WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 19, 1288-1299. Research Article ISSN 2277–7105

FORMULATION AND EVALUATION OF COLD CREAM USING DIFFERENT NATURAL OILS

Nayana P. V.*, Navyashree P. S., Nithyashree H. P., Pavan N. K., Preethi N. S. and Rakshitha C.

Dept. of Pharmaceutics Bharathi College of Pharmacy Bharathinagara – 571422 Maddur Taluk, Mandya District Karnataka, India.

Article Received on
19 August 2024,

Revised on 09 Sept. 2024,
Accepted on 29 Sept. 2024

DOI: 10.20959/wjpr202419-34116

***Corresponding Author**
Nayana P. V.
Dept. of Pharmaceutics Bharathi College of Pharmacy Bharathinagara – 571422 Maddur taluk, Mandya District Karnataka, India.

ABSTRACT

Cosmetics are products designed to enhance and beautify human appearance. This research focused on developing and assessing plant-based formulations, specifically aloe vera incorporated via the water-in-oil technique, with the goal of nourishing and hydrating the skin. A cold cream containing natural oils and aloe vera extract was evaluated for its quality through various methods. The formulated creams exhibited stable physical properties throughout the study, demonstrating good consis tency, spreading ability, appropriate pH levels, and no signs of phase separation. The stability of the cream, including its appearance, properties, viscosity, and fragrance, remained consistent over time. Cold creams, enriched with herbal extracts, offer a cooling and soothing effect as the water in the emulsion gradually evaporates. Herbal creams present several advantages compared to commercially produced creams. They do not have the adverse effects often found in synthetic products and instead contribute to skin nourishment. This study aimed to formulate a cold cream using natural oils and extracts from natural sources, deliberately avoiding synthetic chemicals.

KEYWORDS: Cosmetics, Natural oils, Cold cream, Mechanism, Evaluation.

INTRODUCTION

Cosmetics are products commonly used to enhance and purify the skin. The term "cosmetics" comes from the Greek word “kosmestikos,” which means to adorn. Over time, this has come to refer to materials used to improve appearance and beautify the skin. Throughout history,

herbal cosmetics have been employed for skin beautification. A cold cream, specifically, is a type of water-in-oil emulsion.[1] In our formulation, we incorporated herbal ingredients: Neem oil, coconut oil, sesame oil, olive oil and Almond oil and Aloe Vera gel. Aloe vera gel serves as a moisturizer, helps in alleviating pimples and acne, and is also used for treating burn wounds. Neem provides antifungal and anti-inflammatory benefits and is effective in reducing scars, pigmentation, redness, and itching of the skin.[2] Cold creams also have some dis-advantages such as, limited absorption, poor permeability, skin irritation and drug denaturation.[3]

Mechanism[4]

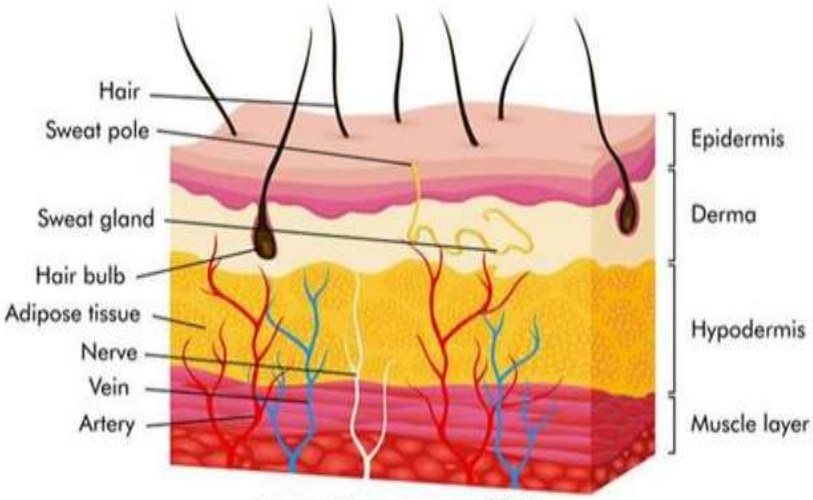


Fig 1 Structure of Skin

When a topical drug is applied to the skin, it initially diffuses into the outermost layer known as the stratum corneum. This layer acts as a primary barrier to drug penetration. There are three primary pathways through which drugs can traverse the skin.

The first pathway involves the skin appendages, often referred to as the “first cut.” Here, drug molecules can enter structures like sweat glands and hair follicles, effectively bypassing the stratum corneum barrier. This route can significantly enhance drug delivery, especially for hydrophilic molecules that might struggle to penetrate the lipid-rich environment of the stratum corneum.

