Review Article

Aloe vera - Nature's healer

K. Deepthi[1], R. Pradeep Kumar[2]*

ABSTRACT

Aloe vera is a plant that belongs to "*Xanthorrhoeacea*" family. It is used in herbal medicine since 1st century AD. Clinical evaluations revealed that the pharmacologically active ingredient is present in the gel and leaves. More than the 300 varieties of *A. vera* exists exhibiting its unique property. The use of herbal products shows minimal side effect but highly effective treatment. Even though there are various advances in fields of medicine, oral infections are considered as a serious public health problem. *A. vera* is said to be as "Portable Nature's First Aid Kit" and has also been used in dentistry for its beneficial properties in various conditions. This review summarizes the various therapeutic application and clinical uses of *A. vera* in dentistry. However, further research should be carried out to unfold the various potential uses of *A. vera* plant in dentistry.

KEY WORDS: Aloe vera, Dental, Oral health

INTRODUCTION

Plants are the source of medicine for thousands of years. Even current drugs mimic natural molecules. The useful parts of a plant or tree are barks, stems, leaves, flowers, and fruits.[1] Many people prefer a natural approach to take care of their teeth. Even though there are various developments in medical field, oral health issue is still public health problem and considered as a burden in developing countries.[2] *Aloe vera* is a vital plant used for healing boils, wounds, burns, and treatment for different diseases. In ancient time, it was used to cure infections, treating skin problems, and as a laxative.[3,4]

Origin

The origin *Aloe vera* is in Southern and Eastern Africa, Mediterranean region.[5]

Distribution

It is distributed in Aruba, Bonaire, Haiti, India, South Africa, USA, Venezuela, and Southern California.[6] In India, it is seen in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra, and Tamil Nadu.[7]

Access this article online	
Website: jprsolutions.info	ISSN: 0974-6943

Constituents of *A. vera*

A. vera contains active constituents such as vitamins, enzymes, lignin, saponins, salicylic acid, and amino acid.[8] In addition to these, they contain anthraquinones, aloin, aloe-emodin, aloetic acid, anthracene, aloe mannan, aloeride, antranol, chrysophanic acid, and resistanol.[9]

Pharmacological Properties

Antitumor and Antioxidant activity

Glycoproteins have anticancer effect that helps in proliferating normal human cells.[10,11] The antioxidant effect is executed by glutathione peroxidase activity, superoxide dismutase enzyme, and a phenolic antioxidant present in *A. vera* gel.[12]

Anti-inflammatory activity

A. vera helps in inhibiting the cyclooxygenase pathway, thereby decreasing the production of prostaglandin E2 from arachidonic acid.[13]

Antidiabetic property

Intake of *A. vera* has shown significant effect both clinically and experimentally on hypoglycemia.[14]

Wound healing property

Glucomannan and gibberellins interact with growth factor receptor on fibroblast and help in proliferation

[1]Final Year BDS, Saveetha Dental College, Saveetha University, Chennai, Tamil Nadu, India,
[2]Reader, Department of Public Health Dentistry, Saveetha Dental College, Saveetha University, Chennai, Tamil Nadu, India

***Corresponding author:** Dr. R. Pradeep Kumar, Department of Public Health Dentistry, Saveetha Dental College, Saveetha University, 162, Poonamalle High Road, Chennai – 600077, Tamil Nadu, India. Phone: +91-9940391698. E-mail: drrpradeepkumar@gmail.com

Received on: 17-09-2017; Revised on: 14-10-2017; Accepted on: 23-11-2017

leading to increased collagen synthesis.[15,16] Topical application of allantoin gel stimulates fibroblastic activity and collagen proliferation.[17]

Antifungal property

It is reported that *A. vera* gel inhibits the growth of *Trichophyton mentagrophytes*, *Pseudomonas aeruginosa,* and *Candida albicans*.[18] Aloe proteins which are purified exhibit antifungal activity against *Candida parapsilosis*, *Candida knesei,* and *C. albicans*.[19]

Antiviral effect

Aloe-emodin was effective against infective type of Herpes simplex virus Type I and Type II and also capable of inactivating all the viruses including varicella zoster, influenza, and pseudorabies virus.[20] Fraction of *A. vera* gel contains lactins which inhibited the proliferation of cytomegalovirus in cell culture, in addition with interfering protein synthesis.[13]

Antiseptic effect

A. vera contains lupeol, salicylic acid, urea, nitrogen, cinnamic acid, phenols, and sulfur which inhibits bacteria, fungi, and viruses.[15]

Cosmetic Properties

Antiaging effect

A. vera had rejuvenating action which stimulates fibroblast which in turn synthesize collagen and elastin fibers causing the skin to be more elastic and less wrinkled.[12]

Moisturizing effect

A. vera gel impregnated gloves improved the integrity of the skin, decreased the wrinkle and erythema.[21] *A. vera* gel with a concentration of 0.25% w/w and 0.5% w/w improves hydration of skin by humectant mechanism, in which *A. vera* gel attracts water from the dermis and keeps this water in stratum corneum.[22]

