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# Formulation and Evaluation of Anti-Acne Cream Activity of Calendula Officinalis and Cinnamon.

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**ABSTRACT:**

The mild formula of the cream acts on the skin without causing irritation. A cream's functions include cleansing, moisturizing, preventing acne and wrinkles, and enhancing skin tone to make the skin look more radiant.Acne is the most prevalent skin disorder, impacting 85% of today's teens. Natural medicines are increasingly commonly used since they are believed to be safer and to have less adverse effects than manufactured ones.

Calendula officinalis, also known as the pot marigold, is well-known for its anti-inflammatory and antibacterial qualities. Our study examines the composition and effectiveness of a calendula officinalis face cream for skincare. Additionally, our face cream formulation contains cinnamon extract, which is good for human skin. Utilizing these advantages, our cream recipe cleanses, clears up acne, and shields the skin.By conducting various experiments, such as pH testing, viscosity analysis, and microbiological evaluations, we showcase the cream's stability and effectiveness. In addition, clinical trials indicate its success in minimizing acne, calming inflammation, and enhancing overall skin texture. The calendula officinalis anti-acne cream offers a hopeful natural remedy for skincare

Calendula tinctures, ointments, and washes are made from the dried petals of the plant and are used to treat minor infections and burns, bruises, and wounds. During radiation therapy, calendula has also been demonstrated to help prevent dermatitis, or inflammation of the skin, in patients with breast cancer.

**Keywords**: Cinnamon, Pot Marigold, Anti-Inflammatory, Anti- acne ,Anti-bacterial

## 1. INTRODUCTION

Your look can be adversely affected by a variety of problems, including wrinkles, dryness, acne, black heads, and pimples. All of these problems stem from changes in hormones in the body. For these kinds of problems, this cream is helpful. Numerous skin disorders, including as dryness, irritation, acne, and black spots, can be treated with this treatment. Additionally, it helps to remove dead skin cells from the epidermis. This product includes antibacterial, anti-inflammatory, antioxidant, and anti-aging qualities that are essential for the skin's sustenance. It also softens, hydrates, and heals every age group has problem of acne, a common skin ailment that is frequently brought on by inflammation, germs, clogged pores, and excessive oil production. Anti-acne creams are skincare products that are specifically created to target these underlying reasons in order to treat and prevent acne breakouts. Using an anti-acne cream on a regular basis can help prevent new breakouts, treat existing ones, and enhance the texture of your skin.[1]

**How to Apply**:

Use facewash to clean your face.

A tiny bit of the cream should be applied to the afflicted areas.

Use it twice a day for optimal effects.

Apply sunscreen later in the day.

**Mechanism**

- Reducing Sebum Production – Ingredients like retinoids (e.g., Tretinoin , Adapalene) and Isotretinoin help regulate oil production, preventing clogged pores.
- exfoliation Exfoliating Dead Skin Cells – Keratolytic agents like salicylic acid promote, preventing the accumulation of dead skin that can block pores.

- Killing Acne-Causing Bacteria – Antibiotics (e.g., clindamycin, erythromycin) and benzoyl peroxide help eliminate Propionibacterium acnes (now Cutibacterium acnes), the bacteria responsible for acne inflammation.
- Reducing inflammation – Anti-inflammatory agents like niacinamide and corticosteroids help calm redness and swelling.[2]

**CLINICAL USES**

- Calendula officinalis

1. DIY Skincare - In addition to curing wounds, dry skin, and blisters, ointment can be used to relieve sunburns, warts, bites, acne, and ulcerations.
2. Tea for Digestive Relief - Marigold blossoms can be used to make tea, which can help reduce the symptoms of colitis and inflammatory bowel illnesses. In addition to lowering stomach or menstrual pains, marigold tea helps treat ulcers, acid reflux, and gastritis.
3. Formula for Immune Boosting - Calendula (marigold) extract or drops are occasionally used to treat fever, sore throat, and cough symptoms. Treatment of Skin, Genital, or Eye Infections Marigold based salves have long been used to reduce hemorrhoids, anal tears, and candida as well as to treat fungal infections of the genitalia, foot, eyes, mouth, and skin.
4. Anti-inflammatory action - The main advantage of calendula for acne is its capacity to lessen inflammation brought on by acne lesions, which may lessen swelling and redness.
5. Potential for wound healing - Calendula is also known to encourage wound healing, which may hasten the repair of acne scars.[3]

