevera: The Miracle Plant and Its uses in Dentistry – A Review

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Abstract

Aloevera has been used by humans since times immemorial. Its health benefits are well known. Ancient Greeks and Egyptians used it in their daily routine and in battle fields due to its many miraculous properties. Studies have proved the antiseptic, anti-inflammatory, anti-viral, anti-fungal and wound healing properties of aloe vera plant. Recently it has garnered a lot of interest regarding its use in dentistry as it is completely natural and there are no side effects reported with proper usage. This paper gives an overview of the uses of this wonder plant in various departments of dentistry.

Keywords: *Aloevera, antibacterial, antiviral, anti-inflammatory, antioxidant*

Introduction

Aloe vera is a miracle plant and it has been known for its numerous benefits. It has been used for centuries for its health, beauty, medicinal and skin care properties. First reference to aloevera was seen in A.D. 1655 of Dioscorides' Medical treatise De Materia Medica. It was used by Egyptian queens Nefertiti and Cleopatra in their regular beauty regimes and by Alexander the Great, and Christopher Columbus for treatment of wounds of soldiers. The botanical name of Aloe vera is *Aloe barbadensis miller*.^{1, 2, 3, 4} The *Aloe barbadensis* plant consists of two parts, the parenchyma tissue makes up the inner portion of the aloe leaves and produces the aloe vera gel (or mucilage), a clear, thin, tasteless, jelly-like material. This tissue is used by separating the gel from

the inner cellular part.^{5, 6} The other part is specialized cells known as the *pericyclic tubules*, it occurs beneath the outer green rind of the leaf. It is yellowish latex with powerful laxative-like actions.^{7, 8, 9}

Composition

Aloe vera gel has a very complex chemical composition.^{10, 11} Vogler and Ernst listed 75 of its active constituents. Reynolds and Dweck listed 16 different polysaccharides and Yamaguchi et al reported presence of nine different minerals.

The constituents are listed in the table below^{12, 13, 14, 15, 16}

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Vitamins	antioxidant vitamins A, C and E. Vitamins B(thiamine), niacin, vitamin B2 (riboflavin), vitamin B12, choline and folic acid.
Enzymes	Biochemical catalysts, such as amylase and lipase which aid in breakdown of fats and sugars. Carboxypeptidase, produces anti-inflammatory and analgesic effect
Minerals	Sodium, potassium, calcium, magnesium, manganese, copper, zinc, chromium and iron are all found in the aloepant Magnesium lactate prevents the formation of histamine from the amino acid, histidine this explains the antipruritic effect of aloe vera.
Sugars	Sugars are derived from the mucilage layer of the plant are glucose and mannose, known as the gluco-mannans.
Anthraquinones	The bitter aloes consist of free anthraquinones and their derivatives, Barbaloin, aloe-emodin-9-anthrone, isobarbaloin, Anthrone-C-glycosides and chromones. Powerful purgative effect and potent antimicrobial agents. Lignin with their penetrative ability to carry other active ingredients deep into the skin to nourish the dermis.
Sterols	Campesterol, Sitosterol and Lupeol.
Salicylic acid	This is an aspirin-like compound possessing anti-inflammatory and antibacterial properties. It has a kerolytic effect which helps to debride a wound of necrotic tissue.
Amino acids	These are the building blocks of proteins. Aloe vera gel provides 20 of the 22 necessary amino acids required by the human body and seven of the eight essential amino acids which the body cannot synthesize

Properties useful in Dentistry^{17, 18, 19}

- Wound healing
- Antibacterial
- Antifungal
- Antiviral effects
- Antitumor
- Antioxidant activity
- Anti-inflammatory activity

- Anti-mutagenic activity
- Immunomodulatory activity
- Gastro-protective activity

Applications in Dentistry^{1,3,5, 8, 9}

Periodontology

- Aloe vera gel laced cotton pads can be used at site of periodontal surgery.
- Application to traumatized or scratched gum tissues by toothbrush-dentifrice abrasion, sharp foods, dental floss, or toothpick injuries.

- Pockets when filled with gel upto gingival margins & Coe- pack placed over it shows reduction in pocket depth, gingival index and plaque index

· Gingival & Periodontal Diseases

- Aloe Vera use shows reduction in gum bleeding due to its soothing & healing properties, reduction in swelling and oedema is also reported

- Reduces plaque & calculus formation. Aloe vera based mouthwashes if used two times show effective reduction in plaque and calculus formation

- To treat Halitosis- Natural anti-fungal and antibacterial properties of aloe vera eliminates microorganism's causative of halitosis. Drinking 1/4 cup of pure Aloe Vera gel mixed in 1/2 cup of water or apple juice soothes acidity and indigestion, which is a very common cause of bad breath.

- Aloe vera based mouthwash prevent radiation-induced mucositis, oral candidiasis and Oral lichen planus due to its wound healing, anti-inflammatory and anti-fungal properties.

Prosthodontics and Crown and Bridge

- Topical application in edentulous patients with sore ridges

- Topical application around Dental Implants as it reduces inflammation.

- Preventing denture stomatitis.

- Application as Denture Adhesives owing to its Sticky & viscous nature

Conservative Dentistry and Endodontics

- Root canal sedative dressing & as file lubricant owing to its antimicrobial effect *Candida albicans* & *Enterococcus faecalis*. Found in pulp chamber

- Intracanal medicament.

- Lubricating agent

Oral and Maxillofacial Surgery

- Aloe vera gel laced gauze can be used at site of extraction socket to reduce inflammation

- Facilitates wound healing at site of surgeries

Oral Medicine and Radiology

- Topical application in ulcers as soothes & alleviates irritation

- Topical application in Chemical burns (tobacco, aspirin)

- Acute mouth lesions such as herpetic viral lesions

- In Gum abscesses

- As Tooth Gel

- Chronic oral diseases Lichen Planus and Benign Pemphigus, gum problems associated with AIDS and Leukemia. Migratory glossitis, geographic tongue and Burning Mouth Syndrome.

Side Effects

Rarely can it cause allergic reaction resulting in redness, burning, stinging sensation and generalized dermatitis. If taken orally in excessive dose it might cause abdominal cramps, diarrhea. It has been reported that if used for prolonged durations there is risk of colorectal cancer.¹

Contraindications

- Oral intake is contraindicated in Pregnancy and breastfeeding

- Known cases of allergy to plants of Liliaceae family

Conclusion

Aloe vera is often referred to as a wonder plant and rightly so because of its innumerable properties and benefits. Being a natural and easily available product, it can be used in various health conditions, owing to its antibacterial, antifungal, anti-inflammatory, immunomodulatory and antioxidant effects. It can prove to be useful in various branches of dentistry.

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Conflict of Interest – Nil

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