

Formulation and Evaluation of Herbal Lotion

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Abstract—The present study aimed to formulate and evaluate a herbal lotion using Aloe vera as the base ingredient, combined with extracts of Neem, Tulsi, and Papaya. The lotion was formulated using a mixture of Aloe vera gel, Neem oil, Tulsi extract, and Papaya extract, along with other excipients. The physical and chemical characteristics of the lotion, such as pH, viscosity, and stability, were evaluated. The antimicrobial and antioxidant activities of the lotion were also assessed. The results showed that the formulated lotion possessed good physical and chemical characteristics, and exhibited significant antimicrobial and antioxidant activities. The lotion was also found to be safe and non-irritating on human skin. The study concludes that the herbal lotion formulated from Aloe vera, Neem, Tulsi, and Papaya extracts has potential as a natural and effective skin care product.

Keyword—Aloe vera, Neem, Tulsi, Papaya, Herbal lotion, Antimicrobial activity, Antioxidant activity, Skin care.

I. INTRODUCTION

Herbal lotions have gained popularity due to the increasing consumer preference for natural and organic skincare products. Unlike chemical-based lotions, herbal lotions are formulated with plant-based ingredients that offer skin benefits such as moisturization, nourishment, and protection against harmful environmental agents. The aim of this project is to design, develop, and characterize a herbal lotion using natural ingredients, while evaluating its potential benefits, chemical composition, and overall effectiveness¹. Herbal lotion is a natural, topical skincare product that combines the therapeutic benefits of herbs with moisturizing properties to promote healthy, radiant skin. This lotion harnesses the potency of botanical extracts to provide hydration, soothe irritation, and protect the skin from environmental stressors. By leveraging the ancient wisdom of herbalism, herbal lotion offers a gentle, effective, and chemical-free alternative to conventional skincare products³.

The benefits of herbal lotion are numerous. It moisturizes and hydrates the skin, reduces

inflammation and oxidative stress, and soothes and calms irritated skin. Additionally, herbal lotion is non-greasy and easily absorbed, making it suitable for various skin types. Key herbal ingredients such as Aloe vera, green tea, Coconut oil, Shea butter, Glycerin, Vitamin E and Jojoba oil work synergistically to promote skin health and well-being².

Herbal lotion offers a natural, effective, and holistic approach to promoting healthy, radiant skin. By tapping into the healing power of herbs, individuals can experience the benefits of a balanced and healthy skincare routine.

Herbalism became more systematic, with publications on herbal remedies. Perfumes and cosmetics containing herbal extracts gained popularity. Egyptians used herbal extracts for skin care, Greeks and Romans employed herbal remedies for skin and hair, Ayurvedic and Traditional Chinese Medicine utilized herbal extracts for skin health⁴⁻⁶.

1. 1990s: Aloe vera gel becomes popular in skincare products.
2. 2000s: Green tea extract gains recognition for antioxidant properties.
3. 2010s: Natural and organic certifications (e.g., USDA Organic) become prominent.

Human skin

The skin is the largest organ of the body, with a entire area of about 20 square feet. The skin protects us from germs and the elements, helps regulate body temperature, and permits the sensations of touch, heat, and cold.

Structure of Skin:

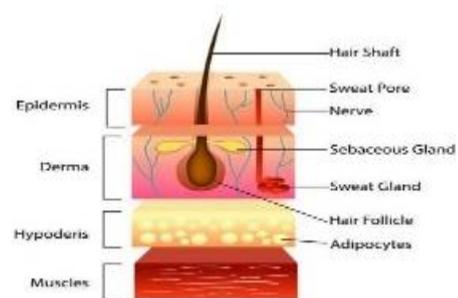


Fig: structure of skin

Ideal properties of lotion:

1. It should physically and chemically stable.
2. It should have optimum pH.
3. It should be non-sticky.
4. It should give a cooling effect.
5. It must be non-irritant.
6. It must be non-inflammatory.
7. It should be attractive.
8. Penetration through the epidermis of the skin should be desirable.
9. Consistency should be optimum.
10. Rubbed easily on the skin without role on effect.

Advantages of Lotion:

1. Also can apply to broken skin
2. No first-pass metabolism
3. Local therapeutic effect
4. Easy to use and portable
5. More stable than liquid
6. No need of rubbing or massage
7. Easy to apply
8. Simple and easy to formulate.

Disadvantages of Lotion:

1. Less stable than solid dosage form
2. Need to shake the container before use in case of emulsion / suspension type of lotion
3. Babies can swallow if applies to hand.

