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Research Article

A Research on Herbal Analgesic Cream for Relieving Pain

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ABSTRACT

Herbal analgesic creams offer a promising avenue for natural pain relief, leveraging the therapeutic properties of botanical ingredients. This formulation is developed using standard formulation of herbal analgesic cream, each varying in the ratio of key ingredients to optimize efficacy. The formulation of herbal analgesic creams involves a rich blend of plant-derived ingredients, drawing from traditional healing knowledge. the review focuses on a composite herbal analgesic cream formulated using *Calotropis gigantea* acts as an analgesic and anti-inflammatory. Methyl salicylate provides warming sensation. Liquid paraffin softens the skin and also used as base in creams and ointments. Beeswax acts as a thickening agent and emollient. Cetylalcohol helps to blend oil and water by giving smooth texture. Paraffin wax acts as a base and skin protectant. Borax helps to stabilize cream. Glycerin draws moisture into the skin and keeps hydrated. camphor provides cooling effect and also reduce itching. Eucalyptus oil used to relieve muscle and joint pain. Coconut oil helps in soothing skin irritation. Rosewater acts as a skin toner and fragrance. This review consolidates scientific and traditional evidence supporting the dermatological efficacy of each component and their synergic actions in analgesic creams. These herbal analgesic creams are safe, effective and eco-friendly.

INTRODUCTION

An analgesic is a substance or medication employed to alleviate pain without inducing unconsciousness. These agents function by either blocking pain signals or modifying the perception of pain within the brain. Analgesics serve as crucial components in managing a spectrum of

pain, from mild discomfort to severe and chronic conditions. ^[1]

They encompass distinct categories, including non-opioid and opioid analgesics. Non-opioid analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen, operate by inhibiting inflammatory pathways or modulating pain perception. Their efficacy in addressing mild

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to moderate pain is coupled with relatively favorable safety profiles, making them preferred options for many individuals seeking relief from pain

In contrast, opioid analgesics act upon specific receptors in the central nervous system to alleviate pain. While highly effective in managing severe pain, their use is accompanied by potential risks of tolerance, dependence, and adverse effects.^[2]

Cream

Cream The word "cream" is derived from French. It entered English through Old French "cresme" or "creme", which itself comes from Late Latin "crānum", under the Drugs and Cosmetics Act, "cream" typically refers to a semisolid dosage form intended for topical application to the skin (or) mucous membrane they are typically emulsions, either oil-in -water(o/w) (or) water-in-oil (w/o) and can contain one (or) more active drug substance. These creams are formulated to deliver medication, protect the skin (or) provide moisturizing effects Creams are semi-solid emulsions of oil and water. They are divided into two types: oil-in-water (O/W) creams which are composed of small droplets of oil dispersed in a continuous water phase, and water-in-oil (W/O) creams which are composed of small droplets of water dispersed in a continuous oily phase. Oil-in-water creams are more comfortable and cosmetically acceptable as they are less greasy and more easily washed off using water. Water-in-oil creams are more difficult to handle but many drugs which are incorporated into creams are hydrophobic and will be released more readily from a water-in-oil cream than an oil-in-water cream. Water-in-oil creams are also more moisturizing as they provide an oily barrier which reduces water loss from the stratum corneum, the outermost layer of the skin. Creams are used for various purposes including daily skincare,

medicated applications, and also a vital component of cosmetics.

Classification

1. Based on emulsion type

- Oil-in-water type
- Water-in-oil type

2. Based on therapeutic use

- Analgesic
- Anti-inflammatory
- Antiseptic

Factors effecting quality of cream

- Fat content and globule size
- Temperature
- Homogenization
- Separation condition
- Microbial load
- PH
- Chemical composition
- Storage condition
- Viscosity

Analgesic:

Analgesics are the painkiller substances, which act by the absence of pain without losing consciousness. The word analgesic derives from Greek an- ("without") and algos ("pain"). [3]. According to international association for study of

