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Formulation and Evaluation of Herbal Lotion containing Cluster Fig

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ABSTRACT

This article is all about the requirement of standardization and the composition of herbal product in day-to-day life. Composition of herbal products will give best effect in our daily life. The only motive- behind to choose the mixture of herbal product was to bring true upon the effectiveness of these formulation without any side-effects.

Comparison includes organoleptic and physico-chemical character such as viscosity, Ph, Spreadibility, moisturization of body after use.

The herbal cosmetics are those when natural herbs and their products used for their aromatic and therapeutic value in cosmetic preparation among consumers for herbal products triggered the demand for natural products and natural extracts in cosmetics preparations.

Lotions are liquid preparations meant for external application without friction. They are applied directly to skin with the help of some absorbent material, such as, cotton wool or gauze soaked in it.

Formulation of Cluster fig lotion along with different ingredients is prepared by using different ratios. These formulations were evaluated with different evaluation parameters like Homogeneity, Appearance, after use feel, Acid Value, pH measurement, Irritancy test, Viscosity, Subjective Properties, spread ability, Type of, Sensitivity Test, Washability Test, Patch test.

The objective of this research is to formulate and evaluate lotion which contain cluster fig pulp. Herbal lotion formulations studied by many researchers and this information can be used by many researchers for novel herbal cosmetic formulations with new herbs.

KEYWORDS: Cluster fig, Herbal lotion, Moraceae, Physicochemical investigation, Pharmacological activity.

I. INTRODUCTION

Herbal lotions have gained popularity in recent years as more people seek natural alternatives to synthetic skincare products. These lotions are formulated using a variety of plant-based ingredients, offering numerous benefits for skin health. This introduction will explore the components, benefits, preparation methods, and considerations for using herbal lotions.

Herbal lotions are topical formulations made primarily from natural plant extracts, essential oils, and other botanical ingredients. Unlike conventional lotions that may contain artificial fragrances, preservatives, and chemical additives, herbal lotions harmless, soothe, moisturize, and nourish the skin. They often incorporate ingredients like aloe vera, chamomile, lavender, tea tree oil, and various carrier oils.

BENEFITS OF HERBAL LOTIONS:

1. Natural Ingredients: The primary appeal of herbal lotions is their reliance on natural ingredients. These components are less likely to cause allergic reactions or irritations, making them suitable for sensitive skin types
2. Nutrient-Rich: Many herbs and plant extracts are packed with vitamins, minerals, and antioxidants.
3. Therapeutic Properties: Herbal ingredients often possess therapeutic qualities. For instance, chamomile is known for its anti- inflammatory properties, while tea tree oil is recognized for its antibacterial effects, making herbal lotions beneficial for various skin conditions.
4. Moisturization: Herbal lotions can provide excellent hydration. Ingredients like shea butter and coconut oil form a protective barrier on the skin, helping to lock in moisture and prevent dryness.
5. Eco-Friendly: Many herbal lotions are produced sustainably, with minimal impact on the environment.

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6. Aromatherapy Benefits: The essential oils used in herbal lotions not only contribute to skin health but also provide aromatherapy benefits.

KEY INGREDIENTS IN HERBAL LOTION

1. Carrier Oils: Oils such as almond, coconut, jojoba, and olive serve as the base for herbal lotions. They are excellent moisturizers and help deliver active ingredients to the skin.
2. Essential Oils: These concentrated plant extracts offer various benefits, including antimicrobial, anti-inflammatory, and soothing properties
3. Botanical Extracts: Extracts from plants like calendula, chamomile, and aloe vera are often added for their healing and
   Soothing properties. They can help alleviate skin irritations, reduce redness, and promote healing.
4. Emulsifiers: Natural emulsifiers like beeswax or vegetable-based emulsifying wax are used to blend oil and water in the formulation, ensuring a smooth texture and stable product.
5. Preservatives: While many herbal lotions aim to be preservative- free, some natural preservatives like rosemary extract or vitamin E may be added to extend shelf life without compromising safety.

