Preparation of Lotion Using Herbal Extracts

[1]Harshal .B. Funde, [2]Kanchan. M. Galgate, [3]Tanmay. S. Kandekar,

[4]Gaurav. P. Dhanwade, [5]Tejas. S. Bagmar, [6]Naman. K. Gandhi

[1]Student, [2]Professor, [3]Student, [4]Student, [5]Student, [6]Student

[1]Department of Pharmacology.

[1]Arihant College of Pharmacy, Kedgaon, Ahilyanagar, Maharashtra, India, 414005.

Abstract:

The use of calendula for its lenitive properties' dates to the XII century. This plant contains several bioactive compounds, including terpenoids, terpenes, carotenoids, flavonoids and polyunsaturated fatty acids. Calendula flower extract is used in soothing cosmetics, such as after-sun, sensitive skin and eye contour products. The anti-inflammatory properties of this ingredient were demonstrated in an animal model, but the mechanism of action is poorly understood. Therefore, our work explored the effect of a calendula flower extract on NO production, a pro-inflammatory radical produced by nitric oxide synthase (iNOS) and highly released by innate immune cells in inflammatory-related pathologies. NO production was evoked by the Toll-like receptor 4 agonist lipopolysaccharide (LPS) in macrophages, using concentrations that did not compromise cells viability. This ingredient exhibited a dose-dependent NO inhibition, reaching 50% at 147 µL/mL without cytotoxicity. Together with previous literature, these results provide experimental evidence on the anti-inflammatory properties of calendula flower extract, as well as its usefulness in cosmetics with soothing properties and adjunctive skin care in the treatment of the diseases associated with dysregulation of the NO signaling cascade

Keywords:

Calendula, Anti-inflammatory lotion, Dry skin lotion, soothing cosmetics, Skin barrier support

Introduction:

Calendula officinalis L. (marigold) belongs to the Asteraceae/Composited family, which is native to Central Europe and Mediterranean. Its flower oil is the main preparation used in cosmetic products, and contains several bioactive compounds, including terpenoids and terpenes (mainly bisabolol, faradiol, chamazulene, Arni diol and esters), carotenoids (mainly with rubixanthin and lycopene structures), flavonoids, (mainly quercetin, isorhamnetin and kaempferol aglycones) and polyunsaturated fatty acids, (mainly calendric acid). Calendula officinalis L. has been used for medical purposes since the XII century. The plant is reported to present several biological activities namely angiogenic, vascular regeneration, analgesic, antimicrobial, antioxidant and immunomodulatory. In cosmetic products, calendula is used in formulations for sensitive skin and soothing products

(e.g., after-sun products) among a variety of presentations, including skin, eye, hair and bath products, with recognized safety for use in cosmetics.

Several Calendula preparations are available for incorporation in topical formulations directed towards wound healing and for soothing inflamed and damaged skin, like extracts, tinctures, and oils. There are 14 INCI designations for *Calendula officinalis* L. preparations at the European directory of cosmetic ingredients, and within the same designation, it is possible to find botanical preparations with different compositions, depending on the part of the plant and extraction method. Calendula flower extract is the most frequently used in cosmetic products. Although *Calendula officinalis* L. is often appointed for its anti-inflammatory activity, few studies have addressed this activity. Loggia et al. used an animal model to demonstrate that several calendula flower preparations obtained by supercritical CO_2 extraction attenuate the inflammation caused by the application of croton oil in mice ears, and that this inflammation reduction was as greater the higher the concentration of fepradinol monoester they contained]. On the other hand, Preethi et al. showed that calendula flower extract is efficacious for treating both acute (carrageenan and dextran induced) and chronic (formalin