- Cinnamon

1. Anti-inflammatory: Antioxidant chemicals found in cinnamon may help lessen inflammation.
2. Antimicrobial: Cinnamon possesses antifungal and antibacterial qualities.
3. Antioxidant: Cinnamon has anti-free radical properties.
4. Cinnamon has the potential to lower blood sugar levels and lower the risk of type 2 diabetes.
5. Parkinson's and Alzheimer's: Cinnamon may help prevent the accumulation of a protein that is a defining feature of Alzheimer's.
6. Digestion: Using cinnamon may make digestion easier.
7. Menstrual cramps: PMS symptoms and menstrual cramps may be lessened with cinnamon tea.[4-5]

- **PHYSIOLOGY OF SKIN**

The skin is the biggest organ in the body, accounting for about 15% of an adult's total weight. In addition to offering protection against exterior physical, chemical, and biological hazards, it performs a number of vital functions, including helping with thermoregulation and limiting water loss. A continuous layer of skin is made up of the mucous membranes that cover the body's surface. The integumentary system is composed of the skin and its related tissues.The skin is composed of three layers: the epidermis, dermis, and subcutaneous tissue. The protective protein keratin, which is a long, thread-like strand, is produced by a specific type of cell called keratinocytes, which make up the outermost layer, or epidermis.

The Dermis, or middle layer, is primarily composed of collagen, a fibrillar structural protein. The dermis is found on the panniculus, or subcutaneous tissue, which is composed of microscopic lipocytes, which are lobes of fat cells.The thickness of these layers varies substantially depending on their location within the body's anatomy.

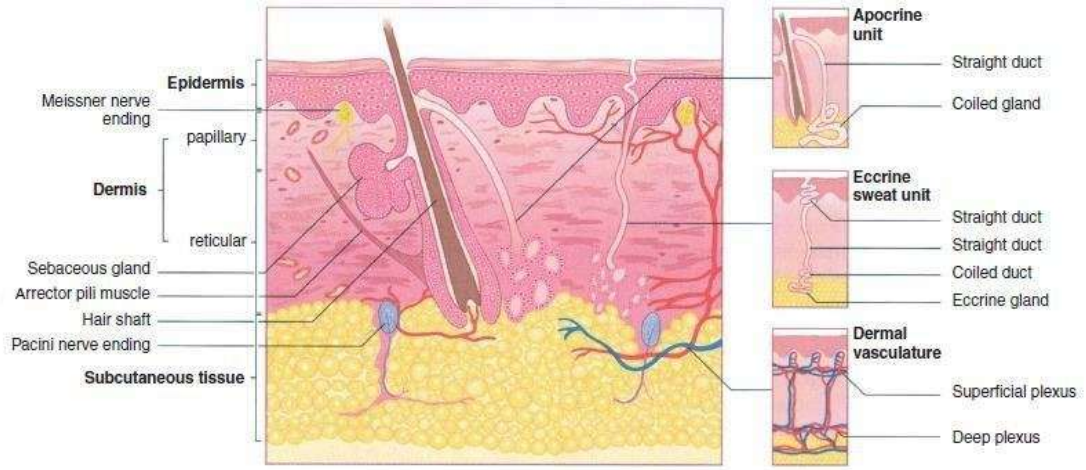



*Figure 1*

**Epidermis:**

The skin's thin outermost layer is called the epidermis. It has three different kinds of cells:

a) Squamous cells. The stratum corneum is the outermost layer that is constantly lost.

b) Base cells. At the base of the epidermis, directly beneath the squamous cells, lie basal cells.

c) Melanocytes. Melanocytes, which produce melanin, are also located at the base of the epidermis. The skin gets its color from this.

**Dermis** :The skin's main layer is called the dermis. Blood vessels, lymph vessels, hair follicles, sweat glands, collagen bundles, fibroblasts, nerves, and sebaceous glands are all found in the dermis.

**Subcutaneous Fat Layer**: The subcutaneous fat layer is the deepest layer of the skin. It is composed of a network of collagen and fat cells. It protects the body from injury and helps maintain body heat by acting as a shock absorber.

