WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 10, 1090-1100. Research Article ISSN 2277–7105

FORMULATION AND EVALUATION OF ANTI- ACNE CREAM FROM FLAX SEED

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Article Received on
28 March 2025,

Revised on 18 April 2025,
Accepted on 09 May 2025

DOI: 10.20959/wjpr202510-36734

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ABSTRACT

The present study focuses on the formulation and evaluation of an anti-acne cream utilizing flax seed (*Linum usitatissimum*) extract, known for its rich content of omega-3 fatty acids, lignans, and antioxidants. Acne vulgaris is a common dermatological condition caused primarily by inflammation, bacterial proliferation (particularly *Propionibacterium acnes*), and excessive sebum production. Natural remedies with minimal side effects have gained increasing attention for acne treatment. In this research, flax seeds were subjected to extraction using a suitable solvent system, and the obtained extract was incorporated into a topical cream base. Various formulations were prepared and evaluated for physicochemical parameters including pH, viscosity, spreadability, stability, and microbial load. The anti-acne potential was assessed through in vitro antibacterial activity against *P. acnes* and *Staphylococcus aureus* using the agar well diffusion method. Among the tested formulations, the optimized batch demonstrated excellent consistency, stability, and significant antibacterial activity, indicating the efficacy of flax seed extract in acne treatment. The results suggest that flax seed-based herbal cream could serve as a promising, safe, and cost-effective alternative for the management of acne.

KEYWORLDS: Anti acne, Flax seed extraction, Acne treatment.

INTRODUCTION

Acne vulgaris is a prevalent skin condition that primarily affects adolescents and young adults, characterized by the inflammation of pilosebaceous units. It is commonly caused by

excess sebum production, follicular hyperkeratinization, colonization by *Propionibacterium acnes*, and subsequent inflammation. Conventional treatments, including topical antibiotics and retinoids, often come with side effects such as skin irritation, dryness, and antibiotic resistance. As a result, there is growing interest in herbal and plant-based formulations, which are generally considered safer and more compatible with human skin.

Flax seed (*Linum usitatissimum*), a traditional medicinal plant, is a rich source of alpha-linolenic acid (omega-3 fatty acid), lignans, and phenolic compounds. These constituents possess notable anti-inflammatory, antioxidant, and antimicrobial properties, making flax seed a potential natural remedy for acne. The anti-inflammatory effect helps reduce skin redness and swelling, while the antibacterial action can help inhibit acne-causing bacteria.

This study aims to formulate a topical cream using flax seed extract and evaluate its physicochemical properties and antimicrobial efficacy. The goal is to develop a safe, effective, and herbal-based anti-acne cream that can serve as a viable alternative to conventional treatments.

SKIN BENEFITS OF FLAX SEED

Flax seed (*Linum usitatissimum*) is a powerhouse of nutrients with numerous benefits for skin health. It is widely recognized for its therapeutic properties, largely attributed to its rich content of omega-3 fatty acids, lignans, and antioxidants. Below are some of the key skin benefits of flax seed:

1. Anti-Inflammatory Properties

Flax seed contains high levels of alpha-linolenic acid (ALA), an omega-3 fatty acid that helps reduce skin inflammation. This property is particularly beneficial in managing acne, eczema, and other inflammatory skin conditions.

2. Antibacterial and Antimicrobial Action

The lignans and phenolic compounds in flax seed exhibit antimicrobial activity that can help combat acne-causing bacteria such as *Propionibacterium acnes* and *Staphylococcus aureus*.

3. Moisturization and Skin Hydration

Flax seed oil acts as an excellent natural moisturizer. It helps maintain the skin’s lipid barrier, preventing dryness, flakiness, and irritation, especially in sensitive skin types.

4. Rich in Antioxidants

Antioxidants in flax seed help neutralize free radicals, reducing oxidative stress and slowing down the aging process. This promotes smoother, healthier, and younger-looking skin.

5. Supports Skin Healing

Due to its wound-healing and cell-regenerating abilities, flax seed supports the repair of damaged skin and may reduce acne scars and blemishes over time.

6. Regulates Sebum Production

Omega-3 fatty acids help balance the skin's oil production, which is crucial in preventing clogged pores and breakouts.

Incorporating flax seed into topical formulations, such as creams and masks, can therefore offer a gentle, natural, and effective approach to skin care, particularly for acne-prone and sensitive skin.

