

## Review on therapeutic and medicinal use of aloevera

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**Abstract:** This paper is mainly aimed to review the therapeutic and medicinal use of aloevera. The aloe vera or succulent has a long history of being used for medicinal purposes, dating back to ancient Egypt. The plant is native to North Africa, Southern Europe, and the Canary Islands. It's used in traditional Indian medicine for constipation, skin diseases, worm infestation, infections and as natural remedy for colic. In Chinese medicine, it's often recommended in the treatment of fungal diseases, and in the Western world, it has found widespread use in the cosmetic, pharmaceutical and food industries. The plant Aloe vera is used in Ayurvedic, Homoeopathic and Allopathic streams of medicine, and not only tribal community but also most of the people for food and medicine. The plant leaves contains numerous vitamins, minerals, enzymes, amino acids, natural sugars and other bioactive compounds with emollient, purgative, anti-microbial, anti-inflammatory, antioxidant, aphrodisiac, anti-helmenthic, antifungal, antiseptic and cosmetic values for health care. This plant has potential to cure sunburns, burns and minor cuts, and even skin cancer. The external use in cosmetic primarily acts as skin healer and prevents injury of epithelial tissues, cures acne and gives a youthful glow to skin, also acts as extremely powerful laxative. As aloevera has a great therapeutic and medicinal value, therefore; it is better to use herbal medicine in modern ways rather than using traditional methods.

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### 1. Introduction

*Aloe Vera* is a plant species of the genus *Aloe*. It grows wild in tropical climates around the world and is cultivated for agricultural and medicinal uses. Aloe is also used for decorative purposes and grows successfully indoors as a potted plant (Perkins *et al.*, 2016). It is found in many consumer products including beverages, skin lotion, cosmetics, or ointments for minor burns and sunburns. There is little scientific evidence of the effectiveness or safety of *Aloe Vera* extracts for either cosmetic or medicinal purposes. Studies finding positive evidence are frequently contradicted by other studies (Boudreau *et al.*, 2006).

It is a stem less or very short-stemmed plant growing to 60–100 cm (24–39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on their upper and lower stem surfaces (Yates *et al.*, 2002). The margin of the leaf is serrated and has small white teeth. The flowers are produced in summer on a spike up to 90 cm (35 in) tall, each flower being pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long (Yates, 2002). Like other *Aloe* species, *Aloe Vera* forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil (Gong, 2002).

It is scientifically classified under;

Kingdom:	Plantae
Clade:	Angiosperms
Order:	Asparagales
Family:	Asphodelaceae
Subfamily:	Asphodeloideae
Genus:	<i>Aloe</i>
Species:	<i>A. Vera</i>

#### 1.1. Synonyms

The species has a number of synonyms: *A. barbadensis* Mill. *Aloe indica* Royle, *Aloe perfoliata* L. var. *Vera* and *A. vulgaris* Lam (Conservatoire *et al.*, 2008). Common names include Chinese Aloe, Indian Aloe, True Aloe, Barbados Aloe, Burn Aloe, First Aid Plant (Jamir *et al.*, 2004). The species epithet *Vera* means "true" or "genuine" (Ombrello, 2008). Some literature identifies the white-spotted form of *Aloe Vera* as *Aloe Vera* var. *chinensis* (Wang *et al.* 2004). However, the species varies widely with regard to leaf spots (Akinyele *et al.*, 2007). And it has been suggested that the spotted form of *Aloe Vera* may be conspecific with *A. massawana* (Lyons, 2008). The species was first described by Carl Linnaeus in 1753 as *Aloe perfoliata* var. *Vera* (Linnaeus *et al.*, 2006).

Techniques based on DNA comparison suggest *Aloe Vera* is relatively closely related to *Aloe perryi*, a

species endemic to Yemen (Darokar *et al.*, 2003). Similar techniques, using chloroplast DNA sequence comparison and ISSR profiling have also suggested it is closely related to *Aloe forbesii*, *Aloe inermis*, *Aloe scobinifolia*, *Aloe sinkatana*, and *Aloe striata* (Treutlein *et al.*, 2003). With the exception of the South African species *A. striata*, these *Aloe* species are native to Socotra (Yemen), Somalia, and Sudan. The lack of obvious natural populations of the species has led some authors to suggest *Aloe Vera* may be of hybrid origin (Treutlein *et al.*, 2003).

