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Study On Herbal Gel Used In The Therapy Of Acne Containing Vigna Radiata And Aloe Vera

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Abstract

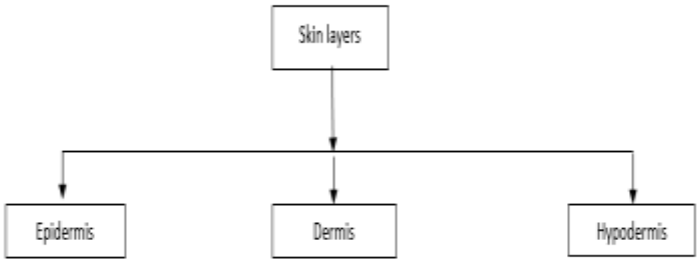
The focus of this study was to develop an herbal gel utilizing Aloe vera and Vigna radiata extract for addressing acne, a skin condition characterized by blocked hair follicles and sebaceous glands, leading to skin inflammation and redness. Aloe vera pulp was harvested and blended with Vigna radiata extract to create a gel formulation incorporating Carboxy methyl cellulose as a neutral gelling agent, methyl paraben as an antimicrobial preservative, propylene glycol for antimicrobial properties and plasticization, and glycerol as a neutralizing agent. Evaluation of the gel's antimicrobial efficacy against Staphylococcus epidermidis, a coagulase-negative staphylococcus, was conducted using gentamycin and fluconazole as reference standards. Encouragingly, the gel exhibited a significant zone of inhibition against microbial agents, indicating its potential for acne treatment. Furthermore, a thorough assessment of the gel's physicochemical properties supported its efficacy in managing acne,

highlighting the beneficial effects of Aloe vera and Vigna radiata onto the skin.

Keywords: Aloe vera; Vigna radiata; Carboxymethyl cellulose; Methyl paraben; Propylene glycol; Glycerol; Polyherbal gel; acne.

Introduction

Skin: The skin is recognized as the body's largest organ, comprising roughly 15% of an adult's total body weight. It serves numerous essential functions, like acting as a protective barrier towards outer physical and chemical elements while also preventing excessive water loss from the body.



Epidermis

The epidermis layer, which constitutes the outer layer of the skin, acts as a protective shield against infection, bacteria, parasites, fungi, viruses, heat, ultraviolet rays and water loss. Composed of layers of stratified squamous epithelial cells, the epidermis is organized into distinct regions, namely:

- Stratum basale
- Stratum spinosum
- Stratum granulosum
- Stratum lucidium
- Stratum corneum

Dermis

The dermis situated between the epidermis and the subcutaneous layer, the dermis houses various types of sensory receptors responsible for touch, pain, and pressure, temperature and vibrations. Cell types found within the dermis include:

- Fibroblasts

- Mast cells
- Histocytes
- Lymphatic vessels
- Hair follicles
- Sweat glands

Hypodermis

The hypodermis is located deep beneath the skin and is known as the subcutaneous layer, the hypodermis is composed of loose connective tissue. Cell types within the hypodermis encompass:

- Fibroblasts
- Adipose tissue
- Macrophages

Acne

Acne is an inflammatory skin condition characterized by inflammation, typically arising when pores are blocked due to a mix of oil and dead skin cells, leading to the accumulation of sebum within the pores. It is a chronic condition commonly known as acne vulgaris and typically affects individuals between the ages of 16 and 25. While mild forms of acne are prevalent during adolescence, severe cases can result in long-term scarring and aesthetic concerns even after treatment. Acne symptoms can be categorized into three main groups: mild, moderate, and severe. The condition is influenced by two primary factors: heredity and hormonal changes.

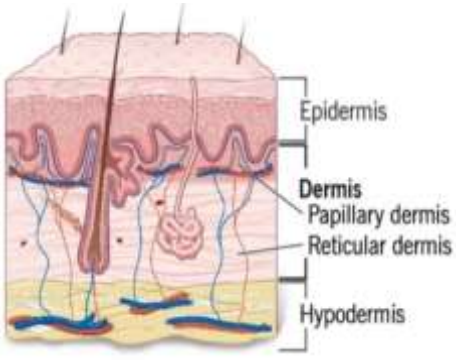


Fig-1_skin layer

Plant Profile

1. Vigna Radiata

Common names: mung bean

Species: Vigna radiata (Fabaceae**)**

Synonyms: Phaseolus aureus

Description: Mung bean is a legume extensively grown across Asia for its nutritious and consumable seeds and sprouts. The plant exhibits slight hairiness and boasts a well-developed root system. Its stems are characterized by numerous branches, occasionally twining at the tips. The seedpods are lengthy, rod -like and hairy, whereas the seeds vary in colour, typically appearing green but also available in shades of yellow and brown.

