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FORMULATION OF EVALUATION OF HERBAL MOISTURIZING CREAM USING CALENDULA OFFICINALIS (MARIGOLD) AND ZINGIBER OFFICINALE (GINGER) BY USING EXTRACTION METHOD

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ABSTRACT

This review explores the formulation and evaluation of herbal moisturizing creams incorporating Calendula officinalis (marigold) and Zingiber officinale (ginger). Both plants possess a rich phytochemical profile, including anti-inflammatory, antimicrobial, and antioxidant properties, making them ideal candidates for topical formulations. The article synthesizes existing research on their pharmacological effects, mechanisms of skin action, formulation strategies, and evaluation parameters. The review highlights the advantages of combining calendula and ginger in moisturizing creams, emphasizing their synergistic effects and potential for safe, effective, and natural skincare.

KEYWORDS: Maceration, Spread ability, Extrudability, Solubility.

INTRODUCTION

The demand for herbal-based skincare products has risen significantly due to growing consumer preference for natural, chemical-free ingredients. Calendula officinalis and Zingiber officinale are two widely studied botanicals known for their beneficial effects on skin health. This review aims to assess their roles in moisturizing cream formulations, with attention to efficacy, safety, and formulation techniques.

Zingiber officinale (Ginger)

Family: Zingiberaceae

Synonym: Zingiber officinale Roscoe

Biological Source: It is obtained from the dried rhizomes of Zingiber officinale Roscoe.

Calendula officinalis (Marigold)

Family: Asteraceae (also known as Compositae)

Synonym: Pot Marigold, Calendula hortensis

Biological Source:It consists of the dried florets or flower heads of Calendula officinalis Linn.

Pharmacological Profile of Active Ingredients Calendula officinalis (Marigold)

Rich in flavonoids, triterpenoids, and essential oils.

Exhibits anti-inflammatory, wound healing, antimicrobial, and soothing properties.

Enhances skin hydration and barrier repair.

Zingiber officinale (Ginger)

Contains gingerols, shogaols, and zingerone.

Demonstrates antioxidant, anti-inflammatory, and antimicrobial actions.Stimulates circulation and may improve skin tone and texture.

Mechanism of Action in Skin Care

Anti-inflammatory: Both herbs reduce skin irritation and redness.

Antioxidant: Neutralize free radicals, preventing premature aging.

Barrier repair: Calendula promotes collagen synthesis; ginger supports cellular regeneration.

Hydration: Formulations enhance moisture retention and skin softness.

Incorporation of Extracts

Aqueous or ethanolic extracts of calendula and ginger are typically used.Extracts added at cooling phase to preserve phytochemicals.

Preservatives and Stabilizers

Natural preservatives (e.g., tocopherol, potassium sorbate) used to prevent microbial growth.Stabilizers ensure cream consistency and shelf-life.

pH (ideal range: 5.0–6.5)

skin-related uses of a moisturizing cream containing Ginger (Zingiber officinale) and Marigold (Calendula officinalis)

1. Deep Hydration

Calendula helps lock in moisture and soothe dry, flaky skin.

Ginger supports skin hydration and improves elasticity.

2. Anti-inflammatory Action

Both ingredients reduce skin inflammation, redness, and irritation beneficial for sensitive or acne-prone skin.

3. Healing and Regeneration

Calendula promotes tissue repair and accelerates wound healing.

Ginger stimulates blood flow, supporting skin regeneration and repair.

4. Anti-aging Effects

Ginger contains antioxidants that help combat free radicals and reduce the appearance of fine lines.

Calendula boosts collagen production, improving skin firmness.

5. Brightening and Even Skin Tone

Ginger helps reduce hyperpigmentation and evens out skin tone.

Calendula contributes to a healthy, radiant complexion.

6. Barrier Protective

Forms a natural barrier on the skin that defends against environmental pollutants and oxidative stress.

FORMULATION OF HERBAL CREAM

Collection of plant material

The Calendula officianalis and Dried rhizomes of zinger were collected from in and around Rajendra Nagar. These are authenticated by botanist, Hyderabad. Then the flower cleaned properly and shade dried at room temperature.

Preparation of Calendula Extract

Flower were collected and washed thoroughly with distilled water and shade dried for 7 days. Dried leaves were ground into powder form. 100gm powder was imbibed with 350ml of 90% ethanol for 3hrs. and transferred to percolator with addition of 150ml of 90% ethanol for maceration for 7 days with occasional stirring. Finally, ethanolic extract was collected and concentrated to get orange reddish residue. The extract was stored in the airtight container at cool and dark place.

Preparation of zinger extract

Dried rhizomes of zinger were ground and the powder obtained was followed for extraction same as that for calendula flower extract. The extract with light green colour was obtained and stored at cool and dark place in air tight container.

