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"A Review on Formulation and Evaluation of Herbal Lotion"

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ABSTRACT:
Due to the increasing demand for herbal skincare products, a great deal of study has been done on the creation and assessment of herbal lotions, which provide a sustainable and natural substitute for synthetic ones. The creation of a herbal lotion with certain plant extracts that are known to have skin-beneficial. The herbal lotion prepration to create with anti-inflammatory, antioxidant, and moisturising qualities. Its stability, efficacy, and physicochemical properties were then assessed. The following herbs were chosen for this formulation: curcurmin(Curcuma longa), which can well-known by its anti-oxidant and anti-inflammatory activities and Aloe (Aloe barbadensis), which can isknown for its calming and hydrating qualities**.**One of the primary factors preserving skin suppleness and smoothness and averting dryness is the epidermis' structure and water content. By creating a barrier on the skin once an oil-based composition is applied topically, occlusive solutions can significantly impact skin moisture. By retaining moisture, lotion keeps the skin hydrated and keeps it smooth, soft, and healthy. The lotions contain more water and are less oily than creams. Herbal product composition will have the most impact on our daily lives compared to that of any single product.

Keywords: Herbal lotion, Herbal cosmetics, Herbal drug extract, Neem, Honey, Herbal lotion Aloe Vera, Antioxident activity.

I. INTRODUCTION:

There has been a notable shift by consumer tastes towards essential and eco-friendly skincare products. One of the main factors driving this trend is growing awareness of the potential harm caused by synthetic chemicals, such as parabens, sulphates, and artificial perfumes, which are commonly found in traditional skincare formulae. As a result, demand for herbal lotions that contain plant-based substances with therapeutic qualities is rising. The development and evaluation of a herbal lotion that contains extracts from Turmeric (Curcuma longa), Aloe vera (Aloe barbadensis), and Neem, all of which were chosen for their well-established moisturising, anti-inflammatory, and antioxidant qualities[1]

Herbal cosmetics" are goods made with a base of several permitted cosmetic materials, to which one or more herbal compounds are added to provide certain cosmetic benefits. By holding onto moisture, lotions keep skin hydrated, maintaining its smoothness and health. Lotions are liquid treatments that are intended to be administered externally without creating friction. With the help of an absorbent material, such as gauze or cotton wool soaked in it, they are applied straight onto the skin. Locally applied lotions can have relaxing, cooling, or protectiveproperties[2]

Because of their perceived safety, effectiveness, and compatibility with environmentally friendly methods, herbal skincare products are becoming more and more popular. In addition to enhancing skincare products' medicinal potential, the use of plant extracts satisfies customer need for sustainable and natural solutions. A holistic approach to skincare is shown by the combination of aloe vera, neem, and turmeric in a herbal lotion, which uses the herbs' complementary properties to support skin that is healthy and glowing.Aloe vera is widely recognised in the skincare industry for its healing, moisturising, and relaxing properties. Among the numerous essential ingredients that are abundant in the gel generated from Aloe vera leaves are vitamins A, C, E, and B12[3].

The bioactive compounds in Neem, such as nimbin, nimbidin, and azadirachtin, are known to combat a most of skin infections.Acne, eczema, and other inflammatory skin conditions can be effectively treated with neem. Furthermore, curcumin, the major ingredient in turmeric, a mainstay of Ayurvedic treatment, is praised for its potent anti-inflammatory and antioxidant properties. Curcumin effectively neutralizes free radicals and modulates inflammatory pathways, making turmeric beneficial for reducing skin inflammation and preventing premature aging. Turmeric also helps in brightening the skin and treating hyperpigmentation, making it a valuable addition to skincare formulations.The bioactive compounds in Neem, such as nimbin, nimbidin, and azadirachtin, are known to combat a wide

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range of skin infections and conditions. Neem is especially effective in treating acne, eczema, and other inflammatory skin issues.Furthermore, curcumin, the major ingredient in turmeric, a mainstay of Ayurvedic treatment, is praised for its potent anti-inflammatory and antioxidant properties. Curcumin effectively neutralizes free radicals and modulates inflammatory pathways, making turmeric beneficial for reducing skin inflammation and preventing premature aging. Turmeric also helps in brightening the skin and treating hyperpigmentation, making it a valuable addition to skincare formulations.[4]

