



Review Article

Use Of Anti-Inflammatory Drugs in Aloe Vera Gel Base Formulation

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ABSTRACT

For thousands of years, people have utilized Aleo vera, a cactus-like plant in the Asphodelaceae (Liliaceae) family, for traditional medical treatments. Because of the bitter juice present in the leaves, Aloe vera gets its name from the Arabic word "Alloeh," which means "shining bitter substance," and the Latin word "vera" which means "True". Aloes come in more than 300 species, the majority of which are indigenous to south Africa, Madagascar, and Arabia. There is a long history of using herbal therapy to treat a wide range of infectious disorders in many regions of the world. One of the key ingredients in traditional medicine is Aloe vera. Aloe vera is a botanical remedy that has been used for a very long time by many different cultures. The succulent plant grows in arid and subtropical regions is most well-known for two different preparations: the thick sap of the leaves, which turns yellow-brown and has potent laxative properties that warn against using it, and the clear, mucilaginous gel is widely used to treat minor burns, especially sunburns.

INTRODUCTION

Definition :

Aleo Vera is the colourless mucilaginous gel obtained from the parenchymatous cells in the fresh leaves of Aloe vera. Due to their biological groups if substance, medicinal plant has particular qualities and uses. The common name "aloe" has been applied to a number of plant in the genus Aloe. Aloe barbadensis, Aloe ferox, Aloe chinensis, Aloe indica, Aloe peyrii, etc. are examples of aloes. Aloe vera Linn syn. Aloe

barbadensis Miller is universally acknowledged as the true plant source of aloe. Aloe vera, a perennial succulent plant with spiky leaves that is a member of the lily (Liliaceae) family, is indigenous to warm, dry climates. It is widely planted practically everywhere in the world as an indoor plant for both decorative and therapeutic purposes. 300 species have been determined to exist. The fresh leaves of Aloe vera (L) Burm.F.(Liliaceae) contain parenchymatous cells, which produce the colourless, mucilaginous gel

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known as Aloe vera gel. Aloe vera latex is made by specialized cells known as pericyclic tubules that are found just below the epidermis or rind of the leaves. Aloin, a bitter-tasting purgative, is harmful to healthy tissue and cells. Because the products of aloe vera plants are physiologically active, handling and processing them after harvest requires particular care. The main requirements for processing to turn the products of the Aloe vera plant into inactive form are time, temperature, and sanitation. How to extract the gel from Aloe vera leaves and store it for a long time so that it can be used in cosmetic and pharmaceutical products is the most crucial component.

Gel : A thick substance that is between a liquid and a solid.

Aloe vera gel:

The entire leaf of the aloe vera plant must be crushed, ground, or pressed in order to create aloe vera juice, which must then go through a number of filtration and stabilization stages. A medicinal, cosmetic, or food product is created by incorporating the resulting solution into or combining it with other solutions or substances. Aloe products may be used, although processing, such as boiling, dehydrating, and grinding, is frequently involved. Processing could lead to permanent alterations in the polysaccharides' original structure, which could have a significant impact on their purported physiological qualities.

Types of gel:

Gel for makeup removal and cleansing. These are primarily aqueous and oily in nature, and they work well to remove makeup since they are readily rinsed off after being fully rubbed in. It is easy to use them. Gel that provides moisture and supplies water. These are primarily aqueous gels with strong moisturizing and cooling qualities. These are also oily gels that are applied with lotions, primarily for dry skin types, and are meant to give oils to the skin's layers.

What are the properties that a gel must have

It should absorb quickly and not leave an oily or sticky residue behind. The skin has to be made softer. It has to be effortlessly absorbed by the skin. It must shield the skin from toxins in the environment and efficiently eliminate them from the skin.

An explanation:

succulent, somewhat sessile perennial herb with leaves that are 30-50 cm long and 10 cm broad at the base; vivid yellow tubular blooms; hue perennial green (when young speckled with white).

General Appearance: The gel is a viscous, colourless, transparent liquid. **Organoleptic properties:** colourless, odourless, viscous with a slightly bitter taste. **Pharmacology:**

Moisturizing actions:

The combination of water and polysaccharide ingredients produces a jelly-like consistency that traps the water within, which is primarily responsible for the moisturising activity. Reduces the mixture's evaporation, offering a persistently damp atmosphere when utilised in humectant qualities and desiccating tissues that encourage the tissue to hold onto their moisture.