If the drug does not utilize this appendage route, it generally remains within the bilayered lipids of the stratum corneum. From there, it can penetrate deeper layers of the skin through two main routes: the transcellular and paracellular pathways.

In the paracellular route, drug molecules travel between the skin cells, navigating through tight junctions. This method allows for the transport of smaller solutes but requires the drug to move through the lipid-rich stratum corneum, which can be a challenging environment.

Alternatively, in the transcellular route, drug molecules are absorbed directly through the skin cells. This pathway is often more favorable for larger or more lipophilic molecules. By crossing the lipid bilayers, the drug can access a more hydrophilic environment within the cells, facilitating further diffusion into the deeper layers of the skin.

Throughout this transport process, drug molecules may interact with various skin components, including keratin, a major structural protein in the stratum corneum. This binding can influence the drug's absorption and overall efficacy. Understanding these pathways is crucial for optimizing the formulation and delivery of topical drugs, ultimately enhancing therapeutic outcomes.[5]

Benefits of herbal cosmetics

- Being natural, it shows less harmful effect on skin.
- Economical and easily available.
- Enhances the energy level in body.
- Relatively safe and it normalizes the body function.
- Shows flexibility in formulations.
- It contains high content of vitamins and minerals.
- Convenient to all the population.[6]

Ingredients profile

Role of ingredients

➢ **Aloe vera[7]**

- Anti-inflammatory, anti-aging
- Wound healing
- Soothe sunburn

➢ **Almond oil[8]**

- Soften and nourishes the skin.
- Cures skin irritations and allergies.

➢ **Neem oil**

- It contains anti-oxidant properties
- Antifungal and anti-bacterial properties.

➢ **Coconut oil**[9]

- Help to moisturize the skin.

➢ **Sesame oil**[10]

- Anti- inflammatory, emollient.
- Hydrate the skin.

➢ **Olive oil**[11]

- Anti-inflammatory
- Prevent from Sun damage.

➢ **Bees wax**[12]

- Helps to emulsify and stabilize the cream.

➢ **Borax**

- Anti-microbial agent, buffering agent.
- It acts as emulsifying agent.

➢ **Liquid paraffin**[13]

- Used in the treatment of dry skin, acts as lubricating agent.
- It is an emollient.

➢ **Sodium benzoate**

- Antifungal, antibacterial.
- It prolongs the shelf life of product.

➢ **Vitamin E capsule**[14]

- Act as Anti-oxidant.

➢ **Rosemary**

- Soothing and calming effect.

Method of preparation[15]

F_1: Formulation of cold cream using almond oil

Sl. no	Ingredients(gm)	F_1
1.	Aloe vera gel	6.5gm
2.	Neem oil	3ml
3.	Almond oil	5ml
4.	Liquid paraffin	10ml
5.	Borax	0.5gm
6.	Bees wax	3gm
7.	Sodium benzoate	0.04gm
8.	Vitamin E capsule	2 capsules

- Take required quantity of Beeswax and Liquid paraffin in porcelain dish.
- Heat this mixture in water bath for melting purpose. Remove dish from water bath.
- Take Borax and distilled water in beaker. Heat this solution in water bath for about 75C.
- This Borax solution added drop wise in porcelain dish with continuous stirring. Add Methyl paraben in porcelain dish dissolved it.
- Add Neem oil and Almond oil in this solution. Add perfume for fragrance. Herbal Cold Cream was obtained.

F_2.: Formulation of cold cream using coconut oil

Sl. no	Ingredients(gm)	F_2
1.	Aloe vera gel	6.5gm
2.	Neem oil	3ml
3.	Coconut oil	5ml
4.	Liquid paraffin	10ml
5.	Borax	0.5gm
6.	Bees wax	3gm
7.	Sodium benzoate	0.04gm
8.	Vitamin E capsule	2 capsules

- Take required quantity of Beeswax and Liquid paraffin in porcelain dish.
- Heat this mixture in water bath for melting purpose. Remove dish from water bath.
- Take Borax and distilled water in beaker. Heat this solution in water bath for about 75C.
- This Borax solution added drop wise in porcelain dish with continuous stirring. Add Methyl paraben in porcelain dish dissolved it.
- Add Neem oil and coconut oil in this solution. Add perfume for fragrance. Herbal Cold Cream was obtained.

