

FORMULATION AND EVALUATION OF HERBAL COLD CREAM

ANSHUL SHARMA¹, MANEESH BANYAL², JYOTI GUPTA³, SWATI JOSHI⁴

1 Student, Department of pharmacy, IEC University, Baddi, Himachal Pradesh

2 Assistant professor, Department of pharmacy, IEC University, Baddi, Himachal Pradesh

3 HEAD OF DEPARTMENT, Department of pharmacy, IEC University, Baddi, Himachal Pradesh

4 Assistant professor, Department of pharmacy, IEC University, Baddi, Himachal Pradesh

Abstract:

Herbal cosmetics are products intended to enhance and beautify human appearances. In order to nourish and moisturize the skin, the current study set out to formulate and evaluate herbal cold creams that contained plant extracts, liquid paraffin as a lubricating agent, bees wax as stabilizer, methyl paraben as an antibacterial agent by using the water in oil method. The cold cream is prepared by using the neem oil and almond oil. After preparation of cream, cream were evaluated for different parameters like appearance, PH, viscosity, stability test, dye test, spread ability & Test for microbial growth. From evaluation study it was concluded that it is a very good attempt to formulate the herbal face pack containing naturally available ingredients like neem and almond. It was also concluded that the prepared formulation was physico-chemically and microbiologically stable, and possessed characteristics of a standard cosmeceutical's formulation for skincare.

Key Words: cold cream, almond oil, rheological studies.

I. INTRODUCTION

Cosmetics are the products which are generally used to beautify the skin and also to purify the skin. The cosmetics are the word derived from Greek word – 'kosmesticos' which means to adorn. Cold cream is the water in oil emulsion. Cold cream gives the prolonged contact time in the site of application as compared to the other semisolid dosage form or formulation. They give elegance to the skin and it is not that much greasy. Due to the oil phase, it gives an emollience to the skin. The function of the cold cream is for restoring moisture to dry skin, it allows to eliminate the waste materials from the pores and also cools the body. It is easily watered washable and easy to wash away. They are non-irritating when applied on the skin.[1] The water phase gives extra conservation to the skin. It gets liquefy at body temperature. It gets penetrated via the epidermis of the skin via the natural pores. More recently anti-aging creams have been manufactured which can retain younger looking skin for many years. The best cleansing agents are cleansing creams, soap and water. Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application. Cream is classified as oil in water and water in oil emulsion. It is applied on outer part or superficial part of the skin and its main ability is to remain for a longer period of time at the site of application. The function of a skin cream is to protect the skin against different environmental condition, weather and gives soothing effect to the skin. There are different types of creams like cleansing, cold, foundation, vanishing, night, massage, hand and body creams. The main aim of our work is to develop a herbal cream which can give multipurpose effect, like moisturizer, reduce acne and skin irritation, reduce skin diseases like eczema, psoriasis, dry skin, wrinkles, rashes etc. and also adding glow to the face. [2,3] We have used two herbal ingredients in our preparation which are Neem, Almond. Aloe Vera gel is used as a moisturizer, to reduce pimples and acne and also used for treatment of burn wounds. Neem is used as an antifungal and anti-inflammatory and it is also used to reduce scar, pigmentation, redness and itching of the skin. From that time the materials which are used to promoting appearances or to beautify the skin are called as cosmetics. From ancient time till now people are still using polyherbal or herbal cosmetics for the beautification of skin. Cold cream is the water in oil emulsion. Cold cream gives the prolonged contact time in the site of application as compared to the other semisolid dosage form or formulation. They give elegance to the skin and it is not that much greasy. Due to the oil phase, it gives an emollience to the skin. The function of the cold cream is for restoring

moisture to dry skin, it allows to eliminate the waste materials from the pores and also cools the body. It is easily watered washable and easy to wash away. They are non-conservation to the skin. It gets liquefy at body temperature natural pores. [1,4]

