

Pharmaceutical assessment of Aloe Vera Skin Gel: A herbal formulation and its potential benefits

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Abstract

Background: Protective layers of skin cover the body. Plant-based herbal cream soothes and moisturises. Treatments commonly include succulent aloe vera, which heals, reduces pain, and moisturizes. For hundreds of years, it has healed skin burns and injuries.

Aim: This study aims on the pharmaceutical assessment of aloe-vera by formulating and evaluating an herbal gel to treat skin conditions.

Material and Method: Aloe-vera, Honey, Glycerin and Carbopol were taken for the formulation of herbal skin gel. Evaluation parameters were also performed to evaluate the formulation and to make sure that the subjected formulation is not harmful for the human mankind.

Result: The aloe vera gel was formulated by using various type of ingredients such as Aloe-vera gel, glycerin, coconut oil, rose water and honey. Aloe-vera contain antimicrobial and hydrating properties protect skin against microbial degradation and moisture to skin.

Conclusion: herbal gel is prepared for tropical administration. Aloe vera is used with polymers in gels to provide synergistic effect as well as moisturizing effect on skin. Herbal remedies are experiencing a surge in popularity worldwide. The utilization of aloe vera, honey, and glycerin in the formulation of an herbal gel is an exemplary notion.

Keywords: Herbal gel; Aloe-vera; Honey; Skin

1. Introduction

The Aloe Vera cactus is native to tropical and subtropical regions. "Aloe Vera" is derived from the Arabic word "Alloeh," which means "shining bitter substance," and the Latin word "Vera," which means "true" [1,2]. The scientific name for Aloe Vera is *Aloe barbadensis miller*. It is an annual plant that resembles a shrub or tree and is xerophytic, succulent, and pea-green. The leaves of the aloe plant are long and triangular in shape, and they are quite juicy. The maximum length and width of these leaves are 20 and 5 inches, respectively. Translucent parenchymal gel recently extracted from the leaf's midrib. In specific scenarios, the production of aloe Vera concentrate entails the use of drying techniques, however in alternative occasions, it is blended with water to yield aloe juice items [3]. The exudation of latex takes place via pericyclic tubules that are present along the yellowish-green epidermis of the leaf. Anthraquinones, used as a laxative, are also derived from this compound [4]. South Africa, Madagascar, and Arabia are home to the vast majority (over 90%) of the world's 300 known species of aloe [5]. There is a slight variation in the amounts of active compounds between species [6]. When it comes to maintaining good skin, Aloe Vera is widely believed to be one of the oldest plants

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utilized by humans. According to research, this plant has been utilized in herbal medicine since the first century AD [7]. Research has shown that Aloe Vera (AV) 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, antiseptic, antibacterial, anti-tumor, skin-protecting, anti-diabetic, Aloe Vera has both antibacterial and antiviral properties [8-9]. Aloe Vera supports wound healing by promoting moisture retention, enhancing cell movement, boosting collagen production, and reducing inflammation. Aloe vera is a plant that typically reaches a height of 60-100 cm (24-39 inches) and does not have a long stem. It reproduces by producing offshoots, which are also referred to as cuttings. Some varieties feature white dots on the upper and lower stem surfaces, and the leaves are thick and meaty, ranging in color from green to gray-green [11].

Researchers are looking into the bioactivity of several components found in aloe vera leaves, including acetylated mannans, polymannans, anthraquinone, glycosides, anthrones, and various lectins. Skin integrity, moisture, erythema, and ulcers are all things that can be helped with aloe vera [13]. Psoriasis, mouth sores, ulcers, diabetes, herpes, bedsores, and burns are just some of the many conditions that can benefit from aloe vera's ability to reduce scarring. AV is excellent at maintaining a taut, hydrated, and smooth skin [14]. Many cosmetic products, such as moisturizers and sunscreens, include aloe vera gel as an essential ingredient. Vitamin B12, vitamin A, and other B-group vitamins, vitamins C and E, folic acid, and 19 of the 20 essential amino acids are all present in AV gel [15]. Some think the gel can be utilized in cosmetics much like vitamin A derivatives can be used to combat the visible signs of aging. A fresh leaf can be sliced and the gel inside the leaf can be applied to a minor burn right away [16]. The scientific name for aloe vera is *Aloe barbadensis* Miller, and this plant belongs to the lily family. It bears a rosette of thick, green leaves at its base. The epidermis (skin) of an aloe vera leaf is double-layered, with the outer layer protecting the mesophyll beneath. Thicker-walled chlorenchyma cells and parenchyma cells make up the mesophyll. A clear, slimy jelly, aloe vera gel is derived from the parenchyma cells of the aloe vera plant. Before aloe products can be used, they must often undergo preparation steps including drying, boiling, or grinding. The polysaccharides might be irreversibly altered during processing. This has the potential to drastically alter their original structure, and thus its hypothesized physiological and pharmacological capabilities. Due to its widespread culinary application, the extraction of Aloe vera juice from the leaf pulp has exploded into a global industry. In particular, Aloe vera gel has been used to create health drinks that don't require frequent restroom breaks.[17]