ADVANTAGES

1) Natural and Safe
2) Anti-Inflammatory Effect
3) Antibacterial Activity
4) Rich in Antioxidants
5) Non-Comedogenic and Moisturizing
6) Cost-Effective and Readily Available
7) Eco-Friendly Formulation
8) Improved Skin Texture and Tone

ACNE

Acne, medically known as Acne vulgaris, is one of the most common chronic inflammatory skin disorders, primarily affecting the pilosebaceous units of the skin. It typically occurs during adolescence but can also persist into adulthood. Acne manifests in various forms, including blackheads, whiteheads, papules, pustules, nodules, and cysts.

The condition arises due to a combination of several factors

- **Excess sebum production** by the sebaceous glands
- **Hyperkeratinization**, or the abnormal shedding of skin cells, leading to clogged pores

- **Bacterial colonization**, especially by *Cutibacterium acnes* (formerly *Propionibacterium acnes*)
- **Inflammation** of the affected areas

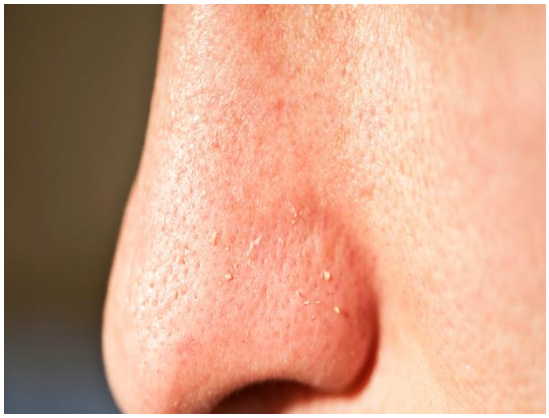
  Commonly affected areas include the face, neck, back, and chest—regions with a high density of oil glands. Although acne is not a life-threatening condition, it can lead to **emotional distress, low self-esteem**, and in severe cases, **permanent scarring**.

TYPES OF ACNE

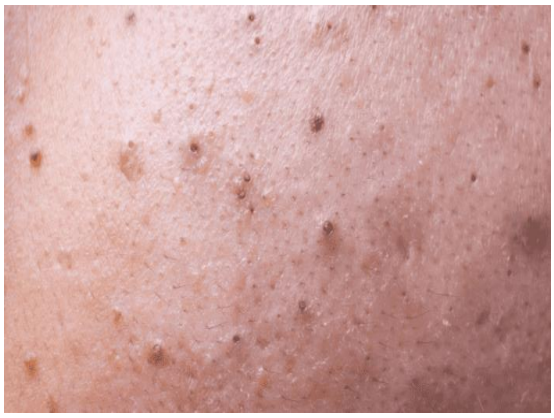
1) NON INFLAMMATORY ACNE

Non-Inflammatory Acne

These are milder forms of acne that do not cause swelling or pain.



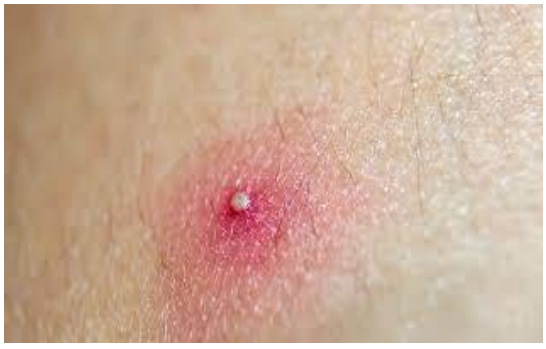
Whitehead



Blackhead

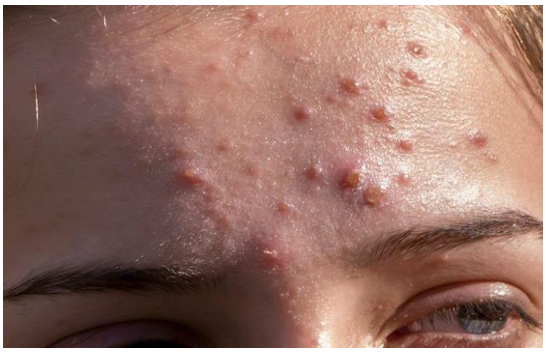
2) INFLAMMATORY

These involve swelling, redness, and sometimes pain.



PUSTULES

PAPULES



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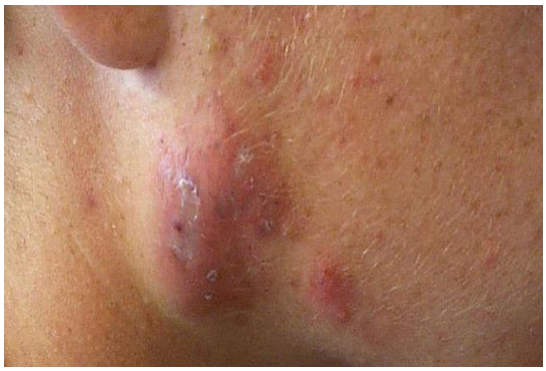


CYST

MATERIAL AND METHOD

PLANT PROFILE

FLAX SEED

SYNONYM: Linseed.