Wound healing:

Aloe vera's ability to heal wounds, prevent ulcers, and speed up the recovery from cutaneous injuries like burns, frostbite and skin infections (diabetic, inflammatory, herpes-related and surgical wounds) (chronic wounds, pressure sores and foot ulcers) has been made known. Aloe vera has greater efficiency than gauze dressing with Petroleum jelly and 1% silver sulfadiazine cream containing framycetin. It prevented a wound from becoming infected over time, and prevented rashes and itching.

Burn treatment:

Radiation burns have been treated with Aloe vera gel. In one trial, individuals receiving Aloe vera cream experienced healing of radiation ulcers, however the fresh gel was more efficient than the cactus. Another individual reported full recovery.



Individual with radiation burns were studied after receiving treatment with fresh Aloe vera gel. In a different study, 27 patients with partial thickness burns received Aloe vera gel treatment.

Anti acne effect:

The most prevalent skin condition that causes problem in adolescence and adulthood is acne. Because Aloe vera contains vitamins, minerals, and hormones, it is highly helpful in treating acne and inflammation on any part of the skin. Because of its hydrophilic nature, it works wonders for oily skin. Aloe vera emulgel, which contains olive, rose, and lemon oils that deeply enter the skin have a cleansing and smoothing effect, also assisted in reducing the flare-up of acne. Additionally, it contains moisturising qualities that guard against excessive drying of the skin, which is bad for skin that is prone to acne. Olive oil has antibacterial and antioxidant properties that help reduce inflammation by combating inflammatory cells.

Anti diabetic effect:

The ability of aloe vera gel to lower blood sugar is widely established. The results, however, could differ depending on how the mucilaginous layer separates from the anthraquinones. It also lowers hepatic transaminases, plasma and tissue cholesterol, triglycerides, free fatty acids, and phospholipids in addition to blood glucose levels. In a study by Rajasekaran et al. Treatment with gel extract was able to return the plasma levels of high-density lipoprotein to normal after had reduced and the levels of low-density lipoprotein had grown. The improvement of glucose metabolism or the anti-oxidant impact, which lowers peroxide levels and, in turn, oxidative damage, may be the explanation for the decreased blood glucose levels. The triglycerides were dramatically reduced by Aloe vera gel.

Immune system Restoration:

According to some reports, Aloe vera can shield skin from radiation harm. Aloe vera gel administration is thought to cause the production

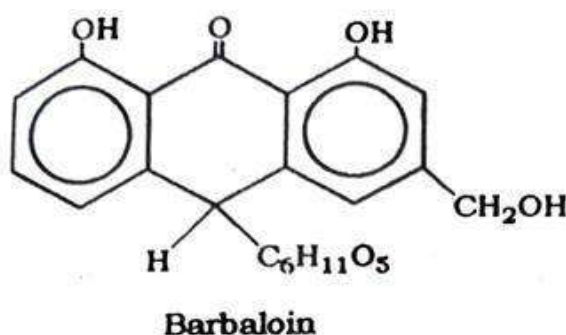
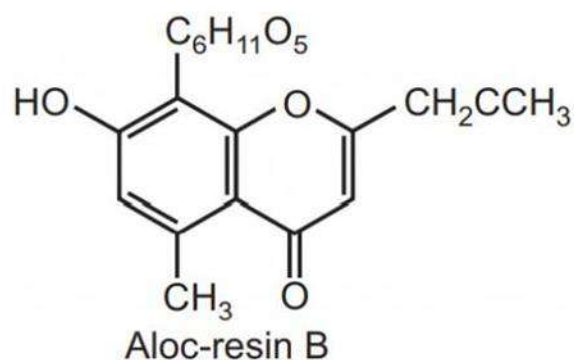
of the antioxidant metallothionein, a protein that serves as a hydroxy radical scavenger, protecting the skin via oxidative injury. Also, it discharges interleukin IL-10 that suppresses the immune system, inhibiting UV-induced delayed type suppression hypersensitivity.