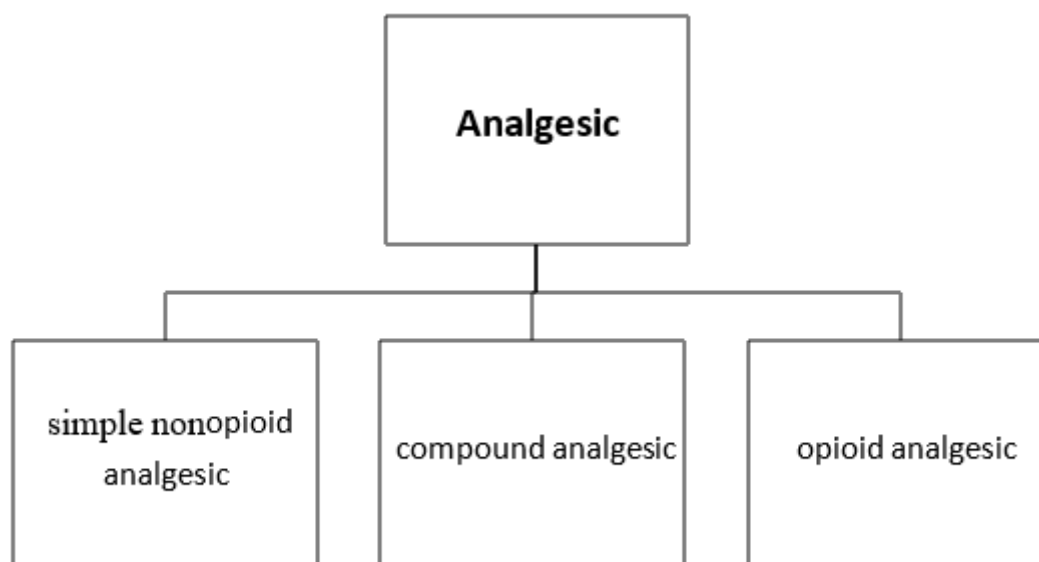


pain (IASP), Pain is defined as an unpleasant experience related to potential tissue damage. These agents function by either blocking pain signals or modifying the perception of pain within the brain. Analgesics serve as crucial components in managing a spectrum of pain, from mild discomfort to severe and chronic conditions [4]. Some types of analgesics are available over the counter. However, stronger variants are available only with a prescription. This is because strong analgesics are more likely to cause side effects such as dependence, addiction, and withdrawal

symptoms. Analgesics are available in many forms, including:

- Oral medications such as tablets, capsules, and liquids, parenteral.
- Topical creams, gels, and ointments
- Suppositories

Classification of Analgesic



Mechanism of action of Analgesics

The analgesia system is mediated by 3 major components:

- The Periaqueductal grey matter (in the midbrain)
- The nucleus raphe magnus (in the medulla)
- The pain inhibitory neurons within the dorsal horns of the spinal cord, which act to inhibit pain-transmitting neurons also located in the spinal dorsal horn [3].

Topical Drug Delivery:

Topical drug delivery can be defined as application of drug via skin to directly treat or cure the skin disorders. These topical drug delivery systems are generally used for local skin infection like fungal infection or where other route of administration is no suitable. It can penetrate deeper into skin and hence give better absorption. Topical application has no of advantages over the conventional dosage forms. In general, they are deemed more effective less toxic than conventional formulations due to the bilayer composition and structure. In the formulation of topical dosage forms, attempts have been made to utilize drug carriers that ensure adequate localization or penetration of the drug within or

through the skin in order to enhance the local and minimize the systemic effects, or to ensure adequate Percutaneous absorption. Topical preparation prevents the GI irritation, prevent the metabolism of drug in the liver so as increase the bioavailability of the drug. Topical preparations give its action directly at the site of action. That ensure adequate localization or penetration of the drug within or through the skin in order to enhance the local and minimize the systemic effects, or to ensure adequate Percutaneous absorption. Topical preparation prevents the GI irritation, prevent the metabolism of drug in the liver so as increase the bioavailability of the drug. Topical preparations give its action directly at the site of action.

ADVANTAGES:

- ❖ Avoidance of first pass metabolism.
- ❖ Convenient and easy to apply.
- ❖ Avoid of risk.
- ❖ Inconveniences of intravenous therapy and of the varied conditions of absorption like pH changes presence of enzymes gastric emptying time etc.
- ❖ Achievement of efficacy with lower total daily dosage of drug by continuous drug input.

DISADVANTAGES:

- ❖ Skin irritation of contact dermatitis may occur due to the drug and / excipients.
- ❖ Poor permeability of some drugs through the skin.
- ❖ Possibility of allergic reactions.
- ❖ Can be used only for drugs which require very small plasma concentration for action.

