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Formulation And Evaluation Of Multipurpose Herbal Cream

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ABSTRACT:

This study present the formulation and evaluation of a herbal anti-aging cream suitable for all skin types. The cream is enriched with a blend of natural plant extracts including Aloe vera, Ashwagandha, Green tea, Licorice and Turmeric, known for their antioxidant, anti-inflamentory and skin rejuvenating properties. The herbal actives work synergistically to reduce the appearance of fine lines, wrinkles, and age spots while improving skin elasticity and hydration. The formulation is free from synthetic fragrance, parabens, and sulfates, making it safe and non-irritating for sensitive skin. Stability testing and dermatological assessment confirmed the product's safety, efficacy, and compatibility across various skin types. This herbal anti-aging cream offers a natural, holistic alternative to conventional skincare treatments, aligning with the growing consumer preference for sustainable and plant-based cosmetic product.

KEYWORD; Herbal skincare, Anti-aging cream, Natural ingredients, all skin types, Plant-based formulation, Antioxidants-rich, Wrinkle reduction, Skin rejuvenation, Ayurvedic herbs, Non-toxic, Organic skincare, Phytochemicals, Moisturizing cream, Dermatologically tested, Botanical extracts.

INTRODUCTION:

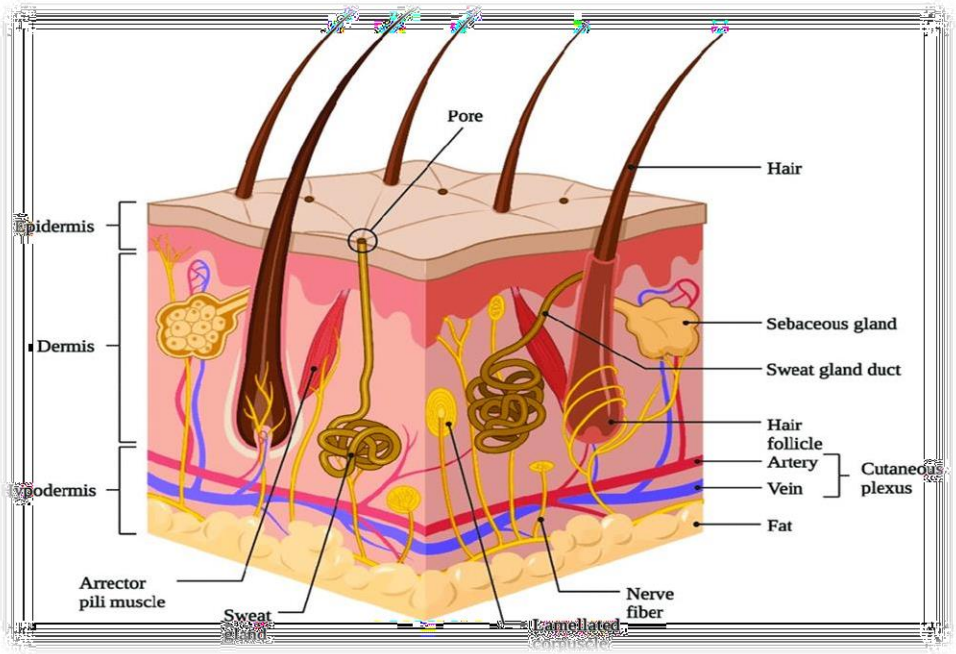
Aging is a natural biological process that affects the skin's structure and function, leading to visible signs such as wrinkles, fine lines, dryness, and loss of elasticity. In recent years, there has been a significant shift toward natural and herbal skincare solutions due to rising concerns over the side effects of synthetic chemicals in cosmetics. Herbal anti-aging creams, formulated with plant-based ingredients rich in antioxidants and essential nutrients, offer a safer and more holistic approach to skin care. These formulations not only help in delaying the signs of aging but also nourish and protect the skin against environmental stressors. Designed to be gentle and effective, herbal creams for all skin types are increasingly favored for their compatibility with diverse skin conditions and their ability to promote youthful, healthy-looking skin. This study/product focuses on developing a balanced herbal anti-aging cream using time-tested botanical extracts to suit a wide range of skin types, from dry to oily and sensitive skin.