Protective effect

A. vera protects skin from radiation damage.[23]

Uses of *A. vera* in Medical Field

Aloe had been used for treating gastrointestinal and gout boils. It is also found that aloe helps to relieve eczema, thermal burns, minor injuries, sunburn, scalding, allergies, and poison ivy.[24] It was used to cure X-ray dermatitis.[25] *A. vera* and aloe arborescence mixture was studied for the therapeutic effect on cirrhosis patients.[26] *A. vera* juice consumption decreased urinary indican values, lowered conversion of tryptophan, improved protein digestion and absorption, and reduced bowel putrefaction.[27]

Clinical Uses of *A. vera* in Dentistry

Oral lichen planus

A. vera mouthwash is an effective treatment of oral lichen planus.[28] It is concluded that topical application of *A. vera* gel improves the quality of life in patients with OLP.[29] It is also proved that aloe gel was safe and effective treatment for vulvar lichen planus.[30]

Aphthous ulcer

Acemannan hydrogel helps in healing aphthous ulcer and reduces pain.[31] A gel had been evaluated which contained allantoin, *A. vera*, and silicon dioxide to study its efficacy on aphthous ulcer.[25]

In treatment of primary teeth

A. vera gel along with non-eugenol cement and permanent restoration is applied in pulpotomy, to the remaining pulp, and is effective and free of symptoms including the absence of mobility, pain, swelling, and abscess.[32]

A. vera and endodontic treatment

Failure of root canal therapy is due to secondary intraradicular infection caused by *Enterococcus faecalis*.[33] A study concluded that aloe shows significant zone of inhibition of *E. faecalis*.[34] *A. vera* is used as sedative dressing and file lubricant as it contains alloins and barbaloins.[35] *A. vera* gel is used as disinfectant for decontaminating GP points in 1 min.[19]

A. vera and alveolar osteitis

Acemannan hydrogel reduced the incidence of alveolar osteitis.[36] *A. vera* contains glucomannan and giberrelins which stimulate fibroblast to proliferate and accelerate wound healing and prevent infection.[35]

Uses in periodontal therapy

Mouthwash containing *A. vera* showed significant reduction in plaque and gingivitis. It is used as a medicaments in periodontal pocket and showed significant improvement, thus can be used as local drug delivery system,[12] and applied to gum tissue that has been traumatized by tooth pick, wrong flossing, and brushing technique.[2] *A. vera* prevents the action of catecholamines due to which epithelization increases.[37]

Adverse Effects

Topical application may cause redness, stinging, and burning sensation and rarely develop into dermatitis.[23]

Drug Interaction

A. vera inner gel increases Vitamin C and E absorption after application.[12] *A. vera* is not recommend in combination with antidiabetic, diuretic, laxative drugs, sevoflurane, and digoxin.[38]

CONCLUSION

Various researches have been conducted to study the efficacy of *A. vera A. vera* holds a good role in dentistry in the future. As *A. vera* is economical, future researches with clinical trial would help to serve better treatments in medical field and in dentistry.