ANATOMY & PHYSIOLOGY SKIN

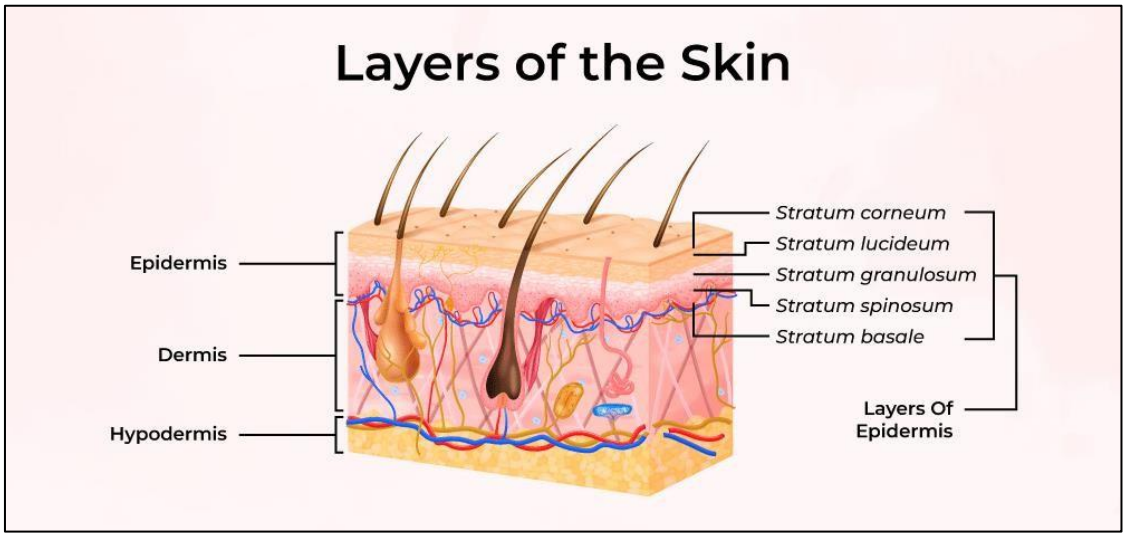
The skin covers the body and protects it from the external environment. It also prevents loss of water, sensory function, thermoregulatory, absorption and is the site for vitamin D synthesis.
The skin is composed of 3 layers.

- The outer layer (epidermis)
- The deeper layer (dermis)
- The deepest layer (hypodermis)

keratin (a tough and water insoluble structural unit). It also consists of dendrites.
The epidermis provides barrier and protection. It consists mainly of the protein keratin (a tough and water insoluble structural unit). It also consists of dendritically but it differs from the keratinocytes.
The epidermis is mainly divided into 5 layers according to keratinocyte morphology

1) Stratum corneum
2) Stratum lucidum
3) Stratum granulosum
4) Stratum spinosum
5) Stratum germinativum

The upper part of epidermis is made up of stratified squamous epithelium tissue. The skin itself contains many accessory things, skin appendages such as the hair follicles, sebaceous gland, sweat gland, erector pill muscle. The hair follicles and surrounding things makes ups an important part called ad pilosebaceous unit. The basement membrane separates the epidermis to the dermis down below on the top basement membrane there is a cuboidal epithelial cell called stratum Basel. The stratum Basel will migrate up to lose the blood supply, there is also other cell in this layer such as mercer cell which, it forms another layer called as stratum granulosum, where the blood supply is almost loss. Above the stratum granulosum is a layer called stratum lucidum which is found only on the thick part of body like palm and sole. The very top layer of epidermis is called as stratum corneum and this is the thickest layer of epidermis.



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DERMIS LAYER

Dermis is essentially connective tissue, and it is made up of many cells called fibroblast which produce an extracellular matrix like collagen, vascular hair follicle, nerve endings and mast cells. They play an important role in allergies, hypersensitive reactions.

The specialized nerve endings (sensory receptors) senses temperature, touches pressure and pain. The are made of two layers: -

