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Aloe vera: A Natural Perquisite to Dental Therapy

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ABSTRACT

Aloe vera has been long time utilized for its numerous advantageous properties. It is still being used for its wide range for illnesses. It advances faster twisted recuperating and torment help. It has antibacterial, antiviral, antifungal and antioxidant effect. Aloe vera has demonstrated numerous utilizations in mouth diseases. This article is about the distinctive utilization of Aloe vera in field of dentistry.

Keywords: *Aloe vera*, Medicinal, Herbal, *A. barbadensis*

INTRODUCTION

The *Aloe vera* plant has been known and utilized for quite a long time for its wellbeing, excellence, therapeutic and healthy skin properties. The name *Aloe vera* gets from the Arabic word “Alloeh” signifying “sparkling intense substance,” while “vera” in Latin signifies “genuine.” 2000 years back, the Greek researchers viewed *Aloe vera* as the all inclusive panacea. The Egyptians called Aloe “the plant of everlasting status.” Today, the *Aloe vera* plant has been utilized for different purposes in dermatology [1]. Regular items are known to assume a vital part in Pharmaceutical science. One of the soonest books regarding the matter of regular solution was the Rig Veda, assembled in India between B.C.E. 4500 and B.C.E. 1600. It records many plants regarded valuable in pharmaceutical and is considered as the pioneer for elective solution. Common antimicrobials can be gotten from barks, stems, leaves, blooms and products of plants, different creature tissues or from microorganisms [2]. The main nitty gritty dialog of Aloe’s therapeutic esteem was found in the Papyrus Ebers, an Egyptian report composed around B.C.E. 1550. This record gives twelve recipes for blending Aloe with different operators to treat both inward and outside human issue. The primary point of reference in Western man’s itemized comprehension of therapeutic plants was crafted by Hippocrates (460B.C-375B.C.), the father of present day medicine. Even today, the World Health Organization gauges that up to 80% of individuals still depend basically on customary drugs. Truth be told, huge numbers of the present medications either impersonate normally happening particles or have structures that are completely or partially gotten from common motives [3].

History

Aloe vera has been utilized for restorative purposes in a few societies for centuries: Greece, Egypt, India, Mexico, Japan and China. Egyptian rulers Nefertiti and Cleopatra utilized it as a feature of their normal excellence administrations. Alexander the Great and Christopher Columbus utilized it to treat troopers’ injuries. The principal reference to *Aloe vera* in English was an interpretation by Goodyew in A.D. 1655 of Dioscorides’ Medical treatise De Materia Medica. By the mid-1800s, *Aloe vera* was being used as a purgative in the United States, however in the mid-1930s, a defining moment happen when it was effectively used to treat interminable and extreme radiation dermatitis [4].

Aloe vera is one of the old restorative plants

It is a perpetual, dry spell opposing, succulent plant having a place with the Asphodelaceae family which, generally has been utilized for an assortment of restorative purposes. It has a tremendous customary part in indigenous arrangement of prescription like Ayurveda, siddha, unani and homeopathy. Clinical assessments have uncovered that the pharmacological dynamic fixings are moved in both the gel and skin of the *Aloe vera* takes off. The bioactive mixes are utilized as astringent, haemostatic, anti-diabetic [5], anti-ulcer, anti-septic [6], antimicrobial [7], cancer

prevention agent and anticancer specialist and furthermore, successful in treating stomach sicknesses, gastrointestinal issues, skin maladies, blockage, radiation damage, wound recuperating, consumes, looseness of the bowels, the runs and in the treatment of skin diseases. Currently the plant is broadly utilized as a part of healthy skin, beautifiers and as nutraceuticals. In the field of dentistry the employments of *Aloe vera* are incalculable. The utilization of *Aloe vera* in dentistry goes back to 1982 when it was utilized to cure periodontitis. It assumes a crucial part to battle periodontal ailments and improves the safeguard mechanism [8]. The pharmacologic activities of *Aloe vera* have been specified in many investigations including its anti-inflammatory, against bacterial, hostile to viral and antifungal properties [9,10]. Because of its hostile to bacterial properties it is successful in anticipating halitosis, gingivitis, stomatitis and periodontitis. Intense oral sores are enhanced by topical utilization of *Aloe vera* gel on aphthous ulcers and precise cheilitis. Reports of fruitful changes in root affectability containing Aloe toothpastes have been confirmed [11]. Hence the point of the present survey is a stride to edify about the writing accessible on *Aloe vera* and its different application in the field of dentistry [12].

