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Aloe Vera: A Miracle Herb for Dentistry

DR. Raman Jayant, DR.Nidhi Pruthi Shukla, DR.Rohma Yusuf, DR.Surbhit Singh, DR. Saumya Nandan, DR. Smriti Tripathi

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 antiviral, antibacterial and wound healing capacity, have 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, dentistry, herb,

INTRODUCTION - Aloe vera (Aloe barbadensis) is a succulent plant that belongs to Liliaceae family. The name Aloe derives from the Arabic word "Alloeh" meaning shining bitter substance while "vera" in Latin means true. There are more than 300 species of the aloe-plant, but the Aloe barbadensis species exhibits the best medicinal properties. It grows mainly in the dry areas of Africa, Asia, Europe, and America.(1)

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. as anti-inflammatory, antiviral, antibacterial, and antioxidative effects are proven in Aloe. vera, its use as an herbal remedy in dental conditions is increasing 2

Among the various currently available herbal agents, the most popular and currently receiving a lot of scientific attention is A. vera. It is a perennial succulent xerophyte, which develops water-storage tissue in the leaves to survive in dry areas of low or erratic rainfall.2

The plant has stiff gray-green lance-shaped leaves containing clear gel in a central mucilaginous pulp. Benefits associated with A. vera have been attributed to the polysaccharides contained in the gel of the leaves. It is a cactus-like plant that grows in hot and dry climates. Numerous studies on A. vera are being done to demonstrate the antiviral, antibacterial, analgesic, anti-inflammatory, and wound healing properties.

The plant consists of two different parts, each of which produces substances with completely different compositions and therapeutic properties. The parenchymal tissue makes up the inner portion of the Aloe leaves and produces the A. vera gel (or mucilage), a clear, thin, tasteless, jelly-like material. This tissue is recovered from the leaf by separating the gel from the inner cellular debris. The other part of the plant is a group of specialized cells known as the pericyclic tubules, which occur just beneath the outer green ring of the leaf. These cells produce an exudate that consists of bitter yellow latex with powerful laxative-like actions.3

HISTORY

The usage of aloe vera dates back to the ancient biblical era (Richa Wadhawan et al., 2014)4

A Aloe vera has been used for its Medicinal properties in several cultures for several million years in Greece, Egypt, India, South Africa, Mexico, China. Alexander the great and Christopher Columbus used Aloe vera for treating wounded soldiers.Cleopatra her regular beauty regimes Hannibal states, during 1750 BC war had been fought to obtain control over the growing area in North Africa 5

The plant is navtive to southern and eastern Africa along the Upper Nile in the Sudanand it was subsequently introduced into the northern parts of Africa and naturalized in the mediterrenean region and other countries across the globe. The plant is cultivated commercially in Aruba, Bonaire, Haiti, India, America and Venezuela, while the finest quality is grown abundantly in the deserts of Southern California Sahu et al., 2013). Egyptians still hang an aloe plant over the door of a New house to provide a long and fruitful life for its occupants.6.

The chief reference to Aloe Vera in English was an understanding by Goodyew in A.D. 1655 of Dioscorides' Medical composition De Materia Medica. By the mid-1800s, Aloe Vera was being utilized as a laxative in the United States, anyway in the mid-1930s, a vital crossroads happen when it was adequately used to treat relentless and extraordinary radiation dermatitis 7

COMPOSITION OF ALOE VERA

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, B1 , B2 , B3 (niacin), B6 , choline, folic acid, alphatocopherol, beta-carotene.

Aloe Vera is one of the few plants that contain vitamin B12. 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. Bradykinasean 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.

Table 1 Chemical composition8

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

• A. Enzymes that help in digestion, like amylase, break down starch and sugar, while others, such as lipase, help break down fats.

• B. 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 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.8

MECHANISM OF ACTION OF ALOE VERA

It has antimicrobial impact is more articulated than fluid extract. 9

Both leaf and gel inhibitorily affect the development of Staphylococcus aureus.

A. vera gel has antimicrobial movement against Gram-positive microorganisms, for example, Bacillus sphaericus, S. aureus, mycobacterium smegmatis, Enterococcus faecalis, Streptococcus pyogenes.

Aside from these, aloe shows antimicrobial movement against Gramnegative microscopic organisms, for example, Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae, and Salmonella typhimurium.

Antifungal action has not been given a lot of consideration. Not withstanding, A. vera gel readiness has an inhibitory activity on development of candida albicans.10

Apart from this, it likewise inhibitorily affects trichophyton metagrophytes. Antiviral impact is increasingly momentous, particularly action against human immunodeficient infection type 1.

