

Formulation And Evaluation of Herbal Anti-Aging Cream

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ABSTRACT:

The present study focuses on the formulation and evaluation of a polyherbal anti-aging cream using natural ingredients known for their therapeutic and cosmetic benefits. Aging is an inevitable biological process influenced by both intrinsic factors, such as genetic predisposition and metabolic changes, and extrinsic factors, including environmental exposure, ultraviolet radiation, pollution, and lifestyle habits. These factors lead to visible skin changes such as wrinkles, fine lines, dryness, pigmentation, and reduced elasticity. The growing demand for safer and more effective skincare products has shifted attention toward herbal formulations due to their minimal side effects and better compatibility with the skin.

This study developed a herbal anti-aging cream using natural ingredients like rice extract, rose water, Aloe vera gel, coconut oil, beeswax, glycerin, liquid paraffin, ashwagandha, turmeric, and methyl paraben as a preservative. Each ingredient was chosen for its skin benefits. Rice extract works as an antioxidant and brightens the skin, while rose water soothes and tones it. Aloe vera provides moisturizing and anti-inflammatory effects.

Ashwagandha and turmeric are key herbal components incorporated for their anti-aging and antioxidant properties. Ashwagandha helps in reducing oxidative stress and improving skin elasticity, while turmeric exhibits anti-inflammatory, antimicrobial, and skin-brightening effects. The formulation process involved the preparation of herbal extracts, followed by incorporation into an oil-in-water (O/W) cream base.

The formulated cream was evaluated for various physicochemical parameters such as pH, viscosity, spreadability, homogeneity, appearance, and stability. The pH of the cream was found to be within the acceptable range for skin application, indicating its compatibility with the skin. The cream exhibited good spreadability and consistency, ensuring easy application. Stability studies were

conducted under different temperature conditions, and the formulation remained stable without any phase separation, color change, or degradation. Furthermore, the formulation demonstrated good moisturizing and skin-softening properties, making it suitable for regular use.

KEYWORDS: Herbal cream, Anti-aging. Herbal formulation, Aloe vera, Ashwagandha, Turmeric, Antioxidant, Skin care, Natural cosmetics, Moisturizing cream.

I. INTRODUCTION:-

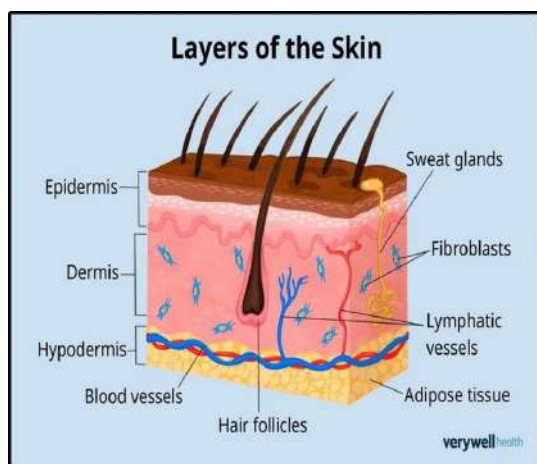
1.1 Skin:

Aging is a natural biological process that causes gradual changes in the skin, such as wrinkles, dryness, fine lines, and loss of elasticity. These changes occur due to both intrinsic factors (like genetics and age) and extrinsic factors (such as sunlight exposure, pollution, and lifestyle habits). One of the main reasons for skin aging is the reduction in collagen production and increased oxidative stress caused by free radicals, which damage skin cells.[1] Anti-aging creams are topical formulations designed to reduce the visible signs of aging and improve overall skin health. These creams work by moisturizing the skin, enhancing collagen synthesis, and protecting against environmental damage. Herbal or polyherbal anti-aging creams are gaining popularity because they contain natural ingredients like Aloe vera, turmeric, coconut oil, and rose water, which have antioxidant, anti-inflammatory, and skin-soothing properties. These ingredients help improve skin hydration, elasticity, and texture without causing major side effects. The formulation of an effective anti-aging cream requires careful selection of ingredients and proper evaluation for quality, safety, and stability. Therefore, herbal anti-aging creams are considered a safe and effective alternative to synthetic products for maintaining youthful and healthy skin.[2]

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The Skin Is Composed of Three Main Layers:

Figure No.1:-Layers Of Skin



1.1.1. Epidermis(Outermost Layer):

The epidermis is the thin, outermost layer of the skin. It is made up of stratified squamous epithelium and does not contain blood vessels (avascular). It receives nutrients from the dermis by diffusion. Its main function is to act as a barrier against environmental damage such as microbes, chemicals, and ultraviolet (UV) radiation.

Structure of Epidermis:

The epidermis consists of five distinct sub-layers (from deep to superficial):

i. Stratum Basale (Germinativum):

○

Deepest layer where continuous cell division (mitosis) occurs.

- Contains melanocytes (produce melanin pigment for skin color and UV protection) and Merkel cells (sensory receptors).

ii. Stratum Spinosum:

○

Made of polygonal cells connected by desmosomes, giving a spiny appearance.

- Provides mechanical strength and flexibility.
-

Contains Langerhans cells for immune defense.

iii. Stratum Granulosum:

- Cells contain keratin, hyaluronic granules, and lipids.
-

Plays an important role in waterproofing the skin and preventing dehydration.

iv.

Stratum Lucidum (present only in thick skin like palms and soles):

- Thin, clear layer of dead cells.
- Provides additional protection.

v. Stratum Corneum:

- Outermost layer made of dead, flattened keratinized cells.
-

Acts as the primary protective barrier and prevents water loss.

Functions of Epidermis:

- Protection against pathogens and chemicals.
- Prevention of water loss.
- UV protection through melanin.
- Continuous renewal of skin cells. [3]

1.1.2. Dermis (Middle Layer):

The dermis lies beneath the epidermis and is much thicker. It is composed of connective tissue rich in collagen and elastin fibers, which provide strength, elasticity, and flexibility to the skin. Unlike the epidermis, it contains blood vessels and nerves.

Layers of Dermis:

i. Papillary Layer:

○

Upper thin layer made of loose connective tissue

○

Contains capillaries, nerve endings, and dermal papillae

○

Responsible for supplying nutrients to the epidermis

ii. Reticular Layer:

○

Deeper, thicker layer composed of dense connective tissue

- Rich in collagen and elastin fibers
- Provides tensile strength and elasticity

Components of Dermis:

○

Blood vessels: Supply nutrients and regulate temperature.