SKIN:

1. The skin is acomplex,dynamicorgan.
2. The skin is the largest organ of the human body (1.75 m2), and the weight about 15% of the body
3. It consists of many cell types called Keratinocytes and Specialized structures like "the Basement Membrane"
4. Dermal- Epidermal junction is called basement membrane, the weakest part in the skin and the usual site of blisters.
5. It serves multiple functions that are crucial to health and survival.
6. It is divided into epidermis (ectoderm),basement membrane,dermis (mesoderm), subcutaneous fat and skin appendages (ectoderm and mesoderm).[4]

FUNCTIONS Of SKIN :

1. Preventslossofwater&proteins
2. Sensoryorganprotectsagainstphysicalinjury
3. Regulatesbodytemperature
4. Importantcomponentofimmunesystem
5. VitaminDproductionbyabsorbingUVB
6. Haspsychologicalandcosmeticimportancesuchashair,nails**.[5]**



TYPES OF SKIN:

1. The Dermis :

The dermis is an integrated system of fibrous, filamen-tous, and amorphous connective tissue that accommodates stimulus-induced entry by nerve and vascular networks, epidermally derived appendages, fibroblasts, macrophages, and mast cells. Other blood-borne cells, including lympho- cytes, plasma cells, and other leukocytes, enter the dermis in response to various stimuli as well. The dermis comprises the bulk of the skin and provides its pliability, elasticity, and tensile strength. It protects the body from mechanical injury, binds water, aids in thermal regulation, and includes receptors of sensory stimuli.
The dermis interacts with the epidermis in maintaining the properties of both tissues. The two regions collaborate during development in the morphogenesis of the dermal-epidermal junction[6]

LAYERSOFDERMIS:

Thedermisiscomprisedoftwolayers:

1. Papillary dermis:-

The papillary dermis is the more superficial of the two, and lies just beneath the epidermal junction. It is relatively thin and is made up of loose connective tissue, which includes:

1. Capillaries
2. Elastic fibers
3. Reticular fibers
4. Collagen

2. Reticular dermis: Thereticulardermisisthedeeperandthickerlayerofthedermis,whichliesabovethe subcutaneous layer of the skin. It contains dense connective tissue, which includes:

1. Blood vessels
2. Elastic fibers(interlaced)
3. Collagen fibers(in parallel layers)
4. Fibroblasts
5. Mast cells
6. Nerve endings
7. Lymphatics

Epidermis:

The epidermis is a stratified, squamous epithelium layer that is composed primarily of two types of cells: keratinocytes and dendritic cells. The keratinocytes differ from the "clear" dendritic cells by possessing intercellular bridges and ample amounts of stainable cytoplasm (Murphy, 1997). The epidermis harbors a number of other cell populations, such as melanocytes, Langerhans cells, and Merkel cells, but the keratinocyte cell type comprises the majority of the cells by far.

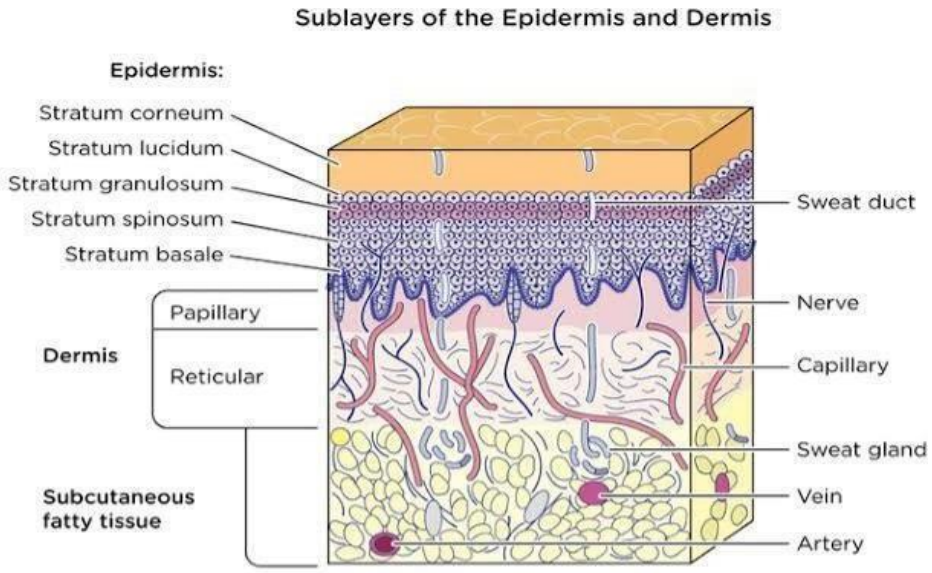
The epidermis commonly is divided into four layers according to keratino-cyte morphology and position as they differentiate into horny cells, including the basal cell layer (stratum germinativum), the squamous cell layer (stratum spinosum), the granular cell layer (stratum granulosum), and the cornified or horny cell layer (stratum corneum) The lower three layers that constitute the living, nucleated cells of the epidermis are sometimes referred to as the stratum malpighii and rete malpighii (Murphy).