The antiviral impacts of acemannan against HIV-1 and other encompassed infections seem, by all accounts, to be identified with the adjustment of glycosylation of viral glycoproteins. 11

The antiviral property of A. vera is expected primarily due to anthraquinone aloin which inactivates different encompassed infections, for example, herpes simplex, varicella zoster, and flu.

ALOE VERA AND DENTISTRY

ENDODONTICS

Intracanal medicament: 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.12

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 bactaria within a minute.13

Obturative material: Aloe Vera has proved to be an effective obturative material for primary teeth.

PERIODONTICS

Mouthwash: Aloe Vera due to its wound healing and antiinflammatory 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.10 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.14

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 coepack 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.

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. 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.15

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.

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.16

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.

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.

Oral lichen planus Choonhakarn et al. [17]conducted a randomized controlled trial study to check the efficacy of A. vera gel in the treatment of oral lichen planus (OLP). He concluded that A. vera gel is statistically significantly more effective than placebo in inducing clinical and symptomatological improvement of OLP. Therefore, A. vera gel can be considered a safe alternative treatment for patients with OLP.

Oral submucous fibrosis Sudarshan et al. [18] carried out a preliminary study to compare the efficacy of A. vera with antioxidants in the treatment of oral submucous fibrosis (OSMF). In this study, 20 subjects with OSMF were included. Patients are divided into two groups, Group A received 5 mg of A. vera gel 3 times daily for 3 months, and Group B received antioxidant capsules twice daily for 3 months. He concluded that A. vera group showed a better treatment response (reduced burning sensation and enhanced mouth opening) than the antioxidants group. Hence, it can be applied topically and effective in the treatment of OSMF.

Recurrent aphthous stomatitis Babaee et al. [19] conducted a double-blind clinical trial to evaluate the topically administered A. vera gel on oral cavity minor aphthous. It was concluded that A. vera 2% oral gel is not only effective in decreasing the patient's pain score and wound size, but also decreased the aphthous wound healing period.

Radiation-induced oral mucositis Ahmadi[20] postulated that oral A. vera mouthwash may not only prevent radiation-induced mucositis by its wound healing and antiinflammatory mechanism, but also reduce oral candidiasis of patients undergoing head and neck radiotherapy due to its antifungal and immunomodulatory properties. Hence, A. vera mouthwash is an alternative agent for treating radiation-induced oral mucositis and candidiasis in patients with head and neck cancers.

SIDE EFFECTS

Topical It may cause redness, burning, stinging sensation, and rarely generalized dermatitis in sensitive individuals. 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. Oral Abdominal cramps, diarrhea, red urine, hepatitis, dependency or worsening of constipation. Prolonged use has been reported to increase the risk of colorectal cancer. The laxative effect may cause electrolyte imbalances (low potassium levels).
Interactions Application of Aloe to the skin may increase the absorption of steroid creams like hydrocortisone. It reduces the effectiveness and may increase the adverse effects of digoxin and digitoxin, due to its potassium lowering effect. Combined use of A. vera and furosemide may increase the risk of potassium depletion. It decreases the blood sugar levels and thus may interact with oral hypoglycemic drugs and insulin. Thus, though A. vera has a wide spectrum of the properties and uses, some of them could be myths and some of them could be real magic. In future, controlled studies are required to prove the effectiveness of A. vera under various conditions.21

TOXICITY

Ingestion of A. vera is sometimes associated with diarrhea, electrolyte imbalance, kidney dysfunction and conventional drug interactions; episodes of contact dermatitis, erythema, and phototoxicity have been reported from topical application.
The diarrhea caused by the laxative effect of A. vera can decrease the absorption of other systemically used drugs. However, these side effects are not seen in all patients. It is hence, important to choose an Aloe product which is pure, stabilized, concentrated, and grown organically. Furthermore, it is desirable to check

for the label of accreditation "Seal of Approval of The International Aloe Science Council" as this seal guarantees the desired necessities.22

CONCLUSION

A. vera may find a promising role in various branches of dentistry in future. Proper diagnosis, knowledge of the traditional medicine, and implementation of that knowledge to the treatment plan are important in ensuring success with this dental therapeutic agent.

A. vera has a lot to offer in the field of dentistry, a lot of studies are on the way to utilize the effective antimicrobial property of the miracle plant. Interest is gathering for the use of A. vera in dentistry, and this natural therapy is already proved its unlimited use in our field. Standardization and quality assurance of A. vera products play a key area which needs to be focused. A. vera, a promising herb with its various clinical applications in dentistry, more clinical research should be undertaken and hence that it can establish itself in this field and mankind can be benefitted with its wide range of properties.

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