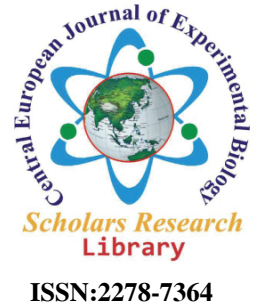




Scholars Research Library

Central European Journal of Experimental Biology, 2020, 8 (2): 1-9
(<http://www.scholarsresearchlibrary.com>)



Distinctive Utilization of Aloe Vera in Field of Dentistry

Sumit Jaidev*

Department of Periodontics and Oral Health, India

*Corresponding Author: Sumit Jaidev, Department of Periodontics and Oral Health, India, E-mail:
jaidevsu@gmail.com

ABSTRACT

Aloe Vera has been long time used for its various beneficial properties. It is as yet being utilized for its wide range for ailments. It progresses quicker wound recovering and torture help. It has antibacterial, antiviral, antifungal and cell reinforcement impact. Aloe Vera has shown various usages in mouth infections. This article is about the unmistakable use of Aloe Vera in field of dentistry.

Keywords: Aloe Vera, Medicinal, Herbal, *A. barbadensis*, Distinctive Utilization.

INTRODUCTION

The Aloe Vera plant has been known and used for a significant long an ideal opportunity for its prosperity, greatness, remedial and solid skin properties. The name Aloe Vera gets from the Arabic word "Alloeh" meaning "shining exceptional substance," while "Vera" in Latin implies "authentic." 2000 years back, the Greek specialists saw Aloe Vera as the comprehensive panacea. The Egyptians called Aloe "the plant of never-ending status." Today, the Aloe Vera plant has been used for various purposes in dermatology [1]. Customary things are known to expect an indispensable part in Pharmaceutical science. One of the soonest books in regards to the matter of normal arrangement was the Rig Veda, gathered in India between B.C.E. 4500 and B.C.E. 1600. It records numerous plants respected significant in pharmaceutical and is considered as the pioneer for elective arrangement. Regular antimicrobials can be gotten from barks, stems, leaves, blossoms and results of plants, diverse animal tissues or from microorganisms [2]. The primary low down exchange of Aloe's helpful regard was found in the Papyrus Ebers, an Egyptian report made around B.C.E. 1550. This record gives twelve plans for mixing Aloe with various administrators to treat both internal and outside human issue. The essential perspective in Western man's separated cognizance of helpful plants was made by Hippocrates (460B.C-375B.C.), the dad of present day medication. Indeed, even today, the World Health Organization checks that up to 80% of people despite everything rely essentially upon standard medications. In all honesty, immense quantities of the current drugs either mimic ordinarily happening particles or have structures that are totally or halfway gotten from basic thought processes [3].

History

Aloe Vera has been used for remedial purposes in a couple of social orders for quite a long time: Greece, Egypt, India, Mexico, Japan and China. Egyptian rulers Nefertiti and Cleopatra used it as a component of their ordinary greatness organizations. Alexander the Great and Christopher Columbus used it to treat troopers' wounds. 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 [4].

Aloe Vera is one of the old remedial plants

It is a ceaseless, drought restricting, delicious plant having a spot with the Asphodelaceae family which, for the most part has been used for a collection of remedial purposes. It has a gigantic standard part in indigenous course of action of solution like Ayurveda, siddha, unani and homeopathy. Clinical appraisals have revealed that the pharmacological powerful fixings are moved in both the gel and skin of the Aloe Vera takes off. The bioactive blends are used as astringent, haemostatic, against diabetic [5], hostile to ulcer, hostile to septic [6], antimicrobial [7], malignant growth anticipation operator and anticancer authority and moreover, effective in rewarding stomach ailments, gastrointestinal issues, skin illnesses, blockage, radiation harm, wound recovering, expends, detachment of the entrails, the runs and in the treatment of skin ailments. At present the plant is comprehensively used as a piece of solid skin, beautifiers and as nutraceuticals. In the field of dentistry the livelihoods of Aloe Vera are endless. The usage of Aloe Vera in dentistry returns to 1982 when it was used to fix periodontitis. It expect a critical part to fight periodontal illnesses and improves the defend instrument [8]. The pharmacologic exercises of Aloe Vera have been indicated in numerous examinations including its mitigating, against bacterial, antagonistic to viral and antifungal properties [9,10]. On account of its threatening to bacterial properties it is effective in envisioning halitosis, gum disease, stomatitis and periodontitis. Extraordinary oral bruises are upgraded by effective use of Aloe Vera gel on aphthous ulcers and exact cheilitis. Reports of productive changes in root affectability containing Aloe toothpastes have been affirmed [11]. Thus the purpose of the current study is a step to illuminate about the composing available on Aloe Vera and its distinctive application in the field of dentistry [12].

