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EVALUTION AND FORMULATION TOPICAL HERBAL GEL FOR SKIN

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ABSTRACT

Topical herbal gels have emerged as effective alternatives for skin care, combining the therapeutic benefits of natural ingredients with advanced formulation techniques. This review evaluates the formulation processes and the physicochemical, biological, and clinical assessment methods for herbal gels. Key herbal ingredients such as aloe era, glycerine, Turmeric, and Tea Tree Oil are analysed for their properties andefficacy in treating various skin conditions. The review discusses the importance of selecting appropriate gelling agents, optimizing pH levels, and conducting stability tests to ensure product safety and effectiveness. Clinical trials underscore the potential of these gels in managing conditions like acne, inflammation, and irritation. This paper aims to provide a comprehensive understanding of topical herbal gels, promoting their integration into conventional dermatological practice. The prepared gel was tested for its physical appearance, pH, how easily it spreads, thickness (Viscosity), and overall smoothness. It was also tested on rabbits to check for skin irritation and on human volunteers for its effectiveness on cracked heels. Stability studies were done following ICH guidelines. The results showed that the gel looked good, was smooth, and spread easily. Its thickness was between 4200 and 4500 centipoises. No skin irritation was found in the animals. The gel also successfully reduced the number and size of pimples during a two-week study and helped heal cracked heels in human volunteers. Additionally, it was helpful for treating skin rashes, swelling, and skin cracks. It can equally important to skin.

KEYWORDS: Herbal gel, Cow urine, Aloe Vera, Neem, Turmeric, Rose water, Glycerine.

INTRODUCTION

Skin diseases are common health problems that affect people of all ages, from newborns to the elderly, and can cause various issues. Keeping the skin healthy is important for overall well-being. Many individuals may experience skin problems, including infections, injuries, or even skin cancer.[1]

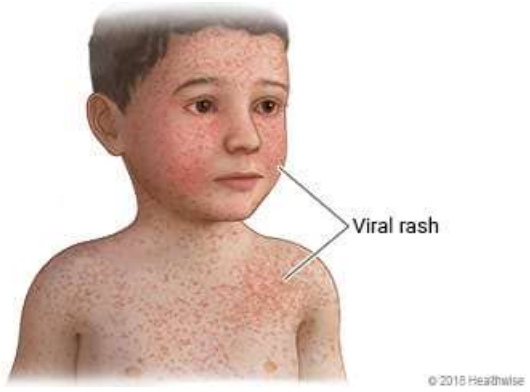
Medications commonly used to reduce different types of inflammation often cause serious side effects like redness and itching. Because of this, it's important to look for better alternatives that may be safer and more effective. Gel formulations are a good option for delivering drugs on the skin because they are easy to apply, stay on longer, and cause fewer side effects compared to other topical treatments or oral medications.[2]

Herbal gel is a thick, jelly-like substance that can be soft or firm, depending on how it's made. It's applied on the skin for different purposes, like protecting the skin, fighting infections, and killing germs. The gel is made from different traditional plants and is often used to treat conditions like inflammation (swelling and pain).