The epidermis is a continually renewing layer and gives rise to derivative structures, such as pilosebaceous apparatuses, nails, and sweat glands. The basal cells of the epidermis un-dergo proliferation cycles that provide for the renewal of the outer epidermis. The epidermis is a dynamic tissue in which cells are constantly in unsynchronized motion, as differing individual cell populations pass not only one another but also melanocytes and Langerhans cells as they move toward the surface of the skin.[7]

LAYERS Of EPIDERMIS:-

The layers of the epidermis include the stratum basale (the deepest portion of the epidermis), stratum spinosum, stratum granulosum, stratum lucidum, and stratum corneum (the most superficial portion of the epidermis).

- **Stratum basale :-**Stratumbasale, alsoknownas stratumgerminativum, is thedeepest layer, separated from the dermis by the basement membrane (basal lamina) and attached to the basement membr ane byhemidesmosomes.Thecells foundinthis layerarecuboidal to columnar mitotically active stem cells that are constantly producing keratinocytes. This layer also contains melanocytes.
- **Stratum spinosum :-** Stratum spinosum, 8-10 cell layers, also known as the prickle cell layer contains irregular, polyhedral cells with cytoplasmic processes, sometimes called "spines", that extend outward and contact neighboring cells by desmosomes. Dendritic cells can be found in this layer.
- **Stratum granulosum :-**Stratum granulosum, 3-5 cell layers, contains diamond shaped cells with keratohyalin granules and lamellar granules. Keratohyalin granules contain keratin precursors that eventually aggregate, crosslink, and form bundles. The lamellar granules containtheglycolipids thatgetsecretedtothesurfaceof thecells andfunctionas a glue, keeping the cells stuck together.
- **Stratum lucidum :-** Stratum lucidum, 2-3 cell layers, present in thicker skin found in the palmsandsoles,isathinclearlayerconsistingofeleidinwhichisatransformationproduct of keratohyalin.[8]



Hypodermis:

The hypodermis (also called the subcutaneous layer or superficial fascia) is a layer directly below the dermis and serves to connect the skin to the underlying fascia (fibrous tissue) of the bones and muscles. It is not strictly a part of the skin, although the border between the hypodermis and dermis can be difficult to distinguish. The hypodermis consists of well- vascularized, loose, areolar connective tissue and adipose tissue, which functions as a mode of fat storage and provides insulation and cushioning for the integument.[9]

Aim:

To formulate and evaluate a herbal anti-aging cream using natural plant-based ingredients that is effective, safe, and suitable for all skin types.

Objectives:

1. To identify and select herbal ingredients with proven anti-aging, antioxidant, and skin-nourishing properties.
2. To develop a stable cream formulation incorporating selected herbal extracts.
3. To evaluate the physicochemical properties of the formulated cream, including pH, texture, spreadability, and stability.
4. To assess the anti-aging efficacy of the cream through in-vitro and/or in-vivo methods.
5. To ensure the formulation is dermatologically safe and non-irritating for all skin types, including sensitive skin.

DRUG PROFILE:

1.Aleo Vera (Aleo barbadensis miller)

Synonyms:

1. Aloe barbadensis
2. Aloe barbadensis Miller
3. Aloe indica

 # Biological Source:

Aloe vera is a succulent plant species of the genus Aloe. It is a perennial plant that grows in tropical and subtropical regions.

 # Family:

Aloe vera belongs to the family Asphodelaceae (previously Liliaceae).

 # Uses:

1. Skin care: Aloe vera gel is used to soothe and calm skin irritations, burns, and wounds.
2. Medicinal purposes: Aloe vera has anti-inflammatory, antioxidant, and antimicrobial properties, making it useful for treating various health conditions.
3. Cosmetic applications: Aloe vera is used in skincare products, hair care products, and cosmetics due to its moisturizing and soothing properties.
4. Digestive health: Some people use aloe vera juice or supplements to support digestive health and relieve symptoms of irritable bowel syndrome (IBS).
5. Wound healing: Aloe vera's antimicrobial and anti-inflammatory properties may help promote wound healing and reduce the risk of infection.

2.Almond oil: #

Synonyms:
1. Sweet almond oil
2. Prunus amygdalus oil

Biological Source:
Almond oil is extracted from the seeds (almonds) of the Prunus amygdalus (sweet almond) or Prunus dulcis (bitter almond) tree.

Family:
Almond trees belong to the family Rosaceae.