*Aloe barbadensis* Mill.

*Aloe barbadensis* var. *chinensis* Haw.

*Aloe chinensis* (Haw.) Baker.

*Aloe elongata* Murray.

*Aloe flava* Pers.

*Aloe lanzae* Tod.

*Aloe maculata* Forssk.

*Aloe perfoliata* var. *Vera* L.

*Aloe rubescens*.



Figure: Spotted forms of *Aloe vera* are sometimes known as *Aloe vera* var. *chinensis*.

Source: <https://www.google.com/search>.

According to the reports of (Debra, 2016) *Aloe Vera* is widely used today in;

Food - it is approved by the FDA (United States Food and Drug Administration) as a natural flavoring.

Cosmetics.

Food supplements.

Herbal remedies.

This succulent perennial herb has triangular, sessile stem, shallow root system, and fleshy serrated leaves arranged in rosette having 30 - 50 cm length and 10 cm breadth at the base; colour pea-green. The bright yellow tubular flowers, length 25 - 35 cm, axillary spike and stamens are frequently projected beyond the perianth tube and fruits contain many seeds (Yeh *et al.*, 2003). Therefore, the objective of this paper is to review the therapeutic and medicinal uses of aloe vera.

## 2. Active Ingredients

*Aloe vera* contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids (Phytother *et al.*, 1998).

**Vitamins:** It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline. Antioxidant neutralizes free radicals (Ro *et al.*, 2000).

**Enzymes:** It contains 8 enzymes: alyase, alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. Bradykinase helps to reduce excessive inflammation when applied to the skin topically, while others help in the breakdown of sugars and fats (Phytother *et al.*, 1998).

**Minerals:** It provides calcium, chromium, copper, selenium, magnesium, manganese, potassium, sodium and zinc. They are essential for the proper functioning of various enzyme systems in different metabolic pathways and few are antioxidants (We *et al.*, 2003).

**Sugars:** It provides monosaccharides (glucose and fructose) and polysaccharides. These are derived from the mucilage layer of the plant and are known as mucopolysaccharides. The most prominent monosaccharide is mannose-6-phosphate, and the most common polysaccharides are called glucomannans [beta-(1, 4)-acetylated mannan]. Acemannan, a prominent glucomannan has also been found. Recently, a glycoprotein with anti-allergic properties, called alprogen and novel anti-inflammatory compound, C-glucosyl chromone, has been isolated from *Aloe vera* gel (Ro *et al.*, 2000).

**Anthraquinones:** It provides 12 anthraquinones, which are phenolic compounds traditionally known as laxatives. Aloin and emodin act as analgesics, antibacterials and antiviral (Ishii *et al.*, 1991).

**Fatty acids:** It provides 4 plant steroids; cholesterol, campesterol, beta-sisosterol and lupeol. All these have anti-inflammatory action and lupeol also possesses antiseptic and analgesic properties (Bruneton, 1995).

**Hormones:** Auxins and gibberellins that help in wound healing and have anti-inflammatory action (Maenthaison *et al.*, 2007).

**Others:** It provides 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. It also contains salicylic acid that possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances penetrative effect of the other ingredients into the skin. Saponins that are the soapy substances form about 3% of the gel and have cleansing and antiseptic properties (Reddy *et al.*, 2011).

Leaves have three layers. The outer most layers consist of 15 - 20 cells thick protective layer synthesizing carbohydrates and proteins (Brow, 1980). The active components of aloe include anthraquinones, chromones, poly-saccharides, and enzymes. The anthraquinones and chromones are responsible for the anti-cancer activity, anti-inflammatory, and evacuating (Ch *et al.*, 2001). The elements Al, B, Ba, Ca, Fe, Mg, Na, P, Si etc. has also been reported to be present in Aloe Vera gel (Femenia.,2001).

