

NOVEL APPROACH TO FORMULATION AND EVALUATION OF STABLE AND EFFECTIVE HERBAL ANTI-AGING CREAM

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1. ABSTRACT

The increasing demand for safe and effective skincare products has led to the development of herbal-based formulations with minimal side effects. The present study focuses on the formulation and evaluation of a stable herbal anti-aging cream using natural ingredients such as green tea extract, aloe vera gel, vitamin E, beeswax, coconut oil, rose water, and lavender oil. These ingredients were selected based on their antioxidant, moisturizing, anti-inflammatory, and skin-rejuvenating properties.

The cream was formulated using an oil-in-water (O/W) emulsion technique to achieve a stable and uniform consistency. The prepared formulation was evaluated for physicochemical parameters including pH, viscosity, homogeneity, spreadability, and stability. A skin irritation test was also conducted to ensure safety.

The results indicated that the formulation possessed suitable pH (5), good viscosity, excellent spreadability, and no signs of irritation. Stability studies confirmed that the cream remained stable under accelerated conditions. The study concludes that the developed herbal anti-aging cream is safe, effective, and can serve as a natural alternative to synthetic skincare products.

Keywords: Herbal cream, Anti-aging, Green tea extract, Antioxidants, Emulsion, Skin care

2. INTRODUCTION

Skin aging is a natural biological process characterized by visible changes such as wrinkles, fine lines, dryness, and loss of elasticity [1]. These changes occur due to intrinsic factors like genetics and physiological aging, as well as extrinsic factors such as ultraviolet (UV) radiation, pollution, and lifestyle habits [5]. Intrinsic aging is a gradual and unavoidable process, whereas extrinsic aging, also known as photoaging, results from environmental exposure, particularly UV radiation [6]. Photoaging leads to deep wrinkles, pigmentation, and rough skin texture, whereas intrinsic aging results in fine wrinkles and dryness. At the molecular level, aging is associated with oxidative stress, which leads to the generation of reactive oxygen species (ROS). These ROS damage cellular components such as lipids, proteins, and DNA, resulting in degradation of collagen and elastin fibers [8].

To counteract these effects, antioxidants play a crucial role in neutralizing free radicals and protecting the skin. Herbal ingredients such as green tea, aloe vera, and vitamin E have gained popularity due to their strong

antioxidant and anti-inflammatory properties [23]. Green tea contains polyphenols like epigallocatechin gallate (EGCG), which inhibit collagen degradation and protect against UV damage [17]. Aloe vera enhances collagen synthesis and improves skin hydration [25], while vitamin E protects against lipid peroxidation [27]. Due to increasing awareness of the harmful effects of synthetic cosmetics, herbal formulations are becoming more popular. These products offer safety, efficacy, and long-term benefits without adverse effects [24].

Thus, the present study aims to formulate and evaluate a herbal anti-aging cream using natural ingredients to provide a safe and effective skincare solution.

3. MATERIALS AND METHODS

3.1 Materials

- Green tea extract



Fig. No. 1: Green Tea

- Aloe vera gel



Fig. No. 2: Aloe Vera

- Vitamin E capsules

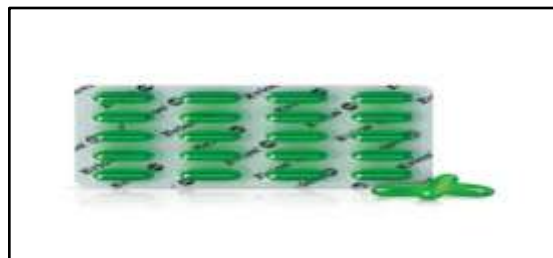


Fig. No. 3: Vitamin E Capsule

- Almond oil



Fig. No. 4: Almond Oil

- Beeswax



Fig. No. 5: Beeswax

- Rose water



Fig. No. 6: Rose Water

- Lavender oil



Fig. No. 7: Lavender Oil

All materials were of suitable cosmetic grade and used without further purification.