Anti-inflammatory :

Definition:

These are the medicines that are widely used to relieve pain reduce inflammation and bring down a high temperature. The body's natural reaction to an injury is inflammation. Which is characterized by heat, redness, swelling, and discomfort and delays the healing process. Aloe vera anti-inflammatory properties Gel helps pain and discomfort in addition to increase the rate of healing. The outcomes noticed because mannose-6-phosphate's anti-inflammatory properties are similar to those of acetylated mannan found in Aloe gel. Additionally, Aloe vera blocks the cyclooxygenase path, lowering prostaglandin production and thereby minimizing the swelling. The water and Aloe vera chloroform extracts were also discovered to decrease the neutrophils count as you get closer to the abdominal cavity. For the treatment of H. Pylori infection, Aloe vera furthermore demonstrated excellent anti-inflammatory activity. Applying Aloe vera topically also reduces inflammation. You can also apply the Aloe vera plants gel straight to the sore and swollen joints. The anti-inflammatory effects of the gel will alleviate joint discomfort and immobility. The herb Aloe vera is well known for its capacity to soothe inflammation and wound, including minor burns and skin irritations. Aloe vera lowers the amount of prostaglandin E2 produced from arachidonic acid and inhibits the cyclooxygenase pathway. C-glucosylchromone, a new anti-inflammatory molecule, was recently extracted from gel extracts.



Chemical constituent of aloe vera:

Ingredients	Method
Aloe vera gel	Apply 14.17 gm of fresh aloe vera gel to the face and neck.
Vitamin E and Aloe vera gel	Apply the mixture to the areas around your eyes and let it sit overnight after breaking the vitamin E capsule and removing the liquid from it
Sea salt, Raw honey and aloe vera	Combine 28.34gm of each ingredient well. Add 14.17 gm of face and body to exfoliate the skin, Rinse with hot water
Aloe vera, honey and rose water	Mix together 14.17 each of aloe vera, raw honey and rose water

Table: 1 Ingredients used in method of preparation

Aloe vera constituents and its properties:

Aloe gel, which is typically found in many over-the-counter skin salves and has a pH 4.5, contains 99% water. Glucomannan, an emollient polysaccharide, is present in the gel. Because it is

an effective moisturizer, many cosmetics contain it. The main carbohydrates component of the gel, acemannan, is a water-soluble long chain mannose polymer that promotes wound healing, regulates immunological response (especially macrophage activation and cytokine production), and has antiviral and antineoplastic properties. The gel also includes the anti-inflammatory bradykinins, the itching-prevention magnesium lactate, the anti-inflammatory salicylic acid, and other antiprostaglandin substances. Anthraquinones and saponins found in whole leaves are thought to have direct antibacterial activities, while polysaccharides have been linked to direct bacterial activity through the stimulation of eucocyte that are phagocytosis can kill germs. A hydroxylated phenol known as pryocatechol is harmful to microorganisms. The location and quantity of hydroxyl groups on it is believed that the phenol group and their toxin levels compared

to microorganisms and the hydroxylation has increased. The family of phenols act by denatured the proteins that are both cell membranes and proteins. They perform the role of in the presence of disinfectant and are efficient biological substance and continue to function even after application. There are several varieties of aloe in the are employed for ailments ranging from cancer to dermatitis. There is expansion experimental proof that it works as an antiviral, a cure for ulcers and a cancer adjuvant due to the effects on immunological modulation. The recent Aloe vera mucilage or gel.

Function:

Salicylic acid, vitamins, enzyme, minerals, sugars, lignin, saponins, and amino acids are the 75 potentially active ingredients found in Aloe vera.

Vitamins: It has antioxidant vitamins c and E as well as vitamin A (beta- carotene). It also includes folic acid, choline and vitamin B 12 .

Enzymes:

It includes the following eight enzymes: lipase, cellulose, alkaline phosphate, amylase, bradykininase, carboxypeptidase, catalase, and peroxide. Topically administered bradykinase helps to decrease excessive inflammation in the skin.

Minerals:

calcium, magnesium, manganese, copper, selenium, chromium, sodium, and zinc are all present. These are vital to the efficient operation of a variety of enzyme network in several of which are anti-oxidant pathways.

Sugars:

They supply glucose and other monosaccharides and fructose as well as polymers (polymannose/ glucomanns). They are originating from the plant's mucilage layer. They go by the name of the mucopolysaccharides. The most prevalent polysaccharide is known as beta- 1,4 acetylated mannan, or glucomanns. One well- known glucomanns, acemannan has also discovered. Glycoproteins with anti-allergens qualities, referred to as alprogen and unique an anti-inflammatory substance, glucosylchromone was separated out of gel of aloe vera.

