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"Review on Herbal Formulation of Aloe Vera Herbal Gel and Its Potential Benefits"

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ABSTRACT:
Aloe Vera Herbal Gel, a Multifaceted Natural Therapeutic Agent, holds a significant position in natural remedies, derived from the parenchymatous tissue of the Aloe barbadensis Miller plant, a species with a rich history of therapeutic application spanning centuries. Its popularity stems from a diverse array of therapeutic properties, meticulously studied and traditionally recognized. At its core, Aloe Vera gel boasts a complex biochemical composition, a key factor underpinning its biological activities. This translucent gel is a reservoir of vital polysaccharides, notably acemannan, alongside an impressive profile of vitamins (including A, C, and E), essential enzymes (such as amylase and lipase), crucial minerals (like zinc and magnesium), and potent phenolic compounds.
This intricate blend of bioactive constituents synergistically contributes to the gel's remarkable anti-inflammatory capabilities, its pronounced wound-healing prowess, its notable immunomodulatory effects, and its significant antioxidant activity, combating damaging free radicals. This exploration delves into the underlying mechanisms driving these multifaceted activities, focusing on the intricate interactions between specific bioactive compounds within the gel and various cellular pathways. Furthermore, it examines the extensive applications of Aloe Vera gel across diverse fields, with a particular emphasis on its role in dermatology, where it soothes and heals skin conditions. Its potential as a natural remedy extends to gastroenterology, aiding in digestive health, and dentistry, promoting oral hygiene. This comprehensive analysis underscores the robust scientific basis that supports the traditional uses of Aloe Vera gel, validating its enduring relevance in contemporary therapeutic applications. The continued investigation into its properties suggests a promising avenue for further research and rigorous clinical trials, potentially unlocking even more of its therapeutic potential and solidifying its role in holistic healthcare.

Keywords: Aloe-vera gel, Therapeutic properties, Pharmacological activity Herbal gel formulation

I. INTRODUCTION:

Aloe vera is derived from the Arabic word "alloeh" which means "shining bitter substance", and the Latin word "Vera" which means "true" [1]. The scientific name for aloe vera is "Aloe barbadensis miller". Aloe vera, also known as Aloe barbadensis, is a member of the Asphodelaceae family, which has more than 360 species [2]. It's possible that aloe vera is a resilient, drought-tolerant, tropical, and juicy plant.In the endemic framework of medicinal regulations, aloe vera has provided the enormous traditional portion, including the Siddha, Unani, Ayurveda and Homeopathy. [3] The Aloe barbadensis plant consists of two different parts, each of which produce substances with completely different compositions and therapeutic properties. A clear, thin, tasteless substance that resembles jelly, aloe vera gel (also known as mucilage) is produced by the parenchymal tissue that makes up the interior part of the aloe leaves. By separating the gel from the inner cellular detritus, this tissue is extracted from the leaf. The pericyclic tubules, a collection of specialized cells that are located just beneath the leaf's outer green rind, make up the plant's other portion. These cells produce an exudate that consists of a bitter yellow latex with powerful laxative-like actions. [4]. It is cactus-like plant that grows readily in hot, dry climates and currently because of demand, it is cultivated in large quantities. The leaves of aloe vera plant are long and triangular in shape. The aloe vera plant leaves 30-35cm long and 10cm broad at the base, they are quite juicy. The colour is pea-green [5] When a leaf's green skin is peeled, a transparent mucilaginous substance that contains fibers, water, and a chemical that retains the water in the leaf is seen. This is called gel. The gel of aloe vera is contained in the leaves. Translucent parenchymal gel extracted from the leaf's midrib [6]. The aloe vera plant Often referred to as a "healing plant," aloe vera has been used in traditional medicine for