3.2 Method of Preparation

Step 1: Preparation of Oil Phase:

The oil phase was prepared by taking beeswax and coconut oil in a clean beaker. These ingredients were heated together at a temperature of about 70–75°C with continuous stirring until the beeswax was completely melted and a clear liquid mixture was obtained. The oil phase was maintained at the same temperature to prevent solidification.

Step 2: Preparation of Aqueous Phase:

In a separate container, the aqueous phase was prepared by mixing rose water and aloe vera gel. This mixture was also heated to 70–75°C to match the temperature of the oil phase. Maintaining equal temperature of both phases is essential for proper emulsification.

Step 3: Emulsification Process:

The heated aqueous phase was slowly added to the oil phase with continuous stirring. The mixture was stirred continuously for about 3–5 minutes to ensure proper mixing and formation of a uniform emulsion. Continuous stirring helps in achieving desired thickness and prevents phase separation.

Step 4: Cooling and Addition of Active Ingredients:

After emulsification, the mixture was allowed to cool gradually to around 40°C. At this stage, heat-sensitive ingredients such as green tea extract, vitamin E, and lavender oil were added. These ingredients were mixed thoroughly to ensure uniform distribution throughout the formulation.

Step 5: Final Mixing and Packaging:

The final cream was stirred continuously until it reached room temperature and achieved a smooth and uniform consistency. The prepared formulation was then transferred into a clean, dry, and airtight container. The container was properly closed and stored in a cool and dry place, away from direct sunlight to maintain its stability and effectiveness.



Fig. No. 8: Method of Preparation

4. FORMULATION TABLE

Ingredient	Quantity
Green Tea Extract	5%
Beeswax	6%
Coconut Oil	10%
Vitamin E	2 capsules
Rose Water	40%
Aloe Vera Gel	20%

5. EVALUATION PARAMETERS

5.1 Appearance

The cream showed uniform color, smooth texture, and pleasant odor.

5.2 pH Determination

The pH was found to be 5, suitable for skin application.

5.3 Viscosity

Measured using Brookfield viscometer: **6093.8 cps**

5.4 Spreadability

Formula used:

$$S = \frac{M \times L}{T} \quad S = TM \times L$$

Observed value: **5.48 g·cm/sec**

5.5 Irritation Test

No irritation observed in volunteers.

5.6 Stability Studies

No significant changes observed at 40°C over one month.

6. RESULTS AND DISCUSSION

The formulated cream exhibited desirable physicochemical properties. The pH close to skin ensured compatibility and safety. Viscosity indicated appropriate consistency, while spreadability confirmed ease of application.

The absence of irritation demonstrated its safety for topical use. Antimicrobial activity suggested protective effects against pathogens. Stability studies confirmed that the formulation remained stable under accelerated conditions. The presence of herbal ingredients contributed to antioxidant, moisturizing, and anti-inflammatory effects, helping to reduce wrinkles and improve skin elasticity.

7. SUMMARY & CONCLUSION

Aging is a natural process that causes changes in the skin like wrinkles, dryness, and loss of elasticity. These changes happen due to internal factors (age, genetics) and external factors (sunlight, pollution, lifestyle). With increasing age, skin loses moisture and collagen, making it look dull and aged.

There are two types of skin aging: intrinsic (natural) and extrinsic (caused by environment). To reduce these effects, herbal anti-aging creams are being developed. Natural ingredients like green tea, aloe vera, vitamin E, and coconut oil help protect the skin, improve hydration, and reduce wrinkles due to their antioxidant and nourishing properties.

Herbal anti-aging creams are safe and effective for maintaining healthy skin. They help reduce signs of aging, improve hydration, and protect the skin from damage. With increasing demand and fewer side effects, herbal formulations have a promising future in skincare.

8. FUTURE PROSPECTS

Herbal cosmetics have a strong future due to increasing consumer awareness. The demand for natural products is rising due to concerns about chemical-based cosmetics. Advancements in formulation technology will further improve the effectiveness of herbal products. The inclusion of novel plant extracts and nanotechnology-based delivery systems may enhance product performance. The market for anti-aging creams is expected to grow significantly, with increasing usage among both men and women.

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