-

Nerves: Provide sensation. (touch, pain, pressure, temperature)

- **Hair follicles:** Produce hair.
-

Sebaceous glands: Secrete sebum to lubricate skin.

-

Sweat glands: Help in excretion and temperature control.

Functions of Dermis:

- Provides mechanical strength and elasticity
- Supports and nourishes the epidermis
-

Plays a role in thermoregulation (via blood vessels and sweat glands)

- Responsible for sensation.

1.1.3. Hypodermis (Subcutaneous Layer):

The hypodermis is the deepest layer of the skin, located below the dermis. It is made up of fat and loose connective tissue. Though not always considered part of the skin, it plays a crucial supportive role.

- **Structure of Hypodermis:**
 - Contains fat cells (adipocytes) that store energy.
 - Includes larger blood vessels and nerves.
 -

Connects skin to underlying muscles and bones.

- **Functions of Hypodermis:**
 - Energy storage in the form of fat.
 - Insulation to maintain body temperature.
 - Shock absorption to protect internal organs.
 - Provides structural support and anchorage. [4]

Functions of Human Skin:

i. Protection:

The skin acts as a protective barrier against harmful agents such as bacteria, viruses, chemicals, and physical injuries (cuts, abrasions).

ii. Regulation of Body Temperature:

The skin helps maintain normal body temperature through sweating and by controlling blood flow (vasodilation and vasoconstriction).

iii. Sensory Reception:

It contains nerve endings that detect sensations like touch, pressure, pain, temperature, and vibration.

iv. Excretion:

Sweat glands remove waste substances such as salts, urea, and water from the body. [5]

v. Vitamin D Synthesis:

The skin produces Vitamin D when exposed to sunlight, which is important for bone health.

vi. Immunity:

The skin acts as the first line of defense and contains immune cells (like Langerhans cells) that help fight infections.

vii. Absorption:

Certain substances (like topical medicines and creams) can be absorbed through the skin into the bloodstream.

viii. Storage:

The skin stores lipids (fat), water, and some nutrients, serving as an energy reserve.

ix. Aesthetic and Social Function:

Skin contributes to appearance and plays a role in communication (facial expressions), affecting confidence, and social interaction.

x. Water Resistance:

The outer layer (stratum corneum) prevents excessive water loss and keeps the body hydrated. [6]

1.2 Aging:

Anti-aging cream is a cosmetic product designed to reduce the visible signs of skin aging and improve overall skin health. As people age, the skin undergoes natural changes such as loss of collagen and elastin, leading to wrinkles, fine lines, dryness, and reduced elasticity. Anti-aging creams help to slow down these effects and maintain a youthful appearance. [7]

These creams usually contain a combination of natural and synthetic ingredients. Common ingredients include antioxidants like vitamin C and vitamin E, which protect the skin from damage caused by free radicals. Moisturizers such as glycerin and hyaluronic acid help to keep the skin hydrated and soft. Herbal ingredients like Aloe vera, turmeric, and Ashwagandha are also widely used for their soothing, anti-inflammatory, and rejuvenating properties. Anti-aging creams work by hydrating the skin, promoting collagen production, and protecting against environmental factors such as sunlight and pollution. Regular use can improve skin texture, reduce wrinkles, and enhance skin tone.

Overall, anti-aging creams are an important part of skincare routines, especially for individuals above

the age of 25. They provide nourishment, protection, and help in maintaining healthy, glowing, and youthful-looking skin. [8,9]



Figure No.2: Skin aging

- **Types Of Anti-Aging Cream:**

- i. **Moisturizing Anti-Aging Creams:**

- Provide deep hydration and prevent dryness.
- Improve skin softness and elasticity.

Examples

(herbal ingredients): Aloe vera, glycerin, coconut oil.

- ii. **Antioxidant-Rich Creams:**

-

Protects skin from free radicals and oxidative stress.

- Help delay wrinkles and skin damage.

Examples:

Green tea, vitamin E, turmeric, grape seed [10]

- iii. **Collagen-Boosting Creams:**

- Increase collagen production.
- Reduce wrinkles and improve skin firmness.

Examples: Ashwagandha, vitamin C, plant peptides.

- iv. **Exfoliating (Rejuvenating) Creams:**

- Remove dead skin cells.
- Promote new cell growth and brighten skin.

Examples: Papaya extract, fruit enzymes, lactic acid [11]

- v. **UV-Protective Creams:**

- Protects skin from harmful UV rays (photo-aging).
- Prevent pigmentation and premature aging.

Examples: Carrot seed oil, zinc oxide, herbal sun filters. [12]

- vi. **Nourishing/Repair Creams:**

- Repair damaged skin and improve texture.
- Provide essential nutrients and hydration.

Examples: Almond oil, jojoba oil, shea butter.

- vii. **Skin Tightening Creams:**

- Improves skin tone and reduce sagging.
- Give a firmer and youthful appearance.

Examples: Aloe vera.

- **Types Of Anti-**

Aging Cream On The Basis Of Use:

- i. Day Anti-Aging Cream.
- ii. Night Anti-Aging Cream.
- iii. Targeted Anti-Aging Cream. [13]

- **Properties Of Anti-Aging Cream:**

- i. Moisturizing.
- ii. Anti-Wrinkle.
- iii. Firming.
- iv. Antioxidant Protection.
- v. Brightening.
- vi. Sun Protection.
- vii. Exfoliating.
- viii. Hydration.
- x. Nourishing.
- xi. Soothing.

- **Ingredient In Herbal Anti-Aging Cream:**

- i. **Rice:**

- Rich in antioxidants.
- Helps brighten skin and reduce wrinkles.

- ii. **Rose Water (Gulab Jal):**

- Soothes and hydrates skin.
- Maintains pH and improves skin texture.

- ii. **Aloe Vera Gel:**

- Provides moisturizing and healing effects.
- Has anti-inflammatory properties.

- iii. **Coconut Oil:**

- Gives deep hydration.
-

Improves skin elasticity and antioxidant properties.

- iv. **Beeswax:**

- Acts as an emulsifier and thickening agent.
-

Helps in forming a protective barrier on skin. [14]

- iv. **Ashwagandha:**

- Reduces signs of aging.
- Possesses antioxidant and anti-inflammatory properties.

- v. **Turmeric:**

- Known for anti-inflammatory and antioxidant effects.
- Helps in skin healing and rejuvenation.