Dynamic constituents of *Aloe vera*

The *Aloe vera* plant is made up of fibrous roots, short stem and a spiral greenish leaves. The leaf is made of a gel, which is colourless, viscous liquid consisting primarily of water and polysaccharides and has a bitter taste. Over 250 species of the genus *Aloe* exist, with only two species grown on commercial basis (*Aloe barbadensis* and *Aloe arborescens*). Regarding chemical constituents, *A. vera* contains amino acids, lipids, sterols, tannins, enzymes chromones (flavonoids) and mannose-6-phosphate. Therefore, this plant had been found useful in the treatment of wound, burns, skin disorders and anti-inflammatory activity.

Aloe vera contains 75 conceivably dynamic constituents: vitamins, chemicals, minerals, sugars, lignin, saponins, salicylic acids and aminoacids [13,14]. There are more than 200 mixes found in *Aloe barbadensis*, around 75 of which have natural movement. The noticeable parts are anthraquinones, Aloin, Aloe emodine polysaccharides, catalysts, lessening sugars, natural acids, metallic cations [15,16]. The ten main areas of chemical constituents of *Aloe vera* include: amino acids, anthraquinones, enzymes, minerals, vitamins, lignins, monosaccharide, polysaccharides, salicylic acid, saponins and sterols.

How does *Aloe vera* act?

1. Healing properties: Glucomannan, a mannose-rich polysaccharide and gibberellin, a development hormone, communicates with development factor receptors on the fibroblast, along these lines invigorating its movement and multiplication, which in consequence fundamentally expands collagen blend after topical and oral *Aloe vera*.
2. Consequences for skin introduction to UV and gamma radiation: *Aloe vera* gel has been accounted for to have a defensive impact against radiation harm to the skin. Correct part isn't known, yet following the organization of *Aloe vera* gel, a cell reinforcement protein, metallothionein, is created in the skin, which rummages hydroxyl radicals and forestalls concealment of superoxide dismutase and glutathione peroxidase in the skin.
3. Mitigating activity: *Aloe vera* restrains the cyclooxygenase pathway and lessens prostaglandin E2 creation from arachidonic corrosive.
4. Impacts on the safe framework: Alprogen restrain calcium inundation into pole cells, in this way hindering the antigen-neutralizer mediated release of histamine and leukotriene from pole cells.
5. Diuretic effects: Anthraquinones shows in latex are an intense purgative. It increments intestinal water content, fortifies bodily fluid discharge and increments intestinal peristalsis.
6. Antiviral and antitumor action: These activities might be because of aberrant or direct impacts. Backhanded impact is because of incitement of the resistant framework and direct impact is expected to anthraquinones. The anthraquinone aloin inactivates different concealed infections, for example, Herpes simplex, Varicella zoster and flu.
7. Saturating and hostile to maturing impact: Mucopolysaccharides help in restricting dampness into the skin. Aloe fortifies fibroblast which creates the collagen and elastin fibers making the skin more flexible and less wrinkled. It likewise affect sly affects the shallow chipping epidermal cells by staying them together, which mellows the skin.

8. Disinfectant impact: *Aloe vera* contains 6 sterile operators: Lupeol, salicylic corrosive, urea nitrogen, cinnamonic corrosive, phenols and sulfur. They all have inhibitory activity on organisms, microorganisms and viruses.

Employments 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 fundamental fixing. It is known to be a brightening operator for the teeth. It is likewise rich in Vitamin K and gives normal insurance to those powerless teeth and gums. Studies utilizing *Aloe vera* in toothpastes have demonstrated that *Aloe vera* tooth gel and the toothpastes were similarly powerful against *Candida albicans*, *Streptococcus mutans*, *Lactobacillus acidophilus*, *Enterococcus faecalis*, *Prevotella intermedia* and *Peptostreptococcus anaerobius*. *Aloe vera* tooth gel exhibited improved antibacterial impact against *S. mitis* [17]. Also the saponin introduce in aloe has a lathery and purifying activity which goes about as a frothing specialist in toothpaste. A study directed on the relative abrasiveness of different mixes on tooth polish demonstrated that *Aloe vera* toothpaste contains for the most part hydrated silica as grating when contrasted with different toothpastes which have calcium carbonate and pumice as rough. The lesser the grating list, lesser is the surface loss of veneer. *Aloe vera* toothpaste could accomplish equivalent or better outcomes without the expansion of fluoride [17]. *Aloe vera* in tooth gel is utilized to purify teeth and gingiva as successfully as toothpaste. The *Aloe vera* tooth gel does not contain the abrasives found in most tooth glues and it is less unforgiving on teeth. It is an awesome option for individuals with touchy teeth or gums. The *Aloe vera* tooth gel utilized as a part of the investigation had no additional fluoride content however still applied right around an equivalent measure of antimicrobial activity.