- papillary
- Reticular

Pilosebaceous unit is made up of several units like-

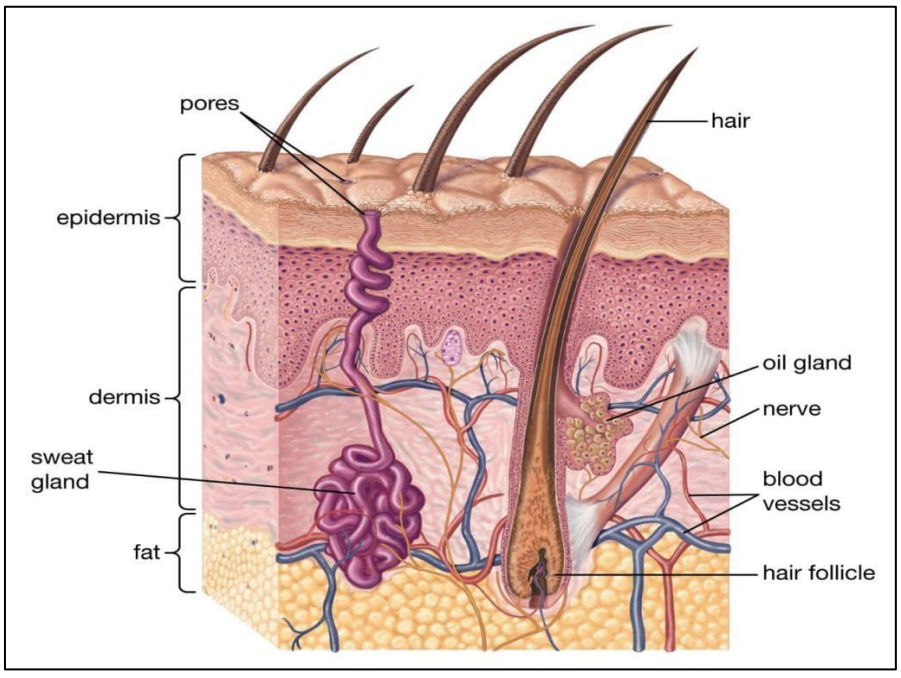
- Hair follicle
- Arrector pili muscle
- Sebaceous gland
- Hair root
- Sweat gland (apocrine gland or eccrine gland)

The sweat gland and the sebaceous gland are essential skin appendages; each components have its own structural function and biology. Sebaceous gland is microscopic gland found in hair follicle and secrets sebum an oily substance that protects the skin from drying out Sweat gland or eccrine gland are found mainly under the arms, on the forehead, palm, etc. They release perspiration that helps regulates body temperature. Skin appendage is often thought to facilitate the dermal absorption of topical agent.

SUBCUTANEOUS TISSUE (HYPODERMIS OR FAT)

It is the deepest layer of skin. It is made up of fat cells and connective tissues. It has many functions including insulation, protection, maintaining body temperature and storing energy. The hypodermis layer includes.

1) Adipose tissue
2) blood vessel
3) connective tissue
4) hair follicles
5) Borsa
6) Macrophage
7) Lymphatic vessels
8) Sweat gland.



PROPERTIES OF SKIN

The epidermis layer is hydrophobic, that is, it is water insoluble. The absorption time of drug depend upon this layer largely on the outer layer of the skin that is stratum corneum.

Stratum corneum provides a barrier by keeping the molecules from passing inside the skin. This barrier protects the lower layer of the skin.

The dermis layer is hydrophilic due to rich subaqueous zone. It absorbs more water than lipid. - The last layer hypodermis is more hydrophilic which is more water soluble. As the drug goes from upper part of skin to lower, the hydrophilicity increases.

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PLANT DESCRIPTION

CLUSTER FIG

Medicinal values are found in the cluster fig commonly known as Ficus racemosa leaves, bark, latex, and root sap. Its fruit can remove the property of indigestion by giving comfort to the stomach along with expulsion of the gases inside it. The heavy menstruation along with coughing blood may become useful for its medication sometimes.

Scientific Classification	
Kingdom:	Plantae
Sub-Kingdom:	Tracheobionata
Division:	Magnoliophyta
Sub-Division:	Tracheophytes
Class:	Equisetopsida
Sub-Class:	Hamamelididae
Order:	Rosales
Family:	Moraceae
Genus:	*Ficus*
Species:	*F. racemosa*

Vernacular Name	
English:	Cluster Fig
Hindi:	Gular
Tamil:	Atthi
Telgu:	Bodda
Sanskrit:	Udumbara
Marathi:	Umber

USES OF CLUSTER FIG:

Hydration: Figs can help keep skin hydrated.
Anti-inflammatory: Figs contain anti-inflammatory compounds that can soothe irritated skin.
Antioxidant: Figs are rich in antioxidants, which can help rejuvenate skin.
Vitamin C: The vitamin C in figs can help brighten skin and reduce the appearance of dark spots.
Omega-3 fatty acids: Figs are high in omega-3 fatty acids, which can nourish skin and reduce acne.