F_3: Formulation of cold cream using olive oil

Sl. No	Ingredients(gm)	F_3
1.	Aloe vera gel	6.5gm
2.	Neem oil	3ml
3.	Olive oil	5ml
4.	Liquid paraffin	10ml
5.	Borax	0.5gm
6.	Bees wax	3gm
7.	Sodium benzoate	0.04gm
8.	Vitamin E capsule	2 capsules

- Take required quantity of Beeswax and Liquid paraffin in porcelain dish.
- Heat this mixture in water bath for melting purpose. Remove dish from water bath.
- Take Borax and distilled water in beaker. Heat this solution in water bath for about 75C.
- This Borax solution added drop wise in porcelain dish with continuous stirring. Add Methyl paraben in porcelain dish dissolved it.
- Add Neem oil and olive oil in this solution. Add perfume for fragrance. Herbal Cold Cream was obtained.

F_4: Formulation of cold cream using Sesame oil

Sl. no	Ingredients(gm)	F_4
1.	Aloe vera gel	6.5gm
2.	Neem oil	3ml
3.	Sesame oil	5ml
4.	Liquid paraffin	10ml
5.	Borax	0.5gm
6.	Bees wax	3gm
7.	Sodium benzoate	0.04gm
8.	Vitamin E capsule	2 capsules

- Take required quantity of Beeswax and Liquid paraffin in porcelain dish.
- Heat this mixture in water bath for melting purpose. Remove dish from water bath.
- Take Borax and distilled water in beaker. Heat this solution in water bath for about 75C.
- This Borax solution added drop wise in porcelain dish with continuous stirring. Add Methyl paraben in porcelain dish dissolved it.
- Add Neem oil and sesame oil in this solution. Add perfume for fragrance. Herbal Cold Cream was obtained.

Evaluation

1. Organoleptic properties

The sensory characteristics, including colour, smell, and appearance, were noted.[16]

2. Sensitivity test

The cream that was prepared was applied to the skin of the hand and exposed to sunlight for 4 to 5 minutes.[17]

3. Grittiness

The formulation was examined using a compound microscope to check for the presence of any particles.[18]

4. pH

The calibration of the pH meter was done with a standard buffer solution. The pH of a solution made by dissolving 0.5 g of cream in 50 ml of distilled water was measured using a digital pH meter.[15]

5. Spreadability

Spreadability is determined by measuring the time, in seconds, it takes for two glass slides to separate from the cream; a shorter time indicates better spreadability. To perform the measurement, 3 g of herbal cream was placed between two slides and pressed to create a uniform thin layer. A weight of 1000 g was then applied for 5 minutes. Following this, an additional 10 g was added using a pan, and the upper slide was connected to a string and hook for pulling. The time taken for the upper slide to move 10 cm over the lower slide was recorded, and spreadability was calculated using the designated formula.

$S=M\times LT$

Where;

M =weight tied to upper slide,

L = length of glass slides,

T = time taken to separate the slides.[18]

6. Irritancy test

Designate a 1 cm^2 area on the left dorsal surface. The cream was then applied to this marked area, and the time was recorded.[15]

7. Dilution test

The type of emulsion is identified by diluting it with either water or oil. An o/w (oil-in-water) emulsion will completely mix with water, since water is the dispersion medium, while a w/o (water-in-oil) emulsion will separate out when mixed with water. Conversely, a w/o emulsion will mix with oil, whereas an o/w emulsion will not dissolve in an oily substance.[16]

RESULTS

➢ Organoleptic properties

Result of organoleptic properties

Sl. no	Properties	F^1	F^2	F^3	F^4
1	Colour	White	White	White	White
2	Odour	Rose-Mary	Rose-Mary	Rose-Mary	Rose-Mary
3	Appearance	Semi-solid	Semi-solid	Semi-solid	Semi-solid

➢ Sensitivity test

Results of sensitivity test

Sl. No	Formulations	Oils	Sensitivity
1	F^1	Almond oil	NO
2	F^2	Coconut oil	NO
3	F^3	Olive oil	NO
4	F^4	Sesame oil	NO