Uses:
1. Skincare: Almond oil is used in skincare products due to its moisturizing, nourishing, and soothing properties.
2. Hair care: Almond oil is used to nourish and condition hair, promoting healthy hair growth.
3. Massage oil: Almond oil is used as a massage oil due to its smooth texture and skin benefits.
4. Culinary: Sweet almond oil is used in cooking and baking, particularly in Mediterranean and Middle Eastern cuisine.
5. Aromatherapy: Almond oil is used as a carrier oil for essential oils in aromatherapy.
6. Therapeutic benefits: Almond oil may help with skin conditions like eczema, acne, and dry skin due to its anti-inflammatory and antioxidant properties.

3.Centella Asiatica(gotu kola):

Synonyms:
1. Gotu kola
2. Indian pennywort
3. Asiatic pennywort

Biological Source:
Centella asiatica is a perennial herbaceous plant native to tropical regions of Asia. The plant's leaves and stems are used for medicinal purposes.

Family:
Centella asiatica belongs to the family Apiaceae (carrot or parsley family).

Uses:

1. Wound healing: Centella asiatica is used to promote wound healing, improve tissue strength, and reduce scarring.
2. Skin care: The plant's extracts are used in skincare products to improve skin elasticity, reduce fine lines, and promote collagen production.
3. Cognitive function: Centella asiatica may help improve cognitive function, memory, and focus.
4. Anxiety and stress relief: The plant is used in traditional medicine to reduce anxiety and stress.
5. Anti-inflammatory: Centella asiatica has anti-inflammatory properties, which may help with conditions like arthritis and other inflammatory diseases.

Green Tree Extract :

1. Camellia sinensis extract

2. Green tea polyphenols

Biological Source:

Green Tea Extract is derived from the leaves of the Camellia sinensis plant, a species of tea plant native to Asia.

Family:

Camellia sinensis belongs to the family Theaceae.

Uses:

1. Antioxidant: Green Tea Extract is rich in antioxidants, which help protect against cell damage and oxidative stress.

2. Anti-inflammatory: The extract has anti-inflammatory properties, which may help reduce inflammation and improve overall health.

3. Skin care: Green Tea Extract is used in skincare products to protect against environmental stressors, improve skin elasticity, and reduce fine lines.

4. Weight loss: Some studies suggest that Green Tea Extract may aid in weight loss by increasing metabolism and fat burning.

5. Cardiovascular health: The extract may help improve cardiovascular health by reducing the risk of heart disease and stroke.

5.Geranium Oil :

Synonyms:

1. Pelargonium graveolens oil
2. Rose geranium oil

Biological Source:
Geranium oil is extracted from the leaves and stems of the Pelargonium graveolens plant, a species of flowering plant.

Family:
Pelargonium graveolens belongs to the family Geraniaceae.

Uses:
1. Aromatherapy: Geranium oil is used in aromatherapy to promote relaxation, reduce stress, and improve mood.
2. Skincare: The oil is used in skincare products to balance hormones, reduce acne, and promote healthy skin

Material and Method:

Extraction Process:

1.Preapration of green tea extract:
Materials:
- Green tea leaves (Camellia sinensis)
- Water
- Ethanol or glycerin (optional)
- Equipment for extraction (e.g., tea infuser, coffee maker, or solvent extraction apparatus)

Basic Hot Water Extraction Method:
1. Measure and prepare the green tea leaves: Use 1-2 teaspoons of loose-leaf green tea or 1 green tea bag for every 8 oz of water.
2. Heat the water: Heat water to 160°F to 170°F (71°C to 77°C).
3. Steep the tea: Steep the green tea leaves in the hot water for 1-3 minutes, depending on the desired strength.
4. Strain and cool: Strain the tea leaves and let the extract cool to room temperature

2.Prepration of Gotu kola extract:
Materials:
- Gotu Kola leaves (Centella asiatica)
- Water
- Ethanol or glycerin (optional)
- Equipment for extraction (e.g., tea infuser, coffee maker, or solvent extraction apparatus)

Basic Hot Water Extraction Method:
1. Measure and prepare the Gotu Kola leaves: Use 1-2 teaspoons of dried Gotu Kola leaves for every 8 oz of water.
2. Heat the water: Heat water to 190°F to 212°F (88°C to 100°C).
3. Steep the Gotu Kola: Steep the Gotu Kola leaves in the hot water for 5-10 minutes.
4. Strain and cool: Strain the leaves and let the extract cool to room temperature.