THE ANATOMY OF SKIN

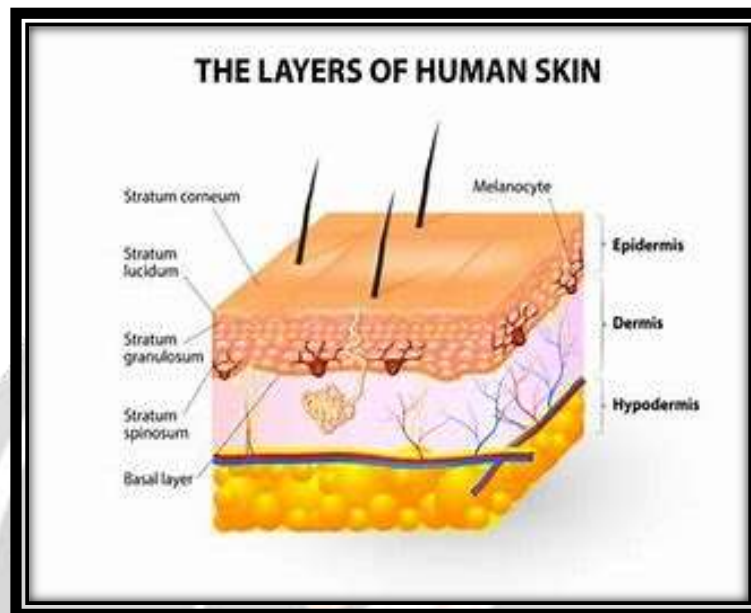


Fig.1 Structure of skin

Skin is the largest organ of the body in term of surface area and weight. It has surface area of approximately 16000cm. In adults, skin represent 8% of body weight. It is the outermost layer or tissue of the living body. Skin shows a protective mechanism from external environment. Skin can produce a favorable chemical substance named as vitamin D when skin is exposed in sunlight. The skin helps to regulate the temperature of the human body and also acts as sensory organ. Skin includes various cellular elements like melanocytes, erythrocytes, keratinocytes etc. It has multi-layer structures because of different components like cells and fibers. [5,6]

The skin consists of skin layers

A. The Epidermis

The outermost layer of the skin is called epidermis which having thickness of about 0.2mm. No veins and capillaries are located in this layer. The thickness of epidermis is depending upon the location of the body. The epidermis mainly consists two types of cells- keratinocytes and dendrites cells. It also contains other number of cells like melanocytes, Langerhans cells etc. The epidermis layer is also called as the metabolic active tissue. [4,7]

The outermost layer is classified into five sub layers and these are

- 1)Stratum corneum
- 2)Stratum lucidium
- 3)Stratum granulosum
- 4)Stratum spinosum
- 5)Stratum Basale

1) Stratum corneum: The exterior sublayer of the epidermis is called as stratum corneum. It is also referred as the horny cell layer having thickness of about 8-15 μ m. The layer is of hexagonal shaped and is helpful for prevention of skin from the large amount of dehydration. It contains main component “ceramide”, which having important role in water retention.

2) Stratum lucidum: Stratum lucidum is composed as thin clear layer of dead skin cells. It is found only in areas of thick skin on the palms of the hands and soles of the feet.

3) Stratum granulosum: The layer is also called as granular cell layer having thickness of 3 μ m. It contains 2-4 layers of granular cell. The shape of the cells is flatter because the keratin fibers are increasingly filled up into the cells.

4) Stratum spinosum: It is also called prickle cell layer having thickness ranges from 50- 150 μ m. It consists of number of cells, which may differ in shape and structure.

5) Stratum basale: Stratum Basale is composed as single layer and is the deepest and sublayer of epidermis. In stratum basale, keratinocytes are produced and shows their movement upward to the outer surface. The process of movement of keratinocytes is known as turnover. For one cycle of this process takes days and keratinocytes also changes their functions and structure. This is also called as basal cell layer and holds 8% of water in epidermis

B. The Dermis

1) Most of the magic happens in the dermis — at least in the skin. Most of the dermis is made up of collagen and elastin as well as fibroblasts . This layer has several functions.

