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Review Article

PHARMACEUTICAL CREAM**Arya Babu, Dr. Subash Chandran M. P, Ms. Shilpa Santhosh, Ms. Aparna M.R,
Dr. Prasobh G.R.**Sree Krishna College of Pharmacy and Research Centre, Parassala,
Thiruvananthapuram Dist, Kerala.**Abstract:**

Topical preparation that will be applied to the skin are called creams. Liquid or semisolid viscous emulsions with varying consistency depending on the oil and water. Creams are semisolid dosage forms containing one or more drug substances dissolved or dispersed in a suitable base. Cosmetics like creams, gels and colognes are used on a daily basis by both women and men. Herbal cream is the best choice to reduce the skin disorder like skin wrinkling, skin ageing and rough skin texture etc. Creams are semisolid emulsions intended to application for mucous membrane or skin.

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INTRODUCTION:

Topical preparation that will be applied to the skin are called creams. Liquid or semisolid viscous emulsions with varying consistency depending on the oil and water. Creams are used for a range of cosmetic functions, as well as cleansing, beautifying, improving, aesthetics, protection and therapeutic functions. Creams are classified as healthy products because they are created using strategies developed within the pharmaceutical industry each nonmedicated cream is generally used to treat a spread of skin conditions or dermatoses. Developed creams are Ayurvedic, herbal or medically assisted and people use them to treat their skin problems. They are created from one or more of the drug substances dispersed in a suitable phase.

Creams may be considered pharmaceutical products as even cosmetic creams are based on techniques developed by pharmacy and unmedicated creams are highly used in a variety of skin conditions (dermatoses). The use of the Fingertip unit concept may be helpful in guiding how much topical cream is required to cover different areas. Creams are semisolid dosage forms containing one or more drug substances dissolved or dispersed in a suitable base ⁽¹⁾. This term has traditionally been applied to semisolids that possess a relatively fluid consistency formulated as either water-in-oil (e.g., Cold Cream) or oil-in water (e.g., Fluocinolone Acetonide Cream) emulsions.

However, more recently the term has been restricted to products consisting of oil-in water emulsions or aqueous microcrystalline dispersions of long-chain fatty acids or alcohols that are water washable and more cosmetically and aesthetically acceptable. Creams can be used for administering drugs via the vaginal route (e.g., Triple Sulfa Vaginal Cream). Creams are used to help sun burns. Cold cream is useful for keeping your skin moisturized all time, especially during the winters. Here are a few good recipes for making cold cream at home. With the arrival of winter season, skin problems gain prominence. Skin becomes dry and moisture deprived. It stretches and then faint lines of crack develop over lips and cheeks. If proper care is not taken, these cracks may further become red. Application of cold cream avoids aggravation of skin problems during the cold season. A plethora of cold creams are seen flooding the market and may be confused as to what to pick for skin. Making a cold cream at home with pure natural ingredients is a very effective remedy for the skin problems.

The credit for discovering cold cream goes to Galen, a Greek doctor who developed the formulation of cold cream in the second century. He prepared an emulsion water and beeswax along with rose petals. These were the key moisturizer ingredients of the cold cream formulated by him. This skin cream was popularly known as Galen's cream. Cold creams not only moisturize the skin but are also used for removing makeup and temporary tattoo marks. The cream is rubbed on tattoo marks and then erased with a cotton ball. Cold cream uses are also associated with preparation of facial paints for kids.

Cosmetics like creams, gels, and colognes are used on a daily basis by both women and men. Creams act as a cleanser for the face in many circumstances. More recently antiaging creams have been manufactured which can retain younger looking skin for many years. The best cleansing agents are cleansing cream, soap and water. Cosmetic creams serve as a skin food for hard, dry and chapped skin. It mainly lubricates, softens and removes unwanted dirt from the skin. Some popular fat creams that are used include Vaseline and Lanolin. Dry creams are used in the manufacture of soap and gelatine which is used as a base for the skin. Hair care has become one of the fastest developing markets in the beauty industry. Many young men turn to oils and gels to maintain and style their hair. Products like hair gels, oils, and lotions have been introduced in the market to help protect hair fall and dandruff. Some professions, like the show business industry, focus on the importance of the outer appearance. Many personalities and artists have utilized makeup to beat the harsh lights and the glare of camera flashes. They very well know the importance of their looks and maintain them by using a variety of cosmetics.