Chemical constituents: the mung bean contains flavonoids, phenols and amino acids.

Uses: known for its antioxidants, anti-inflammatory and antimicrobial properties, the mung bean serves various medicinal purposes.

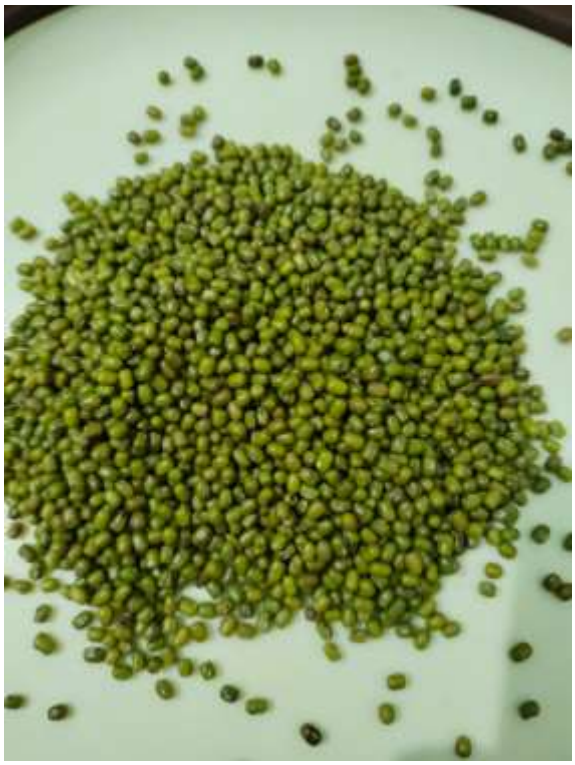


Fig-2_Mung bean

2. Aloe Barbadensis

Common name: Aloe indica Royal, Indian aloe

Family: Aloeaceae

Synonyms: Burn aloe, Indian aloe, true aloe

Description: It's a perennial herb characterized by its small stem and surface-level root system.

Chemical constituents: The plant contains various chemical compounds including barbaloin, aloe emodin, aloesone and aloesin.

Medicinal properties: Aloe vera shows a broad range of medicinal properties like anthelmintic, carminative, anti-inflammatory, antimicrobial and antioxidant effects.

Medicinal uses: The leaf juice of aloe vera is utilized in the treatment of dyspepsia, amenorrhea, burns and various skin diseases.

Fig-3_Aloe-vera plant

Methodology

Materials

S.No	Chemicals And Ingredients	Quantity	Properties

1.	Ethanol	600 Ml	Gel Formation at Low Temperature and Neutral Ph Values
2.	Carboxy methyl Cellulose	2.0 Gm	Natural Gelling Agent
3.	Propylene Glycol	10 Ml	Antimicrobial Preservatives, Stabilizer for Vitamins, Plasticizer
4.	Methyl Paraben	0.5 Gm	Antimicrobial Preservatives
5.	Glycerol	Q.S	Neutralizing Agent, Sweetening Agent
6.	Vigna Radiata Extract	20 Ml	Antioxidant, Antimicrobial, Anti-Inflammatory
7.	Aloe Vera Gel	20 Ml	Antioxidant, Antibacterial, Carminative
8.	Water	Q.S	_____