Dynamic constituents of Aloe Vera

The Aloe Vera plant is comprised of sinewy roots, short stem and a winding greenish leaves. The leaf is made of a gel, which is lackluster, thick fluid comprising fundamentally of water and polysaccharides and has a severe taste. More than 250 types of the sort Aloe exist, with just two species developed on business premise (Aloe barbadensis and Aloe arborescens). With respect to constituents, A. Vera contains amino acids, lipids, sterols, tannins, catalysts chromones (flavonoids) and mannose-6-phosphate. Subsequently, this plant had been discovered valuable in the treatment of wound, copies, skin issues and mitigating movement. Aloe Vera contains 75 possibly unique constituents: nutrients, synthetic substances, minerals, sugars, lignin, saponins, salicylic acids and amino acids [13,14]. There are more than 200 blends found in Aloe barbadensis, around 75 of which have normal development. The recognizable parts are anthraquinones, Aloin, Aloe emodine polysaccharides, impetuses, decreasing sugars, normal acids, metallic cations [15,16]. The ten principle regions of concoction constituents of Aloe Vera include: amino acids, anthraquinones, chemicals, minerals, nutrients, lignins, monosaccharide, polysaccharides, salicylic corrosive, saponins and sterols.

How does Aloe Vera act?

1. Healing properties: Glucomannan, a mannose-rich polysaccharide and gibberellin, an improvement hormone, speaks with advancement factor receptors on the fibroblast, thusly fortifying its development and increase, which in outcome on a very basic level extends collagen mix after effective and oral Aloe Vera.
2. Consequences for skin prologue to UV and gamma radiation: Aloe Vera gel has been represented to have a guarded effect against radiation damage to the skin. Right part isn't known, yet following the association of Aloe Vera gel, a cell fortification protein, metallothionein, is made in the skin, which scrounges hydroxyl radicals and thwarts disguise of superoxide dismutase and glutathione peroxidase in the skin.
3. Mitigating action: Aloe Vera limits the cyclooxygenase pathway and decreases prostaglandin E2 creation from arachidonic destructive.
4. Impacts on the protected system: Alprogen control calcium immersion into shaft cells, along these lines impeding the antigen-neutralizer intervened arrival of histamine and leukotriene from post cells.
5. Diuretic impacts: Anthraquinones shows in latex are an exceptional laxative. It increases intestinal water content, invigorates natural liquid release and additions intestinal peristalsis.
6. Antiviral and antitumor activity: These exercises may be a result of deviant or direct effects. Underhanded effect is a direct result of instigation of the safe structure and direct effect is relied upon to anthraquinones. The anthraquinone aloin inactivates diverse disguised contaminations, for instance, Herpes simplex, Varicella zoster and influenza.

7. Saturating and unfriendly to developing effect: Mucopolysaccharides help in limiting clamminess into the skin. Aloe braces fibroblast which makes the collagen and elastin filaments making the skin increasingly adaptable and less wrinkled. It is like manner influence wily influences the shallow chipping epidermal cells by staying them together, which progresses the skin.

8. Disinfectant effect: Aloe Vera contains 6 sterile administrators: Lupeol, salicylic destructive, urea nitrogen, cinnamon destructive, phenols and sulphur. They all have inhibitory action on living beings, microorganisms and infections.