BIOLOGICAL SOURCE: Flaxseed, a small brown seed, is the seed of the flax plant, Linum usitatissimum.

FAMILY: A member of the Linaceae family.

GEOGRAPHICAL SOURCES: The plant's origins are in the Middle East and Eastern Mediterranean, and it has spread globally.

CHEMICAL CONSTITUENTS: Flax seeds are rich in various chemical constituents, including oil, protein, fiber, and several bioactive compounds like lignans, omega-3 fatty acids, and phenolic acids.

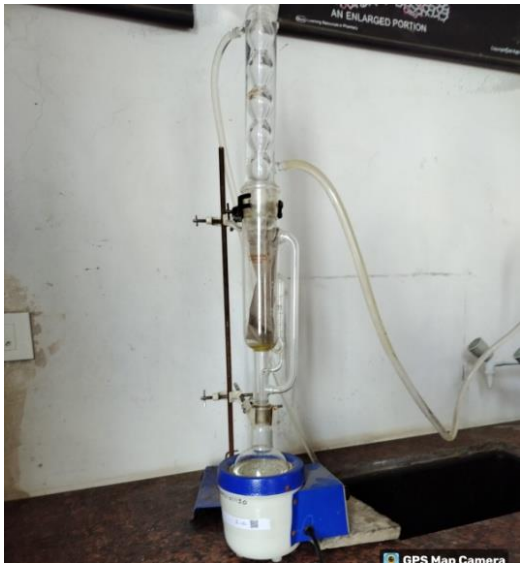
USES

1) Dietary additions
2) Skin and hair care
3) improve digestive health or relieve constipation
4) Powerful Antioxidant
5) Anti inflammatory activity

Sr.No	Components	Quantity	Role
1	Flax seed extract	2.75	Anti bacterial, Anti inflammatory, Anti oxidant
2	Stearic acid	2	Emollient
3	Ceto stearyl alcohol	0.75	Emulsifier
4	Liquid paraffin	4.5	Treatment of dry skin
5	Glyserin	15	Humectant
6	Methyl paraben	0.3	Preservative
7	Triethanolamine	0.003	Balanced PH of cream and stabilizer
8	Rose oil	Qs	Fragrance
9	Distilled water	Qs	Vehicle

EXTRACTION OF FLAX SEED

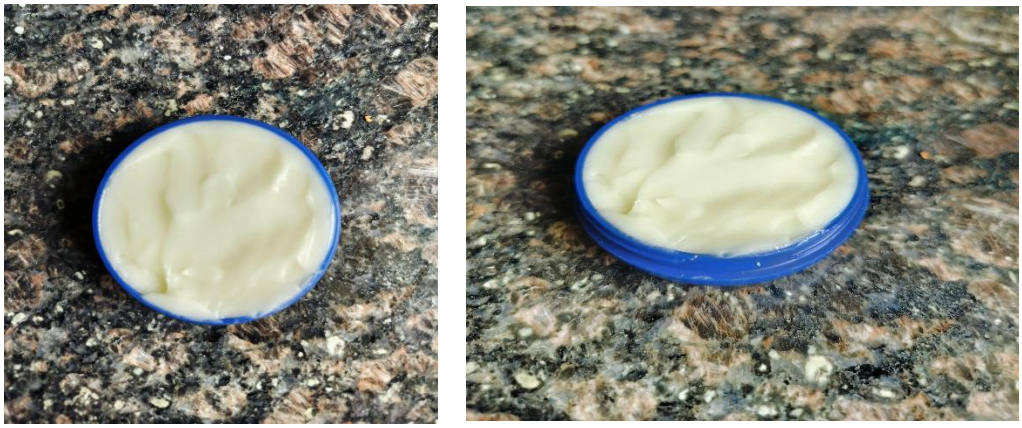
Solvent extraction of the oil was done according to AOAC (1980), Flax seed (50 g) was milled and extracted by adding (200 ml) ethanol (boiling between 70-78 °C) with a soxhlet extractor for (3-4) h. Whatman No. 1 filter paper was placed in the thimble of the Soxhlet extractor. The oil was extracted with Ethanol (1:4 w/v) and at the end of this period, the mixture was filtered and the liquid part was evaporated by using a rotary evaporator to remove excess solvent used in the oil, cooled and preserved for futher analysis.