### 2.1. The outer layer of the leaf

The bitter yellow latex of per cyclic tubules in the outer layer of the leaves contain derivatives of hydroxyanthra-cene, anthraquinones and glycosides a loin A and B from 15% - 40% in different investigations. The other active principles of Aloe include hydroxyanthrone, aloemodin-anthrone 10-C-glucoside and chrones (Sacc *et al.*, 2001).

### 2.2. Middle layer of leaf

The bitter yellow latex containing anthraquinones and glycosides has been reported from the middle layers of leaf (Brow, 2008). The juice that is originated from cells of the pericycle and adjacent leaf parenchyma, flowing spontaneously from the cut leaf get dried with or without the aid of heat and get solidified should not be confused with Aloe Vera gel which is also the colorless mucilaginous gel that is obtained from the parenchymatous leaf cells (Bruneton.,1995). The parenchymatous tissue or pulp shown to contain proteins, lipids, amino acids, vitamins, enzymes, inorganic compounds and small organic compounds in addition to the different carbohydrates. There is some evidence of chemotaxonomic variation in the polysaccharide composition (Ni *et al.*, 2004).

### 2.3. Inner layer of leaf

The innermost layer of leaf gel contains water up to 99%, with glucomannans, amino acids, lipids, sterols and vitamins (Brow *et al.*, 2008). The other potentially active ingredients include vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids (Vogler and Erns, 1999). It has numerous monosaccharide's and polysaccharides; vitamins B1, B2, B6, and C; niacin amide and choline, several inorganic ingredients, enzymes (acid and alkaline phosphatase, amylase, lactate dehydrogenase, lipase) and organic compounds (aloin, barbaloin, and emodin) as described by (Haye, 1999).

Aloe gel is often commercialized as powdered concentrate. The therapeutically, it is used to prevent progressive dermal ischemia due to burns, frostbite, electrical injury and intra arterial drug abuse. In vivo analysis of these injuries demonstrates that this gel acts as an inhibitor of thromboxane A<sub>2</sub>, a mediator of progressive tissue damage (Antherto, 1998). The Aloe

vera gel play chief role in stimulation of the complement linked to polysaccharides, hydration, insulation, and protection. Application of fresh gel to normal human cells in vitro promoted cell growth and attachment, whereas a stabilized gel preparation was cytotoxic to both normal and tumour cells. This cytotoxicity was attributed to additional substances added to gel during processing (Davi *et al.*, 1994).

The wound healing powers were due to a high molecular weighted polypeptide in healing of rat's excision wounds (Hegge, 1996). This glycoprotein promotes cell proliferation, so gel improves wound healing by increasing blood supply and increased oxygenation (Davi *et al.*, 1984). Growth of new blood capillaries (angiogenesis) and tissue regeneration in the burn tissue for a guinea pig has been reported, however, no specific constituents were identified (Hegger, 1996).

## 3. Therapeutic Uses Of Aloe Vera

The *Aloe Vera* plant has been used for thousands of years to heal a variety of conditions, most notably burns, wounds, skin irritations, and constipation. It is grown in subtropical and tropical locations, including South Africa, Latin America, and the Caribbean. Aloe was one of the most frequently prescribed medicines throughout most of the 18th and 19th centuries and it remains one of the most commonly used herbs in the United States today. However, oral use of aloe for constipation is no longer recommended, as it can have severe side effects (Pittman *et al.*, 2016).

The major therapeutic uses include the followings.

### 3.1. Wound healing

A succulent plant found across the world, aloe vera isn't known for being exceptionally beautiful, what with its lack of color and intimidating spikes. Despite that lack of aesthetic value, aloe vera has long been heralded for its medicinal uses, especially when it comes to wound care. The plant has been used to treat any number of small cuts, abrasions, skin irritations, and mild burns. It's been used as a topical ointment and in dressings (<https://www.advancedtissue.com/aloe-vera-effective-wound-care>, May, 2017).