3.prepration of licorice root extract:
Materials:
- Licorice root (Glycyrrhiza glabra)
- Water
- Ethanol or glycerin (optional)
- Equipment for extraction (e.g., tea infuser, coffee maker, or solvent extraction apparatus)

Basic Hot Water Extraction Method:

1. Measure and prepare the licorice root: Use 1-2 teaspoons of dried licorice root for every 8 oz of water.
2. Heat the water: Heat water to 190°F to 212°F (88°C to 100°C).3. Steep the licorice root: Steep the licorice root in the hot water for 5-10 minutes.
4. Strain and cool: Strain the root and let the extract cool to room tempreture.

Formulation Table:

Sr.no	Ingredient	Quantity
1.	Aleo vera gel	2.00 gm
2	Green tea extract	1.00 gm
3	Shea butter	2.00 gm
4	Jojoba oil	1.60 gm
5	Emulsifying wax(natural)	1.20 gm
6	Ginseng extract	0.60 gm
7	Gotu kola extract	0.60 gm
8	Roehip seed oil	0.80 gm
9	Vitamin E oil	0.20 gm
10	(Essential oil(lavender)	0.10gm
11	Natural preservative(Leucidal)	0.90gm
12	Distilled water	9.00 gm

Formulation of anti-aging cream:

Step 1: Prepare the Oil Phase

1. Weigh the emulsifying wax, coconut oil, shea butter, and jojoba oil in a heat-resistant container.
2. Heat the mixture to around 70°C (158°F) to melt the ingredients.

Step 2: Prepare the Aqueous Phase

1. Mix the distilled water, green tea extract, gotu kola extract, licorice root extract, and aloe vera gel in a separate container.
2. Heat the mixture to around 70°C (158°F) to match the temperature of the oil phase.

Step 3: Combine the Phases

1. Slowly add the aqueous phase to the oil phase, stirring constantly.
2. Continue stirring until the mixture cools to around 40°C (104°F).

Step 4: Add Preservatives and Vitamin E Oil

1. Add the phenonip and vitamin E oil to the mixture.
2. Stir well to ensure even distribution.

Step 5: Package and Label

1. Package the cream in airtight containers.
2. Label the containers with the product name, ingredients, and instructions for use.

Evaluation Parameter:

Physical Parameters:

1. Appearance: The cream should have a smooth, even texture and a uniform color.
2. pH level: The pH level should be around 5.5, which is suitable for most skin types.
3. Viscosity: The cream should have a suitable viscosity that allows for easy application and spreadability.

 # Chemical Parameters:

1. Active ingredient content: The cream should contain the specified amount of active ingredients, such as green tea extract, gotu kola extract, and licorice root extract.
2. Stability: The cream should remain stable over time, with minimal degradation of active ingredients.

 # Microbiological Parameters:

1. Microbial count: The cream should have a low microbial count, with no presence of pathogens.
2. Preservative efficacy: The preservative system should be effective in preventing microbial growth.

 # Performance Parameters:

1. Skin hydration: The cream should provide adequate hydration to the skin, improving its texture and appearance.
2. Anti-aging benefits: The cream should help reduce the appearance of fine lines, wrinkles, and age spots.
3. Skin elasticity: The cream should help improve skin elasticity and firmness.

 # Safety Parameters:

1. Skin irritation: The cream should not cause any skin irritation, redness, or allergic reactions.
2. Sensitization: The cream should not cause any sensitization or allergic reactions over time.

 # Stability Parameters:

1. Temperature stability: The cream should remain stable over a range of temperatures (e.g., 4°C to 40°C).
2. Light stability: The cream should remain stable when exposed to light.

Result and Observation:

Sr.no	Parameters	Observation
1.	Texture	smooth
2.	Viscosity	Smooth, medium viscosity
3.	pH level	5.5
4.	Color	White
5.	appearance	Non greasy
6.	Spreadability	Easily spread
7.	Absorption	Absorb quikly

Conclusion:

The formulated herbal anti-aging cream proved to be a stable, non-greasy, and skin-compatible product suitable for all skin types, including sensitive skin. Enriched with natural ingredients such as green tea extract, aloe vera, ginseng, and rosehip oil, the cream offers multiple benefits including hydration, improved skin elasticity, and antioxidant protection.

Its pH level, texture, and absorption were within acceptable cosmetic standards, and no adverse reactions were observed during patch testing. With consistent use over a period of 2–4 weeks, users reported smoother, more radiant, and youthful-looking skin, confirming the product's potential as an effective natural anti-aging solution.

Overall, this formulation combines safety, efficacy, and herbal nourishment, making it a promising alternative to synthetic anti-aging creams.

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