Flax seed Extraction

PROCEDURE

- The oil phase consists of stearic acid and other oil soluble component such as cetyl stearyl alcohol and liquid paraffin were dissolved in the oil phase, heating temperature at 75 °C. [oil phase]
- The water soluble components and preservatives (glycerine, methyl paraben and triethanolamine) were dissolved in the aqueous phase and heated in the same water bath at temperature 75°C[aqueous phase]
- Then slowly add this aqueous phase to heated oily phase.
- Then add a measured amount of Flax seed extract and stir vigorously until it form smooth cream
- Then add few drops of rose oil for Fregrance put this cream into morter pastle to give smooth texture of cream.



Formulation of Cream

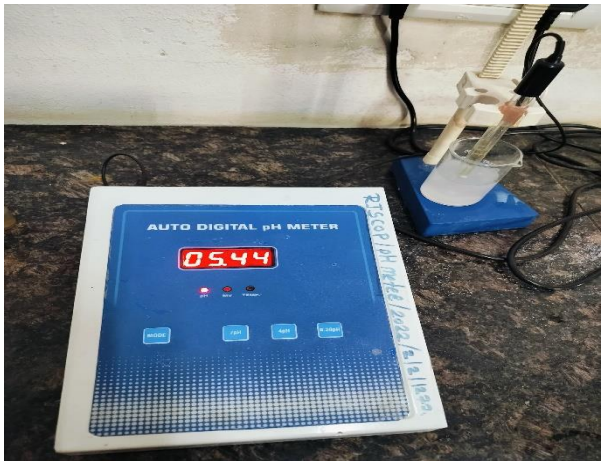
EVALUATION TEST

A. Physical evaluation: In this test, the cream was observed for color, odor, texture, state.

B. Irritancy Mark the area (1em') on the left-hand dorsal surface. Then the creams was applied to that area and the time was noted. Then it is checked for itritancy, erythena, and ademail any for an mterval up to 24 h and reported.

C. Washability. A small amount of cream was applied on the hand and it is then washed with tap water.

D. PH: 0.5 g creams was taken and dispersed in 50 ml distilled water and then PH was measured by using digital PH meter.



pH Meter

E. Phase separation Prepared cream was kept in a closed container at a temperature of 25-100 °C away from light. Then phase separation was checked separation was observed checked. for 24 h for 30 d. Any change in the phase.

F. Greasiness. Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like.

G. Spreadability: The spreadability was expressed in terms of time in seconds taken by two slides to slip off from the cream, placed in between the sides, under certain load. Lesser the time taken for separation of the two slides better the spreadability.

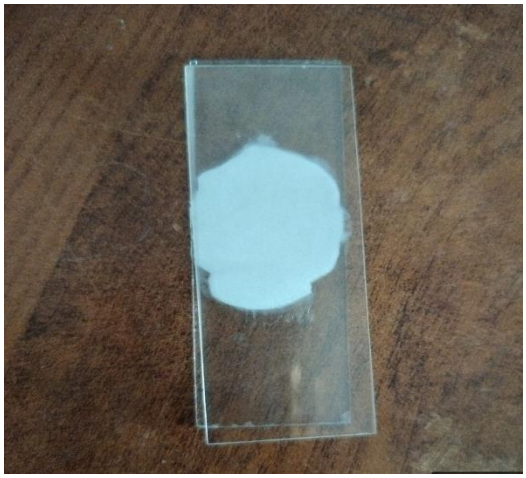
Spreadability "mx V

Where,

m Standard weight which is tied to or placed over the upper slide

1-length of a glass slide

t time taken in seconds



Spreadability

RESULT AND DISCUSSION

Anti acne cream formulation showed good appearance, pH, and No phase separation was observed also, the formulation showed no redness, erythema and irritation during irritancy study and they were easily washable. The cream was stable at room temperature Anti acne cream formulation was stable at room temperature and can be safe for skin. It helps to prevent different skin disorder like pimple, acne, wrinkle, dark spot etc.

CONCLUSION

From the present study it can be concluded that the use of bioactive ingredients in cream. They provide good and healthy skin. The cream will be prepared with using extracts of pumpkin seeds they are good source of medicinal Properties. It helps in the elimination of acne, pimples and marks. Medicinal plant shows less side effect as compare to chemical compounds pumpkin seeds show better anti-inflammatory or anti-bacterial effect.

ACKNOWLEDGMENT

I sincerely thank my guide, Miss. Sonali Kote for their valuable guidance and support throughout this research on formulation and evaluation of anti-acne cream. I also extend my gratitude to my institute RJS College of Pharmacy, Kokamthan for providing the necessary resources. Special thanks to all who contributed directly or indirectly to the successful completion of this work.

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