induced) inflammation in mice, and they hypothesize it acts by inhibiting pro-inflammatory cytokines (IL-1β, IL-6, TNF-α and IFN-γ), COX-2, and subsequent prostaglandin synthesis. Ukiya et al. evaluated the anti-inflammatory activity of isolated compounds from calendula flower extract using the 12-Otetradecanoylphorbol-13-acetate (TPA) induced inflammation ear edema assay in mice, but no assay was performed with the full extract]. Although these in vivo studies demonstrate the ability of calendula flower extract to attenuate signs and symptoms of the inflammatory response, mechanistic studies have not been carried out by the authors. *Calendula officinalis* L. flower ethanol extract exhibited an anti-inflammatory action through the inhibition of pro-inflammatory cytokines (IL-1β, IL-6, TNF-α and IFN-γ), and it was proposed to inhibit COX-2 through the inhibition of the enzyme's gene and subsequent prostaglandin synthesis. Although, the later action mechanism was not confirmed in experimental studies. Additionally, Braga et al., 2009 studied the effect of a propylene glycol extract of *Calendula officinalis* L. flowers on reactive oxygen species (ROS) and reactive nitrogen species (RNS) by electron paramagnetic resonance]. Noteworthy, there are no reports on the activity of Calendula extracts regarding the inhibition of the strong pro-inflammatory mediator nitric oxide (NO) produced by macrophages in

European Scientific Cooperative on Phytotherapy (ESCOP) and EMA monographs, calendula's preferred mode of administration is the oral or cutaneous route. Applicable dosage forms include gels, creams, liquids, ointment, solutions, and spray.

Therefore, to further investigate the anti-inflammatory effect of a commercial Calendula flower extract, a mouse macrophage cell line (RAW 264.7) stimulated with the strong pro-inflammatory stimulus LPS was used in this work. This was done in order to determine the extract's influence on NO production by the inducible iNOS, expressed in innate immune cells including macrophages.

Uses of calendula lotion:

For General Skin Care:

1 Daily Moisturizer: Its emollient properties help hydrate the skin, leaving it feeling soft and supple. It can be used on the face and body.

2 Soothing Dry Skin: It can provide relief from dryness, flakiness, and rough patches by helping the skin retain moisture.

3 Calming Sensitive Skin: Its anti-inflammatory properties can help soothe and calm easily irritated or reactive skin.

4 Gentle for Babies and Children: Due to its mild nature, it's often used in baby skincare for moisturizing and soothing delicate skin

For Addressing Skin Irritations:

1.Minor Cuts and Scrapes: Its potential wound-healing properties may help promote the recovery of minor injuries.

2. Sunburn Relief: The soothing and anti-inflammatory effects can help alleviate the discomfort and redness associated with mild sunburn.

3. Insect Bites and Stings: It can help reduce itching, swelling, and irritation from insect bites.

4.Diaper Rash: Its gentle and anti-inflammatory nature makes it a popular choice for soothing and helping to heal diaper rash.

5. Mild Eczema and Dermatitis: While not a primary treatment, its soothing properties may offer some relief from the itching and inflammation associated with mild flare-ups.

6. Razor Burn and Waxing Irritation: Applying calendula lotion after shaving or waxing can help soothe the skin and reduce redness and bumps.

For Specific Situations:

1. Radiation Dermatitis: Some studies suggest it may help prevent or soothe skin irritation caused by radiation therapy, although more research is needed.

2. Acne Treatment Support: While not a direct acne treatment, its anti-inflammatory properties might help soothe the redness and irritation associated with breakouts. Its hydrating properties can also help prevent dryness from other acne treatments.

Importance of calendula lotion:

1. Soothes and Calms Irritated Skin:

a. Calendula possesses significant anti-inflammatory properties due to its flavonoids and saponins. These compounds can help reduce redness, itching, swelling, and general irritation caused by environmental stressors, dryness, or conditions like mild eczema.

b. It helps to calm sensitive and reactive skin, restoring a sense of comfort.

2. Hydrates and Supports the Skin Barrier:

a. Calendula is rich in fatty acids and natural emollients that help trap moisture in the skin.

b. This supports a healthy skin barrier, preventing water loss and protecting against external irritants, keeping the skin soft, supple, and resilient.