***Aloe vera* in mouthwash:** Mechanical plaque control is the best strategy for controlling plaque and gingivitis. *Aloe vera* in mouthwash is made utilizing common fixings and is free from liquor and saccharin. The antimicrobial impact of mouthwash containing *Aloe vera* has been shown in an *in vitro* think about, in which this phytotherapeutic operator restrained the development of differing oral microorganisms, for example, *S. mutans*, *S. sanguis*, *A. viscosus* and *C. albicans* [18]. Also, *Aloe vera* goes about as a characteristic solution for halitosis that is caused by pathogenic microorganisms and growths and halitosis caused because of stomach related issues. This is because of the antimicrobial impact of *Aloe vera*. *Aloe vera* contains six antimicrobial operators, for example, lupeol, salicylic corrosive, urea, nitrogen, cinnamonic corrosive, phenols and sulfur which have inhibitory activity on organisms, microorganisms and viruses [18]. It likewise secures the delicate tissues of the oral hole, lessening the probability of halitosis. A randomized twofold blinded clinical trial led on the correlation of *Aloe vera* containing mouthwash with 0.1% Triamcinolone acetonide assessed that the clinical impacts of *Aloe vera* demonstrated a critical decrease of gingivitis and plaque gathering after use as a mouth rinse [19]. Clinical Evaluation of effects of local application of *Aloe vera* gel as an adjunct to scaling and root planning in patients with chronic periodontitis revealed that local application of *Aloe vera* gel could be considered as an adjunctive treatment with scaling and root planning for chronic periodontitis [20]. A randomized controlled trial conducted to compare the efficacy of *Aloe vera* mouthwash and chlorhexidine on periodontal health revealed that *Aloe vera* has shown equal effectiveness as Chlorhexidine and hence can be used as an alternative product for curing and preventing gingivitis [21].

***Aloe vera* in dental floss:** Dental floss goes about as an interdental mechanical guide to advance plaque removal. The *Aloe vera* containing eco floss helps expel plaque from interdental zones that the toothbrush can't reach, and in this manner counteracts periodontal infection and dental caries. Additionally the antimicrobial and recuperating properties add to the flossing impact. The *Aloe vera* containing floss has a smoother complete and is delicate when contrasted with the natural (beeswax) and manufactured floss (nylon). The business thinks about led on the item adequacy have indicated better outcomes with *Aloe vera* floss [22].

***Aloe vera* in healing of oral lesions**

***Aloe vera* in lichen planus:** Acemannan, the significant starch division in the gel, is a water-dissolvable long chain mannose polymer which quickens wound recuperating, adjusts invulnerable capacity especially MMP (Matrix metalloproteinase) actuation and creation of cytokines. The gel likewise contains bradykininase, an anti-inflammatory specialist [23], magnesium lactate, which avoids tingling and salicylic corrosive and other anti-prostaglandin mixes which calm irritation [24]. Choonkaran did a twofold visually impaired examination to investigate the viability of *Aloe vera* gel in administration of OLP and found that *Aloe vera* gel is more successful than fake treatment. *Aloe*

vera in osmf *Aloe vera* diminishes the consuming sensation and enhances mouth opening consequently upgraded the patient's consistence. *Aloe vera* infiltrates and enlarges vessels to a harmed site, which enhances healing [25].

***Aloe vera* in aphthous ulcer:** Aphthous stomatitis is a ceaseless self restricting state of the oral cavity. *Aloe vera* hinders intense irritation however not at all like steroids it fortifies fibroblast development to enhance wound recuperating. Intense mouth sores are enhanced by coordinate application in gel shape on aphthous ulcers. *Aloe vera* enacts collagen generation by method for mannose-6-PO₄ official to receptors of fibroblasts. Likewise acemaman exhibit in *Aloe vera* quickens the collagen union. It has been accounted for that acemannan hydrogel show in *Aloe vera* gel quickens the recuperating of aphthous ulcers and diminishes the torment related with them [26]. Garnick assessed a gel that consolidated allantoin, *Aloe vera* and silicon dioxide and its consequences for aphthous ulcers [27].