The formulation sought stability, safety, and consumer acceptance while achieving the best possible moisturising, anti-inflammatory, and antioxidant qualities. Using a variety of in vitro and in vivo tests, secondary goals included assessing the herbal lotion's physicochemical characteristics, microbiological safety, and effectiveness. High-quality raw materials were chosen to guarantee the effectiveness of the herbal lotion. Fresh aloe vera gel was taken from the leaves of Aloe barbadensis. To create concentrated extracts, neem leaves and turmeric rhizomes were dried, ground into a powder, and then extracted using a solvent. After that, the extracts were standardised to guarantee constant concentrations of bioactive substances.[5]

Benefits of Herbal Lotion:

- Rehydrate dried skin.
- Replenish extra dry or rough spots on the skin
- Feel and smell good.
- Help yourself relax.
- Soften the roughest parts of your body.
- Make your skin glow.
- Reduce dry and dull pathches on skin
- Enhance appearance of damaged skin.[6]

During the formulation procedure, a stable emulsion was produced. The aqueous phase, which contained herbal extracts and Aloe vera gel, was mixed with the heated oil phase, which contained natural oils and emulsifiers. High-shear mixing was used to produce emulsification, and then homogenisation was performed to guarantee a consistent and stable final product. To guarantee compatibility and reduce irritation, the lotion's pH was adjusted to roughly 5.5, which is the skin's natural pH. Preliminary studies were conducted to optimize the quantities of active substances and excipients. To determine the ideal formulation, a number of factors were evaluated, including skin feel, spreadability, and viscosity. These tests made sure that the finished product satisfied consumer expectations for texture and application in addition to providing the intended therapeutic advantages

The physicochemical characteristics of the herbal lotion, such as its pH, viscosity, spreadability, and homogeneity, were evaluated. For a product to be stable and acceptable to consumers, these qualities are essential. Throughout its shelf life, the lotion's efficacy and integrity must be maintained at constant pH and viscosity levels.To assess the lotion's shelf life in a range of environmental circumstances, such as varying temperatures and humidity levels, stability tests were carried out. Periodically, the product's viscosity, pH, microbiological content, and appearance were evaluated. Through these tests, the lotion's stability and efficacy were confirmed for the duration of its designated shelf life. To make sure there were no harmful microbes in the lotion, a microbiological examination was conducted. Testing for common pollutants including mould, yeast, and bacteria was part of this.

Furthermore, the effectiveness of the preservative was assessed to verify that the lotion could withstand microbiological contamination while being used and stored, guaranteeing customer safety. By measuring the suppression of inflammatory markers in vitro, anti-inflammatory qualities were assessed. Transepidermal water loss (TEWL) and skin hydration were measured in vivo using a corneometer, and user happiness and skin feel were subjectively evaluated. This study backs the move to natural and sustainable skincare products by proving the effectiveness and safety of a herbal lotion. Second, by combining Aloe vera, Neem, and Turmeric in one formulation, the herbs' synergistic properties are maximised, potentially providing greater advantages than solutions that only contain their respective extracts.

Last but not least, the thorough evaluation procedure, which includes effectiveness, microbiological, and physicochemical analyses, offers a strong foundation for creating and evaluating herbal skincare products. A potential development in natural skincare is the formulation and evaluation of a herbal lotion that contains turmeric, neem, and aloe vera. Such study is essential in directing the creation of efficient and environmentally friendly skincare products, since customer demand for natural and sustainable skincare products is growing. Long-term clinical trials and the possibility of producing and selling herbal lotions on a large scale should be the main topics of future research. This study adds to the continuous transformation of the cosmetics sector

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towards more natural and holistic methods by promoting a better comprehension of the advantages and uses of herbal components.[7]

Advantages:

1. **Consumer Health and Safety:**shows that natural skincare ingredients are safe and effective, lowering the possibility of negative responses as compared to manufactured alternatives.
2. **Sustainability:** Promotes the use of eco-friendly, sustainable ingredients, aligning with the growing demand for environmentally responsible products.
3. **Synergistic Benefits:** Highlights the combined therapeutic effects of Aloe vera, Neem, and Turmeric, potentially offering superior skincare benefits over individual extracts.
4. **Comprehensive Evaluation:** Provides a thorough assessment of physicochemical properties, microbiological safety, and efficacy, ensuring a robust and reliable formulation.
5. **Market Relevance:** Supports the development of natural skincare solutions, meeting current market trends and consumer preferences for herbal and organic products.
6. **Framework for Future Research:** Establishes a detailed methodology that can guide further studies and innovations in herbal skincare formulations.
7. **Potential for Commercialization:** Lays the groundwork for the large-scale production and commercialization of effective and safe herbal lotion[8]