3. Promotes Healing and Skin Repair:

a. Calendula has wound-healing properties that can aid in the recovery of minor cuts, scrapes, and acne blemishes.

b. It's believed to stimulate cell turnover and encourage collagen production, which are crucial for skin repair.

c. Some studies suggest it can increase blood flow and oxygen to the affected area, promoting the growth of new tissue.

4. Provides Antioxidant Protection:

a. Calendula flowers are rich in antioxidant compounds like flavonoids, polyphenols, and carotenoids.

b. These antioxidants help neutralize free radicals caused by UV radiation and pollution, which can damage skin cells and lead to premature aging.

c. By protecting against oxidative stress, calendula helps keep the skin functioning optimally and looking healthy.

5. May Help with Specific Skin Conditions:

a. Early research suggests calendula may help prevent dermatitis (skin inflammation) in people undergoing radiation therapy for breast cancer, although more studies are needed.

Materials and Methods:

1. Materials:

The materials use is fresh calendula flower (Marigold) purchase from Acoform. It consists of an extract from calendula flowers in refined oil, stabilized with tocopherol. It is cosmetic product is "Calendula officinalis L. flower extract". It helps to reduce dryness, it helps to skin healing, soothing effects. It is also use medical like venous ulcers, skin disease, reduce inflammation.

Fig 1 : Calendula Flower

In Ayurveda:

1.Calendula (Marigold) -

Synonym- Aurantiaca, hydruntina.

Botanical Name- Tagetes erecta L.

Kingdom- Plantae.

Family- Asteraceae.

Genus- Calendula

Species- officinalis.

Biological Source: The flower of the plant calendula officinalis, commonly known as pot marigold or English marigold.

Use: It is also used to improve skin hydration and firmness.

Calendula is used for its anti-inflammatory properties, anti-cancer properties and improve skin tone, hydration.

Application of calendula lotion:

How to Apply:

1.Cleanse the area (if needed): For cuts, scrapes, sunburns, or irritated skin, gently cleanse the affected area with mild soap and water and pat it dry before applying the lotion.

2.Take a sufficient amount: Squeeze or scoop a coin-sized amount (or more, depending on the area you're covering) of calendula lotion onto your palm.

3. Gently massage it in: Apply the lotion to the desired area of your skin using gentle, circular motions. Continue massaging until the lotion is fully absorbed. Avoid rubbing vigorously, especially on sensitive or irritated skin.

4.Apply a thin layer: A thin, even layer is usually sufficient to cover the affected or dry skin. You don't need to apply a thick layer for it to be effective.

5. Avoid contact with eyes and mucous membranes: Calendula lotion is for external use only. Be careful not to get it into your eyes, mouth, or other mucous membranes. If accidental contact occurs, rinse thoroughly with water.

6.Wash your hands: Wash your hands after applying the lotion, unless you are treating your hands.

When to Apply:

1.As a daily moisturizer: Apply after showering or bathing on slightly damp skin to help lock in moisture. Use it in the morning and evening, or as needed throughout the day for dry skin.

2.For minor cuts and scrapes: Apply a thin layer 2-3 times a day or as needed after cleaning the wound.

3.For sunburn relief: Apply gently to the affected areas as needed to soothe and hydrate the skin.

4. For insect bites and stings: Apply to the affected area to help relieve itching and inflammation. Reapply as needed.

5.For diaper rash: Apply liberally to clean, dry skin with each diaper change, especially at bedtime or whenever exposure to a wet diaper may be prolonged.

6.For mild eczema and dermatitis: Apply gently to the affected areas to help soothe itching and dryness. Use as often as needed.

7. For razor burn and waxing irritation: Apply immediately after shaving or waxing to calm the skin and reduce redness.

8.For radiation dermatitis: Follow the specific instructions provided by your healthcare team. Generally, it's applied gently to the treated area several times a day.