- ❖ Enzyme in epidermis may denature the drugs

Herbal analgesic cream

Herbal analgesics are natural products effective in reducing pain, soreness, and inflammation associated with various conditions. Herbal analgesics consist of components that are used as pain relievers or anti-inflammatory agents. They work by inhibiting pain signals to the brain or interfering with the interpretation of those signals. Additionally, they decrease inflammation by inhibiting the release of inflammatory cells. By combining analgesics, anti-inflammatory, and soothing agent in a semi solid emulsion base, analgesic creams provide localized comfort. While minimizing systemic side effects. Although most herbal analgesics are safe. Some of them may occasionally cause the side effects such as

- Constipation
- Diarrhea
- Drowsiness
- Headache
- Heartburn
- Blood in the stool
- Kidney damage

MATERIALS AND METHODS

Calotropis gigantea, Methyl salicylate, Liquid paraffin, Bees wax, Cetyl alcohol, Paraffin wax, Borax, Glycerin, Camphor, Menthol, Eucalyptus, Coconut oil, Rose water

METHOD OF PREPARATION

- All ingredients were accurately weighed and measured as per the formula.



- Beeswax, cetyl alcohol, and hard paraffin wax were melted together in a China dish to form the oil phase.
- After melting, liquid paraffin, methyl salicylate, camphor, menthol, eucalyptus oil, and coconut oil were added and heated at 65–70°C until a uniform mixture was obtained.
- For the aqueous phase, borax was dissolved in rose water, and then glycerin and *Calotropis gigantea* leaf extract were added while maintaining the same temperature (65–70°C).
- The hot oil phase was slowly added to the aqueous phase with continuous stirring to form an emulsion.
- Stirring was continued for about 10–15 minutes while keeping both phases at the same temperature for proper mixing and stability.
- The emulsion was allowed to cool gradually to 40°C and then to room temperature to obtain a smooth and uniform cream.
- The prepared cream was transferred into clean, airtight containers and stored in a cool place for further use.

Formulation of analgesic cream containing *Calotropis gigantea*

Ingredients(gm)	F1	F2	F3
<i>Calotropis gigantea</i>	1	1	1
Methyl salicylate	7.5	6.5	8.5
Liquid paraffin	1.2	1.2	1.2
Bees wax	3	4	4
Cetyl alcohol	0.5	1	0.5
Paraffin wax	2	3	3
Borax	0.2	0.2	0.2
Glycerin	3	2	2
Camphor	4	4	5
Menthol	5	6	5
Eucalyptus Oil	1	2	2
Coconut oil	16.6	13.1	11.6
Rose water	5	6	6



Evaluation of cream containing *Calotropis gigantea*

Organoleptic properties:

Formulated herbal creams was further evaluated by using the following physical parameters like color, odor, consistency and state of the formulation.

Colour:

The color of the cream was observed by visual examination. The results were shown in table 2.

Odour:

The odor of cream was found to be characteristics. The result was shown in table 2.

State

The state of cream was examined visually. The cream was semisolid in state and results was shown in table.

Consistency

The formulation was examined by rubbing cream on hand manually. The cream having smooth consistency^[5]

Physiochemical Properties

Irritancy

Mark the area (1 cm²) on the left-hand dorsal surface. Then the cream was applied to that area and the time was noted. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported ^[6]

Wash ability

A small amount of cream was applied on the hand and it is then washed with tap water (table5) ^[23]

Spread ability

Spread ability was evaluated by placing 0.5 g of cream on a glass slide and covering it with another identical slide, ensuring no air bubbles were trapped. A 500 g weight was placed on the top slide for 5 minutes to allow uniform spreading.

Sensitivity:

The prepared cream was applied on a 1 cm² area of the skin on the hand and then exposed to sunlight for 4–5 minutes. The site was observed for any signs of redness, irritation, or allergic reaction to assess skin sensitivity.^[7]

Determination of PH:

The pH meter was first calibrated using standard buffer solutions. Then, 0.5 g of the formulated herbal cream was accurately weighed and mixed thoroughly with 10 ml of distilled water. The pH of the resulting mixture was measured at room temperature using the calibrated pH meter.^[8]

Results and discussion

1. Results of Organoleptic Parameters

SI. No.	Parameters	F1	F2	F3
1.	Color	Faint green	Faint green	Faint green
2.	Odor	Characteristic	Characteristic	Characteristic
3.	Texture	Smooth	Smooth	Smooth
4.	State	Semisolid	Semisolid	Semisolid

Irritancy Test

A 1 cm² area was marked on the dorsal surface of the left hand, and the cream was applied to the

marked region. The site was observed at regular intervals for up to 24 hours for any signs of irritancy, erythema, or edema. Based on the observations, all three formulations (F1, F2, and



F3) showed no signs of irritancy, erythema, or edema.