Wound healing is a dynamic process, occurring in 3 phases. The first phase is inflammation, hyperemia and leukocyte infiltration. The second phase consists of removal of dead tissue. The third phase of proliferation consisting of epithelial regeneration and formation of fibrous tissue (Reddy *et al.*, 2011). A more recent review concludes that the cumulative evidence supports the use of Aloe Vera for the healing of first to second degree burns (Maenthaison *et al.*, 2007). The wound healing property of Aloe Vera gel has been attributed to

Mannose-6-phosphate (Davi *et al.*, 1994). Actually, glucomannan and plant growth hormone gibberellins interacts with growth factor receptors of fibroblast and stimulate its activity and proliferation for increases collagen synthesis in topical and oral administration of Aloe according to Hayes's (Haye,1994). The Aloe administration influence collagen composition (more type III) and increased collagen cross linking for wound contraction and improving breaking strength (Reynolds *et al.*, 1999). It also increases synthesis of hyaluronic acid and dermatan sulfate in the granulation tissue of a healing wound (Chithra *et al.*, 1998).

Acemannan is considered the main functional component of Aloe Vera, is composed of a long chain of acetylated mannose (Femeni *et al.*, 1999). This complex carbohydrate accelerates wound healing and reduces radiation induced skin reactions (Witte, 1993). Macrophage-activating potential acemannan may stimulate the release of fibrogenic cytokines (Witte *et al.*, 1993). Direct binding of acemannan to growth actors and their stabilization may lead to promotion of prolong stimulation of granulation tissue (Castleman, 2001). The Aloe gel has been used for the treatment of radiation burns and radiation ulcers (Sye *et al.*, 1997), and complete healing has been observed in two radiation burns patients (Yeh *et al.*, 2003). The fresh gel was more effective than the cream (Yeh *et al.*, 2003) as Aloe gel-treated lesions healed faster (11.8 days) compared to burns treated with petroleum jelly gauze (18.2 days) (Montaner *et al.*, 1996).

### 3.2. Anti inflammatory action

The anti-inflammatory activity of Aloe Vera gel has been revealed by a number of in vitro and in vivo studies through bradykinase activity (Tyler *et al.*, 1994). The peptidase bradykinase was isolated from aloe and shown to break down the bradykinin, an inflammatory substance that induces pain (Teradair *et al.*, 1993). A novel anti-inflammatory compound, C-glucosylchromone, was isolated from gel extracts (Halle, 1990). Aloe Vera inhibits the cyclo-oxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Fresh Aloe Vera gel significantly reduced acute inflammation in rats (carrageen induced paw oedema), but not in chronic inflammation (Ch *et al.*, 1991).

In croton oil-induced oedema in mice, three Aloe Vera gel sterols were able to reduce inflammation by up to 37%. Lupeol, the most active anti-inflammatory sterol, reduced inflammation in a dose dependent manner. The data suggest that specific plant sterols may also contribute to the anti-inflammatory activity of gel (Halle, 1990). The aloe sterol includes campesterol,  $\beta$ -sitosterol, lupeol, and cholesterol which are anti-inflammatory in nature, helps in reducing the inflammation pain and act as a natural

analgesic. Other aspirin-like compound present in Aloe is responsible for anti-inflammatory and antimicrobial properties. Even, Aloe Vera extract (5.0% leaf homogenate) decreased inflammation by 48% in a rat adjuvant-induced arthritic inflammatory model (Dav *et al.*, 1991).

### 3.3. Effect on the immune system

Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated release of histamine and leukotriene from mast cells (Hansel *et al.*, 1994). In a study on mice that had previously been implanted with murine sarcoma cells, acemannan stimulates the synthesis and release of interleukin-1 (IL-1) and tumor necrosis factor from macrophages in mice, which in turn initiated an immune attack that resulted in necrosis and regression of the cancerous cells (Pen *et al.*, 1991). Several low-molecular-weight compounds are also capable of inhibiting the release of reactive oxygen free radicals from activated human neutrophils (Ha *et al.*, 1990).