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its anti-inflammatory and moisturizing properties [7]. Aloe vera is a fascinating and versatile plant that has captured the attention of people around the globe for centuries [8]. The plant's fleshy leaves contain a gel-like substance that is rich in vitamins, minerals, and antioxidants. This unique composition not only nourishes the skin but also aids in digestion. Aloe vera juice is often consumed for its potential digestive benefits, including helping to the stomach and support gut health. Aloe vera is widely believed to be one of the oldest plants utilized by humans. According to research, this plant has been utilized in herbal medicine since the first century [9]. Research has shown that Aloe vera gel possesses soothing properties that can be beneficial for various skin issues, including cuts, burns, bug bites and inflammation. Important for healing wounds because of its anti-inflammatory and antiseptic activity. Aloe vera has both anti-microbial and anti-inflammatory activity [10 -11]. Aloe vera supports speeding wound healing by promoting moisture retention, enhancing cell movement, boosting collagen production, managing blood sugar, and reducing inflammation. Herbal gel is designed for topical application.

Figure no.1: Aloe-vera Plant

1.2 Drug Profile

Table No 1: Drug profile of Aloe- vera

Name	Aloe-vera
Synonyms	Aloe, Musabbar, kumari
Biological source	Aloe barbadensis Miller
Family	Liliaceae
Plant part used	Leaves
Solubility	soluble in water, methanol and ethanol [12-13]

1.3 Taxonomic Classification

Table No 2: Taxonomical Classification of Aloe-vera

Kingdom	Plantae
Family	Asphodelaceae
Division	Spermatophyta
Sub-division	Angiospermae
Class	Monocotyledonae
Genus	Aloe
Order	Asparagales
Species	Barbadensis Mill [14]

1.4 Species of Aloe Vera

1. Aloe arborescens (Krantz Aloe)

Also referred to as: Krantz Aloe, Tree Aloe

Morphology: Shrubby, multi-branched succulent with long, narrow, grey-green leaves with toothed margins. Produces tall racemes of bright orange-red flowers.

2. Aloe ferox (Cape Aloe)

Also referred to as: Cape Aloe, Bitter Aloe

Morphology: Large, single-stemmed succulent with thick, fleshy, grey-green leaves with prominent reddish-brown teeth along the margins. Produces a tall, branched inflorescence with numerous orange or red flowers. [15-16]

3. Aloe aristata (Lace Aloe)

Also referred to as: Lace Aloe, Torch Aloe

Morphology: Small, compact succulent forming rosettes of dark green leaves covered in white tubercles, giving a "lacy" appearance. Produces small, orange or red flowers on slender stalks.[17]

4. Aloe polyphylla (Spiral Aloe)

Also referred to as: Spiral Aloe

Morphology: Unique succulent forming a symmetrical spiral pattern of thick, grey-green leaves. The spiral can be clockwise or counterclockwise.[18]

5. Aloe variegata (Partridge Breast Aloe)

Also referred to as: Partridge Breast Aloe, Tiger Aloe

Morphology: Small succulent with distinctive V-shaped, mottled leaves with a light and dark green pattern. Produces pink or salmon-colored flowers.[19]

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1.5 Morphological Characteristics of Aloe vera

Table no 3: Morphological Characteristics of Aloe vera

Taste	Bitter
Odour	Odorless
Size & Shape:	Plant grows to 60-100cm in length, with lance - shaped with elongated leaves.
Strands Colour:	green to grey- green
Flower:	Yellow tubular in 25-35 cm in a slender loose raceme.
Root:	Root fibers that can reach 30-40 cm in length.[20]

1.6 Phytochemical Constituents of Aloe-vera

- The most critical bioactive constituents of Aloe Vera are the three isomers of Aloin, Barbaloin, and Isobarbaloin, which constitute the purported crystalline Aloin, present in the medication at 10 to 30%. Other constituents are shapeless Aloin, sap, emodin, and Aloe-emodin.
- Barbaloin is available in all the varieties of Aloe vera. This crystalline component, which is somewhat yellow in color and water soluble, is found in Curaçao aloe, Cape aloe, Socotrine, and Zanzibar aloe.
- The central constituents of Socotrine and Zanzibar aloe are Barbaloin. Aloe is made up of a wide range of mixtures that can be divided into three major categories.
- The principal group of complex sugars (among which acemannan emerges) are found within the leaf gel and have an immunostimulating activity.
- Lastly, there are a few substances with a wide range of activities, for example, minerals, vitamins, crucial, superfluous, and semi-vital amino acids, organic acids, phospholipids, proteins, lignin, and saponins [21-22]

Vitamins: It has antioxidant vitamins A (beta-carotene), C, and E. Choline, folic acid, and vitamin B12 are also present**.** Antioxidant neutralizes free radicals.