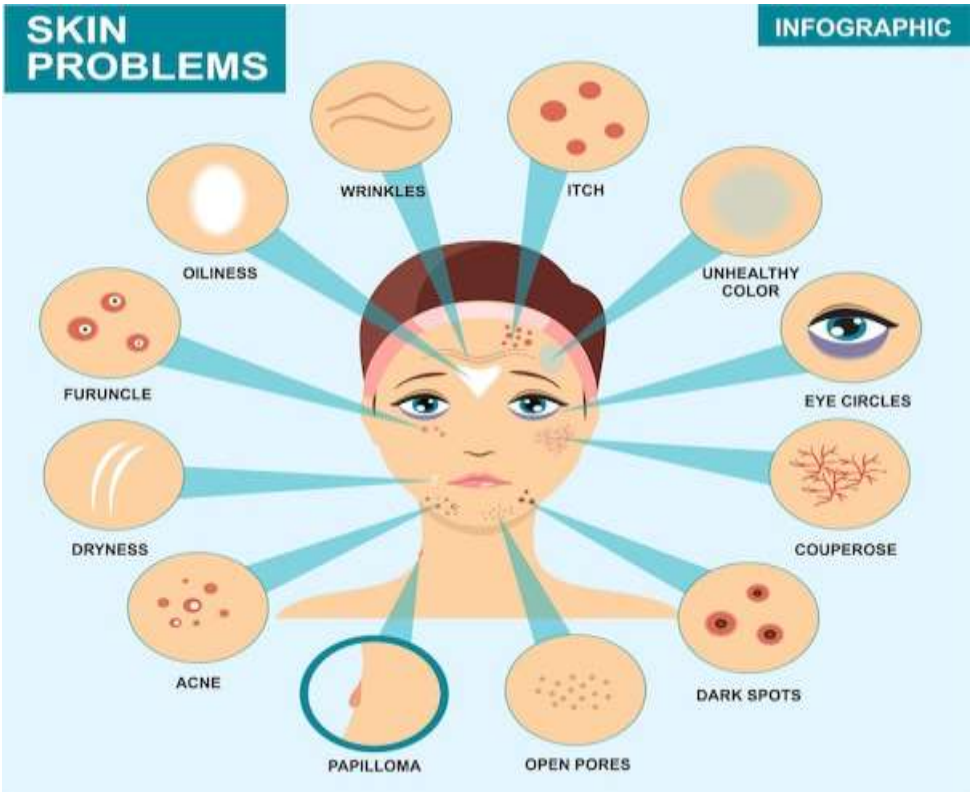
❖ Common skin problems

Skin diseases affect people of all ages, from babies to older adults, and can lead to different kinds of harm. There are over a thousand conditions that can impact the skin.[3]

- **Rashes:** A rash is a red, irritated area of skin or small spots that can appear on the skin's surface.



- **Viral infections:** These happen when a virus gets through the top layer of Skin and Infects the deeper layers.



- **Bacterial infections:** These are caused by different bacteria, with the mostcommon ones being staph and strep bacteria.

- **Fungal infections:** Fungi that are usually harmless can sometimes cause skin problems like ringworm or jock itch.

- **Cracked heels:** Cracked heels are often caused by dry skin. When you walk,the skin on your heels spreads out, which can lead to cracks.

- **Trauma:** Trauma is an injury to the skin caused by things like hitting, cutting, or burning.

❖ **Gels**[4]

- As semisolid systems consisting of dispersions made up of either small inorganic particles or large organic molecules enclosing and interpenetrated by a liquid
- A high degree of physical or chemical cross- linking may be involved.
- The increased viscosity caused by the internal friction is responsible for the semisolid state.

❖ **Classification of gels**[5,6]

Gels can be classified in various ways based on their composition, the solvent used, their physical properties, and how they flow or move. Here are the main ways to classify gels:

1. Based on colloidal phases

- **Inorganic Gels (Two-Phase System)**

These consist of small solid particles (floccules) dispersed throughout the gel. The particles are small but not fully dissolved, and the system can be unstable if the particle size becomes too large. These gels are thixotropic, meaning they become liquid when stirred and return to a semisolid state when left undisturbed. Examples include gels made from aluminum hydroxide and bentonite.

- **Organic Gels (Single-Phase System)**

These consist of large organic molecules that are fully dissolved in the solvent, forming a continuous phase. Organic gels are smooth and stable due to the uniform distribution of the dissolved molecules.

Examples include gels made from carbomer or tragacanth, often found in cosmetics or pharmaceuticals.

2. Based on the nature of the solvent

- **Hydrogels**

Gels where water is the main solvent. They can absorb large amounts of water and are used in applications like wound dressings, contact lenses, and drug delivery systems.

- **Organogels**

Gels where the solvent is an organic liquid (e.g., oils). They are used in cosmetics, ointments, and some drug delivery systems.

3. Based on physical nature

- **Elastic gels**

These gels can return to their original shape after being stretched or compressed, much like rubber. They are often used in soft tissue engineering and biomedical applications.

- **Rigid gels**

These gels are firm and do not easily change shape. They are commonly used in food products like gelatin desserts.