2) In the dermis there are blood vessels and the lymphatic vessels that nourish the skin and eliminate waste products or toxins.

3) Sweat glands are present in the dermis. They create sweat through your pores, removing impurities as cool your body.

4) The hair follicles (where your hair attaches) and the sebaceous glands, which produce the oils that make the skin soft and smooth the skin- sometimes overzealously resulting in rashes and oily skin — are also found in the dermis.[8,9]

C. The Subcutaneous layer

1) The deepest layer of skin is the layer of fat that connects your bones to your muscles and bones. It goes deep that the active ingredients in your skincare products can never reach.

2) The subcutaneous layer is like a thermostat. It protects the body and can also be used as a source of energy in a pinch.

3) Fat also acts as a filter, protecting your muscles, bones and organs from damage.

4) Finally, the subcutaneous layer contains additional blood vessels, nerve endings, hair follicular roots and the deepest oil-producing sebaceous glands.[9]

Advantages of Herbal Cold Cream[4,10,11]

1. It Prevents ageing and dehydration of skin.

2. As cold creams contain enough amount of water and oil, they keep skin safe from the rough environments.

3. They also keep skin moisturized and safe

4. Cold creams are designed to remove makeup and smooth the skin

5. Medicated cold cream is mainly used as topical pharmaceutical dosage form for the treatment of skin.

6. To help in the maintenance of moisture balance of skin and avoid rough skin co uses of cold cream (non-medicated).

7. As cleansing preparation to remove make

8. To provide an emollient effect and oily protective layer on the skin.

9. Also, provide a chemical barrier as with sun block ingredients.

10. As a carrier for drug substances such as diflucortolone valerate in medicated cream.

Ideal Properties of Herbal Cold Cream [12,13]

1. It should not normally be diluted.
2. The pH of the cold cream must be optimum from 4.6–6.0
3. Its consistency should be optimum so that it can be easily put out from the container and apply easily. 4. Should give a cooling effect on the skin after external application.
5. It must provide a thin waxy protective layer on the skin to protect the water evaporation from the skin surface.
6. Should give a faster emollient effect, so that very dry skin can swell up and become soft within a short time.
7. Less greasy than ointment and Easily spread on the skin.
8. It should be physically and chemically stable throughout its shelf-life.
9. The excipients should be compatible with each other. It should be sterile.

4.3 Application of Herbal Cold Cream to skin [14,15]

Despite their intended design as facial moisturizers, cold creams are actually very versatile and can be used in a number of different ways. First, one of its most popular uses is as a makeup remover. The thick oils are able to gently melt makeup and dirt away, allowing it to be removed with minimal damage, rubbing or scrubbing. Similarly, some find it effective as a primer for cosmetic foundations as it smooths the skin and allows makeup to be applied more evenly across the face. Since it removes makeup without water, Kelly says it even is a great product to take camping or on road trips where you may be away from your bathroom sink or shower! Lastly, cold creams can also be effective as a lip balm, body lotion, or even a shaving cream. Using a cold cream on your lips helps lock in vital moisture and provide hydration throughout the day to the sensitive skin on the lips. Likewise, applying a moisturizing cold cream to your body delivers the same intense hydration that the cream is designed to provide to your face but to your arms, legs, back, and hands.

4.4 Cold Cream Benefits [11,15]

The benefits of cold cream are quite simple. By design, cold cream is meant to topically moisturize the skin, so anyone looking to boost the hydration of their skin can benefit from using this product. However, those with particularly sensitive skin or dry, itchy skin will benefit the most from using it daily to improve the texture and appearance of their complexion. These effects are likely the result of the cold cream's ability to help restore the skin's effectiveness as a natural barrier to the environment, something that is lost when your skin is too dry.