For prepararing 20gm moisturizing cream

Crude drug	Qty taken	uses
Alcoholic extract ginger marigold	4.5% 0.2ml 0.2ml	Antiaging Antiinflamatory
water	15ml	hydration
Vitamin E	2 drops	Antioxidant
Steric acid	3.4g	Fatty material
Potassium hydroxide	0.1gm	Fine texture without harshness
Glycerin	0.6ml	Humectant, for soften skin
Rose water	0.5%q.s	For fragrance

Maceration Process of Crude Extract

Fig: a. Maceration process (Marigold), Crude extract [calendula],
b. Maceration process (Ginger), Crude extract [Zingiber]

Formulation of Herbal moisturizing cream

Table: Formulatiomoisturizing cream

Name of Ingredients	**Quantity to be Taken**		
	F1	F2	F3
Prepared calendula Extract	0.08gm	0.10gm	0.12gm
Prepared zinger Extract	0.08gm	0.10gm	0.12gm
Cream Base q.s	10gm	10gm	10gm

Procedure for preparation of herbal cream

1) Initially cream base was prepared by weighing accurately grated steric acid which was placed in evaporating dish on water bath.
2) After melting of steric acid remaining ingredients were added and stirred gently to aid melting and mixing homogeneously followed by cooling of cream base.
3) Herbal cream was prepared by mixing accurately weighed calendula and zinger extract to the cream base by levigation method to prepare a smooth paste with two or three times its weight of base.
4) It gradually incorporating more base until to form herbal cream, finally transferred in a suitable container.

Fig: Preparation of herbal moisturizing cream by using marigold and ginger extract.

FORMULATION TECHNIQUES

1. Phase Separation

Phase separation refers to the breakdown of the emulsion system in a cream, where oil and water phases no longer remain homogeneously mixed, leading to the appearance of separate layers, clumping, or watery discharge.

2. Oil Phase Preparation

Oil phase separation refers specifically to the phenomenon where the oil components of a cream formulation separate from the emulsion system, usually rising to the top or forming visible droplets. This is a key sign of emulsion instability and can compromise the cream's texture, appearance, and efficacy.

It is the breakdown of the emulsion, where the oil phase detaches and separates from the water phase in a cream, resulting in an oily layer, droplets, or greasy surface.

3. Aqueous Phase Preparation

The aqueous phase is the water-based component of a moisturizing cream and serves as the continuous phase in most oil-in-water (O/W) emulsions. Proper preparation of the aqueous phase is essential to ensure emulsion stability, texture, hydration, and active ingredient performance.

4. Emulsification

Emulsification is the process of mixing two immiscible liquids (usually oil and water) with the help of emulsifying agents (emulsifiers) to form a stable emulsion. In moisturizing

creams, it ensures that active ingredients are evenly distributed and the product remains homogeneous over time.

Emulsification is a key step in the formulation of moisturizing creams, especially oil-in-water (O/W) emulsions, where oil droplets are dispersed within a continuous water phase. It allows for the stable combination of immiscible substances (oil and water), resulting in a smooth, uniform cream with desirable texture and stability.

5. Cooling and Mixing

The mixture is cooled, and additional ingredients like fragrances, preservatives (e.g., methyl paraben), and active ingredients (e.g., aloe vera gel, herbal extracts) are added.

EVALUATION PARAMETERS

This includes visual inspection for color, odor, and texture. A good moisturizing cream should be visually appealing, have a pleasant odor, and a smooth, non-gritty texture.

Color And Odour

Colour and odour were visually evaluated.

Consistency

Consistency is Smooth and no greediness is observed.

pH

The pH of the herbal Cream was measured with a digital pH metre. The solution of cream was prepared by using 100ml of distilled water and set aside for 2hrs. pH was determined in triplicate for the solution and average value was calculated.

The pH of the cream should be within a suitable range (typically 4-7) to avoid skin irritation and maintain the skin's natural balance.

Viscosity

Viscosity refers to the cream's thickness and flow. It should be thick enough to be easily applied but not so thick that it's difficult to spread.

Spreadability

This test assesses how easily the cream spreads on the skin. A good moisturizing cream should spread evenly with minimal effort.

Spreadability was measured by compressing an extra sample between two slides with a specific weight and time. Spreadability has been determined by measuring the time required to separate the two slides. Better spreadability is the result of taking less time to separate two slides.

$$S=M\times L/T$$

Where S = Spreadability

M = Weight tide to the upper slide

L = Length of glass tube

T = amount of time taken to separate the slides

Solubility: Soluble in boiling water and miscible in alcohol, ether, and chloroform.

Washability: The formulation was applied to the skin, and the ease of washing with water was assessed.

Non-Irritancy Test: A herbal moisturizing cream was tested on human skin to determine its effectiveness. The test involves applying a little amount of sample to the hand and observing the effects over 24 hours, no impact was seen, and it is non irritant to the skin.

Homogeneity: The formulation were tested for homogeneity by visual appearence by touch.

Wetness: It is determined by applying cream on skin surface of human volunteer.

Type of swear: It is determined by applying cream on skin surface of human volunteer. After application of cream the type of film or smear formed were checked. (smooth and oily).

Stability: Stability tests assess how well the cream retains its properties over time and under different conditions (e.g., temperature changes). This includes phase separation (where the oil and water components separate).