Vocations of Aloe Vera in dentistry

Aloe Vera as a constituent for plaque control

Aloe Vera in toothpaste and tooth gel: Aloe Vera is added to toothpaste as a major fixing. It is known to be lighting up administrator for the teeth. It is in like manner plentiful in Vitamin K and gives typical protection to those feeble teeth and gums. Studies using Aloe Vera in toothpastes have exhibited that Aloe Vera tooth gel and the toothpastes were comparatively incredible against *Candida albicans*, *Streptococcus mutans*, *Lactobacillus acidophilus*, *Enterococcus faecalis*, *Prevotella intermedia* and *Peptostreptococcus anaerobius*. Aloe Vera tooth gel displayed improved antibacterial effect against *S. mitis* [17]. Likewise the saponin present in aloe has a frothy and decontaminating movement which goes about as a foaming expert in toothpaste. An examination coordinated on the overall abrasiveness of various blends on tooth clean showed that Aloe Vera toothpaste contains generally hydrated silica as grinding when diverged from various toothpastes which have calcium carbonate and pumice as harsh. The lesser the grinding list, lesser is the surface loss of facade. Aloe Vera toothpaste could achieve equal or better results without the development of fluoride [17]. Aloe Vera in tooth gel is used to filter teeth and gingiva as effectively as toothpaste. The Aloe Vera tooth gel doesn't contain the abrasives found in most tooth pastes and it is less unforgiving on teeth. It is a magnificent alternative for people with sensitive teeth or gums. The Aloe Vera tooth gel used as a piece of the examination had no extra fluoride content anyway still applied right around an equal proportion of antimicrobial movement.

Aloe Vera in mouthwash: Mechanical plaque control is the best technique for controlling plaque and gum disease. Aloe Vera in mouthwash is made using normal fixings and is liberated from alcohol and saccharin. The antimicrobial effect of mouthwash containing Aloe Vera has been appeared in an in vitro consider, in which this phytotherapeutic administrator limited the improvement of contrasting oral microorganisms, for instance, *S. mutans*, *S. sanguis*, *A. viscosus* and *C. albicans* [18]. Likewise, Aloe Vera goes about as a trademark answer for halitosis that is brought about by pathogenic microorganisms and developments and halitosis caused in light of stomach related issues. This is a direct result of the antimicrobial effect of Aloe Vera. Aloe Vera contains six antimicrobial administrators, for instance, lupeol, salicylic destructive, urea, nitrogen, cinnamonic destructive, phenols and sulfur which have inhibitory action on life forms, microorganisms and infections [18]. It is like manner makes sure about the fragile tissues of the oral opening, decreasing the likelihood of halitosis. A randomized twofold blinded clinical preliminary drove on the connection of Aloe Vera containing mouthwash with 0.1% Triamcinolone acetonide surveyed that the clinical effects of Aloe Vera showed a basic decline of gum disease and plaque gathering after use as a mouth wash [19]. Clinical Evaluation of impacts of nearby utilization of Aloe Vera gel as an extra to scaling and root arranging in patients with interminable periodontitis uncovered that neighbourhood use of Aloe Vera gel could be considered as an adjunctive treatment with scaling and root getting ready for incessant periodontitis [20]. A randomized controlled preliminary directed to look at the adequacy of Aloe Vera mouthwash and chlorhexidine on periodontal wellbeing uncovered that Aloe Vera has demonstrated equivalent viability as Chlorhexidine and subsequently can be utilized as an elective item for restoring and forestalling gum disease [21].

Aloe Vera in dental floss: Dental floss goes about as an interdental mechanical manual for advance plaque expulsion. The Aloe Vera containing eco floss ousts plaque from interdental zones that the toothbrush can't reach, and as such neutralizes periodontal disease and dental caries. Moreover the antimicrobial and recovering properties add to the flossing sway. The Aloe Vera containing floss has a smoother complete and is sensitive when diverged from the regular (beeswax) and made floss (nylon). The business ponders drove on the thing sufficiency have shown better results with Aloe Vera floss [22].

Aloe Vera in recuperating of oral injuries

Aloe Vera in lichen planus: Acemannan, the critical starch division in the gel, is a water-dissolvable long chain mannose polymer which animates wound recovering, changes resistant limit particularly MMP (Matrix

metalloproteinase) activation and making of cytokines. The gel in like manner contains bradykininase, a mitigating authority [23], magnesium lactate, which abstains from shivering and salicylic destructive and other enemy of prostaglandin blends which quiet disturbance [24]. Choonkaran did a twofold outwardly hindered assessment to research the suitability of Aloe Vera gel in organization of OLP and found that Aloe Vera gel is more effective than counterfeit treatment. Aloe Vera in osmf Aloe Vera reduces the expending sensation and improves mouth opening therefore overhauled the patient's consistence. Aloe Vera invades and grows vessels to a hurt site, which upgrades recuperating [25].