Skin's physiological role:

- Protection
- Thermoregulation
- Sensation
- Excretion
- Secretion of Vitamin D [6-7]

## 2. AIM AND OBJECTIVES :

**Aim:**

The primary aim of this research is to formulate, evaluate, and develop a natural anti-acne cream using the synergistic properties of Cinnamomum verum (cinnamon) and Calendula officinalis.

**Objectives**

Formulation of the Anti-Acne cream:The first goal is to formulate the anti-acne cream by combining extracts of calendula officinalis and cinnamon in an optimal way to maximize their anti-acne effects.

Create a cream basis that improves the designed product's stability, bioavailability, and user experience.[8]

1. Physical and Chemical Evaluation
2. Microbiological Evaluation
3. In vitro Studies
4. In vivo Studies.[7-8]

## 3. DRUG PROFILE

- **Calendula officinails**

Binomial Name: Calendula officinails

| | |
|---|---|
| Kingdom | Plantae |
| Order | Asterales |
| Family | Asteraceae |
| Clade | Asterids |
| Genus | Calendula |
| Species | C.officinalis |

*Table : 01*

**Figure 1**

Synonyms: Pot marigold, Calendula.

**Calendula officinalis**

Often called "pot marigold," this blooming plant is indigenous to the Mediterranean region and is a member of the daisy family (Asteraceae). It is well-known for its vivid orange or yellow daisy-like flowers, which are frequently used medicinally because of its anti-inflammatory and wound-healing qualities.

- Phytochemistry
- Flavonoids
- TriterpenoidsVitamin
- Polysaccharides
- Sterols
- Acids Phenolic
- Glycosides of Flavonols
- Alkaloids and Amines. [9]
- **Cinnamon**

Binomial Name: Cinnamomum verum

| | |
|---|---|
| kingdom | plantae |
| Order | Laurales |
| Family | Lauraceae |
| Clade | Angiosperms |
| Genus | Cinnamomum |
| Species | C. verum |

*Table : 02*

**Figure 2**

Synonyms : Camphorina cinnamomum, Cinnamomum aromaticum

**Cinnamon**

Because of its warm, aromatic smell, cinnamon, a spice made from the dried inner bark of several species of Cinnamomum trees, is mostly used as a flavoring element in cooking.

- Cinnamaldehyde
- Acid Cinnamic:
- Coumarins
- Essential Oils.
- Tannins
- Flavonoids
- Acids Phenolic:
- Polysaccharides and Mucilage.
- Glycosides .[10]

## 4. EXPERIMENTAL STUDIES :

**a) Methodology:**

- Calendula officinalis
- Cinnamon
- Aloe vera

- Liquid Paraffin
- Borax
- Methyl Paraben
- Rose Oil

**Preparation of Extract:**

Method of Oil Infusion (Calendula Oil)

Calendula-infused oil, which can be added to skincare items including lotions, salves, and creams, is frequently made using this technique.

Materials:

- 50-100 gm of dried calendula flower
- Carrier oil (200-300ml; such as almond,jojoba or olive oils)
- Jar of glass with a tight-fitting lid
- A strainer or cheesecloth (for filtering)

Method:

1. Get the calendula flowers ready.
2. For the infusion, use dried calendula flowers.
3. Fill jar with calendula flowers and add carrier oil.keep it for two-three days.
4. Use a sieve to pour the oil through jar
5. Storage-in cool and dry place.[11-12]

**Preparation of Antiacne cream:**

1. Each compound was carefully weight.
2. Maintain temperature at 75ºC while heating liquid paraffin & beeswax in borosilicate glass beaker.(the oil phase)
3. Dissolve borax and methyl parabean in distilled water.
4. Mixture should be heated until the methlyparabean and borax are completely dissolved.Add this aqueous phase to the oily phase.
5. Next,add measured amount of calendula officnalis and cinnamon extract,mix vigorously until a creamy formulation developes
6. As a scent, add enough drops of rose water. Put cream on slab and mix in a geometrical design to get smooth texture.[13-14]

- **Formulation of Preparation**

| Sr. No | Contents | Formulation | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| 1 | Calendula officinalis | 8 gm | 10 gm | 12 gm |
| 2 | Cinnamon | 4 gm | 5 gm | 6 gm |
| 3 | Bees wax | 1.2 gm | 1.6 gm | 2.0 gm |
| 4 | Borax | 0.3 gm | 0.4 gm | 0.5 gm |
| 5 | Methyl Paraben | 0.06 gm | 0.08 gm | 0.1 gm |
| 6 | Liquid Paraffin | 1.5 gm | 2 gm | 3 gm |
| 7 | Rose oil | 0.6 gm | 0.8 gm | 1 gm |
| 8 | Distilled water | q.s. | q.s. | q.s. |
| | | 15 gm | 20 gm | 25 gm |

*Table : 03*

**b) EVALUATION OF ANTI-ACNE CREAM**

To evaluate the quality of the created formulation, several quality control tests were conducted, including visual inspection and physiochemical and conditioning performance testing.