- vii. **Methyl Paraben:**

- Used as a preservative.
- Prevents microbial growth in cream.

- viii. **Vitamin E Capsule:**

- Skinglow.
- Hairgrowth.
- ix. Glycerine:**
- Worksasahumectant.
-

Retainsmoistureandprovidessmoothnesstoskin.

KeyIngredientsforTexture

Thickeners:

- Rice.
- Coconutoil.
- Aloeveragel.
- Turmeric.

Binders:

- AloeVeraGel.
- Turmeric.

LiquidBase:

- RoseWater.

This combination ensures your cream is smooth,easily spreadable, and stable.If youfeelthe texture is too thin or thick during formulation , you can adjust the quantities of rice (thickens)or rose water. [15]

• SideEffectOfHerbalAntu-Aging Cream:

Although herbal anti-aging creams are considered saferthan synthetic creams, some side effects may still occur depending on the ingredients, skin type, and frequency of use.

i. SkinIrritation:

-

Someherbalextractsoressentialoilsmaycause irritation, especiallyinpeople with sensitive skin.

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Symptoms:Redness,itching,burningsensation,ormildinflammationontheskin.

ii. AllergicReactions:

- Naturalplantingredientssuchas essentialoils, fragrances, orpreservativescantrigger allergic reactions in certain individuals.
-

Symptoms:Rashes,swelling,itching,orskinredness.

iii. Photosensitivity(SunSensitivity):

-

Certainherbalcompoundscanincreasetheskin'ssensiti vity tosunlight.This maylead to sunburn or pigmentation if sunscreen is not used.

iv. SkinDrynessorPeeling:

- Someherbal extractsthat promoteskinrenewal may cause mild drynessor peeling when used frequently.

v. Acne or Pore Blockage:

- Heavyoils orherbalcomponents increamformulations may clogpores and causeacneor blackheads, particularlyin oily skin.

vi. ContaminationorAdulterationRisk:

Some herbal cosmetic products may contain hidden chemicals or steroids if not properly regulated, which can lead to serious skin problems.[16]

• Mechanism Of ActionOf HerbalAnti-AgingCream:

Herbal anti-aging creams contain natural plant extracts rich in antioxidants, vitamins, and bioactive compounds that help delay the signs of skin aging. Their mechanisms of action are as follows:

i. AntioxidantActivity:

Herbal ingredients such as rice bran, green tea, and aloe vera contain antioxidants like flavonoids, polyphenols, tocopherols, and γ -oryzanol. These compounds neutralize free radicalsand reduceoxidativestress,whichisoneof themaincausesof skinaging. Thishelps protect skin cells from damage and slows the formation of wrinkles and fine lines.

ii. StimulationofCollagenProduction:

Certain herbal extracts and bioactive peptides stimulate fibroblast activity and enhance collagen synthesis in the skin. Increased collagen improves skin elasticity and firmness, thereby reducing wrinkles and sagging.

iii. Anti-inflammatoryEffect:

Many herbal ingredients possess anti-inflammatory properties that reduce skin irritation, redness, and inflammation. This helps maintain healthy skin and preventspremature aging.

iv. MoisturizingandHydration:

Natural oils and plant extracts help retain moisture in the skin by strengthening the skin barrier. Proper hydration makes the skin smooth, soft, and reduces the appearance of fine lines.

v. SkinRegenerationandRepair:

Herbal components promote cell regeneration and repair damaged skin cells. This improves skin texture, tone, and overall appearance.[17]

• BenefitsOfHerbalAnti-AgingCream:

i. ReducesWrinklesandFineLines:

- Helpsinminimizingvisiblesignsofaging.
- Improvesskinsmoothness.
- Duetocollagen-supportingandantioxidantproperties.

ii. Provides Deep Hydration:

- Prevents dryness and keeps skin moisturized.
- Maintains skin softness and elasticity.
-

Herbal oils and humectants improve moisture retention.

iii. Improves Skin Elasticity:

- Enhances firmness and reduces sagging.
- Promotes collagen and elastin production.

iv. Antioxidant Protection:

-

Protects skin from free radicals and oxidative stress.

-

Delays premature aging caused by environmental factors.

v. Enhances Skin Glow and Texture:

-

Makes skin smoother, brighter, and more even-toned.

- Removes dullness and improves complexion.

vi. Reduces Pigmentation:

-

Helps in reducing dark spots and uneven skin tone.

-

Natural ingredients regulate melanin production.

vii. Protects Against UV Damage:

-

Some herbal ingredients provide mild sun protection.

- Prevents photo-aging caused by UV rays.

viii. Anti-inflammatory Action:

- Reduces redness, irritation, and inflammation.
- Suitable for sensitive skin.

ix. Promotes Skin Repair and Regeneration:

- Helps in healing damaged skin cells.
- Encourages new cell growth.

x. Safe and Fewer Side Effects:

- Made from natural ingredients.

Suitable for long-term use products. [18]

II. REVIEW OF LITERATURE:

i. Sharma, P.P. et al (2020): Skin aging is a natural and complex biological process influenced by intrinsic factors such as genetics and hormonal changes, and extrinsic factors like ultraviolet (UV) radiation, pollution, and lifestyle. These factors lead to visible signs such as wrinkles, dryness, loss of

elasticity, and pigmentation. One of the major mechanisms responsible for skin aging is oxidative stress caused by reactive oxygen species (ROS), which damage cellular components including DNA, proteins, and lipids.

Herbal anti-aging creams have gained considerable attention in recent years due to their safety, effectiveness, and minimal side effects compared to synthetic products. According to Sharma, P.P. (2020), herbal cosmetics are widely used in modern skincare because they contain natural ingredients that provide moisturizing, antioxidant, and protective effects. These formulations are prepared using plant-based materials that improve skin health and delay aging signs.

ii. Patil, M.A. et al. (2020): Skin aging is a natural biological process influenced by both intrinsic and extrinsic factors. Intrinsic aging is related to genetic and physiological processes, whereas extrinsic aging is mainly caused by environmental factors such as ultraviolet (UV) radiation, pollution, and lifestyle. These factors lead to the formation of wrinkles, fine lines, dryness, and loss of skin elasticity. One of the major causes of skin aging is oxidative stress due to the generation of reactive oxygen species (ROS), which damage cellular structures including proteins, lipids, and DNA (Patil et al., 2020).