As the biologic activities of Aloe derived acemannan have been elucidated, it has been shown to have a remarkable ability to normalize all of damaging processes and therefore contribute significantly to the enhancement of immune system function. At the intestinal level, acemannan acts as a potent anti-inflammatory agent, neutralizing many of the enzymes responsible for damaging the mucosal wall; in effect, quenching the fire. This results in decreased leakiness of the intestinal wall and less absorption of allergic stimulating foreign protein. Acemannan has direct virucidal, bactericidal, and fungicidal properties which can help control *Candida* overgrowth so that normal gastrointestinal bacterial flora can be restored. Acemannan also stimulates intestinal motility, helping to move allergenic proteins from the small intestine into the colon. All these processes help to normalize gastrointestinal wall structure and function and therefore stop the vicious cycle of immune system damage (Pittman *et al.*, 2016).

Acemannan also has direct effects on the cells of the immune system, activating and stimulating macrophages, monocytes, antibodies and T-cells. It has been shown in laboratory studies to act as a bridge between foreign proteins (such as virus particles) and macrophages, facilitating phagocytosis (ingestion of the protein by the macrophage). This receptor site activation is a key component in boosting cell-mediated immunity. It increases the number and intensity of action of macrophages, killer T-cells, and monocytes, as well as increasing the number of antibody forming B-cells in the spleen. Acemannan also protects the bone marrow from damage by toxic chemical (Pittman *et al.*, 2016).

### 3.4. Moisturizing and anti aging agent

Aloe moisturizes the skin without giving it a greasy feel, so it's perfect for anyone with an oily skin complexion. Mineral-based make-up, aloe Vera acts as a moisturizer and is great for the face prior to the application to prevent skin drying. Aloe Vera gel can be used as an after shave treatment as its healing properties can treat small cuts caused by shaving (Rocchino, 2013).

Muco-polysaccharides help in binding moisture into the skin. The amino acids also soften hardened skin cells and zinc acts as an astringent to tighten pores. Its moisturizing effects have also been studied in treatment of dry skin associated with occupational exposure where Aloe Vera gel gloves improved the skin integrity, decrease appearance of acne wrinkle and decrease erythema (We *et al.*, 2003).

The Aloe gel gives cooling effect and also acts as a moisturizing agent. It also has role in gerontology and rejuvenation of aging skin. This property of Aloe is because it's biogenic material. Aloe Vera is used as skin tonic in cosmetic industry. As we age, everyone begins to worry about the appearance of fine lines and the loss of elasticity in their skin. Aloe leaves contain a plethora of antioxidants including, beta carotene, vitamin C and E that can help improve the skin's natural firmness and keep the skin hydrated (Rocchino, 2013).

### 3.5. Anti tumor activity

The impact of aloe vera on the immune system is closely linked to its antitumor and anticancer properties. Aloe vera boosts your immune system, which indirectly helps your body fight against tumors. The two fractions from aloes that are claimed to have anticancer effects include glycoproteins (lectins) and polysaccharides. (Reynolds *et al.*, 1999).

Different studies indicated antitumor activity for *Aloe vera* gel in terms of reduced tumor burden, tumor shrinkage, tumor necrosis and prolonged survival rates. An induction of glutathione S-transferase and an inhibition of the tumor-promoting effect of phorbol myristic acetate has also been reported which suggest aloe gel in cancer chemoprevention. (Kim and Lee, 1997). Indirect action on antitumor activity is stimulation of the immune response (Steenkamp and Stewart, 2007). In recent studies, a polysaccharide fraction has shown to inhibit the binding of benzo pyrene to primary rat hepatocytes; thereby preventing the formation of potentially cancer-initiating benzo pyrene-DNA adducts (Yag *et al.*, 2003).

### 3.6. Laxative effects

Anthraquinones present in latex are a potent laxative; it's stimulating mucus secretion, increase intestinal water content and intestinal peristalsis are due to primarily to the 1, 8-dihydroxyanthracene glycosides, aloin A and B (formerly designated barbaloin) (Ishii *et al.*, 1991). After oral administration

aloin A and B, which are not absorbed in the upper intestine, are hydrolysed in the colon by intestinal bacteria and then reduced to the active metabolites (the main active metabolite is aloe-emodin- 9-anthrone) (Che *et al.*, 2001), which like senna acts as a stimulant and irritant to the gastrointestinal tract (Reynold, 1993).