Formulation of Anti-Acne Herbal Gel

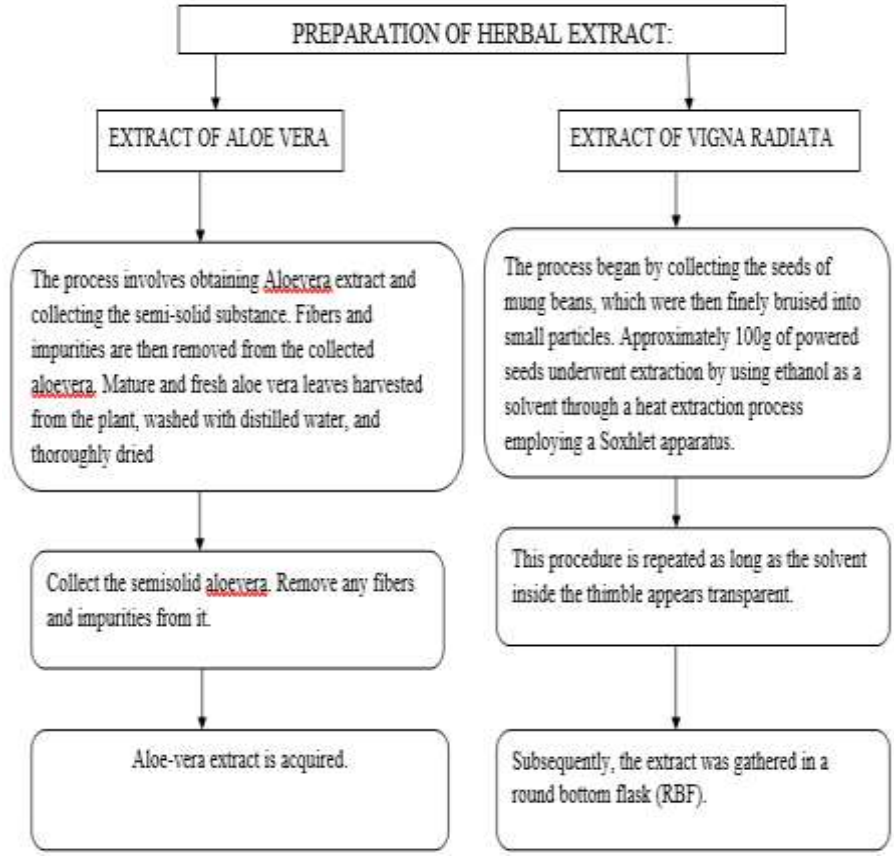

PREPARATION OF HERBAL EXTRACT:
EXTRACT OF ALOE VERA
EXTRACT OF VIGNA RADIATA
The process involves obtaining Aloevera extract and collecting the semi-solid substance. Fibers and impurities are then removed from the collected aloevera. Mature and fresh aloe vera leaves harvested from the plant, washed with distilled water, and thoroughly dried
The process began by collecting the seeds of mung beans, which were then finely bruised into small particles. Approximately 100g of powered seeds underwent extraction by using ethanol as a solvent through a heat extraction process employing a Soxhlet apparatus.
Collect the semisolid aloevera. Remove any fibers and impurities from it.
This procedure is repeated as long as the solvent inside the thimble appears transparent.
Aloe-vera extract is acquired.
Subsequently, the extract was gathered in a round bottom flask (RBF).

Fig-4_Aloe-vera extract

Fig-5_Mung bean extract

Preparation of Gel Base:

1. Gel Base Formulation

- The adequate quantity of water was used to disperse the gelling agent. Propylene glycol 400 (act as an antimicrobial preservative and plasticizer) was incorporated into the dispersion phase. Additional excipients, including methyl paraben or propylene paraben were introduced with ongoing stirring on a heating mantle.
- For CMC gels, the pH of the vehicle was adjusted to neutral using glycerol. Subsequently, the mixture underwent stirring using a heating mantle spinning at 500 rpm for 2 hours.
- After stirring, the homogenous gel showed a consistency like bubble free appearance. Subsequently, it was left undisturbed for 24 hours to access its stability and consistency.

Fig-6_Gel base

2. Herbal Gel Formulation Containing Vigna Radiata and Aloe vera

The herbal gel was developed by integrating the extracts of Vigna radiata and Aloe vera fluid into a fine-tuned CMC gel. Aloe vera fluid was then combined with the required amount of water until CMC got dispersed.

- Simultaneously, a precise amount of propylene glycol 400 and methyl paraben mixture was introduced into the aforementioned mixture of CMC, Vigna radiata extract, and Aloe vera extract. Propylene glycol was added gradually to adjust the skin pH to the required range of 6.8-7 and achieve the desired gel consistency. Subsequently, the composition was stirred continuously (using a propeller) at 500 rpm for 2 hours.
- Following the mixing process, the resultant gel exhibited homogeneity and was free from air bubbles. The gel was subsequently allowed to sit at room temperature for 24 hours to ensure its stability and consistency.

Fig-7_Herbal gel

CONCLUSION

The culmination of these investigations underscores several key points leading to the below conclusions:

- The above study aims to address the severe skin status of acne by developing an effective and safe herbal gel utilizing Vigna radiata and Aloevera.
- The integration of the extract of Vigna radiata and collected Aloe vera gel into an optimized CMC gel base has been achieved.
- The mixture of these herbal constituents exhibits potential for alleviating acne-related concerns.
- Antimicrobial studies indicate the absence of microbial contamination and demonstrate a significant area of inhibition. Moreover, in-vivo skin irritation studies reveal no harmful skin reactions or local overall changes, such as defatting of the skin.

In summary, this study concludes that making an herbal gel could be a good and safe way to give patients their therapy. It might help patients stick to their treatment plan in a better way.

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