Application:

1. Skin care: moisturising, soothing sunburns, reducing inflammation.
2. Therapeutic uses: acne, wound healing, skin conditions.
3. Beauty and cosmetics: facial moisturiser, body lotion, hand/foot cream.
4. Wellness and relaxation: stress relief, sleep improvement, massage lotion.
5. Suitable for sensitive, dry, oily, combination, and normal skin.
6. Baby care: diaper rash, skin soothing; sports/fitness: muscle relief.

Types of lotion:

A) Simple Lotion:

This kind of lotion is used. They are used kind cooling and soothing effect for smooth skin. Moisture in the body also provide humectant effect.

b) Therapeutic Lotion

Therapeutic lotions contain different kind of therapeutic agent depending on desired effect required.

E.g. calamine lotion as protectant and astringent and salicylic acid lotion as keratolytic bacteriostatic and fungi static

c) Suspension Type of Lotion

Some lotions contain insoluble solids called suspension type of lotion. Here, bentonite, sodium carboxy methyl cellulose uses as suspending agent. E.g. calamine, Sulphur, zinc oxide.

d) Emulsion type of lotion

These are diluted lotions with o/w emulsion stabilise by emulsifying agents like emulsifying wax. E.g. Benzoyl benzoate lotion.

DRUG PROFILE:

Aloe Vera

Chemical Names: Aloe-Emodin, Aloin, And Other Glycosides

Biological Source: Aloe Vera (Aloe Barbadensis)

Family: Liliaceae

Chemical components:

1. Anthraquinones: aloin, aloe-emodin
2. Glycosides: aloin and aloe-emodin glycosides
3. Vitamins A, C, and E
4. Minerals: potassium, magnesium, and calcium
5. Alanine, glutamic acid, and aspartic acid are amino acids.

Applications in lotion:

1. The ability to moisturise
2. Calming and anti-inflammatory properties
3. Properties of antioxidants
4. Benefits of skin repair and wound healing



Fig: Aloe vera

Neem:

Chemical name: *Azadirachta indica*

Biological source: Neem tree (*Azadirachta indica*)

Family: Meliaceae

Chemical components:

1. Limonoids: nimbin and azadirachtin
2. Alkaloids: nimbidine
3. Nimboside is a glycoside.
4. Fatty acids: oleic acid, linoleic acid

Applications in lotion:

1. Antimicrobial and antifungal characteristics
2. Calming and anti-inflammatory properties
3. Repelling and insecticidal qualities
4. Astringent and skin-toning qualities
5. Capacity to lessen skin irritations, pimples, and acne



Fig: Neem

Papaya

Chemical name: *Carica papaya*

Biological source: Papaya fruit (*Carica papaya*)

Family: Caricaceae

Chemical components:

1. Enzymes: chymopapain and papain
2. Vitamins A, C, E, and K
3. Minerals: iron, magnesium, and potassium
4. Alanine, glutamic acid, and aspartic acid are amino acids.
5. Flavonoids: quercetin and kaempferol

Applications in lotion:

1. Papain's exfoliating and skin-brightening qualities
2. Antioxidant and anti-aging effects
3. Calming and moisturising qualities
4. Capacity to lessen skin irritations, pimples, and acne

5. Organic skin-whitening and skin-toning qualities



Fig: Papaya

Tulsi

Chemical name: *Ocimum sanctum*

Biological source: Tulsi plant (*Ocimum sanctum*)

Family: Lamiaceae

Chemical components:

1. Volatile oils: linalool and eugenol
2. Flavonoids: vicenin and orientin
3. Phenolic substances: rosmarinic acid
4. Terpenes: camphor and borneol

Applications in lotion:

1. Antimicrobial and antifungal characteristics
2. Calming and anti-inflammatory properties
3. Antioxidant and anti-aging qualities
4. Capacity to lessen skin irritations, pimples, and acne
5. Natural skin-toning and revitalising qualities



Fig: Tulsi

Formulation of Papaya, Tulasi, and Neem Extraction:

Neem extraction:

To carry out the extraction, 19 grammes of crushed neem leaves were macerated in 150 millilitres of distilled water and left for three

days. After three days, the solution was left in the rotary evaporator for roughly thirty to forty minutes. After the procedure was finished, the extracted material was left to dry further in a water bath for approximately nine to eleven hours, or until it became sticky¹¹⁻¹³.

Papaya extraction:

Chopping the fruit into pieces and extracting the seeds. After that, mortar pastel was used to crush the pieces. Following fine grinding, it was transferred to a beaker, filled with 100 millilitres of ethanol, and left for 20 - 25 mins for maceration process¹⁵.