Picture showing Irritancy test

Irritation study observations



Sl. No.	Formulation	Irritant effect	Erythema	Edema
1.	F1	Nil	Nil	Nil
2.	F2	Nil	Nil	Nil
3.	F3	Nil	Nil	Nil

Spread ability Test

The spread ability evaluation indicated that the formulated cream exhibited good spreading properties. It easily formed a uniform layer upon application, suggesting that the formulation can be applied smoothly and evenly on the skin. This characteristic is important for ensuring effective coverage, better absorption, and improved user experience during topical use.



Picture showing Spreadability

Table 5.3: Spread ability test observations

Formulations	Spread ability (gm cm/sec)
--------------	----------------------------

F1	4.5
F2	6.5
F3	7

Sensitivity Test

The sensitivity test revealed that the formulated cream did not produce any signs of skin sensitivity. No redness, irritation, or discomfort was observed on the tested area, indicating that the cream is well-tolerated and safe for topical application.



Picture showing Sensitivity test

Table 5.4: Sensitivity test observations

Sl.NO	Formulations	Sensitivity Reactions
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1	F1	No
2	F2	No
3	F3	No

Determination of pH

The pH of the developed cream was measured using a calibrated digital pH meter at room temperature. An appropriate amount of the cream was taken in a 50ml beaker, and the readings were recorded. The results of the pH determination are summarized in the corresponding table.



Picture showing pH test

Table 5.5: pH test observations

Sl. No	formulations	pH
1	F1	5.9
2	F2	5.7
3	F3	5.6

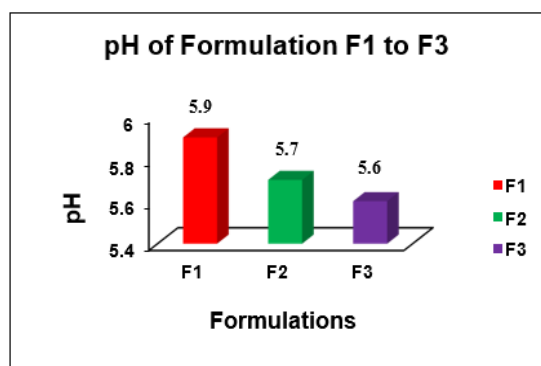


Fig 5.6 : Results of pH test

- *Calotropis gigantea* herbal analgesic creams were prepared using varied quantities of natural oils (eucalyptus oil and coconut oil) via the oil-in-water (O/W) method to determine the optimal formulation.
- The creams were evaluated for general appearance, sensitivity, irritation, washability, pH, and spread ability; all formulations passed the tests.
- Among the formulations (F1, F2, F3), F3 demonstrated superior analgesic and anti-inflammatory properties.
- Irritancy tests showed no redness, edema, irritation, or erythema in any formulation.
- All formulations exhibited good semisolid consistency, characteristic color, and odor, and did not induce sensitivity reactions under sunlight exposure.
- Being O/W type, the creams provide nourishing and moisturizing benefits.
- Spread ability values were within standard limits; F1 showed slightly better spread ability (4.5 gm cm/sec) compared to others.
- pH of all formulations ranged from 5.5 to 6.5, suitable for topical application; F3 had a pH of 5.6, requiring no adjustment.
- Comparative evaluation of F1, F2, and F3 highlighted F3 as the optimal formulation balancing efficacy, texture, and user preference.

CONCLUSION



- Natural oils like eucalyptus oil and coconut oil were found to be effective for the formulation of *Calotropis gigantea* analgesic cream.
 - F3 is safe for use, suitable for topical application on muscles, joints, chest, and dry skin areas, making it versatile for daily use.
 - Herbal remedies are generally preferred due to their perceived safety and lower risk of side effects than synthetic products.
 - Further detailed stability studies are recommended to enhance the overall quality of the product.
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