Recent research has shown that makeup helps in protection from harmful rays of the sun. Many beauty products manufacturers have utilized the needs of people to protect themselves and their skin from the rays of the sun. Many beauty products manufacturers have utilized the needs of people to protect themselves and their skin from the rays of the sun. Cosmetics help to enhance appearance and make feel more confident. With more cosmetics on the market today than ever before, it becomes obvious to that they play a great role in everyday life. Herbal cream is the best choice to reduce the skin disorder like skin wrinkling, skin aging, and rough skin texture etc. Creams are semisolid emulsions intended to application for mucous membrane or skin.

ADVANTAGES

Injured areas can be dried quickly by creams than other semi-solid preparations.

- Non-irritating when applied to the skin.
- Easily water washable.
- Easy to wipe away.
- Less greasy compared to ointment.
- Easy to spread on the skin's surface (i.e. easy to apply) ⁽²⁾.

DISADVANTAGES

- Stability is not as good as ointment
- They are less hydrophobic than other semi- solid preparation, so risk of contamination is higher than the others. □ They are less stable than solid dosage form.
- They are bulkier than solid dosage form ⁽³⁾.

IDEAL CHARACTERISTICS

- It should liquefy at body temperature.
- It should penetrate the epidermis (Via natural opening).
- Its viscosity should be low enough to permit easy spreading.
- It should be non-toxic.
- It should be non-irritant.
- It should be non- inflammatory ⁽⁴⁾.

COMPOSITION FOR PREPARATION OF SKIN CREAMS

Ingredients used in skin cream include water, petroleum oil, vegetable oils, fats as well as their derivatives, humectants and emulsifying agent.

FORMULATION OF CREAMS

SL. No	ADDITIVES	EXAMPLES
1	Vehicle	Water, Syrup
2	Oils	Liquid Paraffin, olive oil
3	Fats	Almond Oil, fatty acid
4	Waxes	Bees Wax, Paraffin wax
5	Lanolin	Hydrous Lanolin
6	Glycol	Propylene glycol, Ethylene glycol
7	Colours	Saffron, Curcumin
8	Emollients	Squalene, Lanolin
9	Emulsifying agents	Bentonite, Colloidal Kaolin
10	Gums	Gum tragacanth, Gelatin
11	Wetting Agents	Sulfonated Oils, Glycerin

12	Humectants	Honey, Aloe vera
13	Perfumes	White blossoms, orange blossom

Table no 1: Formulation of creams

Vehicle: One of the most widely used raw materials in the manufacture of cream is water. In cosmetics water is used as solvent for many ingredients of cosmetics. Water should be either deionized or distilled, if it has to be incorporated in cream formulations. Water is cheapest ingredient in creams, so it is good to use purest water ⁽⁵⁾.

Oil, fats and waxes: Oil, fats and waxes and their derivatives form an essential portion of creams. Oil may be of two types mineral oil and glyceride oil ⁽⁶⁾.

Mineral oil: Mineral oil consist of hydrocarbons derived from petroleum oil. A number of mineral oils are used in cream formulation ⁽⁷⁾. Examples:

o Light liquid paraffin

o Heavy liquid paraffin.

Glyceride oil: Glyceride oil is mostly vegetable oils. Examples of glyceride oils are almond oil, arachis oil, castor oil, coconut oil, olive oil etc.

Fats: A variety of fatty materials are used in cream preparations. These materials may be from vegetable, animal or mineral origin. Glyceride oils and fats may be of animals or vegetable origin. They consist of combinations of higher fatty acids and glycerin. When saponified they form soap, or fatty acid and glycerin, depending upon the process used. The most common of these fatty acids are lauric, margaric, palmitic, stearic, saturated group. Oleic acid is liquid and most popular unsaturated fatty acid. More specially the oil most commonly used in other cosmetics are olive oil, almond oil, sesame oil, peanut oil, cocoa butter fat, mutton tallow, lard and beef stearin ⁽⁸⁾.

