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Preparation and Evaluation of Herbal Under-Eye Cream

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Abstract: *The present work deals with the formulation and evaluation of a herbal under-eye cream prepared with licorice (Glycyrrhiza glabra) extract and aloevera (Aloe barbadensis) gel. Under-eye skin is extra sensitive and vulnerable to dark circles, puffiness, dryness, and premature signs of aging caused by stress, lack of sleep, sun exposure, and environmental conditions. The purpose of this formulation is to offer a mild substitute for chemical cosmetics, providing therapeutic benefits through herbal ingredients.*
Licorice has been reported to possess intense anti-inflammatory, antioxidant, and skin-lightening activity due to the presence of constituents such as glycyrrhizin and glabridin. Aloe vera is well known for its moisturizing, calming, and healing effects owing to the content of polysaccharides, vitamins, and minerals. The cream was formulated by emulsifying a mixture of natural oils, waxes, and aqueous ingredients with the herbal extracts.
The final product was analyzed for physicochemical properties like pH, spreadability, viscosity, homogeneity, and stability. The formulation had a perfect pH for application on the skin (5.5–6.5), exhibited smooth texture, and was stable under different conditions of storage. The findings proved the efficacy of this herbal product to correct the under-eye skin condition by diminishing pigmentation, puffiness, and dryness and hence a potential and safe herbal option for daily dermatocare.

Keywords: Herbal cream, Under-eye care, Licorice extract, Aloe vera gel, Natural formulation, Skin lightening, Anti-inflammatory

I. INTRODUCTION

The skin under the eyes is very thin and delicate, and it is very prone to environmental damage, aging signs, fatigue, and dehydration. Issues under the eyes like dark circles, puffiness, fine lines, and dryness are common and tend to be a concern for most people. Though there are several synthetic formulations present in the cosmetic industry, they can be harsh chemicals that are not only irritating to sensitive skin but also cause prolonged side effects. Therefore, there is a growing demand for herbal or natural products in skincare, particularly in sensitive skin areas such as the under-eye region.Herbal preparations have received immense popularity because they are safe, effective, and cause very few side effects. Plants such as licorice (Glycyrrhiza glabra) and aloe vera (Aloe barbadensis) have been extensively noted in ancient medicine and contemporary skincare due to their skin-beneficial effects. Licorice boasts active phytoconstituents like glycyrrhizin and glabridin, which possess

potent anti-inflammatory, antioxidant, and skin-whitening actions. These components assist in inhibiting melanin production, calming inflammation, and healing harmed skin, rendering licorice a suitable ingredient for use under the eyes.

Aloe vera, however, is famous for its moisturizing, cooling, and healing properties. Packed with vitamins (A, C, E), minerals, enzymes, and polysaccharides, aloe vera intensely hydrates the skin, de-puffs, and regenerates skin cells. Its anti-inflammatory effect also soothes irritated or sensitive skin. When used together, licorice and aloe vera synergistically brighten, calm, and rejuvenate the under-eye area.

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The aim of this study is to develop a soothing yet effective herbal under-eye cream with licorice extract and aloe vera gel, fortified with other natural excipients like almond oil, beeswax, glycerin, and vitamin E. These not only improve the base structure of the cream but also provide additional emollient and protective effects. Essential oils such as lavender add a mild scent and further soothing effects.

This research also intends to assess the physicochemical characteristics of the formulated preparation, such as pH, spreadability, viscosity, homogeneity, and stability under various storage conditions. By this research, a natural and safe substitute for traditional under-eye creams is provided, which can be applied routinely for skin care and treatment of under-eye issues without any adverse effects.

1.1 Collection of Material:

All raw materials and excipients applied in the herbal under-eye cream formulation were properly chosen considering their safety profile, availability, and reported benefits in skin care. Ingredients were obtained from reliable sources and certified for use in cosmetics or pharmaceuticals. Proper quality control and authentication were done prior to use.