- **Organoleptic properties**

*Table : 4*

| **Parameters** | **Calendula officinalis** | **Cinnamon** |
|---|---|---|
| Texture | Vibrant, Broad, Flower: Yellow | Brittle, Papery |
| Smell | Sweet, Earthy, Floral | Strong, Warm, Sweet and Spicy Aroma |
| Taste | Mild, Slightly Peppery Taste | Both Sweet and Spicy, Hot |
| Tongue Sensation | Bitterness, Unpleasant | Very Pungent |

- **Screening of cream formulation and phytochemically**

| **Phytoconstituent** | **Calendula officinalis** | **Cinnamon** |
|---|---|---|
| Flavonoids | Present | Present |
| Saponins | Present | Absent |
| Phenols | Present | Present |
| Tannins | Present | Present |
| Alkaloids | Absent | Present |

*Table-:5*

- **Procedure of Phytochemical Test**

| **Phytochemical Test** | **Reagent / Procedure** | **Observation / Interpretation** |
|---|---|---|
| Flavonoids | Add few drops of 1 % NaOH Solution to extract or cream. | Positive Yellow colourindicates Flavonoids. |
| Saponins | Shake extract or cream with water in test tube. | Positive : Persistent Foam formation indicates Saponin. |
| Phenols | Add few drops 5% NaOH Solution to extract or cream. | Formation of Yellow colour indicates Phenol compound. |
| Tannins | Add few drops 1% ferric chloride solution to extract or cream. | Formation of blue green colour indicates Tannins. |
| Alkaloids | Add few drops of Dragendroff's reagent to cream. | Yellow or orange precipitation indicates presence of alkaloids. |

| | | |
|---|---|---|
| Essential Oils | Heat small amount of cream containing Calendula and Cinnamon extract. | Characteristic Cinnamon or Calendula scent confirms presence of essential oils. |

*Table : 6*

## 5. BENEFICIAL PROPERTIES OF 'POWDER OF THE DRUGS'

Herbal medicines like Calendula officinalis (Calendula) and Cinnamomum cassia (Cinnamon) in powdered form have a number of advantageous qualities and maintain many of the bioactive chemicals found in the plant material. These powders can provide therapeutic benefits when added to products like oils, lotions, or even taken as teas or capsules.

**An extractive soluble in alcohol :**

Five grams of precisely weighed powdered drug were placed in a Stoppard conical flask, to which 100 milliliters of 90% alcohol was added. The mixture was shaken continuously for six hours using an electric shaker, then left to macerate overnight. Following this, the filtrate was carefully evaporated until dry, and the weight of the extract was measured, along with its percentage.

Alcohol-Soluble Extractive: (Extractive Weight/Drug Weight) X 100

**a) Extractive Soluble in Water**

A Stoppard conical flask containing 5 grams of accurately weighed powdered drug was filled with 100 milliliters of chloroform water. The flask was shaken continuously for 6 hours in an electric shaker and left to macerate overnight. The extract was then carefully filtered and evaporated until fully dry. The weight of the extract was measured, and its percentage was calculated.

Weight of extractive / Weight of drug X 100 equals Water-Soluble Extractive.

**c) Total Ash**

Three grams of the medication were weighed, then burned in a China dish at a temperature not exceeding 450°C until all carbon was eliminated. After cooling, the sample was weighed again.