Tulsi leaf extraction:

Tulsi leaves were cleaned, dried, and ground into powder. The powder was mixed with dimethyl sulfoxide, heated, and concentrated. The mixture was then filtered to obtain a clear Tulsi leaf extract, free from contaminants. This process yielded a prepared extract of Tulsi leaves¹⁶.

Aloe vera extraction:

Aloe vera leaves must first be gathered from the botanical garden and cleaned with distilled water.

- Next, we must use a knife to cut the leaf's outer portion longitudinally.
- Next, we extracted the colourless parenchymatous tissue and placed it in a 400 ml beaker.
- Next, we must use a stirrer mixer to agitate the aloe vera gel.
- After that, it was filtered to get rid of different kinds of contaminants using a muslin cloth.
- Finally, cover the beaker with silver foil or filter paper to stop any environmental factors or microbial growth²².

II. MATERIAL & METHOD

MATERIAL:

Composition of Aqueous Phase

Sr. No.	Ingredient	Quantity
1.	Aloe Vera	20 ml
2.	Neem extract	5 ml
3.	Papaya extract	10ml
4.	Tulsi extract	5 ml
5.	Triethanolamine	2 ml
6.	Glycerine	10 ml
7.	Rose water	10 ml
8.	Distilled water	Q.S.

Composition of Oil Phase

Sr. no.	Ingredient	Quantity
1	Steric acid	5 mg
2	Coconut oil	15 ml
3	Honey	5 ml
4	Lemon oil	1 ml

METHOD:

Step 1: Weighing and Getting the Ingredients Ready

1. Use a digital scale to precisely weigh each ingredient.
2. In a double boiler or a heatproof mixing bowl placed over a pot of simmering water, melt the coconut oil and stearic acid to prepare the ingredients for mixing.

Step 2: Oil Phase 1 Mixing.

Stir together the honey, lemon oil, coconut oil, and melted stearic acid until thoroughly blended.

Step 3: Water Phase 1 Preparation.

In a different heatproof mixing bowl, thoroughly mix the tulsi extract, glycerin, aloe vera gel, neem extract, papaya extract, and rose water.

Step 4: Emulsification and Cooling

1. Let the water phase and oil phase cool to between 40°C and 45°C (104°F and 113°F).
2. Using a homogeniser or immersion blender, gradually mix the water phase into the oil phase.
3. Keep mixing until all of the phases are combined and emulsified.

Step 5: Adjusting the pH

1. Use triethanolamine (TEA) to bring the lotion's pH down to about 5.5.

Step 6: Packing and Filling

1. Transfer the lotion into sterile, clean tubes or bottles.
2. Tightly seal the container and write the product name, ingredients, usage guidelines, and any other pertinent details on the label.

EVALUATION TEST:

1. Organoleptic character:

Appearance: A visual inspection of the lotion's appearance was conducted.

Colour: The cream's colour was noted through visual inspection.

Odour: By sniffing, the lotion's odour was evaluated.

2. Homeogenicity

Both touch and visual appearance were used to test the homogeneity of the formulation.

3. Ph

Both a digital PH meter and pH paper were used to measure the prepared herbal lotion's pH⁷.

4. Spreadability

By sandwiching the sample between two slides and applying a specific weight for a predetermined amount of time, the spread ability of the lotion formulation was assessed.

5. Test of Irritation

A particular region of the left hand's dorsal surface received the lotion application. Erythema, oedema, and irritation were monitored for 24 hours and reported¹⁹.

6. After-fill

Following the application of the prescribed quantity of cream, emolliency, slipperiness, and residue amount were observed.

7. Test for Microbial growth

The formulation was put in the middle of the petri dish, and the plates were then incubated for 72 hours at 37°C to monitor the microbial growth.

8. Types of Smear

Types of Smear Following lotion application, the kind of film or smear that developed on the skin was examined²⁴.

9. Ease of removal

By washing the area with water, the cream's ease of removal was assessed.

III. CONCLUSION

The formulation and evaluation of the herbal lotion using Aloe vera gel, papaya extract, Tulsi extract, and Neem extract demonstrated promising results. The combination of these natural ingredients with excipients like glycerin, rose water, and coconut oil created a nourishing and moisturizing lotion. The addition of honey and lemon oil enhanced the lotion's

antimicrobial and anti-aging properties. The formulated lotion showed potential benefits for skin health, including hydration, soothing, and protection. Further studies and evaluations could lead to a stable and effective herbal lotion product.

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