According to Patil, M.A. et al. (2020), there has been a growing interest in herbal anti-aging creams due to their natural origin and fewer side effects compared to synthetic products. Herbal creams are formulated using plant-based ingredients that contain bioactive compounds such as flavonoids, tannins, polyphenols, and vitamins. These compounds possess strong antioxidant properties, which help in neutralizing free radicals and protecting the skin from oxidative damage.

iii. Chaiyana, W. et al. (2021): Skin aging is a multifactorial biological process caused by intrinsic factors such as genetics and metabolism, as well as extrinsic factors like ultraviolet (UV) radiation, pollution, and lifestyle. These factors lead to oxidative stress due to the formation of reactive oxygen species (ROS), which damage skin components such as collagen, elastin, and cellular proteins, resulting in wrinkles, fine lines, and loss of elasticity.

According to Chaiyana, W. et al. (2021), herbal extracts play a significant role in anti-aging skincare due to their multiple biological activities. The study investigated various plant

extracts for their antioxidant, anti-aging, anti-inflammatory, and skin-whitening properties. It was reported that herbal extracts are rich in phenolic compounds and flavonoids, which are responsible for strong antioxidant activity and protection against oxidative stress.

iv. Yadav, A. et al. (2021): Skin aging is a gradual biological process caused by intrinsic factors such as genetics and metabolic changes, as well as extrinsic factors like ultraviolet (UV) radiation and environmental pollution. These factors lead to structural damage in the skin, including degradation of collagen and elastin, resulting in wrinkles, dryness, and reduced elasticity. According to Yadav et al. (2021), oxidative stress caused by reactive oxygen species (ROS) plays a key role in accelerating the aging process. The study focused on the formulation and evaluation of a herbal anti-aging cream using plant extracts such as *Moringa oleifera* and *Ocimum sanctum* (Tulsi). These herbal ingredients are known for their antioxidant, antimicrobial, antibacterial, inflammatory, and antifungal properties, making them highly suitable for skin care applications.

v. Costa, E.F. et al. (2022): Skin aging is a complex biological process influenced by intrinsic factors such as genetics and physiological changes, and extrinsic factors including ultraviolet (UV) radiation, pollution, diet, and lifestyle. These factors lead to structural and functional changes in the skin such as wrinkles, pigmentation, dryness, and loss of elasticity. One of the major mechanisms involved in skin aging is oxidative stress caused by reactive oxygen species (ROS), which damage cellular components including lipids, proteins, and DNA. According to Costa, E.F. et al. (2022), there has been a rapid increase in the development of herbal-based

dermocosmetic products due to consumer demand for safe, non-invasive, and effective anti-aging treatments. Herbal-derived products are rich in bioactive compounds and act through multiple biological pathways involved in skin aging, making them highly effective alternatives to synthetic formulations.

vi. Gokhale, S. et al. (2022): Skin aging is a continuous biological process characterized by structural and functional changes in the skin such as wrinkles, fine lines, dryness, and loss of elasticity. These changes occur due to intrinsic factors like genetics and aging, as well as extrinsic factors such as ultraviolet (UV) radiation, pollution, and lifestyle. One of the major causes of skin aging is

oxidative stress caused by reactive oxygen species (ROS), which damage proteins and DNA, leading to premature aging.

According to Gokhale, S. et al. (2022), herbal cosmetics have gained significant importance due to their safety, effectiveness, and minimal side effects compared to synthetic products. The study focused on the formulation, development, and evaluation of a herbal anti-aging cream using natural ingredients such as Aloe vera and beetroot extract. These ingredients are known for their antioxidant, moisturizing, and skin-rejuvenating properties.

vii. Sriram, R., & Gopal, V. et al. (2023): Skin aging is a complex biological process caused by a combination of intrinsic factors such as genetics and metabolism, and extrinsic factors like ultraviolet (UV) radiation, pollution, and lifestyle habits. These factors result in visible changes including wrinkles, fine lines, dryness, pigmentation, and loss of elasticity. One of the major mechanisms involved in skin aging is oxidative stress due to reactive oxygen species (ROS), which damage cellular components such as collagen, elastin, proteins, and DNA.

According to Sriram and Gopal (2023), natural bioactive compounds derived from plants play a crucial role in preventing and managing skin aging. The study emphasizes that herbal bioactives act as antioxidants, moisturizers, cell-repairing agents, and UV protectants, making them highly effective in anti-aging skin care formulations.

viii. Khanpara, P., & Sojitra, N. et al. (2023): Skin aging is a natural biological process influenced by intrinsic factors such as genetics and metabolism, and extrinsic factors including ultraviolet (UV) radiation, pollution, and environmental stress. These factors lead to visible changes such as wrinkles, fine lines, dryness, and loss of elasticity. A major cause of skin aging is oxidative stress due to reactive oxygen species (ROS), which damage skin cells, proteins, and collagen. According to Khanpara, P., & Sojitra, N. (2023), herbal formulations have gained significant importance in anti-aging skin care due to their natural origin, safety, and effectiveness.

ix. Kapadnis, V., & Mhaske, A. et al. (2024): Skin aging is a complex and progressive biological process influenced by intrinsic factors such as genetics and hormonal changes, as well as extrinsic factors including ultraviolet (UV) radiation, pollution, and environmental stress. These factors lead to visible signs of aging such as wrinkles, fine lines, dryness, and loss of skin elasticity. A key

mechanism involved in skin aging is oxidative stress caused by reactive oxygen species (ROS), which damage cellular components like collagen, elastin, proteins, and DNA.

According to Kapadnis, V., & Mhaske, A. (2024), herbal anti-aging creams have gained increasing attention due to their natural composition, safety, and effectiveness. The study focused on the formulation and evaluation of a herbal anti-aging night cream using plant-based ingredients such as butterfly pea flower extract, Aloe vera gel, corn flour, and vitamin

E. These ingredients are rich in antioxidants and provide multiple benefits for skin health.

X. Sharma, R. et al. (2025): Skin aging is a complex biological process influenced by intrinsic factors such as genetics and metabolic changes, as well as extrinsic factors including ultraviolet (UV) radiation, pollution, and lifestyle. These factors lead to visible signs such as wrinkles, fine lines, dryness, and loss of skin elasticity. A key mechanism involved in skin aging is oxidative stress caused by reactive oxygen species (ROS), which damage cellular components like collagen, elastin, proteins, and DNA.