Anthraquinones:

Traditionally regarded as laxatives, these phenolic chemicals are comprised of 12 different types, Aloin and emodin have antiviral, antibacterial and analgesic properties.

Fatty acids:

This contains four plant steroids campesterol, beta- sisosterol, luteol and cholesterol. All of these have Anti-inflammatory qualities and lupesol has analgesic and anti-bacterial qualities as well.



Figure 1: Aloe vera plant and Aloe Vera Gel

Gel extraction process from Aloe vera pulp

The exudates and mucilage of the Aloe vera leaves were removed in order to extract the gel, which was then scraped out with a blunt – edged knife. To make the mucilage consistent, it was vigorously mixed in a blender. This solution was filtered after being strained through muslin fabric. For both cold – and hot- extracted gels (CEG and HEG).

Cold extracted gel (CEG):

This homogeneous solution was extracted. Cold extracted gel (CEG) was added to a solution of hydrochloric acid (HCL) having a pH of 3.50, and this solution was acidified. The crude gel was then precipitated out of the extract by slowly adding 95% alcohol while stirring. Centrifugation was used to obtain the gel.

Hot extracted gel (HEG):

Material left over after squeezing the blended solution through a muslin cloth was repeatedly treated with hot water until the full extraction of gel was effected. This material is known as hot extracted gel (HEG). The homemade gel (HEG) was made.

Application:

1. Aloe vera gel is frequently applied externally to treat inflammatory skin conditions and small wounds. Burns, bruises and abrasions are among the minor skin irritations that the gel is used to treat. The gel is also utilized as a moisturizing components in liquids, creams, sun lotions, shaving creams, lip balms, therapeutic ointments, and face packs in the cosmetics business.
2. Burns have been treated naturally with Aloe vera gel.
3. It has been reported that Aloe vera gel works well for treating radiations burns as well as first- and second-degree thermal burns.
4. Burns caused by radiation or heat heal more quickly and with less necrosis when Aloe vera gel containing solution are used to treat them.

Due to its vulnerability to enzymatic, oxidative, or microbiological degradation, the gel typically needs to be made fresh.

5. The succulent Aloe vera plant holds water in the form of a gel in its leaves.
6. Highly hydrating, this gel is excellent for treating minor scrapes, wounds, bug bites, sunburns, and other skin issue.
7. Aloe vera leaves supposedly contain 75 nutrients in their gel. 20 minerals, 18 amino acids, 12 vitamins, and 200 active substance.
8. The thing has been used as a resource for functional foods, particularly for the creation of health beverages with Aloe vera gel, which doesn't cause constipation.
9. It also appears in other food products, including for instance, milk, ice cream, candy, etc. Also used as a flavoring is Aloe vera gel.
10. Some foods as a preservative and ingredient.
11. Constipation can be lessened by consuming Aloe latex orally. However, the FDA has prohibited its use as a laxative because of safety concerns.
12. When used orally, Aloe vera lowers HbA1c and blood sugar in type 2 diabetics.
13. Genital herpes outbreaks may cure with three daily applications of a 0.5 % Aloe extract cream.
14. Lichen plants, an inflammatory disease that results in skin or mouth ulcers or rashes. Itchy moth rashes can be relieved by using an Aloe vera gel mouthwash three times a day for 12 weeks or by applying an Aloe vera gel twice a day for 8 weeks.



Contraindications:

If a person has a documented allergy to plants in the Liliaceae family, using Aloe vera gel is not used.

Adverse reaction:

very few cases of burning skin sensations and contact dermatitis have been reported after topical applications of aloe vera gel on dermabraded skin.

CONCLUSION

In conclusion, there is a lengthy history of using Aloe vera derivative in medicine. Aloe vera is also still being used more and as a skin remedy. Modern tissue engineering techniques produced innovative scaffolds for treating wounds based on Aloe vera gel extracts applications for health (Gil – Cifuentes, Jimenez, Fontanill Ru bio – Elizalde and colleagues, 2019). Aloe incorporation vera included in synthetic and natural polymers developed to imitate the human body's original structure could minimize their negative effects (2018) Tran, Hamid, Cheong 2019; Ghorbani, Nezhad -Mokhatari; Ezhilarasu et al. 2020 (Ramazani). As a result, additional directed studies need to encourage the growth of Aloe vera based items for the benefit of people everywhere.

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