4.1 Ingredients of Formulations [16,17]

All the natural materials used in the present study i.e., Almond oil, Neem oil from local market, in a form of dried powder. The details of the plant material used for the formulation of cold cream are mentioned below

1. Almond oil
2. Neem oil
3. Borax
4. Beeswax
5. Rose water

A. Almond Oil



Fig.2 Almond oil

It's also anti-inflammatory and boosts immunity. Containing omega-3 fatty acids, almond oil might help you maintain healthy cholesterol levels and improve your memory. It may help lower your risk for diseases like cancer and heart disease.

B. Neem Oil (Azadirachtaindica)



Fig.3 Neem oil

Neem oil is a naturally occurring pesticide found in seeds from the neem tree. Neem oil is a mixture of components. Azadirachtin is the most active component for repelling and killing pests and can be extracted from neem oil. The portion left over is called clarified hydrophobic neem oil.[30]

C. Borax



Fig. 3 Borax

Borax, combined with wax, is used in many cosmetic products like creams, gels, and lotions. It is famously used in hand soaps to help wash off the oil or grease from the hands. Borax's alkaline nature makes it a perfect ingredient in cleansers and toners. In cosmetic products, borax is sometimes used as an emulsifier, buffering agent, or preservative for moisturizing products, creams, shampoos, gels, lotions, bath bombs, scrubs, and bath salts. Borax is also an ingredient combined with glue and water to make “slime,” a gooey material that many kids enjoy playing with right from creams and body lotions to shampoos, bath gels and even the in-vogue bath bombs, just about every product associated with skincare has Borax as one of its components. Given its mild and antiseptic nature, quite a few natural cosmetic products tend to include Borax as an essential ingredient as well. [30]

D. Bee wax



Fig.4 Bee wax

Ability to Protect from Irritants-Beeswax can also act as a layer of protection when applied to the skin. It can protect skin from environmental irritants and extreme weather. Promotion of Hair Growth-Beeswax not only moisturizes and soothes hair, but it can keep moisture from getting out of the hair. Beeswax can create a protective layer on the skin. It's also a humectant, which means that it attracts water. Both of these qualities can help the skin stay hydrated. Beeswax is also a natural exfoliator, ideal for sloughing away dead skin cell. Beeswax heals and softens skin, and is an antibacterial agent. It can help you fight conditions like acne, dry skin, eczema, and stretch marks. Our raw beeswax can help you create your own skin care moisturizers and lotions specially formulated just for you.[27,28]

E. Rose Water



Fig.5 Rose water

Rose water is especially hydrating when combined with other moisturizing ingredients, such as ceramides or glycerin. “These help to moisturize the skin, protect the skin barrier and prevent further water loss from the skin,” says Allawh. However, it shouldn't replace your current moisturizer. Rose water has been used as a beauty product for thousands of years, so it's no surprise that it can improve your complexion and reduce skin redness. The antibacterial properties may help reduce acne. The anti-inflammatory properties can reduce skin redness and puffiness. Rose Water Maintains the Skin's Natural pH Balance. Chemically produced soaps and cleansers disrupt the pH balance of our skin, making it prone to bacteria that cause various skin conditions like rashes and acne. This property helps rose water restore the skin to its normal pH level.

4.2 Method of Preparation [19,20,15]

- 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 75 C.
- 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

TABLE 1: Composition of Herbal cold cream

Sr No.	Name of Ingredient	Scientific name	Quality (for 100gm)	Uses
1	Methyl Paraben	methyl p-hydroxybenzoic acid	0.010 gm	Antibacterial properties and Preservation
2	Borax	sodium tetraboratedecahydrate	0.25 gm	Stability
3	Beeswax	Apiccerana, Apis Mel, Apismellifera, ApisMellif	15 gm	emulsifying agent, stabilizer
4	Liquid Paraffin	petrolatum	50 gm	Prevents skin itching and lubricating agent
5	Neem Oil	Azadirachtaindica	23 gm	Prevent or even kill fungus
6	Almond oil	Prunusdulcis var. dulcis.	25 gm	protective layer skin

EVALUATION OF HERBAL COLD CREAM [21,22]

Morphological Evaluation

Physical properties: The cream was observed for the color, odor and appearance.