Total Ash = Wt. of ash /Wt. of drug x 100

**d) Acid Insoluble Ash**

After boiling for five minutes with 25 milliliters of diluted hydrochloric acid, the total amount of ash was obtained. The insoluble residue was then transferred to a Gooch crcible, washed with hot water, and burned until a constant weight was achieved.[15-17]

| **Total Parameter** | **Calendula officinalis** | **Cinnamomum cassia** |
|---|---|---|
| Total Ash Value | 5.5 % | 3.3% |
| Alcohol Soluble Content | 3.5% | 2.1% |
| Water Soluble Content | 5.8% | 3.1% |

*Table : 7*

## 6.RESULT AND DISCUSSION

**Evaluation studies of prepared formulations:**

The prepared three formulations were evaluated by observing the appearance and consistency. Further formulations were evaluated by conducting pH measurement, spreadability, viscosity, washability and foamability

- **Physical Appearance:**

The formulated wound healimg cream was visually inspected for their colour, odour and consistency.

| Formulation | Colour | Odour |
|---|---|---|
| F1 | Off-white | Sweet |
| F2 | White | Warm |
| F3 | White | Mildy sweet |

*Table : 08*

- **Determination of $_{p}$H:**

| Formulation | pH |
|---|---|
| F1 | 6.5 |
| F2 | 6.2 |
| F3 | 7 |

*Table : 09*

The ph. of formulated cream that is F1, F2 and F3 was found to be 6.5, 6.2 and 7 respectively and the ph. of the formulated cream was almost equal to the ph. of the skin which prevents the irritation of the skin.

- **Determination of Spreadability:**

Spredability guarantees consistent cream application and is crucial for patient compliance. When applied to the skin, good spreadability can guarantee the cream's dissemination.

| Formulation | Spreadibility (gm.cm/sec) |
|---|---|
| F1 | 4.8 |
| F2 | 6.3 |
| F3 | 5.8 |

*Table : 10*

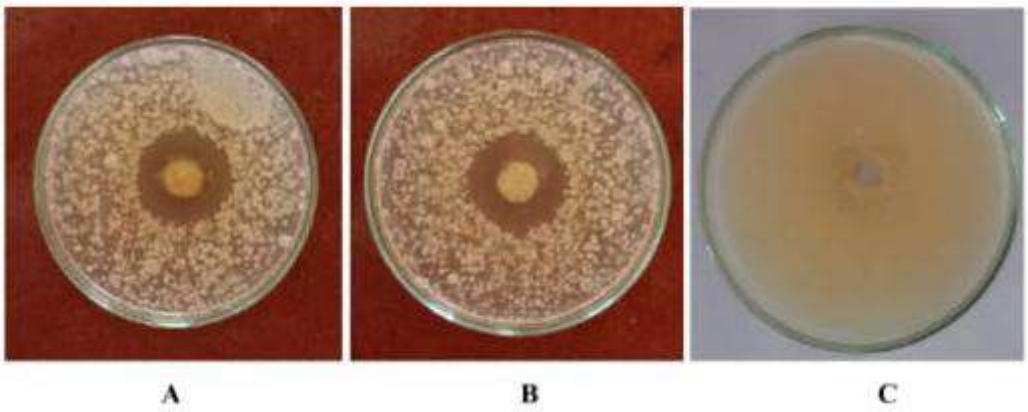
The F3 formulation has a higher spredability than the other formulation, at 5.8 gm.cm/sec. This demonstrates that formulation F3 is more spredable than the others.

- **Antimicrobial Studies:**

Antimicrobial activity is the capability of antimicrobial agents to prevent the growth or destroy harmful microorganisms.

| Formulation | Zone of Inhibition |
|---|---|
| Standard | 13 |
| F3 | 12.4 |

*Table : 11*



## 7.CONCLUSION

Because of its unique anti-inflammatory, antibacterial, and healing qualities, calendula officinalis and cinnamon make a potential natural alternative for treating acne when used to make an anti-acne cream. Marigold, or calendula officinalis, is well-known for its capacity to calm the skin, lessen inflammation, and encourage the healing of wounds—all of which are critical for the treatment of acne. Contrarily, cinnamon includes substances with antibacterial and antifungal qualities that aid in stopping the growth of bacteria that cause acne.

Calendula soothes sensitive skin, lessens redness, and hastens the healing of acne scars.

Because it inhibits the growth of bacteria on the skin, cinnamon is an excellent antibacterial that may help prevent acne outbreaks.Together, these components effectively address acne's root causes (bacterial activity) as well as its symptoms (redness and inflammation).

To guarantee that the cream is safe and effective for all skin types, it is imperative to remember that optimal formulation is essential..

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