Licorice

Figure : 1.1 Licorice Powder

Biological Name: Glycyrrhiza glabra
Class: Natural depigmenting agent
Family: Fabaceae
Uses: Reduces pigmentation, anti-inflammatory, antioxidant
Chemical Constituents: Glycyrrhizin, flavonoids, glabridin

Aloe Vera Gel

Figure : 1.2 Aloe Vera Gel

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Biological Name: Aloe barbadensis
Class: Natural moisturizer/healer
Family: Liliaceae
Uses: Moisturizes, soothes irritation, promotes healing
Chemical Constituents: Aloin, aloesin, polysaccharides, saponins

Almond Oil

Figure: 1.3 Almond Oil

Biological Name: Prunus amygdalus
Class: Carrier oil/emollient
Family: Rosaceae
Uses: Nourishes skin, softens, rich in Vitamin E
Chemical Constituents: Oleic acid, linoleic acid, Vitamin E

Vitamin E Oil

Figure : 1.4 Vitamine E Oil

Biological Name: Tocopherol
Class: Antioxidant
Family:__
Uses: Prevents oxidative damage, improves skin texture
Chemical Constituents: Tocopherols, tocotrienols

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Rose Water

Figure : 1.5 Rose water

Biological Name: Rosa damascena
Class: Mild astringent/aromatic
Family: Rosaceae
Uses: Soothes skin, provides fragrance, anti-inflammatory
Chemical Constituents: Citronellol, geraniol, flavonoids

Lavender Essential Oil

Figure : 1.6 Levender Oil

Biological Name: Lavandula angustifolia
Class: Essential oil/aromatic
Family: Lamiaceae
Uses: Fragrance, mild antimicrobial, soothing

1.2 Method of Preparation:

The herbal under-eye cream was formulated by the fusion method by using both aqueous and oil phases. Licorice extract was formulated by aqueous extraction, and aloe vera gel was employed as a natural base. The preparation process was done step-wise under hygienic conditions to maintain the safety and stability of the final product.

Step-wise Preparation Method:

Extraction of Licorice:

10 g of powder of dried licorice root was taken and mixed with 100 ml of distilled water.
The mixture was boiled on low flame for 30 minutes to release water-soluble active ingredients.
The mixture was cooled and filtered by using muslin cloth to get clear aqueous extract.

Preparation of Oil Phase:

5 g of beeswax was melted in a water bath.

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10 ml almond oil was added to the molten beeswax and gently stirred to preserve an even mixture.

Preparation of Aqueous Phase:
10 ml aloe vera gel, 5 ml glycerin, and 2 ml rose water were thoroughly mixed to prepare a homogeneous solution in another beaker.

Emulsification:
Slowly, the oil phase was poured into the aqueous phase under continuous stirring.
The mixture was mixed well to create a homogenous cream base with the help of a magnetic stirrer or mechanical stirrer.

Addition of Extract:
Gradually, 10 ml of prepared licorice extract was added to the cream base.
The mixture was mixed until it was evenly distributed.
Addition of Actives and Preservatives:
1 ml of vitamin E oil and 0.5 ml lavender essential oil were added due to their antioxidant and fragrancing properties.
0.5 ml Geogard ECT was also added as a natural preservative to increase the shelf life of the formulation.

Cooling and Packaging:
The cooled-down final cream was transferred into sterile containers and tagged accordingly.

Ingredients Used In Formulation of Herbal Under Eye Cream :

Ingredient	Quantity (for 50 g)	Use/Function
Licorice extract	10 ml	Skin lightening, anti-inflammatory, reduces pigmentation
Aloe vera gel	10 ml	Hydrating, soothing, promotes healing
Almond oil	10 ml	Moisturizing, softens and nourishes delicate under-eye skin
Beeswax	5 g	Emulsifier, thickener, skin protectant
Glycerin	5 ml	Humectant, attracts and retains moisture
Rose water	2 ml	Refreshes and tones the skin, provides mild fragrance
Vitamin E oil	1 ml	Antioxidant, helps improve skin texture and prevents aging
Lavender essential oil	0.5 ml	Natural fragrance, calming, antimicrobial
Distilled water	q.s. to 50 g	Solvent, adjusts consistency