4. Based on Rheological Properties (Flow behavior)

- **Thixotropic gels**

These gels become less viscous and flow when subjected to stress (e.g., shaking or stirring) but return to their original state when the stress is removed.

- **Non-Thixotropic gels**

These gels maintain their shape and consistency, even when stressed.

❖ **Advantages of gels formulation[7,8]**

1. Easy to apply and spread
2. Non-greasy and non-sticky
3. Quick drying and absorption
4. Can be formulated for various skin types
5. Excellent for wound healing and tissue repair
6. Can be used as a delivery system for active ingredients
7. Stable and consistent texture
8. Cosmetically elegant
9. Easy to remove
10. Suitable for topical and transdermal applications

❖ **Disadvantages of gels formulation[9,10]**

1. Limited shelf life due to water content
2. Risk of microbial contamination
3. May require preservatives
4. Can be affected by temperature and humidity
5. May not be suitable for sensitive skin

6. Can cause skin irritation or allergic reactions
7. Difficult to formulate with high concentrations of active ingredients
8. May require special packaging
9. Can be expensive to manufacture
10. Quality control and stability testing required

❖ **Ideal properties topical gel**[11]

1. Ideally, the gelling agent must be inert, safe and cannot react with other formulation constituents.
2. The gelling agent should produce a sensible solid-like nature at the time of storage which is easily broken when exposed to shear forces produced by squeezing the tube, trembling the bottle or at the time of topical application.
3. It should have suitable anti-microbial agent.
4. The topical gel must not be sticky.
5. The ophthalmic gel must be sterile.
6. The apparent viscosity or gel strength increases with an increase in the effective crosslink density of the gel. However, a rise in temperature may increase or decrease the apparent viscosity, depending on the molecular interactions between the polymer and solvent.

❖ **Herbal drugs for skin disease**

Topical herbal gel for skin diseases are a natural treatment option applied directly to the skin. These gels contain herbal extracts that help in soothing, healing, and treating various skin conditions like acne, eczema, psoriasis, or rashes.

Some commonly used herbs in these gels include

1. Aloevera
2. Cow urine
3. Turmeric
4. Neem
5. Rose water

1) Aloevera

- **Botanical name** - Aloe vera
- **Common name** – Korphad
- **Family** - Aloeceae

- **Parts used**- Leaves
- **Uses:** Aloe vera is good for irritated or inflamed skin. It helps repair skin from the most tender wounds. It helps speed up the process of healing to burns & other wounds. It is hydrating, rejuvenating and toning for skin. It moisturises and softens skin. Known for its cooling and healing properties, it helps soothe burns, rashes, and dry skin.[12]

2) Cow urine

cow urine is used has antimicrobial, antiviral, and antifungal properties, which makes it an Ayurvedic cow urine treatment for skin diseases like eczema, acne, redness, irritation, rashes or allergic reaction. To maintain glowing healthy skin, cow urine is used.[13]

3) Turmeric

- **Botanical origin** - Curcuma longa Family- zingiberaceae
- **Common name**- Turmeric
- **Urdu name**- Haldi
- **Part used**- Dried rhizomes, Has anti-inflammatory and antibacterial effects, useful for treating acne and skin irritation.[14]

4) Neem

- **Botanical name:** Azadirachta Indica
- **Common name:** Neem
- **Family:** Meliaceae

Used

- **Antibacterial:** Neem can help fight acne-causing bacteria.
- **Anti-inflammatory:** Neem can relieve inflamed skin and soothe redness and itchiness.
- **Hydrating:** Neem can help heal dry skin and avoid further dryness and itchiness.
- **Anti-aging:** Neem has anti-aging properties that rejuvenate the skin and make it healthy.
- **Rich in vitamin E:** Neem is a rich source of vitamin E which helps repair damaged skin cells.