1.1. Pharmacological properties of aloe vera gel

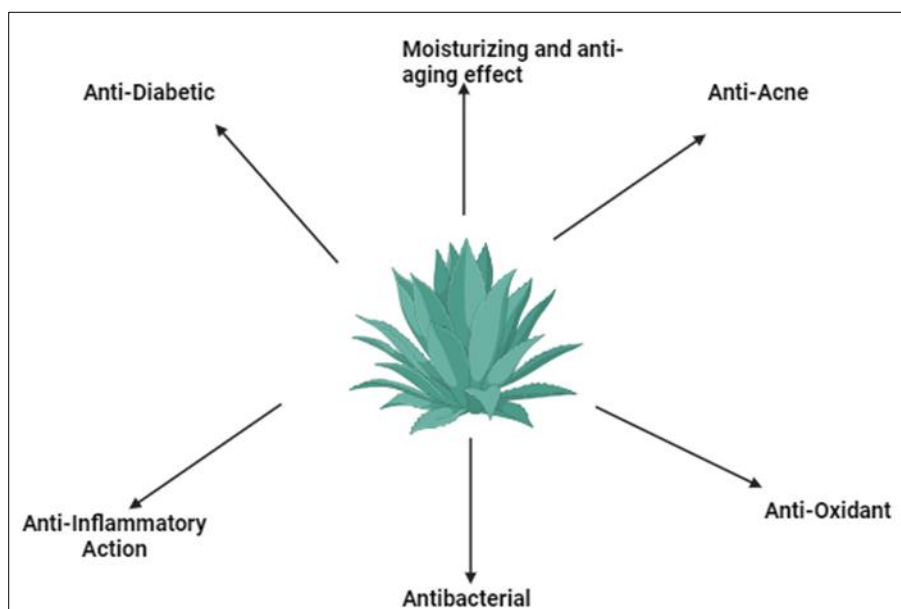


Figure 1 Pharmacological properties of Aloe-Vera [18]

2. Material and methods

2.1. Plant Material

Aloe-vera, Honey was taken as plant material in this formulation. Aloe-vera was collected from the Botanical Garden, Lucknow Model College of Pharmacy, Lucknow. Honey was purchased from the local market of Krishna Nagar, Lucknow.

2.1.1. Aloe-Vera

Aloe vera is a popular medicinal plant with antioxidant and antibacterial properties. It may reduce dental plaque, speed wound healing, prevent wrinkles, and manage blood sugar.

Benefits of Aloe-Vera

- Soothes Burns
- Heals Wounds
- Eases Intestinal Problems
- Reduces Arthritic Swelling
- Heals Psoriasis Lesions [19]
- Gum Infections
- Eye irritations and injuries
- Strains and sprains



Figure 2 Aloe-Vera [18]

2.1.2. Honey

Honey is an excellent preservative for aloe due to its long shelf life and compatibility with various substances. Honey is primarily composed of sugar, along with a combination of amino acids, vitamins, minerals, iron, zinc, and antioxidants. Honey is utilized for its various health benefits, including its anti-inflammatory, antioxidant, and antibacterial properties. Honey helps retain moisture in the skin's deeper layers, promoting a healthy and youthful appearance. [20-21]



Figure 3 Honey

2.2. Chemicals

Carbopol and Glycerin was collected from the chemical store room, Lucknow Model College of Pharmacy, Lucknow.