Aloe Vera in aphthous ulcer: Aphthous stomatitis is a perpetual self-limiting condition of the oral cavity. An Aloe Vera ruin extraordinary bothering anyway not under any condition like steroids it invigorates fibroblast improvement to upgrade wound recovering. Exceptional mouths wounds are improved by organize application fit as a fiddle on aphthous ulcers. Aloe Vera orders collagen age by technique for mannose-6-PO₄ authority to receptors of fibroblasts. In like manner acemaman display in Aloe Vera animates the collagen association. It has been represented that acemannan hydrogel show in Aloe gel stimulates the recovering of aphthous ulcers and lessens the torture related with them [26]. Garnick surveyed a gel that combined allantoin, Aloe Vera and silicon dioxide and its ramifications for aphthous ulcers [27].

Aloe Vera and HSV: Topical association of Aloe Vera has been comprehensively used for wound recuperating. Aloe Vera has organized antiviral development against HIV1 by preventing glycosylation of glycoproteins. It acts synergistically with AZT or acyclovir by controlling the replication of HIV and HSV1 [28]. Aloe emodin, an anthraquinone organized from Aloe Vera, was showed up in vitro to inactivate HSV-2. Acemannan reduced herpes simplex illness in two refined objective cell lines [29]. These results exhibited that anthraquinones expelled from Aloe Vera are explicitly virucidal to wrapped contaminations and can be used for the treatment of herpetic wounds.

Aloe Vera and oral submucous fibrosis: Aloe Vera gel is viable if there should arise an occurrence of osmf when contrasted and cancer prevention agent better improvement in mouth opening and decrease of consuming side effects was found [30].

Consuming mouth disorder: It is an excruciating state of multifactorial etiology normally portrayed as copying sensation in tongue, lips, sense of taste or all through the mouth. There might be deadness on the tip of the tongue or in the mouth, severe or metallic changes in the taste and dry or sore mouth. In this condition to evaluate the viability of Aloe Vera in this condition, persistent was separated into 3 gatherings. Gathering I tongue defender which comprise of a straightforward, low thickness poly ethylene sheath covering the tongue from the tip to the back third this is worn for 15 min 3 times each day. Gathering II is tongue defender and 0.5 ml av at 70% 3 times each day and gathering III tongue defender and 0.5 ml fake treatment 3 times each day. This treatment is preceded for 3 months. When improvement looked at long last was more for bunch II. Thus, inferring that Aloe Vera is successful for rewarding patient with consuming mouth disorder [31].

Aloe Vera in dental replacement stomatitis: Stomatitis can occur from leaving false teeth in the mouth while napping and from smoking or nutrient A deficiencies regardless of the way that there are a couple of explanations behind this issue, a normal explanation is a direct result of the parasite *Candida albicans*. The antimicrobial effects of Aloe Vera have been credited to the plant's trademark anthraquinones: Aloe emodin, aloetic destructive, aloin, anthracene, anthranol, barbaloin, chrysophanic destructive, ethereal oil, ester of cinnamonic destructive, isobarbaloin and resistanol. Hanley uncovered that an Aloe Vera expel reduced disturbance by 48% of each a rat adjuvant-impelled tendon combustible model. Even more starting late, the peptidase bradykinase was detached from aloe and seemed to isolate the bradykinin, a provocative substance that incites torment [32].

Aloe Vera in dental caries

The usage of Aloe Vera for dental caries returns in the region of 1700 and 3700 BC and is determined in the papyri of out of date Egypt the Ebers, which throws light on remedial practices [33,34]. There exists a strong bactericidal development of Aloe Vera gel against cariogenic infinitesimal living beings. This activity is credited to different pharmacologically powerful blends including anthraquinones, aloin, aloe-emodin, aloetic destructive, anthracene, aloe mannan, aloeride, antranol, chrysophanic destructive, resistanol and saponin [35]. Aloin and aloe-emodin have strong antibacterial and antiviral activities. Aloin and aloe-emodin have polyphenolic structures, which can curb protein association by bacterial cells, along these lines explaining their antimicrobial activity. This brand name may in like manner explain the quieting activity of Aloe Vera gel [36]. Acemannan propels dentin improvement by invigorating basic human dental crush cell duplication, partition, extracellular lattice course of action, and

mineralization. The antimicrobial effect of a dentifrice containing Aloe Vera has been appeared in an in vitro investigation [37], in which Aloe Vera controlled the advancement of different oral microorganisms.