Enzymes: It contains 8 enzymes: alliinase, alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. When used topically, bradykinase helps decrease excessive inflammation.

Minerals: It includes zinc, potassium, sodium, magnesium, manganese, copper, selenium, calcium, and chromium. They are necessary for many enzyme systems in different metabolic pathways to function properly, and some of them are antioxidants.

Anthraquinones: It comprises twelve anthraquinones, which are phenolic substances that have traditionally been used as laxatives. Antiviral, antibacterial, and analgesic qualities are possessed by emodin and aloin.

Flavonoids: Approximately 13 flavonoids and their glycoside derivatives were isolated and identified from Aloe vera including three types; namely flavone (62–67), flavonol (68–72), and flavan-3-ol (73,74).

Polysaccharides: Among the most significant bioactive components, polysaccharides such as acemannan are known for their hydrating and skin-soothing properties. They form a protective barrier on the skin, helping to retain moisture and support the skin's natural healing process.[23]

Fatty acids: It contains lupeol, cholesterol, campesterol, β-sitsoterol, and four plant steroids. All of them have anti-inflammatory effects, and lupeol has analgesic and antibacterial qualities as well.

Hormones: Gibberellins and auxins have anti-inflammatory and wound-healing properties.

1.7 Geographical Source of Aloe-vera

Aloe vera is native to East and South Africa; however, it has been introduced to the West Indies and tropical countries and will flourish in the countries bordering the Mediterranean. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra, UK, Himachal Pradesh, and Tamil Nadu. It is financially created in Aruba, Bonaire, Haiti, India, South Africa, the Joined together of America and Venezula .[24]

Table no 4: Geographical Condition of Aloe-vera.

Temperature	**Rainfall**	**Sowing Temperature**	**Harvesting Temperature**
250 to 400 C (Ideal)	1000 to 1800 MM (with at least some source	300 to 350 C (Ideal)	250 to 350 C (Ideal)

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	of Irrigation)		

1.7 Pharmacological Activity of Aloe Vera

Aloe vera, like many other herbs and plants, has endless medicinal applications.

1. Wound Healing

There are three stages to the dynamic process of wound healing. Leukocyte infiltration, inflammation, and hyperemia characterize the initial stage. The elimination of dead tissue is the second stage. the third stage of proliferation, which includes fibrous tissue development and epithelial regeneration. According to multiple studies, tannic acid and a certain kind of polysaccharide may be useful ingredients for wound healing.. Aloe gel not only increased collagen content of the wound but also changed collagen composition and increased the degree of collagen cross linking. [25-26]

2. Anti-inflammatory Action: Inflammation is an innate response of the body against an injury, characterized by swelling, pain, redness and heat, resulting in delay in the healing process. Aloe vera gel's anti-inflammatory properties not only ease pain and discomfort but also improve the healing process. The effects observed for acetylated mannan in Aloe gel resembles the anti-inflammatory action of mannose-6-phosphate.[27]

3. Antiseptic Effects:

The antiseptic properties of Aloe vera are attributable to the presence of six antiseptic agents: lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenols, and sulfur. These chemicals have an inhibiting effect on fungus, bacteria, and viruses. Though most of these uses are interesting controlled trials are essential to determine its effectiveness in all diseases.[28]

4. Anti-Diabetic Effect:

The five Phytosterols of Aloe Vera, phenol, 24-methyl-lophenol 24-ethyl-lophenol, cycloartanol and 24-methylene cycloartenol demonstrated hostile to diabetic impacts in sort 2 diabetic mice. Aloe Vera contains polysaccharides which expand the insulin level and show hypoglycemia Properties. The five Phytosterols of Aloe Vera, phenol, 24-methyl-lophenol, 24-ethyl-lophenol, cycloartanol and 24-methylene cycloartenol demonstrated hostile to diabetic impacts in sort 2 diabetic mice. Aloe Vera contains polysaccharides which expand the insulin level and show hypoglycemia Properties.[29]