Waxes: Waxes used in creams and other cosmetics include bees wax, carnauba wax, ceresin, ozokerite Japan wax and spermaceti. Of these beeswax and spermaceti are of animal origin, while carnauba, candelilla and Japan wax are from vegetable kingdom. Montane, a vegetable wax and ozokerite a mineral wax, are both derived from lignite of these waxes. Bees wax, ceresin and spermaceti most important for cosmetics ⁽⁹⁾.

Lanolin: Lanolin is derived from wool fat. The anhydrous grade is free from water. The hydrous lanolin contains between 25% and 30% water. Anhydrous lanolin has melting point of 380°C to 420°C and a slight odour.

Lanolin is available in two types

- Anhydrous lanolin

Anhydrous lanolin is thick and quite sticky or tacky, while hydrous lanolin has had water added to it, to make it thinner. Anhydrous is more commonly used in homemade cosmetic preparations.



Figure no 1: Anhydrous Lanolin

- Hydrous lanolin

Lanolin hydrous is a powerful topical lubricant that helps to treat, protect and soften very dry, rough or chapped skin. This deep moisturizing ointment contains just purified water and Lanolin USP (a natural skin conditioning agent) ⁽¹⁰⁾.



Figure no 2: Hydrous Lanolin

Glycol: Glycol are dihydric alcohols lying halfway between ethanol and glycerol. There are number of glycol available. Those used in cosmetics consist mainly of ethylene glycol, diethylene glycol and propylene glycol ⁽¹¹⁾.

Colours: Coloring agents is in fact, a generic term for any colour imparting substances. Most of natural

colours have been replaced by coal tar colours so far as cosmetics is concerned. A few of the natural colours might still to be used. Examples of natural colours used in cosmetics are saffron, chlorophyll and cochineal ⁽¹²⁾.



Figure no 3: Saffron



Figure no 4: Cochineal

Emollients: Emollients, also commonly referred to as moisturizers, are products that help to soften skin or to treat skin that has become dry. Most emollients are forms of oil or grease, such as mineral oil, squalene, and lanolin. They work by increasing the ability of the skin to hold water, providing the skin with a layer of oil to prevent water loss, and lubricating the skin.

EMULSIFYING AGENTS

Inorganic solid: Inorganic solid which forms emulsion include bentonite, colloidal kaolin, hydrated lime or magnesia and other clay, when dispersed with water, their colloidal properties permit the formation of emulsion in water.

Gums and proteins: Gums and proteins are used as emulsifying agent include gum tragacanth, karaya gum, gum Arabic, agar- agar, Irish moss, alginate pectin, saponins, gelatine, casein, methylcellulose and egg albumin.

Wetting Agents: Wetting agent are basically a type of surface-active agents. Among them are include soap, sulfonated oils, fatty alcohols sulfates, sulfated fatty esters and amides, Secondary alcohol sulfates and aryl

alkyl sulfates. Quaternary ammonium compound are series of wetting agents which also exhibit high germicidal and fungicidal properties. Wetting agent have two common properties of lowering surface tension, being uninfluenced by hard water forming considerable foam with water and other solvents, possessing considerable solvent action and aiding in formation of emulsions.

Humectants: Humectants (or moisturizers) are important cosmetic ingredients allowing to prevent loss of moisture thereby retaining the skin's natural moisture. Some compounds also have the ability to actively attract moisture. Humectants are key ingredients in most skin care products but are also often used in hair care products to volumize the hair by attracting moisture which expands the hair shaft. There is a large variety of very different compounds providing moisturizing effects including proteins, acids, polysaccharides, and various small molecules (e.g., glycerin, sorbitol, urea, aloe vera, olive oil, honey, babassu oil, grape seed oil, avocado oil, etc).