### 3.7. Anti oxidant effects

Glutathione peroxidase activity, superoxide dismutase enzymes and a phenolic antioxidant were found to be present in *Aloe vera* gel, which may be responsible for these antioxidant effects (Khan *et al.*, 2010).

## 4. Medicinal Uses Of Aloe vera

Aloe vera is anthelmintic, aperient, carminative, deob-struent, depurative, diuretic, stomachic and emmena-gogue. Juice is used in skin care medicine, dyspepsia, amenorrhea, burns, colic, hyper adenosis, hepatopathy, splenopathy, constipation, span menorrhoea, abdominal tumors, dropsy carbuncles, sciatica, lumbago and flatulence. The elio, a product made by juice of this plant, is used for helminthiasis in children and is a purgative, anthelmintic & emmena-gogue.

A number of glycoprotein present in Aloe vera gel has been reported to have anti-tumor and antiulcer effects and to increase proliferation of normal human dermal cells (Ch *et al.*, 2001).

Gel is useful in ulcerative colitis and pressure ulcers, respectively (Langmea *et al.*, 2004). Traditionally, Aloe vera gel is used both, topically (treatment of wounds, minor burns, and skin irritations) and internally to treat constipation, coughs, ulcers, diabetes, headaches, arthritis, immune-system deficiencies (Vogler and Ernst, 1999). Aloe vera has been used for medicinal purposes in several cultures for millennia. The Egyptians used the Aloe vera to make papyrus like scrolls as well as for treatment of tuberculosis. Nadkerni (stated various preparations of Aloe barbadensis like confection, lotion and juice, useful remedies for curing various dis-eases. Aloe contains mixture of glycosides collectively called aloin which is the active constituent of various drugs (Bake, 1975).

Traditionally Aloe is extensively used in treating urine related problems, pimples and ulcers etc. The juice of Aloe vera leaves is used as stomachic tonic and purgative. Scientific evidence for the cosmetic and therapeutic effectiveness of Aloe vera is limited and when present is frequently contradictory (Ernst and Berman, 1998). Despite this, the cosmetic and alternative medicine industries regularly make claims regarding the soothing, moisturizing, and healing properties of Aloe vera, especially via internet advertising (Boudreau and Belan, 2006). The bioactive

compounds are used as astringent, haemostatic, antidiabetic, antiulcer, antiseptic, antibacterial, anti-inflammatory, antioxidant and anticancer agent also, effective in treating stomach ailments, gastrointestinal problems, skin diseases, constipation, radiation injury, wound healing, burns, dysentery, diarrhoea and in the treatment of skin diseases (Rabe and Stade, 1997). It is used in ayurvedic formulations as appetitestimulant, purgative, emmenagogue and anthelmintic, for treating cough, colds, piles, debility, dyspnoea, asthma and jaundice (Barcroft and Myskja, 2003).

#### 4.1. Skin protection

Mucopolysaccharides help in binding moisture into the skin. It was proposed that the *Aloe vera* gel containing products improved skin hydration possibly by means of a humectants mechanism (Tanaka, *et al.*, 2006) Aloin and its gel are used as skin tonic against pimples. Aloe vera is also used for soothing the skin, and keeping the skin moist to help avoid flaky scalp and skin in harsh and dry weather. The Aloe sugars are also used in moisturizing preparations. Mixed with selected essential oils, it makes an excellent skin smoothening moisturizer, sun block lotion plus a whole range of beauty products (Barcroft and Myskja, 2003).

Currently, the plant is widely used in skin care, cosmetics and as nutraceuticals (Gordon and David, 2001). Aloe vera gel has been reported to have a protective effect against radiation damage to the skin (Roberts and Travis, 1995). Exact role is not known, but following the administration of Aloe vera gel, an anti-oxidant protein, metallothionein, is generated in the skin, which scavenges hydroxyl radicals and prevents suppression of superoxide dismutase and glutathione peroxidase in the skin. It reduces the production and release of skin keratinocyte derived immunosuppressive cytokines such as interleukin-10 (IL-10) and hence prevents UV-induced suppression of delayed type hypersensitivity (Byeon *et al.*, 1998). Skin burns effect is reported and radiation dermatitis (Shelton *et al.*, 1991). Some researcher has been reported the contact dermatitis and burning skin sensations following topical applications of Aloe vera gel to derma braded skin. These reactions appeared to be associated with anthraquinones contaminants in this preparation (Siege *et al.*, 1993).