Aloe Vera in endodontic

End of the microorganisms and revulsion of re-malady inside the crush conduit are the essential objectives of the squash space treatment. Aloe Vera

Aloe Vera in periodontitis

Aloe Vera is a trademark thing contained in home developed dentifrices for plaque control and gum disease. Clinical effects of Aloe Vera showed a basic diminishment of gum disease and plaque hoarding after use of a mouth wash containing Aloe Vera. The microcirculation of wound is overhauled by Aloe, extending oxygenation. Aloe pieces movement of catecholamines, thusly increases epithelisation [38]. Aloe Vera extends cross associating of collagen. The Type I/Type III collagen extent of aloe rewarded wounds is low, exhibiting extended Type III collagen. The degrees of hyaluronic destructive and dermatan sulfate, the rule constituents of ground substance are high in aloe rewarded wounds. Acemannan goes about as a macrophage trigger [39]. In an assessment drove by Fujita [40] communicated that carboxypeptidase in Aloe Vera inactivates bradykinin by around 67% and lightens torture. Aloe Vera contains magnesium salicylate, lactate decarboxylase, which is known to thwart histidine, thusly keeping the game plan of histamine from histidine in post cells. The decrease in gingival rundown can be attributed to proximity of sterols as alleviating authorities and lupeol as a spotless torment assuaging. Existing affirmation illustrates that Aloe Vera used as a piece of collection of centers is practical in shortening the term of wound mending. Aloe Vera enters and enlarges vessels to a hurt site, which improves patching.

Aloe Vera in dental inserts

The Aloe gel can be used to enable bone advancement both around and onto the outside of endosseous dental embeds set in districts with widened peri-embed inflexible distortions. Aloe Vera can be used around dental supplements to control disturbance from bacterial debasement. As it has antimicrobial and patching properties it improves bone-implant interphase and in preventing peri-implantitis. Aloe Vera quells the cyclooxygenase pathway and reduces prostaglandin age from arachidonic destructive. Starting late, the novel quieting compound called C-glucosyl chromone was confined from gel separates [41]. Utilizing a rat exhibit Hegggers recommended that the antibacterial effect of the Aloe Vera gel in vivo could overhaul the injury retouching process by clearing out the infinitesimal living beings that additional to bothering [42].

Aloe Vera in mending attachment

Extraction goals repair honestly and dry connection game plan is checked when Aloe Vera is associated on extraction site. Aloe Vera contains glucomannan and gibberelins which ability to strengthen fibroblast to increase speedier in wound district and to stimulate curved patching with epithelial cell development and furthermore to balance infection which could prevent wound recovering. Clinical examinations have exhibited its amplexness in speeding up turned recovering in postderm-scratched region, deficient thickness of wounds, and weight ulcers. Stop dried acemannan was moreover given off an impression of being convincing against agonizing dry connection treatment due to dental method challenges [43].

Aloe Vera and dental replacement cement

Acemannan, a complex mannose sugar got from the Aloe Vera plant, has an inalienable consistency, which makes it ideal for dental replacement concrete definitions. It was found that the holding sway gives an incredibly strong and sturdy hold which shields false teeth from slipping and sliding, thusly envisioning aggravations of the mucosa. Aloe Vera sustains the gingiva, quiets and helps aggravations like dental replacement wounds [44].

Aloe Vera in dental replacement more clean

Aloe Vera gel supposedly was bactericidal against *Pseudomonas aeruginosa* while acemannan shielded it from holding quickly to human lung epithelial cells in a monolayer culture. A took care of Aloe Vera gel preparation purportedly limited the improvement of *Candida albicans*. It goes about as an antifungal expert. This can in like manner be used close by fragile liners. The saponins which contain glycosides are frothy substances that have both cleansing and disinfectant properties [45].

Aloe Vera in gloves

Dental restorative administrations work power normally encounters the evil impacts of occupationally-related dermatitis on the grounds that of consistent usage of gloves and hand neatness. An inventive dry-covering development has conveyed another thought - an assessment glove that bit by bit passes on Aloe Vera gel to the skin of the gloved hand. Expansive exploration shows that Aloe lessens disturbance, redesigns skin hydration and soaks the skin. Aloe Vera contains saponins which are frothy substances that have both cleaning and antiseptic properties [45].