Physicochemical Evaluation: -

Washability: The cream was applied on the hand and observed under the running.

- **pH:** The pH meter was calibrated with the help of standard buffer solution. Weight 0.5 gm of cream dissolved it in 50 ml of distilled water and its pH was measured with the help of digital pH meter.
- **Viscosity:** Viscosity of the cream was determined with the help of Brookfield viscometer at 100 rpm with the spindle no.
- **Spread ability test:** The cream sample was applied between the two glass slides and was compressed between the two-glass slide to uniform thickness by placing 100 gm. of weight for 5 minutes then weight was added to the weighing pan. The time in which the upper glass slide moved over the lower slide was taken as a measure of spread ability.

$$\text{Spread ability} = \frac{M}{L \times T}$$
 Where M =weight tight to upper slide
 L =length moved on the glass slide
 T =time take
- **Irritancy test:** Mark an area (1 sq.cm) on the left-hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs. and reported. [25,26]
- **Test for microbial growth:** Agar media was prepared then the formulated cream was inoculated on the plate's agar media by steak plate method and a controlled is prepared by omitting the cream. The plates were placed in the incubator and are incubated in 37 0 C for 24 hours. After the incubation period, the plates were taken out and the microbial growth were checked and compared with the control.[23,24]
- **Dye test:** The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide then covers it with a cover slip, and examines it under a microscope. If the disperse globules appear red the ground colorless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colorless.
- **Homogeneity:** Homogeneity was tested via the visual appearance and test.

RESULT AND DISCUSSION

Following evaluation parameters were performed to ensure superiority of prepared cold cream

6.1 Morphological Evaluation

Herbal cold cream was evaluated for morphological parameters showed in the Table 2. The color of formulation was yellowish. The odor of prepared formulations was pleasant and good acceptable which is desirable to cosmetic formulations. Texture and smoothness were acceptable as per requirement of cosmetic formulations.

TABLE 2: Morphological Evaluation

Sr.No	Parameters	Observations
1	Colour	Whitish green
2	Odour	Pleasant
3	Texture	Smooth

6.2 Physicochemical Evaluation

- **pH:** Herbal cold cream was evaluated for physicochemical parameters showed in the Table 3. The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. The herbal formulation was shown pH nearer to skin required i.e. **pH 6.65**
- **Washability:** Washability test was carried out by applying a small amount of cream on the hand and then washing it with tap water.

- **Viscosity:** Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 °C using spindle No. 63 at 2.5 RPM. According to the results all the formulations showed adequate viscosity.
- **Test for microbial growth:** There was no signs of microbial growth after 24 hrs. of incubation at 37°C and it was comparable with the control.
- **Spread ability test:** The spread ability test showed that the formulated cream has good spread able property. The separate in the description of evaluation test lesser the time taken for separation of the two slides better the spread ability.
- **Dye test:** The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide covers it with a cover slip, and examines it under a microscope. The disperse globules appears colorless in the red ground i.e. w/o type cream.
- **Homogeneity:** The homogeneity of the formulated cream was judged by the visual appearance and touch. The appearance and touch of the cream were good.

CONCLUSION

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. Herbal face packs are considered as sustaining and productive way to advance the appearance of skin. Herbal face packs or masks are used to stimulate blood circulation, rejuvenates those muscles and help to maintain the elasticity of the skin and remove dirt from skin pores. Thus, in the present work, it is a very good attempt to formulate the herbal face pack containing naturally available ingredients like neem, almond. It is suggested that the prepared formulation was physico-chemically and microbiologically stable, and possessed characteristics of a standard cosmeceutical's formulation for skincare.

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