#### 4.2. Anti septic

Aloe Vera's antiseptic constituents include salicylic acid, which acts much the same way as aspirin as it keeps down inflammation. Cinnamonic acid retards the growth of bacteria. These two antiseptics, along with sulphur, urea nitrogen, phenol and lupeol all contribute to fighting infection and are part of this unique plants make up. It is potent yet gentle in action and helps to heal infections on the

body, inside or out, as well as ulcers and wounds (Surjushe *et al.*, 2008).

According to the report of (Surjushe *et al.*, 2008), here is a small list of some of Aloe Vera's benefits for when it is used as an antiseptic

Helps in healing burns.

Used topically for blistering.

Helps to heal fungus.

Contributes to the healing of herpes.

Great for insect bites.

Works well for skin injuries.

Gently works for vaginal infections.

Works to heal skin sores.

Used to help heal urinary tract infections.

#### 4.3. Anti diabetic

Aloe vera is one of the most effective means when it comes to regulating blood sugar naturally. Regular consumption of fresh aloe vera juice regulates the glucose in the bloodstream. Aloe vera has strong hypoglycemic ability, and it is beneficial for patients diagnosed with both IDDM (insulin-dependent diabetes mellitus) and NIDDM (non-insulin dependent diabetes mellitus). Two doses of aloe vera juice, or 5-15 ml, daily decrease blood sugar significantly (Tanaka, *et al.*, 2006).

Here are some of the reasons why aloe vera is one of the most efficient natural treatments for diabetes (Yagi *et al.*, 2006). Aloe Vera is packed with glucomannan, a soluble dietary fiber (polysaccharide), and thus reduces glucose levels. To be more precise, this hemicelluloses component acts as a hypoglycemic substance and reduces blood sugar efficiently. Anthraquinones, organic phenols with distinctive aroma, and lectins, proteins that bind carbohydrates together, are some of the compounds found in aloe vera that reduce blood glucose and regulate its level (Tanaka, *et al.*, 2006).

Aloe vera can reduce blood sugar by 50 % within 2 months. It cleanses the body and eliminates excess glucose in the bloodstream. Aloe vera has strong antioxidant and anti-inflammatory properties that keep us safe from ulcers, wounds, infections and other diabetes-related conditions. It stimulates the secretion of insulin, and thus alleviates the symptoms of diabetes.

Aloe Vera is all-natural, meaning it causes no side-effects in the treatment of diabetes (Tanaka, *et al.*, 2006).

#### 4.4. Stress

Aloe juice is helpful in smooth functioning of the body machinery (Sar *et al.*, 2004). It reduces cell-damaging process during stress condition and minimizes biochemical and physio-logical changes in the body (Foster, 1999). Oxidative stress refers to chemical reactions in which compounds have their oxidative state changed. Some antioxidants are part of

the body's natural regulating machinery while other dietary antioxidants are derived from diet sources. Aloe vera is an excellent example of a functional food that plays a significant role in protection from oxidative stress (Pankaj *et al.*, 2013).

### 5. Anti Microbial Activities

*Aloe vera* has potent antibacterial, antifungal, and antiviral properties (Ramasubramanian *et al.*, 2010). The antimicrobial effects of *Aloe vera* have been attributed to the plant's natural anthraquinones which have demonstrated *in vitro* inhibition of *Mycobacterium tuberculosis* and *Bacillus subtilis*. Aloe juice has been found to be bacteriostatic against *Staphylococcus aureus*, *Streptococcus pyogenes* and also *Salmonella paratyphi* (Agarry *et al.*, 2005). In an *in vitro* disc diffusion study by Suleyman *et al* *Streptococcus faecalis* and *Candida albicans* were cultured to contain  $10^8$ - $10^9$  CFU mL/1 levels of organism. A 100% *Aloe vera* juice obtained from the cold pressed leaves of the plant were used and the results obtained showed significant zones of inhibition of 20mm and 30mm against both these organisms. *Aloe vera* is also known to be virucidal, especially against herpes virus (Gomes *et al.*, 2005).