2.2.1. Carbopol 940

Carbopol 940 exhibits the property to enhance the viscosity. It was used to show good spread ability and consistency was selected for wound healing property of herbal gel of Aloe vera. [22]

2.2.2. Glycerine

Glycerine helps reduce itching of the scalp fast. Aloe vera offers relief to skin and hair damaged by sunlight exposure. With organic Aloe vera, the skin spots and rashes fade away gradually. Aloe vera locks moisture, whereas Glycerine brings radiance to the skin and hair. [23]

2.3. Method

2.3.1. Formulation and preparation of aloe vera gel

- Firstly, cut off the fresh aloe leaves from the plant.
- After Cutting, Rinse the leaves by cold water.
- Cut away the few portions from the bottom and wipe off any yellow gel.
- 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.
- Add honey into the freeze gel of aloe-vera leaves.
- Formulation was prepared.
- Coloring agent and preservatives was added to the Formulation to make formulation elegant. [24]



Figure 4 Cut off the Aloe-Vera leaves



Figure 5 Aloe-Vera Leaves



Figure 6 Leaf under Cold water



Figure 7 Slice off the outer layer



Figure 8 Scooping the Gel



Figure 9 Placing the Gel into Mortar to Homogenize it



Figure 10 Homogenization of Gel



Figure 11 Place the gel in Freezer



Figure 12 Gel after Freezing



Figure 13 Honey



Figure 14 Mix Honey with Aloe



Figure 15 Herbal Aloe Vera Skin Gel

2.4. Evaluation of herbal aloe-vera gel

Evaluation research is defined as a form of disciplined and systematic inquiry that is carried out to arrive at an assessment or appraisal of an object, program, practice, activity, or system with the purpose of providing information that will be of use in decision making.

2.4.1. Organoleptic Properties

Visual inspection methods are used to evaluate the organoleptic properties of the herbal gel. Color, Odor, Texture and state were examined during this assessment.

2.4.2. Absorption test

Absorption test was done by applying the gel onto the skin and rubbed until it gets completely absorbed.

2.4.3. Skin Irritancy test

The irritation test was done by applying a formulation on hand's back skin and leave it for 15 minutes to check irritation reaction such as swelling, itching and redness effect on the skin.

2.4.4. Homogeneity test

Homogeneity test was assessed by visual inspection and touch.

2.4.5. pH Test

The pH value of this purely herbal Aloe-vera Gel was determined by using digital pH meter.

2.4.6. Spread-ability test

Between two slides, a gel that weighed 500 mg was put. 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.

2.4.7. Smoothness

The smoothness of the lotion formulation was assessed through touch examination, wherein we rubbed the Gel between their fingers and made observations regarding its texture. We recorded whether the gel felt smooth, clumped, homogeneous, or harsh. [25]

3. Results and discussion

The aloe vera gel was formulated by using various type of ingredients such as aloe-vera gel, glycerin, coconut oil, rose water and honey. Aloe-vera contain antimicrobial and hydrating properties protect skin against microbial degradation and moisture to skin. Glycerin has anti-aging property. The herbal body lotion was evaluated to various parameter such as physiochemical parameter, pH, washability, irritancy, homogeneity, viscosity, smoothness, etc., used to check the quality and performance of formulation.

The effect of different ingredients in the formulation was investigated. The physiochemical property of formulation such as color is white, odor is pleasant, and state is semi-solid. The pH of formulation is neutral and washability is also good.

Table 1 Result of evaluation parameter of Herbal Aloe-Vera Skin Gel

S. No.	Test	Result
1	Color	Slightly yellow
2	Odor	Earthy and garlicky
3	Texture	smooth
4	State	Semi -solid
5	Absorption test	Very well Absorbed
6	Skin Irritancy test	No Irritancy effect
7	Homogeneity	Good
8	pH	6.5
9	Spread-ability Test	Smooth and light to Spread
10	Smoothness	Good

4. Conclusion

Based on the above study, we can say that herbal gel is made for use in warm areas. Aloe vera is used in gels to make them work better together and to keep the skin wet. Herbal formulations are becoming more popular all over the world. It is a very good effort to make a herbal gel with Aloe vera, honey, turmeric powder. Aloe Vera makes the skin more wet and smooths out rough spots, cracks, and cuts. Due to its anti-inflammatory, anti-acne, anti-oxidant, anti-diabetic, non-irritant, and deeply penetrating qualities, aloe-vera gel helps nourish the skin and get it back to its normal position. It also has a soothing and moisturizing effect.

Currently, to treat the various skin diseases without getting any side effect is a major challenge. The herbal formulation has a great advantage that herbal formulation does not show any kind of side effect. Thus, this present project, the herbal gel formulation shows good attempt to formulate. This formulation contains Aloe-Vera, Honey, Carbopol 940, Glycerin.

In the current study, it was observed that the formulation exhibited enhanced stability at room temperature and demonstrated favorable flow characteristics. This formulation exhibits compatibility with various skin types and demonstrates a lack of irritative effects. Furthermore, it nourishes and safeguards the skin against external environmental factors.

Compliance with ethical standards

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Disclosure of conflict of interest

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