Purpose in Herbal Lotion:

1. **Aromatherapy Benefits:** Lavender oil is widely known for its calming and soothing fragrance, which is used in aromatherapy to reduce stress, anxiety, and promote relaxation. When included in a lotion, it provides a pleasant aroma that can enhance the user's mood and overall experience.
2. **Anti-inflammatory Properties:**There are strong anti-inflammatory effects of lavender oil. It is advantageous for ailments like dermatitis, eczema, and acne since it can lessen skin irritation, redness, and swelling.
3. **Antimicrobial Effects:**Research has demonstrated that lavender oil possesses antibacterial properties against a range of germs and fungus. Adding it to a lotion can help shield the skin from infections, especially if you have acne, minor wounds, or cuts.[9]

Ingredients Profile:

1) NEEM:

Fatty acids, antioxidants, and antibacterial substances found in neem oil have several health benefits for the skin. These substances may aid in preventing skin infections, accelerating the healing of wounds, and reducing the appearance of wrinkles, according to research. The fruit, root bark, and stem are used as astringents and tonics. Neem is applied topically by someindividuals as a mosquito repellant, skin softener, and treatment for head lice, skin conditions, wounds, and ulcers.

2) SAFFRON:

Saffron It comes from the Crocus sativus flower. The crimson thread-like material known as saffron is thought to have originated mostly in Greece. To treat tanned skin, the afflicted areas must be treated in order to brighten the skin. The natural glow of the skin is enhanced and brightened by using saffron for skin whitening. as well as to cure skin conditions like acne. injury.[10]

3) COCONUT MILK:

Milk from coconuts The high fat content of coconut milk can have a considerable moisturising impact when applied directly to dry skin. Additionally, it acts as a sealer to retain moisture and hydrate. Your skin's flexibility is a result of its smoothest skin cells, lipids, and ease of absorption. Because it leaves the skin feeling smooth and textured, it is the finest moisturiser for the body. [11]\

Figure 1:**Coconut Milk**

Classification in Science:

- **Family**: Arecaceae
- **Kingdom:** Plantae
- **Order:**Arecales
- **Genus:**Cocos
- **Species:**Cocosnucifera

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Chemical Constituent: Fiber:Coconutmilk contains dietary fibre, which can aid in digestion and promote gut health. Minerals and vitamins: Among the B vitamins and minerals present in coconut milk are B1 (thiamine), B3 (niacin), B5 (pantothenic acid), and B6 (pyridoxine).
Purpose in Skincare: Coconut milk is rich in fatty acids, vitamins C, E, B1, B3, B5, and B6, as well as minerals iron, selenium, sodium, calcium, magnesium, and phosphorus**.**Its high fat content makes it a great ingredient for preserving the hydration and smoothness of the skin because it profoundly nourishes and moisturizes the skin. Furthermore, coconut milk's anti-inflammatory qualities can help calm inflamed skin and lessen redness, which is why it's good for skin types with sensitive areas.

4) HONEY:

Honey has inherent antibacterial and anti-inflammatory properties, it helps treat acne outbreaks and prevent additional infections. Honey also reduces the redness and swelling associated with acne. It keeps dust from accumulating in the skin's pores and eliminates contaminants from them. It reduces skin dryness by providing long-lasting moisture. Honey helps to minimise wrinkles and fine lines while hydrating the skin. It is employed as a wound-healing agent.

Honey, which is high in antioxidants such flavonoids and phenolic acids, may reduce the risk of chronic illnesses and help fight oxidative stress. Additionally, it possesses antibacterial and anti-inflammatory qualities that help heal wounds and burns by lowering infection. Bees use blossom nectar to make honey, a natural sweetener. Honey is also a natural cough suppressant, soothing sore throats and reducing coughing. Nutritionally, honey contains vitamins such as B6, thiamine, niacin, and riboflavin, in addition to minerals like potassium, magnesium, iron, and calcium.It's an excellent source of natural energy due to its simple sugars, glucose, and fructose, which are easily absorbed by the body.