Clinical study

Calendula and Wound Healing:

1.A systematic review of Calendula officinalis extract for wound healing suggests it may help speed up the resolution of the inflammation phase and increase the production of granulation tissue in acute wounds, based on animal studies and one clinical trial. However, more robust clinical trials are needed.

2.Increased Granulation Tissue: Research on acute wound healing indicates that calendula extract may speed up the resolution of the inflammation phase and boost the production of granulation tissue, which is crucial for wound repair.

Calendula for Skin Conditions:

1.A clinical trial investigated a sunscreen lotion containing calendula extracts in children and found it more effective than a control sunscreen (with licorice extracts) in improving skin symptoms after sun exposure, such as hyperpigmentation. It also showed good tolerability.
2.Eczema and dermatitis: Due to its anti-inflammatory properties, calendula may help soothe the redness, itching, and irritation associated with these conditions. Some studies specifically show benefits for diaper dermatitis.

Calendula for Skin Health:

1.One clinical study demonstrated that a sunscreen lotion containing calendula extracts offered better protection against sun-induced skin symptoms in children compared to a control sunscreen.

2.Early evidence suggests that calendula might help prevent dermatitis in breast cancer patients undergoing radiation therapy, although other studies have shown mixed results.

Equipment:

1.Clean glass jar with a lid.

2.Water bath or Heatproof bowl set over a saucepan of simmering water.

3.Measuring Cylinder or kitchen scale for accurate measurements.

4.Thermometer.

5.Small whisk or immersion blender.

6.Clean container for the finished lotion

Procedure:

PART 1: Infusing the oil with calendula.

1.Take Dried Calendula Flower 4 grams Accurately.

2.Combine Oil and Flower: Place the calendula flowers in a clean glass jar approximately 80 ml of your chosen carrier oil over the flower, ensuring they are fully submerged.

3.Keep for 2-4 Weak in clean glass jar in sunny spot and shaking gently every few days to form extract of dried calendula flower.

4.Once infusion complete, strain the oil through a cheesecloth to remove the calendula flower. Gently press the flowers to extract as much oil as possible. You should have a calendula-infused oil. Measure out approximately 79 ml of this infused oil fie next step.

PART 2: Making the lotion.

1.Heat the Oil Phase: In your water bath combine the calendula infused oil 79 ml and the emulsifying wax 6 grams. Heat gently until the wax in completely melted and the oil is clear. Use a thermometer to ensure the temperature reaches around 70-75°C.

2.Heat the Water Phase: Take distilled water in separate water bath approximately 14 ml to the same temperature as the oil phase 70-75°C.

3.Emulsify: Slowly pour the heated water phase into the heated oil phase while. Then whisking for several minutes until the mixture starts to thicken and emulsify. And you can also use a small immersion blender for a smoother emulsion.

4.Cool Down: Remove the mixture from the heat and continue to stir gently as it cools down. And this help to create a stable emulsion.

5.Add Preservative and Optional Ingredients: Once the lotion has cooled down to below 40°C. Chosen Methyl Paraben preservative according to the manufacturer's approximately 0.5-1 grams. Then add the glycerin or essential oil at this stage and stir well to combine.

6. Final Mixing: stir the lotion thoroughly to ensure all ingredients are evenly distributed.

7. Package: Pour or spoon the finished lotion into clean, airtight containers.

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Fig 2 : Calendula Extract

Formula table :

Sr. No.	**Ingredient**	**Quantity**
1	Dried calendula Flowers	4 Garms
2	Emulsifying Wax	6 Grams
3	Methyl Paraben	1Grams
4	Carrier Oil	50 ML
5	Glycerin.	1 Grams
6	Distilled Water	80ML

Fig 3 : Calendula lotion

Conclusion :

The use of calendula lotion offers a multitude of benefits, making it a valuable addition to skincare routines for various needs. Its well-documented anti-inflammatory and soothing properties make it particularly effective for calming irritated and sensitive skin, reducing redness, and providing relief from conditions like eczema and diaper rash.

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