According to Sharma, R. et al. (2025), there has been significant advancement in the development of herbal anti-aging creams through the integration of modern technologies such as nanotechnology. Herbal formulations contain bioactive compounds like flavonoids, polyphenols, vitamins, and essential oils, which provide antioxidant, anti-inflammatory, and skin-protective effects.

III. NEED OF STUDY:

The study of anti-aging herbal cream has gained significant importance in recent years due to the increasing concern about skin health and appearance. Skin aging is a natural biological process influenced by intrinsic factors such as genetics, hormonal changes, and metabolism, as well as extrinsic factors like ultraviolet (UV) radiation, pollution, stress, and unhealthy lifestyle habits. These factors lead to visible signs of aging such as wrinkles, fine lines, dryness, pigmentation, and loss of skin elasticity. Therefore, there is a growing need to develop effective solutions to prevent and manage these skin-related issues.

In the modern era, people are becoming more conscious about their appearance and are actively seeking products that can maintain youthful and healthy skin. However, many synthetic or chemical-based anti-aging products may

cause side effects such as skin irritation, redness, allergic reactions, and long-term damage. This has led to an increased demand for herbal and natural cosmetic products, which are considered safer and more compatible with the skin.

Herbal anti-aging creams are formulated using plant-based ingredients that contain bioactive compounds such as flavonoids, polyphenols, vitamins, and essential oils. These compounds exhibit strong antioxidant, anti-inflammatory, and skin-protective properties. Antioxidants play a crucial role in neutralizing free radicals, which are responsible for oxidative stress and premature aging of the skin. Herbal ingredients help in maintaining skin structure, improving elasticity, and reducing wrinkles [19].

Another important need for studying herbal anti-aging creams is their ability to provide multiple benefits. Unlike synthetic products that may target a single function, herbal formulations offer a combination of effects such as moisturizing, nourishing, healing, and protecting the skin. Ingredients like Aloe vera provide hydration and soothing effects, turmeric offers anti-inflammatory benefits, and natural oils help in improving skin texture and elasticity. This multifunctional nature makes herbal creams highly effective for overall skin care. The study is also necessary to evaluate the formulation and stability of herbal creams. Proper formulation techniques are required to ensure that the cream has suitable physicochemical properties such as pH, viscosity, spreadability, and stability. A well-formulated cream should be non-irritant, easily applicable, and stable under different environmental conditions. Scientific evaluation ensures that the product is safe, effective, and suitable for long-term use.

In addition, herbal anti-aging creams are cost-effective and easily accessible compared to synthetic products. Most herbal ingredients are readily available and can be processed with simple techniques, making them affordable for a large population. This is particularly important in developing countries where access to expensive cosmetic products may be limited. Furthermore, there is a growing scope for innovation and research in the field of herbal cosmetics. Advanced technologies such as nano-formulations and polyherbal combinations are being developed to enhance the delivery and effectiveness of herbal ingredients. These advancements improve the penetration of active compounds into the skin and increase their bioavailability, leading to better

results.

Another important aspect is the need for standardization and quality control of herbal products. Since herbal formulations may vary in composition, it is essential to conduct studies to ensure consistency, safety, and efficacy. In conclusion, the study of anti-aging herbal creams is essential to develop safe, effective, and affordable skincare solutions [20]

IV. AIM OF OBJECTIVE:



Aim:

The aim of this study is to formulate and evaluate a herbal anti-aging cream using natural ingredients that helps to reduce signs of aging such as wrinkles, fine lines, dryness, and loss of skin elasticity, while ensuring safety, stability, and effectiveness.



Objective:

1. To select suitable herbal ingredients

Choose natural plant-based materials with antioxidant and anti-aging properties.

2. To formulate the herbal anti-aging cream

Prepare the cream using appropriate excipients and formulation methods.

3. To evaluate physicochemical properties

Determine pH, viscosity, spreadability, homogeneity, and stability.

4. To assess safety and skin compatibility

Ensure the cream is non-irritant and safe for topical application.

5. To study antioxidant activity

Evaluate the ability of the formulation to reduce oxidative stress.

6. To improve skin hydration and elasticity

Check moisturizing and skin-softening effects.

7.

To develop a stable and effective formulation

Ensure long shelf life and consistent performance.

8.

To compare herbal formulation with synthetic products

Highlight advantages like safety and fewer side effects.

2. Plan OF Work:

Literature review:

Collect information about skin aging and herbal ingredients used in anti-aging creams.

Selection of ingredients

Select suitable herbs, oils, wax, and other excipients for the formulation.

Collection of materials

Procure and prepare all required ingredients and equipment.

Formulation of cream

Prepare the herbal anti-aging cream using a suitable method.

Evaluation tests

Evaluate parameters such as pH, viscosity, spreadability, homogeneity, and skin irritation.

Stability study

Check stability of the cream at different storage conditions.

Result and discussion

Analyze and interpret the results obtained from evaluation tests.

Conclusion

Conclude effectiveness and quality.

3. MATERIAL AND METHODOLOGY:

3.1 Material

i. Rice



Figure No.3: Rice

Biological Source: *Oryza sativa* (Graminae family).

Synonyms: Rice grain, Paddy, Asian Rice.

Chemical Constituents: Starch, proteins, vitamins (B1, B3, B5), ferulic acid, phytic acid.

Uses:

- Exfoliates and brightens the skin.
- Reduces wrinkles and fine lines.

ii. Rose Water:



FigNo.4: Rose Water

Biological Source: Petals of *Rosa damascena* (Rosaceae family)

Synonyms: Gulab Jal, Rosa essence, Rose hydrosol.

Chemical Constituents: Phenylethyl alcohol, citronellol, geraniol, terpenes, flavonoids.

Uses:

- Balances skin pH.
- Soothes irritated skin.
- Provides hydration and a glowing effect.

iii. Aloe Vera Gel:



FigureNo.5: Aloe Vera Gel

Biological Source: Gel from the leaves of *Aloe barbadensis* (Liliaceae family).

Synonyms: Aloe, Ghritkumari, Aloe juice.

Chemical Constituents: Polysaccharides (acemannan), vitamins (A, C, E), enzymes, lignins, salicylic acid.

Uses:

- Moisturizes and soothes the skin.
- Wounds and burns.
- Reduces inflammation.
- Provides anti-aging benefits.

iv. Coconut Oil:



FigureNo.6: Coconut Oil

Biological Source: Oil extracted from the dried kernel of *Cocos nucifera*.