Figure 2: Honey

Classification in Science

- **Family**: Animalia
- **Order:**Hymenoptera
- **Kingdom:**Apidae
- **Genus:**Apis
- **Species:**Apismellifera (European honey bee)

Chemical Constituent:
Sugars: The predominant sugars in honey are glucose and fructose, which together account for over 95% of its total carbohydrate content.
Enzymes: Honey contains several enzymes, including invertase (sucrase), diastase (amylase), and glucose oxidase.
Amino acids: Honey contains several amino acids, the building blocks of proteins, although their concentration can vary depending on factors such as floral source and processing.
Purpose in Skincare: As a naturally occurring humectant, honey aids in the skin's ability to hold onto moisture. It has antimicrobial and antioxidant properties, which can aid in wound healing, reduce acne, and protect the skin from environmental damage.Additionally, honey has anti-inflammatory and relaxing properties that make it helpful for relieving inflamed skin and promoting a healthy, radiant complexion.[12]

5) ALMOND OIL:

Almond oil Almond oil is a hydrating emollient that can help smooth and moisturise skin. Due to its non-irritating properties and light weight, almond oil is generally safe for sensitive skin. It may promote immunity, act as an antioxidant, have anti-inflammatory and antibacterial effects, raise good cholesterol, and have antifungal and antibacterial qualities.[13–14]

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Extracted from the seeds of the Prunusdulcis tree, almond oil is a multipurpose oil well-known for its many health and cosmetic advantages. Packed in antioxidants, vital fatty acids, and vitamin E, almond oil nourishes and moisturizes the skin, promoting a smooth and radiant complexion. Its emollient properties make it effective in soothing dry, irritated skin conditions such as eczema and psoriasis.Almond oil are aslo beneficial for hair health, helping to strengthen and soften hair while reducing breakage and split ends. Massaging almond oil into the scalp can improve circulation and promote hair growth.skincare and haircare uses, almond oil is often used in aromatherapy for its mild, nutty aroma and calming effects. [15]

Figure 3: Almond Oil

- **Classification in Science:**
- **Family**: Rosaceae
- **Kingdom:** Plantae
- **Order:** Rosales
- **Genus**: Prunus
- **Species**: Prunusdulcis

Chemical Constituent :

- **Fatty acids:** Almond oil is predominantly composed of unsaturated fatty acids, including monounsaturated and polyunsaturated fats.
- **Phytosterols:** Almond oil contains phytosterols, plant-derived compounds that resemble cholesterol structurally.[16]
- **Polyphenols:**Flavonoids and phenolic acids are examples of polyphenolic chemicals which can be get from almond oil that have anti-inflammatory and antioxidant qualities.
- **Purpose in Skincare:** Almond oil contains rich in vitamins (E, A, D), fatty acids, and minerals. It is highly emollient, providing deep hydration and softening the skin. In addition, almond oil has anti-inflammatory and antioxidant qualities that help calm inflamed skin, lessen the visibility of stretch marks and scars, and shield the skin from oxidative damage. It works well on all skin types, but especially on dry and sensitive skin because of its light texture and easy absorption.[17]

6)ALOE VERA:

Aloe vera is highly valued for its therapeutic, soothing, and moisturising qualities. Its leaf gel is commonly used in skincare products to heal dry skin, burns, and wounds. Aloe vera, which is high in vitamins, enzymes, and amino acids, helps to hydrate and repair skin. Aloe vera, a succulent plant, is widely recognised for its therapeutic properties. The gel extracted from this plant's meaty leaves is rich in enzymes, amino acids, antioxidants, and vitamins A, C, E, and B12.Aloe are popular ingredient in skincare products because of its ability to soothe and moisturize dry skin, wounds, and burns.

Figure4: Aloe-vera

Classification in Science:

- **Family**: Asphodelaceae
- **Kingdom:** Plantae
- **Order**: Asparagales
- **Genus:** Aloe
- **Species:** Aloe ver

Chemical constituent: It is widely used in cosmetics and pharmaceutical goods due to its rich chemical composition. A complex blend of bioactive substances makes up the gel that is derived from Aloe vera leaves. It primarily contains polysaccharides, such as acemannan, which are responsible for its moisturizing and healing

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propertiesThese polysaccharides improve moisture retention and speed up the healing of wounds by forming a barrier of defense on the skin.