Contraindication

Aloe Vera ought to be utilized mindfully in pregnancy, lactating moms.

Effective

Aloe Vera may causes redness, consuming and stinging sensation unfavorably susceptible responses are expected to anthraquinones, for example, alone and barbaloin

Foundational

Ingestion of Aloe Vera is at some point related with looseness of the bowels, electrolyte lopsidedness, kidney brokenness and customary medication associations. Draw out use has been accounted for to builds the danger of colorectal malignant growth. Aloe Vera in kids under 10 years old is limited. Expanded hypoglycemia may be found related to oral antidiabetics or on the other hand insulin if there should be an occurrence of diabetic patients. Aloe Vera gel isn't suggested in mix with hostile to diabetic, diuretic or purgative medications, and digoxin.

CONCLUSION

Aloe Vera assumes the promising job in different parts of dentistry in future. Future examinations ought to be intended to decide the ideal focus; time of use and its impact on oral holes and assessment of possible reactions and long haul use ought to be assessed.

REFERENCES

- [1] Surjushe, A., Vasani, R., and Saple, D.G., Aloe vera: a short review. *Indian J Dermatol*, **2008**. 53(4): p.163.
- [2] Rabe, T. and Vanstaden, J., *J Ethnopharmacol*, **1991**. 56(1): p. 81-87.
- [3] Klein, A.D., and Penneys, N.S., Aloe vera. *J Am Acad Dermatol*, **1988**. 18(4): p. 714-720.
- [4] Cheesbrough, M., 2nd ed. Oxford: Butterworth, **2000**.
- [5] Yashodha, S.R., Clinical Investigation to Compare the Effectiveness of a Herbal Mouth Wash Containing Aloe Vera with Commercially Available Chlorhexidine and Placebo Mouth Wash in Controlling Plaque & Treating Gingival Inflammation: A 3 Month Clinical Study (Doctoral dissertation, Tamil Nadu Government Dental College and Hospital, Chennai). **2017**.
- [6] Bunya, N., *Phytomed*, **1996**. 3: p. 245-248.
- [7] Rabe, T., and Van Staden, J., Antibacterial activity of South African plants used for medicinal purposes. *J Ethnopharmacol*, **1997**. 56(1): p. 81-87.
- [8] Satoskar, R.R., Shah, S.J., and Shenoy, S.G., Evaluation of anti-inflammatory property of curcumin (diferuloyl methane) in patients with postoperative inflammation. *Int J Clin Pharmacol Ther Toxicol*, **1986**. 24(12): p. 651.
- [9] Choi, S., and Chung, M.H., March. A review on the relationship between Aloe vera components and their biologic effects. In *Seminars in Integrative Medicine*, **2003**. 1(1): p. 53-62.
- [10] Choi, S.W., et al., The woundhealing effect of a glycoprotein fraction isolated from aloe vera. *Br J Dermatol*, **2001**. 145(4): p. 535-545.
- [11] Atherton, P., *Nurs Stand*, **1998**. 12(41): p. 49-52
- [12] Shelton, R.M., Aloe vera. *Int J Dermatol*, **1991**. 30(10): p. 679-83.
- [13] Mcanalley, A.H., *Int J Pharm Bio Med Res*, **2010**, 1(4): p. 376-384.
- [14] Williams, W.B., *J Microbiol*, **1995**, 28: p. 25-30.
- [15] George, D., et al., *Gen Dent*, **2009**, p. 238-241.