5. Anti-fungal Activity: A refined aloe vera gel prepration reported suppressed the growth of fungus albbicans. The purified aloe proteins have been found to exhibit potent antifungal activity against candida paraprilosis, candida krusei and candida albicans.[30]

2. Herbal Gel: Herbal gel aloe vera is a topical product centred around the soothing and healing properties of the Aloe vera plant. The core ingredient is the clear, viscous gel extracted directly from the plant's leaves, renowned for its moisturizing and anti-inflammatory effects. Often, this base is enhanced with other herbal ingredients, creating a "herbal gel" that aims to amplify or diversify the therapeutic benefits. The resulting product is typically used for external application, designed to address a range of skin irritations, from sunburns and minor cuts to dryness and general discomfort. The formulations vary between brands, but the fundamental principle remains: harnessing the natural power of Aloe vera, sometimes coupled with other botanicals, to promote skin health and well-being.[31]

2.1 Formulation and preparation of aloe vera gel

- To begin, trim the plant's young aloe leaves.
- After Cutting, Rinse the leaves by cold water.
- Remove any yellow gel by cutting off the small pieces from the bottom.
- Use a vegetable peeler or knife to Peel of the outer layer of leaves.
- Take a Spoon or Knife and Scoop the gel out from the leaves.
- Place the aloe gel in a Mortar-pestle.
- Homogenize the gel into the Mortar-pestle.
- Collected gel was placed into the Freeze in an ice cube tray.
- Incorporate honey into the aloe vera leaf freeze gel.
- Formulation was prepared.
- Colouring agent and preservatives were added to the Formulation to make formulation elegant. [32]

2.2 Evaluation of herbal aloe-vera gel

In order to provide knowledge that will be useful in decision-making, evaluation research is a type of methodical and disciplined investigation that is conducted to arrive at an assessment or appraisal of an item, program, practice, activity, or system.

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Table no 5: Evaluation of herbal aloe-vera gel

Organoleptic Properties	Organoleptic properties of the herbal gel. Colour, Odor, Texture and state were examined during this assessment.
Absorption test	The gel was applied to the skin and rubbed in until it was fully absorbed as part of the absorption test.
Skin Irritancy test	By applying a formulation on hand's back skin and leave it for 15 minutes to check irritation.
Homogeneity test	Touch and visual inspection were used to evaluate the homogeneity test.
pH Test	The pH value of this purely herbal Aloe-vera Gel was determined by using digital pH meter.
Spread-ability test	A 500 mg gel was placed between two slides. On the top slide, a 200 g weight was put. The weight was taken off, and the extra mixture was thrown away. The bottom slide was attached to the machine, and the upper slide was attached to a string that didn't bend and had a 100 g load put on it. The time it took for the top slide to come off was written down
Smoothness	when we rubbed the Gel between their fingers and made observations regarding its texture. We recorded whether the gel felt smooth, clumped, homogeneous, or harsh [33]

II. RESULT:

The aloe vera gel formulated by using various type of ingredients such as aloe-vera gel, glycerine, coconut oil, rose water and honey. Aloe vera has moisturizing and antibacterial qualities. shield the skin from dampness and microbial deterioration. Glycerine has anti-aging properties. The herbal gel was evaluated to various parameter such as physiochemical parameter, pH, washability, irritancy, viscosity, smoothness etc used to check the quality and performance of formulation.

III. CONCLUSION:

Since ancient times, aloe vera has been utilized as a medical plant due to its many therapeutic benefits. Because aloe vera contains many components that have pharmacological and therapeutic effects, its chemical makeup is especially significant. The cultivation of Aloe vera has achieved enormous commercial significance for therapeutic items and cosmetics. We can say that the herbal gel is made for use in warm area. Aloe vera is used in gels to make them work together and to keep the skin wet.

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