REFERENCES

1. Klein AD, Penneys NS. *Aloe vera*. J Am Acad Dermatol 1998;18:714-20.
2. Digra R, Rao NC, Gupta N, Vasi S. Ayurvedic herbs in dentistry: Learn how to manage oral health and tooth decay with these modest herbs? J Orofac Res 2014;4:41-5.
3. Atherton P. *Aloe vera*: Magic or medicine. Nurs Stand 1998;12:41-52.
4. Robson MC, Heggers JP, Hangstrom WJ. Myth, magic, witch craft or fact? *Aloe vera* revisited. J Burn Cure Rehabil 1982;3:157-63.
5. Tanwar R, Gupta J, Sheikh A, Panwar R, Heralgi R. *Aloe vera* and its uses in dentistry. Indian J Dent Adv 2011;3:656-8.
6. Yeh GY, Eisenberg DM, Kaptchuk TJ, Philips RS. Systematic review of herbs and dietary supplements for glycemic control in diabetes. Diabetes Care 2003;26:1277-94.
7. Bhat G, Kudva P, Dodwad V. *Aloe vera*, Nature's soothing healer to periodontal disease. J Indian Soc Periodontal 2011;15:206-9.
8. Atherton P. *Aloe vera* revisited. Br J Phytother 1998;4:176-83.
9. Kambizi L, Afdayan AJ. Extracts from aloe ferox and *Withania somnifera*. Inhibit *Candida albicans* and *Neisseriagonorrhoea*. Afr J Biotech 1991;7:12-5.
10. Yagi A, Egusa T, Arase M, Tanabe M, Tsuji H. Isolation and characterization of the glycoprotein fraction with a proliferation-promoting activity on human and hamster cells *in vitro* from *Aloe vera* gel. Planta Med 1997;63:18-21.
11. Choi SW, Son BW, Son YS, Park YI, Lee SK, Chung MH, *et al.* The wound-healing effect of a glycoprotein fraction isolated from *Aloe vera*. Br J Dermatol 2001;145:535-45.
12. Kavyashree G, George R. *Aloe vera*: It's uses in the field of medicine and dentistry. IOSR J Dent Med Sci 2015;14:15-9.
13. Wynn RL. *Aloe vera* gel: Update for dentistry. Gen Dent 2005;53:6-9.
14. Ghannam N, Kingston M, Al-Meshaal IA, Tariq M, Parman NS, Woodhouse N. The anti-diabetic activity of aloe: Preliminary clinical and experimental observation. Horm Res 1986;24:286-94.
15. Renu T, Gupta J, Asif S, Panwar R, Heralgi R. *Aloe vera* and its uses in dentistry. Indian J Dent Adv 2011;3:656-8.
16. Heggers JP, Kucukcelebi A, Listengarten D, Stabenau J, Ko F, Broemeling LD, *et al.* Beneficial effect of aloe on wound healing in an excisional wound model. J Altern Complement Med 1996;2:271-7.
17. Sundarkar P, Govindwar R, Nyamati SB, Alladwar N, Thombre V, Soni A, *et al.* Use of *Aloe vera* in dentistry. J Indian Acad Oral Med Radiol 2011;23:389-91.
18. Agarry OO, Olaleye MT, Bello-Michael CO. Comparative microbial activities of *Aloe vera* gel and leaf. Afr J Biotechnol 2005;4:11413-4.
19. Tayal E, Sardana D, InduShekar KR, Saraf BG, Sheoran N. Current perspective on use of *Aloe vera* in dentistry. Eur J Med Plants 2014;4:1408-19.
20. Sydiskis RJ, Owen DG, Lohr JL, Rosler KH, Blomster RN. Inactivation of enveloped viruses by anthraquinones extracted from plants. Antimicrob Agents Chemother 1991;35:2463-6.
21. West DP, Zhu YF. Evaluation of *Aloe vera* gel gloves in the treatment of dry skin associated with occupational exposure. Am J Infect Control 2003;31:40-2.
22. Sajjad A. *Aloe vera*: An ancient herb for Morden dentistry-A literature review. J Dent Surg 2014;2014:1-6.
23. Meena M, Figueiredo NR, Trivedi K. *Aloe vera*-An update for dentistry. J Dentofac Sci 2013;2:1-4.
24. Saeed MA, Ahmad I, Yaqub U, Akbar S, Waheed A, Saleem M, *et al. Aloe vera*: A plant of vital significance. Sci Vision 2004;9:3-4.
25. Collins CE, Collins C, Amer J. Roentgen dermatitis treated with fresh whole leaf of *Aloe vera*. Roentgen 1937;33:396-7.
26. Jin Y, Hong JT, Kim L, Sin-Koa, Yun YP. Effects of *Aloe vera* and Arborescence Mixture on Cirrhosis Patients. USA: International Congress of Phototherapy, Organised by the Pharm. Soc of Korea and Aloe Research Foundation; 1991. p. 42.
27. Bland J. Effect of Orally Consumed Aloe juice on Gastrointestinal Function in Normal Humans. Linus Pauling Institute of Science and Medicine. Palo Alto. California: Preventive Medicine; 1985.
28. Mansourian A, Momen-Heravi F, Jamee MS, Momen-Beetollahi M. Comparison of *Aloe vera* mouthwash with triamcinolone acetonoide 0.1% on oral oral lichen planus: A randomised double blinded clinical trials. Am J Med Sci 2011;342:447-51.
29. Salazar-Sanchez N, Lopez-Jornet P, Camacho-Alonso F, Sanchez-Siles M. Efficacy of topical *Aloe vera* in patients with oral lichen planus: A randomised double blind study. J Oral Pathol Med 2010;39:735-40.
30. Rajar UD, Majeed R, Parveen N, Sheikh I, Sushel C. Efficacy of *Aloe vera* gel in the treatment of vulval lichen planus. J Coll Physicians Surg Pak 2008;18:612-4.
31. Nair GR, Naidu GS, Jain S, Nagi R, Makkad RS, Jha A. Clinical effectiveness of *Aloe vera* in the management of oral mucosal diseases a systematic review. Journal of Clinical and Diagnostic Research 2016, 10(8): ZE01-ZE07.
32. Gupta N, Bhat M, Devi P, Girish. *Aloe vera*: A natures gift to children. Int J Clin Pediatr dent 2010;3:87-92.
33. Siqueira JF Jr., Aetiology of root canal treatment failure: Why well-treated teeth can fail. Int Endod J 2001;34:10.
34. Chandra BS, Kumar AJ. *In vitro* anti-bacterial efficacy of *Aloe vera* extract on resistant anti-microbial strains in endodontics. Endodontology 2011;23:6-9.
35. Mitra R, Kumar V. Unfolding the gift of nature: *Aloe vera* in dentistry. Indian J Basic Appl Med Res 2015;4:94-101.
36. Poor MR, Hall JE, Poor AS. Reduction in the incidence of alveolar osteitis in patients treated with the Sali Cept patch contains Acemannan hydrogel. J Oral maxillofac Surg 2002;60:314-9.
37. Rubin MB. Vitamins and wound healing. Plast Surg Nurs 1984;4:16-9.
38. Agarwal A, Dwivedi N. Aloe vera: Magic or myth. SRM J Res Dent Sci 2013;4:119-24.