- [16] Pradeep, A.R., Agarwal, E. and Naik, S.B., Clinical and microbiologic effects of commercially available dentifrice containing aloe vera: a randomized controlled clinical trial. *J Periodontol*, **2012**. 83(6): p. 797-804.
- [17] Kathuria, N., *Internet J Microbiol*, **2010**. 9(2).
- [18] Zhang, L. and Tizard, I.R., Activation of a mouse macrophage cell line by acemannan: the major carbohydrate fraction from Aloe vera gel. *Int Immunopharmacol*, **1996**. 35(2): p. 119-128.
- [19] Mansourian, A., et al., Comparison of aloe vera mouthwash with triamcinolone acetonide 0.1% on oral lichen planus: a randomized double-blinded clinical trial. *Am J Med Sci*, **2011**. 342(6): p. 447-451.
- [20] Moghaddam, A.A., et al., Clinical evaluation of effects of local application of Aloe vera gel as an adjunct to scaling and root planning in patients with chronic periodontitis. *J Dent*, **2017**. 18(3): p.165.
- [21] Vangipuram, S., Jha, A., and Bhashyam, M., Comparative efficacy of aloe vera mouthwash and chlorhexidine on periodontal health: A randomized controlled trial. *J Clin Exp Dent*, **2016**. 8(4): p.e442.
- [22] Fulton Jr, J.E., The stimulation of postdermabrasion wound healing with stabilized aloe vera gelpolyethylene oxide dressing. *J Dermatol Surg Oncol*, **1990**. 16(5): p. 460-467.
- [23] Walters, K., *J Trop Med*, **2000**. 6: p. 34-39.
- [24] Choonhakarn, C., Busara, B., and Sripan, P.S., *Br J Dermatol*, **2008**. 158(7): p. 573-577.
- [25] Sudarshan, R., Annigeri, R.G., and Sree Vijayabala, G., Aloe vera in the treatment for oral submucous fibrosis– A preliminary study. *J Oral Pathol Med*, **2012**. 41(10): p. 755-761.
- [26] Fulton Jr, J.E., The stimulation of postdermabrasion wound healing with stabilized aloe vera gelpolyethylene oxide dressing. *J Dermatol Surg Oncol*, **1990**. 16(5): p. 460-467.
- [27] Collins, C.E., Collins, C., and Amer, J., *J Invest Dermatol*, **1973**. 33: p. 396-397.
- [28] Maguire, H., Torbinejad, M., and Kettering, J.D., *J Endod*, **1996**. 22(4): p. 190-193.
- [29] Kemp, M.C., et al., *Antiviral Res*, **1990**. 13: p. 83-89.
- [30] Sudarshan, R., Annigeri, R.G., and Sree Vijayabala, G., Aloe vera in the treatment for oral submucous fibrosis– A preliminary study. *J Oral Pathol Med*, **2012**. 41(10): p. 755-761.
- [31] Deni, J., *Science Tech Enterpren*, **2009**. 34: p. 256-259.
- [32] Plaskett, L.G., *Life Sciences Press*, Washington, **1996**.
- [33] Forrai, J., Dental Press Foundation, Budapest, **2005**.
- [34] Kambiz, L. and Afolayan, A.J., Extracts from Aloe ferox and Withania somnifera inhibit Candida albicans and Neisseria gonorrhoea. *Afr J Biotechnol*, **2008**. 7(1).
- [35] Ferro, V.A., *J Antimicrob Agents Chemother*, **1997**. 47: p. 1137-1139.
- [36] Lee, S.S., Zhang, W.U., and Li, Y., The antimicrobial potential of 14 natural herbal dentifrices: results of an in vitro diffusion method study. *J Am Dent Assoc*, **2004**. 135(8): p.1133-1141.
- [37] Maguire, H., Torbinejad, M., and Kettering, J.D., *J Endod*, **1996**. 22(4): p. 190-193.
- [38] Fani, M. and Kohanteb, J., Inhibitory activity of Aloe vera gel on some clinically isolated cariogenic and periodontopathic bacteria. *J Oral Sci*, **2012**. 54(1): p. 15-21.
- [39] Ainamo, J. and Bay, I., *Int Dent J*, **1983**. 25(4): p. 229-235.
- [40] Fujita, K., Teradaira, R., and Nagatsu, T., *Biochem Pharmacol* **1976**. 25: p. 205-210.
- [41] Yun, N., Lee, C.H., and Lee, S.M., Protective effect of Aloe vera on polymicrobial sepsis in mice. *Food Chem Toxicol*, **2009**. 47(6): p. 1341-1348.
- [42] Heggers, J.P., Piniless, G.R., and Robson, M.C., *Am J Med Technol*, **1979**. 41: p. 293-294.
- [43] Oliveira, S., et al., *J Appl Oral Sci*, **2009**. 16(4): p. 1678-1682.
- [44] Bhat, G., Kudva, P., and Dodwad, V., Aloe vera: Nature's soothing healer to periodontal disease. *J Indian Soc Periodontol*, **2011**. 15 (3): p. 205.
- [45] Sudarshan, R., Annigeri, R.G., and Vijayabala, G.S., Aloe vera in dentistry. *Indian J Stomatol*, **2013**. 4(1): p. 45-47.