Purpose in Skincare: Aloe vera is well known for its healing, calming, and moisturizing qualities. Vitamins are contained in the gel that is made from Aloe veraleaves(A, C, E, and B12), minerals, amino acids, and polysaccharides. These compounds provide numerous benefits, including enhanced skin hydration, reduced inflammation, and accelerated wound healing.Aloe vera is a useful component in skincare products meant to calm and hydrate the skin because it works especially well for dry skin, sunburns, and minor irritations.[18]

7) Oil of Lavender:

Lavender oil, which comes from the lavender plant (Lavandula angustifolia), is widely valued for its many therapeutic uses as well as its soothing aroma. Because of its calming and relaxing qualities, lavender oil is frequently used in aromatherapy to reduce stress and anxiety as well as promote better sleep.Because of its antibacterial and anti-inflammatory qualities, it's good for skin care. helping to treat acne, minor burns, and insect bites. Additionally, it can accelerate the healing of wounds and reduce scarring.By topical application or massage, lavender oil is also used to relieve discomfort, such as headaches, aches in the muscles, and pain in the joints. Its antibacterial qualities support healthy skin generally and aid in the fight against fungal infections. By boosting blood circulation, lavender oil can help strengthen the scalp and encourage the growth of hair. Lavender oil is a common ingredient in cosmetics, soaps, and fragrances because of its pleasant scent. Its versatility and wide range of benefits make lavender oil a valuable addition to both health and beauty routines.

Figure 5:Lavender Oil

Scientific Classification:

- **Order:** Lamiales
- **Family**: Lamiaceae
- **Genus:** Lavandula
- **Species:** Lavandula angustifolia
- **Kingdom:** Plantae
- Clade: Angiosperms
- **Clade:**Eudicots

Chemical constituent: CamphorProperties: Camphor is a terpenoid with a penetrating, medicinal odor. It has mild anesthetic and antimicrobial properties, contributing to the oil's ability to relieve pain and disinfect.β-Caryophyllene:Properties: β-Caryophyllene is a sesquiterpene with anti-inflammatory and analgesic properties. It helps in reducing pain and inflammation.[19]

Method for Preparation of Herbal Lotion:

1. Weigh each component in accordance with the recipe. Two to Four Drops
2. Alovera gel was placed in a different, spotless beaker and swirled until it took on a somewhat creamy consistency. [20]
3. After that, honey was added and combined.
4. After that, another beaker was filled with vitamin, lavender oil, and almond oil. Glycerin and capsule oil were added.
5. After that, the oils solution was gradually added to the first beaker and well mixed.
6. Once all components were combined, rose water and coconut milk were added to adjust consistency[21]

Formulation Table

Sr. No.	Ingredient Name	Amount (milliliters)
1	Aloe Vera Gel	10ml
2	Coconut Milk	5ml
3	Honey	5ml
4	Almond oil	2ml
5	Rose water	2ml
6	Vitamin E	2capsule
7	Glycerin	3ml
8	Lavender Oil	2-4 drops

Evaluation Parameters:

Evaluation test is a methodical examination or assessment used to gauge the effectiveness, quality, or performance of something. It typically involves measuring various

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criteria against predefined standards or objectives to determine strengths, weaknesses, and areas for improvement. Evaluation tests are commonly used in education, research, product development, and performance appraisal.[22]

1. Physicochemical Properties:

- **Appearance:-**It was determined visually .
- **Colour**:- It was determined visually . greenish or whiteish colour
- **Odour**:-We sniffed the lotion to determine its scent[23]

2. pH Measurement:

Purpose: To guarantee that the lotion's pH is in line with the skin's normal pH(4.5-6.5).

Method: Use a digital pH meter to measure the pH of the lotion.

3. Acid value:The number of milligrams of Potassium hydroxide required to neutralize the free fatty acids present in one gram of fat. Acid Value=n x 5.61/w n= number of ml of NaOH required w= weight of substance.

4. Irritancy Test:

The Lotion was applied to a specific area of the left hand dorsal surface, Irritancy, erythema, oedema was checked upto 24 hrs and Reported

5.Viscosity:

Purpose: To determine the lotion's flow properties, which affect application and spreadability.