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Order:	Rosales
Family:	Moraceae
Genus:	*Ficus*
Species:	*F. racemosa*

II. MATERIALS & METHOD

FORMULATION TABLE: For 30 ml lotion

METHOD OF PREPARATION

Decontamination and Preparation:

Select healthy, unspoiled, mature cluster fig fruits.
Rinse thoroughly under running potable water followed by immersion in 0.1% sodium hypochlorite solution for 1 minute and rinse again with sterile distilled water to remove residual disinfectants. Pat dry using sterile tissue or clean muslin cloth.

MECHANICAL PROCESSING:

Using a sterile knife, peel the outer pericarp to expose the inner mesocarp.
Slice longitudinally into thin sections (~2–3 mm thick).

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SEED REMOVAL:
Manually separate and discard seeds using sterile forceps or spoon to prevent inclusion of abrasive particulates.

MACERATION:
Transfer the pulp to a sterilized mortar.
Triturate using the pestle until a homogenous, viscous paste is formed.

FILTRATION
Pass the paste through a sterile muslin cloth or fine mesh to remove any fibrous or gritty residue.
Collect the filtrate in a covered, pre-sterilized glass container.

STORAGE:
Store the extract at 4–8°C in an amber-colored container until use (max 24 hours recommended)

SR. NO.	INGREDIENTS	F 1	F 2	F 3
1	Aloe Vera Gel	10 ml	10 ml	10 ml
2	Cluster Fig	4 gm	5 gm	4 gm
3	Coconut milk	5 ml	4 ml	5 ml
4	Honey	5 ml	5 ml	4 ml
5	Almond oil	2 ml	1 ml	2 ml
6	Rose water	2 ml	2 ml	1 ml
7	Vitamin E	2 Capsules	3 Capsules	2 Capsules
8	Glycerin	3 ml	4 ml	3 ml

FORMULATION OF LOTION BASE
Oil Phase Components:
Coconut milk – 5 ml
Almond oil (Prunus Amygdalus) – 2 ml
Lavender oil (Lavandula angustifolia, essential oil) – 2–4 drops
Vitamin E (Tocopherol acetate) – contents of 1 capsule (~400 IU)
Aqueous Phase Components:
Aloe vera (Aloe barbadense) gel – 10 ml
Glycerin (pharmaceutical grade) – 3 ml
Natural honey – 5 ml
Rose water (Rosa damascene hydrosol) – 2 ml

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PROCEDURE:

In a sterile beaker, combine coconut milk, almond oil, Vitamin E oil,and lavender oil.

Stir gently with a sterile glass rod until a uniform mixture is formed.

Preparation of Aqueous Phase:

In a separate sterile beaker, mix aloe vera gel, honey, glycerin, and rose water.

Stir until completely blended to a clear, uniform aqueous solution.

Emulsification Process:

Place both beakers in a water bath preheated to 60°C–70°C to achieve optimal emulsification temperature.

Slowly incorporate the aqueous phase into the oil phase under constant stirring.

Continue stirring for 8–10 minutes or until a semi-viscous lotion-like consistency is achieved.

While the mixture is still warm (around 60°C), dissolve the appropriate quantity of methylparaben (typically 0.02%–0.03% w/v) in a small volume of warm distilled water and add it into the emulsion.

Allow the emulsion to cool gradually to 40°C while stirring to prevent phase separation.

Incorporation of Herbal Extract:

While the lotion base is still warm (approx. 40–45°C), add the prepared Ficus racemosa extract in aliquots.

Mix thoroughly to ensure homogenous dispersion throughout the lotion matrix.

Final Cooling and Storage:

Allow the formulation to cool at room temperature

Transfer immediately into sterile, transparent bottles or glass pump dispensers using a sterile funnel.and Store in a cool, dry place. Avoid exposure to sunlight.

EVALUATION

EVALUATION TEST:

Appearance: The appearance of the lotion was observed by visual examination.

Color: The color of the cream was observed by visual examination.

Odor: The odor of the lotion was tested by smelling.

pH: pH of prepared herbal lotion was measured by using both pH paper & digital pH meter.

Spread ability: The term "spread ability" Describes how easily a formulation applies to the skin. The product's ability to disseminate is directly related to how well it is absorbed.