MATERIAL AND METHOD

A moisturizing cream is typically prepared using an oil-in-water (O/W) emulsion, combining an oil phase (emollients, waxes, etc.) and an aqueous phase (water, humectants, etc.), along with an emulsifying agent. The general method involves heating and combining these phases, followed by cooling and homogenization.

MATERIALS

Emollients

These soften and moisturize the skin, examples include:

Oils: Mineral oil, sunflower oil, almond oil, etc.

Butters: Shea butter, cocoa butter.

Esters: Isopropyl myristate.

Waxes:

Provide structure and help retain moisture, examples include:

Natural waxes: Beeswax, carnauba wax.

Synthetic waxes: Cetyl alcohol, stearyl alcohol.

Humectants:

Attract and retain moisture, examples include:

Glycerin: A common and effective humectant.

Urea: Another widely used humectant.

Hyaluronic acid: A powerful humectant that can hold large amounts of water.

Emulsifying Agents

Help to combine the oil and water phases.

Borax: Used with beeswax to create a stable emulsion.

Stearic acid and triethanolamine: Commonly used in combination.

Preservatives

Prevent microbial growth and extend shelf life, examples include:

Methylparaben: A common preservative.

Phenoxyethanol: Another commonly used preservative.

Other ingredients

Water: The base of the aqueous phase.

Fragrance: Optional, for scent.

Colorants: Optional, for visual appeal.

METHOD

1. Phase Preparation

Oil Phase: Melt the solid ingredients (waxes, some emollients) in a heat-resistant container at around 70-80°C.

Aqueous Phase: Dissolve the humectants and emulsifying agent (if applicable) in water, heating gently if needed.

2. Emulsification

Slowly add the oil phase to the aqueous phase while constantly stirring, maintaining the temperature between 69-75°C.

Use a homogenizer or stirrer to ensure proper mixing and emulsification.

3. Cooling and Mixing

Continue stirring while cooling the mixture to below 40°C.

Add any heat-sensitive ingredients (fragrances, preservatives) at this stage.

4. Final Steps

Adjust pH if needed, aiming for a slightly acidic pH (around 5.0-5.5).

Pour the cream into suitable containers and allow it to cool completely.

RESULTS AND DISCUSSION

The present study was done to prepare and evaluate the herbal cream. For this the herbal extracts were prepared by using simple maceration process to obtain a good yield of extract and there was no any harm to the chemical constituents and their activity. The levigation method was used to prepare cream so that uniform mixing of the herbal extract with the cream base was occurred which was stable during the storage. The physicochemical properties were studied which shows satisfactory results for spreadability, Washability, Solubility, Loss on drying and others.

The texture of cream is smooth. By visual appearance and touch its confirm that all formulation produces uniform distribution of extract in cream.

Table: Physical properties of herbal cream

S.NO	Specification	Limit
01	State	Semi solid
02	Colour	Yellowish cream
03	Odour	Characteristic
04	Texture	Smooth

Determination of Ph

The pH of the ointment was found to be in range of 5-6.5 which is good for skin pH. All the herbal formulation of ointment were shown pH near to the skin required. i.e.

F1- 5.4, F2-6 and F3-6.2. The observed pH are near to the skin pH.

Table: Determination of pH

S .no	Formulation	Ph
01	F1	5.4
02	F2	6
03	F3	6.2

Determination of Spreadability

The Spreadability plays a considerable role in patient compliance and ensures uniform application of cream to a large area of the skin. The low value of spreadability coefficient of the cream was sufficient suggesting easy spreading. The lower value of spreadability indicates the lesser work required to spread the cream over the skin. Which means formulation was easily spreadable by applying small amount of shear. The spreadability test showed that formulation has good spreadable property.

Table: Determination of spredability.

S .no	Formulation	Spreadability
01	F1	26.5sec
02	F2	29.2sec
03	F3	31sec

Evaluation parameters of herbal cream

Table: evaluation parameters of herbal Cream.

Formulation	Colour	pH	Spreadability	Texture
F1	Yellowish cream	5.4	26.5sec	Smooth
F2	Yellowish cream	6	29.2sec	Smooth
F3	Yellowish cream	6.2	31sec	Smooth

Physicochemical evaluation of formulated cream

Table: Physiochemical evaluation of formulated cream.

Physicochemical parameters	Observation
Colour	Yellowish cream
Odour	Characteristics
Consistency	Smooth
pH	6
Spreadability	26.5sec
homogeneity	Homogenous smooth and consistent easily spreadable moisturizer skin surface.
Emollience	o/w type emulsion
Loss on drying	30%
Solubility	Soluble in boiling water, miscible with alcohol, ether, chloroform
Washability	Good
Non irritancy	Non irritant
Stability study (20^0c, 25^0c, 37^0c)	Stable

CONCLUSION

The combination of Calendula officinalis and Zingiber officinale presents a promising approach to formulating effective herbal moisturizing creams. Their complementary pharmacological properties offer skin nourishment, protection, anti acne, Anti aging , skin brightening sunburn and healing benefits etc., which have many properties including antibacterial activity.

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