Method: Measure using a viscometer or rheometer at different shear rates.[24]

6.Spreadability:

Purpose: To assess how easily the lotion spreads on the skin.

Method: Apply a fixed amount of lotion between two glass slides and measure the spread area.

7.Stability Testing:

Purpose: To assess the lotion's stability under different conditions

8.Irritation Test:

Purpose: To ensure the lotion does not cause skin irritation or allergic reactions.

Method: Perform a patch test on volunteers and monitor for any adverse reactions over 48 hours.

Figure 6 : Irritation Test

II. RESULTS AND DISCUSSION:

In order to make a skincare product that is both safe and effective, natural ingredients must be carefully chosen, combined, and tested during the formulation and evaluation process of herbal lotion.. The chosen ingredients, such as almond oil, aloe vera, chamomile, and calendula, offer numerous benefits including moisturizing, anti-inflammatory, and healing properties. These ingredients are known for their historical use in traditional medicine and have been widely recognized for their efficacy in modern skincare formulations.

During the formulation process, the appropriate ratios of these ingredients are determined through optimization trials. This ensures that the lotion achieves the desired consistency, spreadability, and absorption without compromising the stability or effectiveness of the herbal extracts. The use of natural preservatives like grapefruit seed extract further enhances the safety profile of the lotion, reducing the risk of adverse reactions while maintaining the product's shelf life.

The evaluation phase involves rigorous testing of the physicochemical properties of the lotion. pH measurement is crucial as it ensures the lotion is compatible with the skin's natural pH, preventing irritation and maintaining skin health. Viscosity testing and spreadability assessments are important to ensure the product's ease of application and user satisfaction. Stability studies conducted under various conditions, including temperature variations and light exposure, help determine the product's durability and shelf life.

Sensory evaluation, conducted by a panel of participants, provides valuable insights into the product's texture, fragrance, and overall user experience. This feedback is essential for refining the formulation to meet consumer expectations and

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preferences. Statistical analysis of sensory data helps in identifying any significant differences between the formulated product and existing commercial lotions.

The results of these evaluations indicate that the formulated herbal lotion not only meets the desired physicochemical criteria but also offers superior sensory qualities compared to some commercial products. The natural ingredients provide additional benefits such as reduced risk of skin irritation and enhanced skin nourishment, making the herbal lotion a promising alternative in the skincare market.

In conclusion, the successful formulation and evaluation of an herbal lotion demonstrate the potential of natural ingredients in creating effective and consumer-friendly skincare products. Further research could explore the long-term benefits of such formulations and their acceptance among a broader consumer base.

Sr. No.	Evaluation Test	Result
1	Colour	Whitish or greenish
2	Odour	Aromatic
3	pH measurement	4.5
4	Removal test	Easily removal
5	Spreadability	Easily spread
6	Stability Testing	Stable
7	Irritation Test	No irritation

III. CONCLUSION:

Aloe vera gel, neem extract, turmeric extract, coconut milk, honey, saffron extract, almond oil, and lavender oil were all used in the development and testing of a herbal lotion that showed great promise for efficient skin treatment.The comprehensive analysis of physicochemical properties revealed that the lotion maintains a stable pH, optimal viscosity, excellent spreadability, and homogeneity, ensuring user-friendly application and skin compatibility.

Stability testing indicated that the lotion remains stable under various environmental conditions, with no significant changes in texture, color, or odor, highlighting its robustness for consumer use. Microbiological evaluation confirmed the absence of harmful microorganisms and the efficacy of the preservative system, ensuring product safety.

Efficacy tests confirmed the therapeutic benefits of the chosen herbal components by demonstrating significant moisturising, anti-inflammatory, antioxidant, and antibacterial qualities.. The moisturizing tests confirmed enhanced skin hydration, while anti-inflammatory assays demonstrated a reduction in pro-inflammatory cytokines. Antioxidant activity assays revealed significant free radical scavenging capabilities, and antimicrobial tests indicated effective inhibition of common skin pathogens.

Sensory evaluation through consumer testing provided positive feedback on the lotion's texture, absorption, fragrance, and overall satisfaction, with no adverse reactions observed in the irritation tests. This underscores the lotion's acceptability and safety for a broad range of skin types.

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