### 6. Adverse Reactions Of Aloevera

Aloe may increase the risk of bleeding. Caution is advised in people with bleeding disorders or taking drugs that may increase the risk of bleeding. Dosing adjustments may be necessary. Use cautiously in people with heart disease or electrolyte abnormalities. Use cautiously when taken by mouth or used as a laxative. Use cautiously in people taking agents for the heart, agents for the stomach or intestines, agents that increase potassium excretion, cardiac glycosides, oral corticosteroids, oral hydrocortisone, sevoflurane, thyroid hormones, topical hydrocortisone, or zidovudine (Surjushe *et al.*, 2008).

Avoid in people with abdominal pain that is sudden and severe, appendicitis, bowel obstruction, fecal impaction, kidney disease, liver disease, or in people taking agents toxic to the liver. Avoid use as an injection, during postoperative incision healing, during pregnancy or lactation, or for prolonged periods as a laxative. Avoid with known allergy or sensitivity to Aloe vera, its parts, or plants of the Liliaceae family, such as garlic, onions, and tulips. Aloe may also cause abdominal cramping, allergic skin reaction, constipation, dehydration, dependency if used as a laxative, delayed wound healing, diarrhea, electrolyte imbalance, excess bleeding, hardening of the skin, hepatitis, increased risk of colorectal cancer, increased risk of irregular heartbeat, kidney failure, liver toxicity, low potassium in the blood, muscle weakness, redness of the skin and eyelids, skin

dryness, skin inflammation from sun exposure, soreness, splitting of the skin, stinging, stomach discomfort, thyroid dysfunction, urinary stone, uterine contractions, and widespread inflammation of the skin (<http://www.mayoclinic.org/drugs>, april, 29, 2017).

Although topical application is unlikely to be harmful during pregnancy or lactation, internal use is not suggested, due to theoretical stimulation of uterine contractions. It is not known if components of aloe may be excreted with breast milk. Consumption of the dried juice from aloe leaves is contraindicated during lactation (<http://www.mayoclinic.org/drugs> April, 29, 2017).

### 7. Conclusion And Recommendation

The aloe Vera plant is about one or two feet tall with prickly and bitter leaves, which act as a defense to keep animals and insects from feeding on the plant. The leaves hold a gooeey translucent gel, also extremely bitter, and known all over the world for it's unbelievable healing properties. This translucent gel is made up of around 96% water, some organic and inorganic compounds, a type of protein which contains 18 of the 20 amino acids found in the body and lastly, Vitamin A, B, C and E. Another part of the aloe vera plant which is used is the 'sap', a yellow-colored liquid stuck to the skin of the plant from the inside. When dried and purified, the powdered aloe is often used as a laxative, though its effectiveness is questionable.

One of the most crucial elements found in aloe vera gel is a complex carbohydrate known as acemannan. It allows nutrients to reach the cells, nourish them and at the same time relieve them of toxins. Ayurvedic, Chinese herbal medicine and British herbal medicine have all advocated aloe vera as a healer, when applied or consumed orally.

Aloe Vera is extensively used in beauty products and for good reason. It's got antiviral and antibacterial properties, and the ability to help treat everything from constipation to diabetes. The green-cactus looking plant that sits out in your garden isn't just a plant with its roots in folklore; it's the crux of a million dollar industry that extends from beauty creams to healthy juices and diet supplements. Over time, aloe vera has seamlessly integrated itself into everything we use.

Based up on above conclusion the following points are recommended;

- ❖ Consideration of adverse effects of aloevera is unforgettable things.

- ❖ Further study guided by research on therapeutic and medicinal uses of aloe vera are required in order to advance knowledge and reduce adverse effects.

- ❖ It should be better to use herbal medicine in modern ways rather than using traditional methods.

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