Synonyms: Copra oil, Nariyal tel, Coconut fat.

Chemical Constituents: Lauric acid, capric acid, caprylic acid, vitamins (E, K), and polyphenols.

Uses:

- Deeply hydrates the skin.
- Improves skin elasticity.
- Reduces scars and marks.

v. Glycerin:



Figure No. 7: Glycerine

Source:

Obtained naturally from animal fat and vegetable oils

Uses:

- Used as humectant.
-

Used as emollient which soothes and softens skin.

- Improves skin elasticity.

vi. Ashwagandha:



Figure No. 8: Ashwagandha.

Biological Source: Roots of *Withania somnifera* (Solanaceae family).

Synonyms: Indian Ginseng, Winter Cherry, Asgandh.

Chemical Constituents: Withanolides, alkaloids, sitosterols, flavonoids.

Uses:

- Reduces oxidative stress.
- Promotes skin regeneration.
- Prevents premature aging.
- Improves skin elasticity.

vii. Turmeric:



Figure No. 9: Turmeric

Biological Source: Rhizomes of *Curcuma longa* (Zingiberaceae family).

Synonyms: Haldi, Indian Saffron, Curcuma.

Chemical Constituents: Curcumin, demethoxycurcumin, bisdemethoxycurcumin, essential oils.

Uses:

- Fights acne and scars.
- Provides a natural glow.
- Protects against oxidative damage.

viii. Methyl Paraben:



Figure No. 10: Methyl Paraben

Uses:

- Widely used for its preservative property.
- Used for cosmetic and personal care products.

ix. Bees Wax:



Figure No. 11: Beeswax

Biological source: Natural wax obtained from honeycomb of honeybees like *Apis mellifera*.

Chemical constituents: Free fatty acids, hydrocarbons, and free alcohol.

Uses:

○

Used as base in creams, ointments and cosmetics.

○ Acts as emulsifying and thickening agent.

x. Vitamin E Capsule:



Figure No. 12: Vitamin E Capsule.

Biological source: Vitamin E is obtained from vegetable oils such as sunflower oil, wheat germ oil, and soybean oil.

Synonyms: Tocopherol, Alpha-tocopherol.

Chemical constituents: Tocopherols and tocotrienols.

Uses:

○ Protects skin from free radical damage.

○ Used in anti-aging and skin-care products, Acts as an antioxidant



Ingredients:

Ingredients	Role in formulation
Rice (Powder)	Exfoliator, anti-aging, smoothens skin
Rosewater (Gulab jal)	Hydrating agent, toner and fragrance
Aloe vera gel	Moisturizer, soothing, anti-inflammatory
Coconut oil	Emollient, nourishes skin
Turmeric powder	Anti-inflammatory, skin brightening
Glycerine	Humectant
Ashwagandha extract	Rejuvenating, anti-inflammatory
Methylparaben	Preservative
Beeswax	Emollient and moisturizer
Vitamin E capsule	Antioxidant, protects skin from free radicals, anti-aging, improves skin moisture and repair

Table No.1: Ingredients used and their roles

6.2. Method of Formulation:

Herbal anti-aging cream is prepared by the oil-in-water (O/W) emulsification method. Beeswax, coconut oil, and liquid paraffin are heated to about 70°C to form the oil phase. Rosewater, glycerine, aloe vera gel, and methylparaben are heated separately as the aqueous phase. The aqueous phase is slowly added to the oil phase with continuous stirring to form an emulsion. After cooling, ashwagandha extract, turmeric powder, and rice powder are added and mixed well to obtain a smooth cream.

- **Extraction method:**

- Soxhlet Method
- Maceration Method

- **Ingredients:**

- Ashwagandha
- Turmeric

- **Apparatus:**

- Soxhlet extractor
- Beaker
- Round bottom flask
- Stirrer
- Petridish
- Digital weight balance
- Hot water bath

- **Ashwagandha extract for Soxhlet Method:**



Figure No.13: Ashwagandha extract process

- **Turmeric extract for maceration Method:**



Figure No.14: Turmeric extract process

- **Formulation process:**

- i. **Oil Phase Preparation (~70°C):**

- Mix and heat:

- Beeswax
- Coconut oil
- Vitamin E Capsule
-

Heat to $\sim 70^{\circ}\text{C}$ and stir until fully melted and uniform.

ii. Water Phase Preparation ($\sim 70^{\circ}\text{C}$):

- Mix and heat:
- Rosewater
- Glycerine
- Aloe vera gel
- Methylparaben (ensure it is fully dissolved)
- Maintain at $\sim 70^{\circ}\text{C}$.

iii. Emulsification (Critical Step):

-

Slowly add the water phase into the oil phase dropwise at first, then gradually faster.

- Stir continuously using:
- High-speed stirrer, hand blender, or magnetic stirrer at 1000–1500 rpm.
-

Continue mixing for 10–15 minutes until a creamy texture forms.

iv. Cool Down Phase ($\sim 40^{\circ}\text{C}$):

- When the emulsion cools to $\sim 40^{\circ}\text{C}$, add powdered actives:
- Ashwagandha extract
- Turmeric extract
- Rice powder
- Mix gently until uniformly dispersed.
-

Avoid vigorous stirring to prevent breaking the emulsion.

v. Cooling and Final Packing:

-

Continue gentle stirring until the cream reaches room temperature.

-

Check for texture and uniformity and fill into sterile, airtight containers.

❖ **Equipment used:**

- Digital weighing balance ($\pm 0.001\text{g}$)
- Hot water bath with temperature control,
- Glass beakers
- Glass rod
- stainless-steel spatula
- Magnetic stirrer/mechanical homogenizer
- Thermometer
- Storage containers

❖ **Digital weighing balance**



Figure No.15: Digital weighing balance.

- A digital weighing balance is an electronic instrument used to measure the weight of substances accurately.
-

It works on the principle of Electromagnetic Force Restoration.