Known for its antibacterial and antifungal properties, helps treat infections and inflammation.[15]

5) Rose water

- **Botanical name:** Rosa Damascena
- **Common name:** Gulab
- **Family:** Rosaceae

- **Rose water can have many benefits for your skin, including**
  - **Hydration:** Rose water is a natural hydrator that can help maintain your skin's moisture balance. It's rich in natural oils and sugars, which can help prevent dryness and promote a dewy complexion.
  - **Anti-inflammatory properties**: Rose water can soothe irritated skin and reduce redness. This makes it a good choice for people with sensitive or acne-prone skin.
  - **Anti-aging properties:** Rose water is rich in antioxidants, which can help diminish the appearance of fine lines and wrinkles.
  - **Toning and tightening:** Rose water can act as a natural astringent, which can help tone and tighten the skin. This can minimize the appearance of pores.
  - **Acne control:** Rose water has antimicrobial properties that can help control and prevent acne breakouts.
  - **Heals wounds:** Rose water can help soothe cuts and reduce their appearance.
  - **Improves skin tone and blemishes:** Rose water can brighten skin and reduce the appearance of blemishes.
  - **Reduces skin irritation:** Rose water can help reduce skin irritation caused by eczema and rosacea.

These herbal gels are often preferred because they are natural, have fewer side effects, and are easily absorbed by the skin.[16]

❖ MATERIAL AND METHODS

- **Materials**
- **Table: Formula of topical herbal gel.[17]**

Sr. No	Formulation ingredient	Properties	Category
1.	Extract of Cow Urine	Germicidal and healing agent	10 %
2.	Neem extract	Antimicrobial and Antibacterial Agent	10 %
3.	Turmeric	Moisturizer and Gelling Agent	10 %

4.	Glycerin	Gel Smoothing Agent	5%
5.	Rose water	Solvent	28.75 %
6.	Alo Vera	Moisturizer	10 %
7.	Carbopol	Gelling Agent	1.0%
8.	Polyethylene Glycol	Gel Smoothing Agent	5%

- **Method**[18]

1. Preparation cow urine extract

To make 10 % W/V cow urine extract, 10% cow urine is mixed with 100 milliliters of distilled water. Cow urine has been historically used in Ayurveda for its medicinal properties, including antimicrobial effects.

Steps

1. Collection: Collect fresh cow urine from a healthy, disease-free cow.
2. Filtration: Filter the urine through a clean muslin cloth or sieve to remove impurities.
3. Distillation: Boil the urine in a distillation apparatus to collect the vapor. Condense this vapor back into liquid form to obtain pure cow urine extract.
4. Storage: Store the distilled cow urine in an airtight container in a cool place, away from directly sunlight.

2. Preparation of neem extract

100 milliliters of distilled water are used to boil 10 % fresh been leaves. Pour the mixture through a filter. Neem (Azadirachta indica) is well-known for its medicinal properties, especially in skin care.

Steps

1. Neem Leaves Collection: Collect fresh neem leaves.
2. Washing: Wash the leaves thoroughly under clean water.
3. Drying: Air-dry the leaves in a cool, shaded area to remove moisture.
4. Boiling: Boil the leaves in water for about 30 minutes.
5. Straining: Once the water turns green, strain the liquid to remove the leaves.
6. Concentration: If a stronger extract is required, simmer the neem water further to reduce its volume and increase the concentration.
7. Storage: Store the extract in a sterilized bottle, in a cool, dry plants.

❖ Formulation of topical herbal gel[19,20]

Step 1: Preparation of gel base

1. Weigh and mix Carbopol 934, PEG 400, and glycerin in a ratio of 2:1:1.
2. Add distilled water to achieve a uniform mixture.

Step 2: Addition of herbal extracts

1. Add Aloe vera extract (20% w/w) and Turmeric extract (10% w/w) to the gel base.
2. Mix thoroughly for 30 minutes to ensure uniform distribution.

Step 3: Filling and Storage

1. Fill the prepared gel into collapsible tubes.
2. Store in a dry, cool environment.

❖ CONCLUSION

The development of topical herbal gel for skin care has shown promising results in terms of its potential to provide natural, safe, and effective skincare solutions. The review of various herbal extracts, such as Aloe vera, Turmeric, and Neem, has highlighted their antimicrobial, anti-inflammatory, and antioxidant properties, which can help to soothe, protect, and rejuvenate the skin.

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