***Aloe vera* and HSV:** Topical organization of *Aloe vera* has been broadly utilized for wound healing. *Aloe vera* has coordinate antiviral movement against HIV1 by hindering glycosylation of glycoproteins. It acts synergistically with AZT or acyclovir by restraining the replication of HIV and HSV1 [28]. Aloe emodin, an anthraquinone arranged from *Aloe vera*, was appeared *in vitro* to inactivate HSV-2. Acemannan lessened herpes simplex disease in two refined target cell lines [29]. These outcomes demonstrated that anthraquinones removed from *Aloe vera* are specifically virucidal to wrapped infections and can be utilized for the treatment of herpetic injuries.

***Aloe vera* and oral submucous fibrosis:** *Aloe vera* gel is effective in case of osmf when compared with antioxidant better improvement in mouth opening and reduction of burning symptoms was found [30].

Burning mouth syndrome: It is a painful condition of multifactorial etiology usually described as burning sensation in tongue, lips, palate or throughout the mouth. There may be numbness on the tip of the tongue or in the mouth, bitter or metallic changes in the taste and dry or sore mouth. In this condition to assess the efficacy of *Aloe vera* in this condition, patient was divided into 3 groups. Group I tongue protector which consist of a transparent, low density poly ethylene sheath covering the tongue from the tip to the posterior third this is worn for 15 min 3 times a day. Group II is tongue protector and 0.5 ml av at 70% 3 times a day and group III tongue protector and 0.5 ml placebo 3 times a day. This treatment is continued for 3 months. When compared finally improvement was more for group II. Hence, concluding that *Aloe vera* is effective for treating patient with burning mouth syndrome [31].

***Aloe vera* in denture stomatitis:** Stomatitis can happen from leaving dentures in the mouth while dozing and from smoking or vitamin A inadequacies In spite of the fact that there are a few reasons for this issue, a typical reason is because of the parasite *Candida albicans*. The antimicrobial impacts of *Aloe vera* have been credited to the plant's characteristic anthraquinones: Aloe emodin, aloetic corrosive, aloin, anthracine, anthranol, barbaloin, chrysophanic corrosive, ethereal oil, ester of cinnamonic corrosive, isobarbaloin and resistannol [32]. Hanley revealed that an *Aloe vera* remove diminished irritation by 48% of every a rodent adjuvant-actuated ligament incendiary model. All the more as of late, the peptidase bradykinase was disconnected from aloe and appeared to separate the bradykinin, a provocative substance that actuates pain [33].

***Aloe vera* in dental caries**

The utilization of *Aloe vera* for dental caries goes back in the vicinity of 1700 and 3700 BC and is specified in the papyri of antiquated Egypt the Ebers, which tosses light on restorative practices [34,35]. There exists a solid bactericidal movement of *Aloe vera* gel against cariogenic microscopic organisms. This action is credited to various pharmacologically dynamic mixes including anthraquinones, aloin, aloe-emodin, aloetic corrosive, anthracine, aloe mannan, aloeride, antranol, chrysophanic corrosive, resistanol and saponin [36]. Aloin and aloe-emodin have solid antibacterial and antiviral exercises. Aloin and aloe-emodin have polyphenolic structures, which can repress protein union by bacterial cells, in this way clarifying their antimicrobial action. This trademark may likewise clarify the calming action of *Aloe vera* gel [37]. Acemannan advances dentin development by animating essential human dental mash cell multiplication, separation, extracellular grid arrangement, and mineralization. The antimicrobial impact of a dentifrice containing *Aloe vera* has been shown in an *in vitro* study [38], in which *Aloe vera* restrained the development of various oral microorganisms.

***Aloe vera* in endodontics**

End of the microorganisms and aversion of re-disease inside the mash waterway are the primary goals of the mash space treatment. *Aloe vera* is suggested in its application in root trenches as a calming dressing and as a document

ointment. It contains alloins and barbaloins as fundamental synthetic constituents. Its bactericidal action is observed to be under Ca(OH)_2 . The normal zone of hindrance with methanol concentrate of *Aloe vera* against *E. faecalis* was observed to be 12 mm. These outcomes were in concurrence with the examinations done [38].