➢ Grittiness

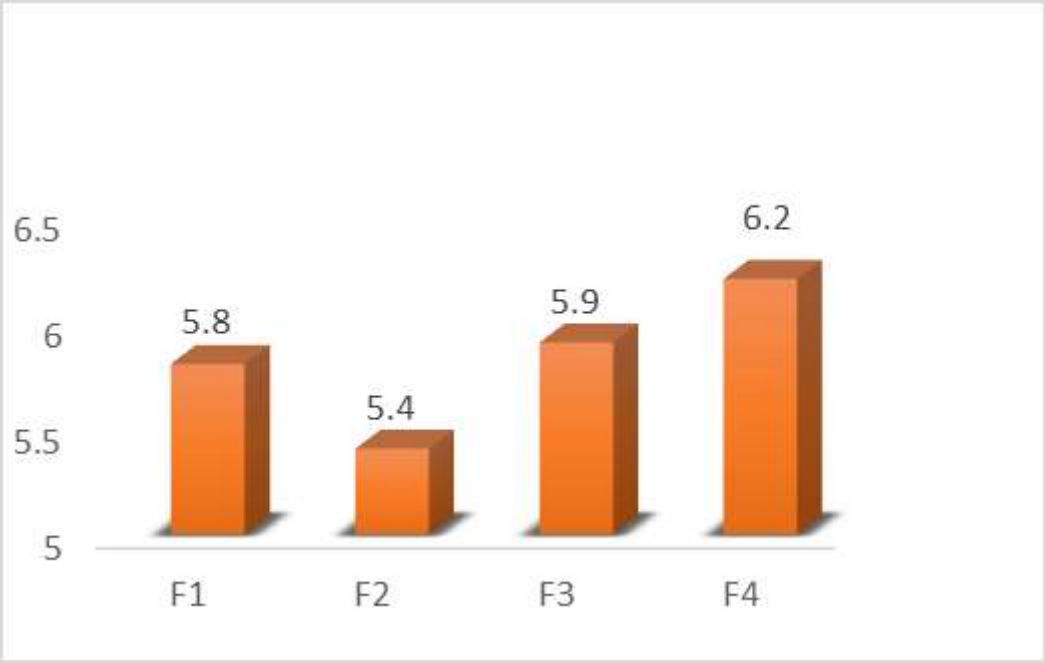
Result

The formulated cream does not contain any extraneous particles.

➢ PH determination

Results of p^H determination

Sl. No	Formulations	Oils	PH
1	F^1	Almond oil	5.8
2	F^2	Coconut oil	5.4
3	F^3	Olive oil	5.9
4	F^4	Sesame oil	6.2

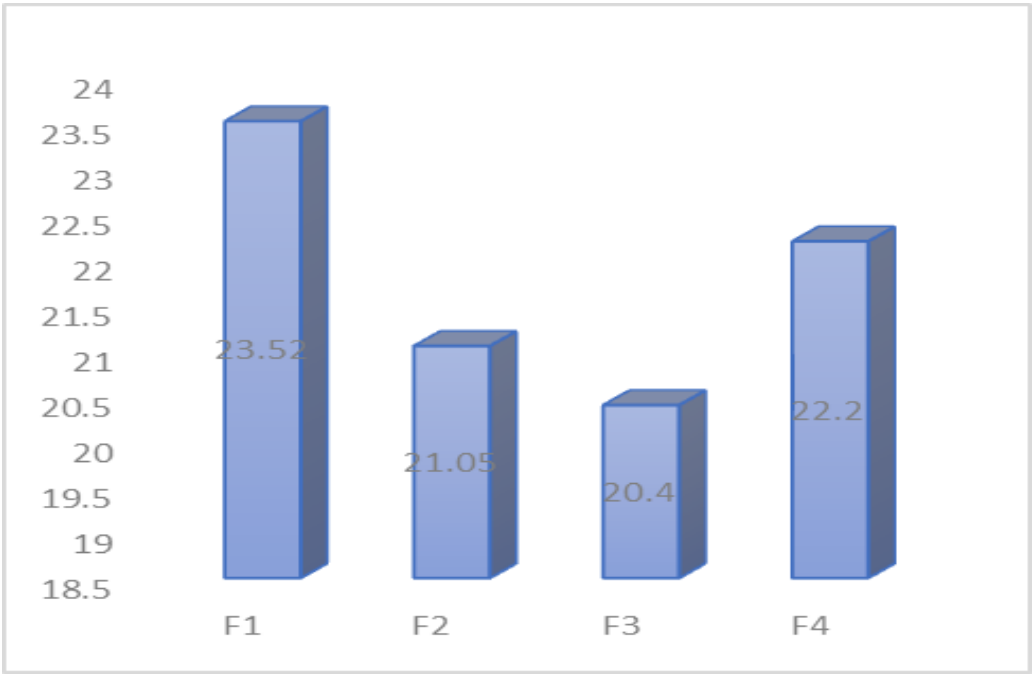


Graphical representation P^H

- **Spreadability**

Results of spreadability test

Formulations	Mass (gm)	Radius (gm)	Time (sec)	Spreadability (gmcm/sec)	spreadability
F^1	100 gm	2.0	8.5	23.52	Spreadable
F^2	100 gm	2.0	9.5	21.05	Spreadable
F^3	100 gm	2.0	9.8	20.40	Spreadable
F^4	100 gm	2.0	9	22.2	Spreadable



Graphical representation of Spreadability

The spreadability test showed that the formulated cream has good spreadable properly.