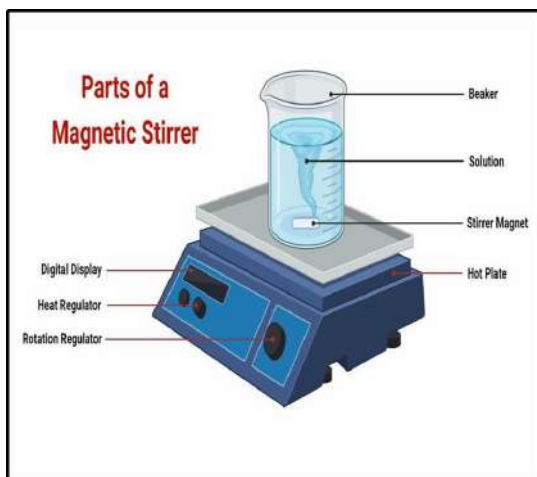
- The weight is shown on a digital display.
-

Main parts: weighing pan, load cell (sensor), display screen, and control buttons.

-

It is commonly used in laboratories, pharmacies, and industries for precise measurement.

❖ **Magnetic stirrer/mechanical homogenizer**



FigureNo.16:Magneticstirrer/mechanicalhomogenizer

○

A magnetic stirrer is a laboratory instrument used to mix liquids.

○ It works on the principle of Magnetism.

○

A magnetic stir bar placed in the liquid rotates due to a magnetic field.

○

Main parts: base unit, magnetic stir bar, and speed control knob.

○

It is used in chemical, pharmaceutical, and research laboratories for uniform mixing.

❖ Formulation Tablet:

Sr.no.	Ingredients	F1	F2	F3	FinalBatch
1.	Rice powder	1gm	1gm	1gm	1gm
2.	Aloe vera gel	3gm	4gm	4gm	5gm
3.	Ashwagandha extract	1gm	2gm	2gm	1.8gm
4.	Turmeric extract	0.3mg	0.4gm	0.4gm	0.4gm
5.	Rose water	4ml	5ml	4ml	4ml
6.	Methyl paraben	0.3gm	0.4gm	0.8gm	0.8gm
7.	Coconut oil	2ml	3ml	4ml	3ml
8.	Beeswax	1.5gm	2.5gm	3.5gm	3.5gm

9.	Vitamin E Capsule	0.5ml	0.5ml	0.5ml	0.5ml
10.	Glycerine	1ml	3ml	3ml	4ml

Table No.2: Formulation of all the batches

4.

5. Evaluation Test:

The formulated herbal multipurpose cream was subjected to a series of organoleptic, physicochemical, and stability tests to evaluate its aesthetic qualities, spreadability, viscosity, stability, and overall suitability for topical application. The evaluation was carried out using standard procedures pharmacopoeia and research-based references.

[a] Organoleptic (Basic) Evaluation:

Organoleptic sensory evaluation involves the assessment of the formulation's aesthetic and sensory characteristics through visual, olfactory, and tactile perception. These parameters help to evaluate the product's acceptability, usability, and immediate quality. The following organoleptic properties were assessed:

• Colour

The colour of the cream was evaluated visually under natural daylight and compared to a standard white background. Any discoloration, darkening, or inconsistency in colour was noted. An ideal cream should have a uniform and appealing colour that reflects the natural ingredients used and does not indicate degradation. The consistency in colour is an important indicator of formulation stability and user acceptance.

• Odour

Odour was assessed manually through direct smelling of the cream sample. The fragrance was expected to be mild, herbal, and pleasant, reflecting the natural essential oils and extracts present in the formulation. A strong or foul odour may indicate microbial contamination or ingredient incompatibility. A non-irritating, acceptable odour is essential for patient compliance in topical applications.

• Type of Emulsion

To confirm whether the cream was oil-in-water (O/W) or water-in-oil (W/O) emulsion, simple tests were performed:

• Dye Solubility Test

A water-soluble dye (methylene blue) was added to a sample of the cream. Uniform colouring indicated a water-continuous phase, confirming an O/W emulsion.

[b] pH Determination:

The pH of the formulation was measured to ensure compatibility with human skin. About 1g of cream was dispersed in 10ml of distilled water in a clean beaker and stirred well. The pH was measured using a digital pH meter calibrated with standard buffer solutions. The measurement was performed at room temperature ($25 \pm 2^\circ\text{C}$) on Day 0, 7, 14, and 21. Topical products should ideally have a pH between 4.5 and 7.0 to avoid irritation and maintain skin barrier function.

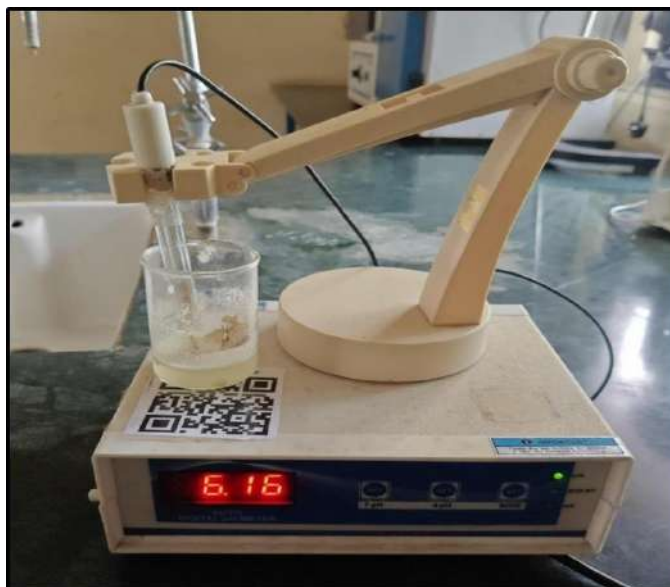


Figure No.17: pH test of formulation

[c] Spreadability Test

Spreadability indicates how easily the cream spreads on the skin, which directly affects user comfort and application.

○

A circle of 2cm diameter was marked on a clean glass plate.

○

About 0.5g of cream was placed at the centre.

○

Another glass plate was placed on top, and a 20g weight was gently placed for 1 minute.