***Aloe vera* in periodontitis**

Aloe vera is a characteristic item contained in home grown dentifrices for plaque control and gingivitis. Clinical impacts of *Aloe vera* demonstrated a critical diminishment of gingivitis and plaque amassing after utilization of a mouth rinse containing *Aloe vera*. The microcirculation of wound is upgraded by Aloe, expanding oxygenation. Aloe pieces activity of catecholamines, along these lines increments epithelisation [39]. *Aloe vera* expands cross connecting of collagen. The Type I/Type III collagen proportion of aloe treated injuries is low, demonstrating expanded Type III collagen. The levels of hyaluronic corrosive and dermatan sulfate, the principle constituents of ground substance are high in aloe treated injuries. Acemannan goes about as a macrophage stimulator [40]. In an examination led by Fujita [41] expressed that carboxypeptidase in *Aloe vera* inactivates bradykinin by around 67% and alleviates torment. *Aloe vera* contains magnesium salicylate, lactate decarboxylase, which is known to hinder histidine, along these lines keeping the arrangement of histamine from histidine in pole cells. The reduction in gingival list can be ascribed to nearness of sterols as mitigating specialists and lupeol as a clean pain relieving. Existing confirmation demonstrates that *Aloe vera* utilized as a part of assortment of focuses is viable in shortening the term of wound healing. *Aloe vera* enters and widens vessels to a harmed site, which enhances mending.

***Aloe vera* in dental implants**

The Aloe gel can be utilized to empower bone development both around and onto the surface of endosseous dental inserts set in locales with broadened peri-implant rigid deformities. *Aloe vera* can be utilized around dental inserts to control irritation from bacterial defilement. As it has antimicrobial and mending properties it enhances bone-embed interphase and in forestalling peri-implantitis. *Aloe vera* represses the cyclooxygenase pathway and diminishes prostaglandin generation from arachidonic corrosive. As of late, the novel calming compound called C-glucosyl chromone was detached from gel extracts [42]. Using a rodent demonstrate Heggers proposed that the antibacterial impact of the *Aloe vera* gel *in vivo* could upgrade the injury mending process by wiping out the microscopic organisms that added to irritation [43].

***Aloe vera* in healing socket**

Extraction destinations mend legitimately and dry attachment arrangement is counteracted when *Aloe vera* is connected on extraction site. *Aloe vera* comprises of glucomannan and giberrelins which capacity to fortify fibroblast to multiply speedier in wound region and to quicken twisted mending with epithelial cell expansion and also to counteract disease which could hinder wound recuperating. Clinical investigations have demonstrated its adequacy in increasing speed of twisted recuperating in postderm-scraped area, incomplete thickness of wounds, and weight ulcers. Stop dried acemannan was likewise appeared to be compelling against excruciating dry attachment treatment because of dental technique difficulties [44].

***Aloe vera* and denture adhesive**

Acemannan, a complex mannose sugar got from the *Aloe vera* plant, has an inborn consistency, which makes it perfect for denture cement definitions. It was discovered that the holding impact gives an amazingly solid and durable hold which keeps dentures from slipping and sliding, along these lines anticipating aggravations of the mucosa. *Aloe vera* fortifies the gingiva, calms and lightens disturbances like denture bruises [45].

***Aloe vera* in denture cleaner**

Aloe vera gel allegedly was bactericidal against *Pseudomonas aeruginosa* while acemannan kept it from holding fast to human lung epithelial cells in a monolayer culture. A handled *Aloe vera* gel readiness purportedly restrained the development of *Candida albicans*. It goes about as an antifungal specialist. This can likewise be utilized alongside delicate liners. The saponins which contain glycosides are foamy substances that have both purging and disinfectant properties [46].

***Aloe vera* in gloves**

Dental medicinal services work force regularly experiences the ill effects of occupationally-related dermatitis because of continuous utilization of gloves and hand cleanliness. A creative dry-covering innovation has delivered another idea - an examination glove that step by step conveys *Aloe vera* gel to the skin of the gloved hand. Broad research shows that *Aloe* diminishes aggravation, upgrades skin hydration and saturates the skin. *Aloe vera* contains saponins which are foamy substances that have both purifying and germicide properties [46].

Contraindication

Aloe vera should be used cautiously in pregnancy, lactating mothers.

Topical

Aloe vera may causes redness, burning and stinging sensation allergic reactions are due to anthraquinones such as alone and barbaloin

Systemic

Ingestion of *Aloe vera* is sometime associated with diarrhea, electrolyte imbalance, kidney dysfunction and conventional drug interactions. Prolong use has been reported to increases the risk of colorectal cancer. *Aloe vera* in children under 10 years of age is restricted. Increased hypoglycemia might be seen in conjunction with oral anti-diabetics or insulin in case of diabetic patients. *Aloe vera* gel is not recommended in combination with anti-diabetic, diuretic or laxative drugs, digoxin.

CONCLUSION

Aloe vera plays the promising role in various branches of dentistry in future. Future studies should be aimed to determine the optimal concentration, time of application and its effect on oral cavities and evaluation of potential side effects and long term use should be evaluated.

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