- **Irritancy test**

Results of irritancy test

Sl. No	Formulations	Redness	Edema	Irritation	Inflammation
1.	F^1	NO	NO	NO	NO
2.	F^2	NO	NO	NO	NO
3	F^3	NO	NO	NO	NO
4	F^4	NO	NO	NO	NO

- **Dilution test**

Results of dilution test

Sl. No	Formulation	Water	Oil
1	F^1	Immiscible	Miscible
2	F^2	Immiscible	Miscible
3	F^3	Immiscible	Miscible
4	F^4	Immiscible	Miscible

The formulated creams are found to be W/O type of emulsion.

CONCLUSION

From the above results it is concluded that the formulated creams shows good consistency, spreadability, p^H and there is no phase separation during the work. It does not show any sensitivity reactions and also no irritancy, the natural oils such as neem oil, almond oil, sesame oil, olive oil and coconut oil were found to be better suited for the formulation of cold cream. Natural oils are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. From the above study it can be concluded that the all formulations were good and also herbal cold cream containing natural oils is safe to use as it is developed from herbal extract. Further detailed stability studies are needed to improve the overall quality of the product.

REFERENCE

1. Oswal Rajesh. Formulation and evaluation of polyherbal cold cream; JETIR, 2014; 10(9): 464-472.
2. Sahu P, Chandravanshi A, Bhuneshwar, Singh S, Sharma H, Sahu G K. Development of Analgesic Chewable gummy tablet for palatable drug delivery. International Journal for Multidisciplinary Research, 2023; 5, 2: 2582-2160.

3. Chanchal D, Swarnlata S. Novel approaches in herbal cosmetics. J Cosmet Dermatol, 2008; 7(2): 89-95. doi: 10.1111/j.1473- 2165.2008.00369.
4. Roshan Yadav, Pharmaceutical preparation & evaluation of cold cream; Int. J. Innov. Scie & Res. Tech, 2023; 8(5): 1069-1075.
5. Topical drug delivery [Internet]. Wikipedia, 2023 [2023]. Available from:https://en.m.wikipedia.org/wiki/Topical_drug_delivery#Mechanism.
6. Shital V, A review on preparation and evaluation of herbal cold cream; world. J. Pharma. Res, 2022; 11(5): 690-97.
7. Mali, A. S., Karekar, P., & Yadav, A. V. Formulation and evaluation of multipurpose herbal cream. International Journal of Science and Research, International Journal of Science and Research, 2015; 4(11): 1495-1498.
8. Ahmad Z. The uses and properties of almond oil. Complement Ther Clin Pract, 2010; 16(1): 10-12. doi: 10.1016/j.ctcp.2009.06.015
9. Shanbhag T, Amuthan A, Shenoy S, Sudhakar. Effect of Neem, Aloe vera, Triphala and Garlic on the healing of cutaneous wounds in Wistar albino rats. Pharmacologyonline, 2010; 3: 1037-1045.
10. Ogawa S, Takada M, Miyamoto S, Nagamachi H, Kitagawa K, Tsukada K. Effects of sesame oil on human health. Juntendo Medical Journal, 2015; 61(3): 208-215. doi: 10.14789/jmj.61.208
11. Lin TK, Zhong L, Santiago J. Anti-inflammatory and skin barrier repair effects of topical application of some plant oils. Int J Mol Sci, 2017; 19(1): 70. doi: 10.3390/ijms19010070
12. Dipali Bolde, A research on: Formulation and evaluation of natural sesame oil based herbal cream. Int J Creat Res thoug, 2024; 12(6): 108-120.
13. Meera Deokar, Research on: Formulation of Herbal cold cream. World J Pharma Res, 2024; 18(10): 465-472.
14. Durgesh Sanjay P, Formulation and evaluation of moisturizing cream using Marigold and ginger. World J Pharma Res, 2024; 13(9): 1938-1950.
15. Anshul S, Formulation and evaluation of herbal cold cream; IJARIIE, 2023; 9(3): 2578-2587.
16. Harshada ghogare, preparation and evaluation of herbal cold cram; Int. J. Pharma. res. Appli, 2022; 7(40).
17. D Ajinath ekanth, Formulation and evaluation of herbal cold cream by sandalwood oil; Int. J. Creat. Res. Thoughts, 2023; 11(5): 1.

18. Busaid M, Akhtar M S, Alam T, Shehata W A. Development and evaluation of herbal cream containing Curcumin from Curcuma longa. Pharm Pharmacol Int J, 2020; 8(5): 285-89.