Patch Test: A patch test is a methodology to identify allergies or irritations from substances that contact the skin, and it involves applying a small amount of a suspected allergen to the skin, usually the back, and looking for a reaction. To do a patch test for lotion on 1 sq cm, apply a small amount of the lotion (about the size of a pea) to a clean, dry area on the dorsal surface of your left hand, behind your ear or dorsal surface of your forearm for 24-48 hours with the lotion intact or as undisturbed as possible.

Removal Test: The ease of removal of the cream applied was examined by washing the applied part with water.

Absorption: Lotion is those form which the drug initially moves into the deeper skin tissues and finally into the systemic circulation. Such lotion should be evaluated for the rate of drug absorption.

Grittiness: Some of the ways through which the roughness of a lotion can be ascertained is through pressing a tiny amount of lotion between the thumb and index finger for any coarse particles to show. This test is alternatively called skin scratch test.

Viscosity: Viscosity of formulation is determined by Brookfield viscometer. At 12 rpm and at a temperature of 25ºC the sample (30 g) is placed in a beaker and allow to equilibrate for 5 minutes before measuring the dial reading using a T-D at 60rpm.

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EVALUATION TABLE:

Sr. No	Test	Formula 1	Formula 2	Formula 3
1	**Appearance**	Lotion type	Lotion type	Lotion type
2	**Color**	Light brown	Brown	Light brown
3	**Odor**	Floral aroma	Floral aroma	Floral aroma
4	**pH**	5	4.5	4.5
5	**Spread ability**	Easily spreadable	Easily spreadable	Easily spreadable
6	**Patch Test**	No reaction	No reaction	No reaction
7	**Washability**	Easily removed from the skin by using water	Easily removed from the skin by using water	Easily removed from the skin by using water
8	**Absorption**	Easily absorbable after applied	Easily absorbable after applied	Easily absorbable after applied
9	**Grittiness**	No grittiness found	No grittiness found	No grittiness found
10	**Viscosity (Pascal)**	5700	4850	4120

III. RESULT & DISCUSSION

RESULT

All three herbal lotion formulations went through a variety of evaluation parameters, such as appearance, color, odor, pH, spread ability, irritancy, viscosity, absorption and grittiness. Here's a summary of the observations:

Formula 1 showed superior result:

Appearance: It has a lotion-like consistency with a light brown hue and a lovely floral scent.

PH: It measured at 5.0, which is perfect for keeping the skin's natural acidity in check.

Spread ability: It spreads easily, allowing for a smooth application on the skin.

Absorption: It absorbs quickly without leaving any greasy residue behind.

Irritancy: There were no signs of redness, swelling, or irritation noted.

Viscosity: It has a smooth flow, making it easy to apply and wash off.

Grittiness: No rough particles were found; the texture was confirmed to be smooth.

On the other hand, Formulas 2 and 3 had slightly less viscosity, less spread ability, and a lower pH of 4.5, which may not suit everyone's skin type. While all formulations were safe and non-irritating, Formula 1 emerged as the most user-friendly and cosmetically appealing option.

DISCUSSION

The evaluation results clearly indicate that Formula 1 was the most effective and well-balanced among the three herbal lotion.

formulations. It's ideal pH, great spread ability, and smooth texture can be credited to the careful selection and concentration of ingredients, especially aloe vera, honey, glycerin, and coconut milk. These ingredients are renowned for their hydrating, soothing, and moisturizing properties, which enhanced the overall skin feel and absorption.

The slightly lower performance of Formulas 2 and 3 can be attributed to:

Higher concentrations of cluster fig and glycerin, which increased viscosity.

Minor differences in the levels of rose water and almond oil, impacting the consistency and sensory qualities.

The non-irritating nature of all formulations confirms the safety and effectiveness of the chosen natural ingredients. However, Formula 1's overall sensory experience and functional performance make it the standout choice.

IV. CONCLUSION

The present study on the preparation and evaluation of herbal lotions demonstrates that herbal formulations can provide effective and safe skincare solutions using natural ingredients. Among the three

formulations developed and tested, Formulation 1 showed the most favorable results across multiple parameters such as pH balance, spread ability, viscosity, appearance, and ease of absorption. It was also non-irritant indicating its potential for safe topical use.

The superiority of Formulation 1 can be attributed to its optimal combination of aloe vera, cluster fig, coconut milk, and other herbal components, which worked synergistically to enhance skin hydration, healing, and protection. These findings support the use of herbal lotions as viable alternatives to synthetic skincare products and pave the way for further development of natural cosmetic formulations with improved efficacy and consumer appeal.

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