- The diameter of the spread cream was measured in cm. Larger diameter indicates better spreading

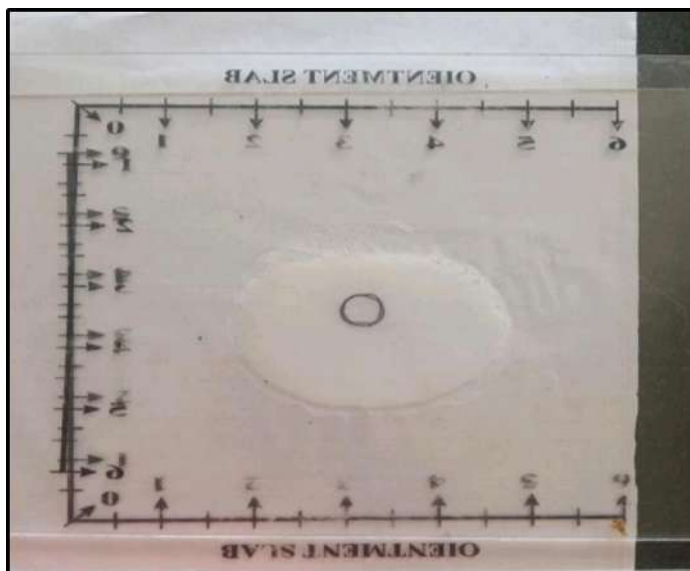


Figure No. 18: Spreadability Test



Figure No. 19: Spreadability Test

[D] Homogeneity and Texture Analysis

- The cream was examined visually and by touch to assess:

Homogeneity: Absence of lumps, grittiness, and phase separation.

- Texture: Soft, smooth, non-sticky feel when

applied to the skin.

- A homogeneous, smooth cream enhances cosmetic appeal and user compliance.

[E] Centrifugation Test

To evaluate the physical stability of the emulsion, approximately 5 g of cream was placed in a centrifuge tube and centrifuged for 30 minutes. The sample was observed for:

- Phase separation
- Sedimentation or creaming
-

Absence of separation indicates good emulsion stability.

[F] Observation for Phase Separation

The cream was stored at room temperature and observed on Day 0, 7, 14, and 21 for:

- Oil separation
- Layer formation
- Discoloration

No visible separation indicates emulsion integrity and product stability over time.

RESULT AND DISCUSSION:

The formulated polyherbal anti-aging cream F1, F2, F3 and final batch were evaluated for organoleptic characteristics, physicochemical properties, and physical stability using standard parameters. Among the five, Formulation F1, F2, F3, showed signs of instability, including phase separation and poor consistency during tests. In contrast, formulation of final batch remained physically stable, with superior spreadability, texture, and appearance throughout the study period. The results of the evaluation are discussed below.

A. Colour:

Other batches:

Slight discoloration and uneven tone were observed, especially by Day 14, likely due to poor emulsification and possible degradation of herbal components.

Final batch: Maintained a consistent cream colour throughout the evaluation period, indicating good stability and uniform distribution of ingredients.

A consistent colour is considered an important parameter for cosmetic acceptability and product stability.

B. Odour:

Other batches: The odour became slightly rancid by Day 14, possibly due to the breakdown of oils or microbial growth linked to instability.

Final batch: Retained a herbal fragrance throughout the testing period, indicating good preservative action and stable oil incorporation.

C. Appearance:

Other batches: Showed non-uniformity, dull texture, and slight oil separation visible from Day 7 onward.

Final batch: Appeared smooth, semi-solid throughout, with no visible separation.

D. Texture/Feel on Skin

Other batches: Felt slightly greasy and left an oily residue, making it cosmetically less acceptable.

Final batch: Provided a soft, smooth, and non-sticky feel, ideal for regular application.

E. Washability:

Other batches: Required more water and effort to remove; left a greasy layer after washing. Final batch: Easily washable with water and left the skin soft and clean.

F. Emulsification Test:

Other batches: Failed the dye solubility test consistently after Day 7, indicating phase separation and breakdown of O/W emulsion structure.

Final batch: Passed test, confirming that it remained a stable oil-in-water (O/W) emulsion throughout the 21-day period.

G. pH Determination:

Formulation	Day 0	Day 7	Day 14	Day 21
Final batch	6.1	6.1	6.0	6.0

Table: pH Determination of Formulation

Other batches showed a continuous drop in pH, indicating potential degradation or microbial contamination. Final batch maintained a stable pH in the skin-compatible range (4.5-7.0), suggesting better formulation stability.

H. Spreadability:

Formulation	Spread diameter (cm)
Final batch	6

Table: Spreadability Evaluation of Formulation

Final batch had higher spreadability, indicating better ease of application, attributed to its optimized emulsifier system (beeswax + stearic acid). Other batches spread poorly and unevenly, likely due to partial phase separation and thicker consistency.

Other batch: Visual and tactile examination revealed lumps and gritty texture after Day 7, with oil separation evident by Day 14.

Final batch: Smooth and homogeneous texture persisted through all testing points. No grittiness or separation was observed.

A homogeneous cream reflects proper emulsification.

I. Homogeneity and Texture Analysis:

and enhances user satisfaction,

J. Centrifugation Test:

Formulation	Result after centrifugation (30)
Final batch	Separation and stability observed

Table: Physical Stability Evaluation of Formulation

The results confirm final batch is superior physical stability compared to other batch, which failed under stress conditions.

K. Observation for Phase Separation

Other batches: Oil separation, layer formation, and discoloration were noted from Day 7 onward. Final batch: No signs of separation or physical degradation during the 21-day observation period. These results show that the presence of stearic acid and extra beeswax in final batch improved emulsification and stabilized the cream over time.

Parameter	F1	F2	F3	Final batch
Colour	Uneventone	Uneventone	Yellow colour	Consistent yellow colour
Odour	Rancid smell	Coconut oil smell	Strong waxy	Less waxy smell
Appearance	Granules	Dull semisolid	Uniform	Smooth and uniform
Texture/feel	Greasy	Leaves residue	Air bubbles	Soft, non-sticky
Washability	Difficult to wash	Leaves slight residue	Washable	Easily washable with water
Type of emulsion	Failed day test after day 7	Stable emulsion	O/W emulsion	Passed test; conform stable O/W emulsion

Conclusion:

The present study successfully formulated a herbal anti-aging cream using natural ingredients such as Aloe vera, turmeric, Ashwagandha, coconut oil, and rose water. These ingredients provide antioxidant, moisturizing, and skin-rejuvenating effects, which help in reducing signs of aging like wrinkles, dryness, and dullness. The prepared formulation was evaluated for various parameters such as pH, texture, spreadability, washability, and stability. The final batch showed good consistency, smooth texture, non-greasy nature, and stable O/W emulsion, making it suitable for topical application. The cream was found to be safe, effective, and skin-friendly, with no irritation observed. It also meets the demand for natural and eco-friendly cosmetic products. Thus, the developed herbal anti-aging cream can be considered a cost-effective and reliable alternative to synthetic creams, with good potential for future use and commercial production.



Final product: Herbal Anti-Aging Cream

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