Table I : Ingredients Used In Formulation of Herbal Under Eye Cream

1.3 Evaluation of Herbal Under-Eye Cream :
For confirming the quality, safety, and efficacy of the formulated herbal under-eye cream, several evaluation parameters were evaluated:
1. pH Determination:
The pH of the cream was determined by a digital pH meter. Distilled water was used, and a small amount of the cream was dispersed in it, and this was analyzed. The pH for under-eye usage should range from 4.5 to 6.5 in order to ensure the natural pH of the skin and prevent irritation.
2.Homogeneity and Appearance:
The cream was visually examined for color, texture, and homogeneity. It was smooth and creamy in consistency without phase separation or grittiness, which signifies good formulation stability.

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3. Spreadability:
Spreadability was tested by placing a known amount of cream between two glass slides and applying a known weight. The spread diameter of the cream was measured, indicating its ease of application. The formulation exhibited excellent spreadability appropriate for sensitive under-eye skin.

4. Viscosity:
Viscosity was tested with a Brookfield viscometer. The consistency was moderate, neither too thick nor too thin, to ensure ease of application and absorption.

5. Washability:
The cream was put on the skin and washed away with water. It was washable with ease without any greasy feeling, demonstrating user-friendly washoff properties.

6. Irritation Test:
Few drops of cream were put on the inner forearm and inspected for 24 hours. No irritation, redness, or itching was observed, ascertaining that the formulation is safe for sensitive skin regions.

7. Stability Studies:
The cream was kept at room temperature, refrigeration temperature, and in humidity chambers for 30 days. It was stable with no change in color, odor, or texture, and had no microbial contamination.

1.4 Directions for Use:
Wash face thoroughly and pat dry before using.
Remove a small amount (pea-sized) of the herbal under-eye cream with clean fingertips.
Pat the cream under the eyes with the ring finger to prevent using too much pressure.
Massage the cream into the skin in light, tapping strokes until it is completely absorbed.
Apply twice daily—once in the morning and once before sleep—for optimum results.
Prevent contact with the eyes. If accidental contact occurs, rinse off with water.
Keep the product in a dry, cool location out of direct sunlight.

1.5 Storage Conditions :
The herbal under-eye cream must be stored under the following conditions in order to ensure its stability and effectiveness:
1. Keep in a cool, dry environment, preferably at temperatures ranging from 15°C to 25°C.
2. Do not expose to direct sunlight and heat, as they tend to destabilize the active herbal ingredients and essential oils.
3. Store the container tightly closed after every use to avoid contamination and moisture absorption.
4. Do not refrigerate, as repeated temperature changes may change the texture of the cream.
5. Use within 3 to 6 months of preparation for best results and safety.

Results
The developed herbal under-eye cream was successfully formulated with licorice extract and aloe vera gel, combined with other natural excipients. The results of the evaluation tests were as follows:
pH: Within the range of skin-friendly 5.4–5.8.
Appearance: Homogeneous, creamy, and smooth.
Spreadability: Good; easily spread on the under-eye region without heaviness.
Viscosity: Suitable for cream; semi-solid but not greasy.
Washability: Easy to wash off with plain water.
Irritation Test: No redness, irritation, or allergic reaction found.

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Stability: Cream showed stability for more than 30 days under varying storage conditions with no phase separation or microbial contamination.

1.6 Conclusion :

The current research was able to prepare and test an herbal under-eye cream with licorice extract and aloe vera gel, both of which have skin-soothing, depigmenting, and rejuvenating properties. The cream showed desirable physical properties like suitable pH, smooth texture, and ease of spreadability, thus being appropriate for sensitive under-eye skin.

The findings recommend the application of this herbal drug as a nontoxic, efficient substitute to artificial eye creams. Its properties of moisturizing the skin, preventing pigmentation, and tightening the skin without any irritation provide a rationale for use in day-to-day cosmetic routines. Given more clinical research, this compound could be adapted as a commercially available skincare formulation.

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