Figure no 5: Moisturizer

Perfumes: Perfume is a substance that imparts a scent or odor, including a sweet and pleasant smell. Examples of natural perfumes used in creams are

- o White blossoms
- o Rosy dreams
- o Orange blossom (13)



Figure no 6: White blossom



Figure no 7: Orange blossom



Figure no 8: Rosy dreams

FUNCTIONAL RAW MATERIALS:

There are some materials which are incorporated in semisolid preparations for their specified functions and are used in variety of semisolid preparation. The list of functional raw materials is listed in table no :2

Sl. No	Raw materials	Functions
1	Vitamins	Maintenance of physiological role
2	Amino acids	Moisturization
3	Anti-inflammatory agents	Reduces inflammation

Table no 2: Raw materials

Vitamins: - Vitamins play an important role in maintaining the physiological function of whole body. They also help us maintaining physiological function of skin. Vitamin A, vitamin B, vitamin C, vitamin E, nicotinamide, biotin, etc. are generally used in formulations of creams.

Amino acids: - Amino acids are effective in helping recovery of dry and rough skin by moisturizing the epidermis system. There are several amino acids, but there are certain amino acids with which the body must be supplied such amino acids are called essential amino acids. Essential amino acids include histidine, arginine, tryptophan, methionine, etc.

Anti –inflammatory agents: - The term anti-inflammatory refers to something that reduces, or is against, inflammation. Examples of natural Vitamins used in creams are green tea, turmeric, white willow, Boswellia, cade oil etc ⁽¹⁴⁾. **Skin care procedures and skin care products**

The information on skin care procedures is plentiful but little scientifically documented and the number of products available for cleansing, soothing, restoring, reinforcing and protecting is of an almost infinite variety.



Figure no 9: Skincare products

Sl.no	Name of products	Functions
1	Cleanser	To remove dead skin cells
2	Serum	Treat skincare problems
3	Moisturizer	Moisturize skin
4	Sunscreen	To prevent sunburn
5	Body lotion	Defense against microbial invasion

Tale no 3: Skin care Products

FUNCTIONS OF SKINCARE PRODUCTS:

1. Removal of dirt, sebum, microorganisms, exfoliated corneocytes and other non-wanted substances from the skin.
2. Reduction of unpleasant skin symptoms (e.g., pruritus, burning, odour).
3. Restoration of (sub-clinically) damaged skin (e.g., dry and inflamed skin).
4. Reinforcement of undamaged but vulnerable skin (e.g., skin surface pH balance, germ reduction).
5. Protection of damaged, undamaged and vulnerable skin from various noxious factors.
6. Providing a pleasant skin feel (well-being).

CLASSIFICATION OF CREAMS

All the skin creams can be classified on different basis:

1. According to consistency they are divided into two types
 - Oil-in-Water (O/W) creams which are composed of small droplets of oil dispersed in a continuous phase, and an emulsion in which the oil is dispersed as droplets throughout the aqueous phase is termed an oil-in-water (O/W) emulsion.
 - Water-in-Oil (W/O) creams which are composed of small droplets of water dispersed in a continuous oily phase. When water is the dispersed phase and an oil the dispersion medium, the emulsion is of the water-in-oil (W/O) type.
2. According to function, e.g., cleansing, foundation, massage, etc.
3. According to characteristics properties, e.g., cold creams, vanishing creams, etc.
4. According to the nature or type of emulsion. Types of creams according to function, characteristic properties and type of emulsion.
 1. Make-up cream (o/w emulsion):
 - a) Vanishing creams.
 - b) Foundation creams.
 2. Cleansing cream, cleansing milk, Cleansing lotion (w/o emulsion)
 3. Winter cream (w/o emulsion):
 - a) Cold cream or moisturizing creams
 4. All-purpose cream and general creams.
 5. Night cream and massage creams.
 6. Skin protective cream.
 7. Hand and body creams.
1. **Make-up creams:** These are mainly o/w type of emulsion. It is cream-based product which leaves a smooth hydrated finish (either stain matte or luminous) on the skin. It nourishes skin and is basically sweat-resistant and creates a dewy.
 - Vanishing creams: They are called vanishing creams because they seem to disappear when rubbed onto the skin. These formulations are based on stearic acid. After application, the cream leaves a dry but tacky residual film which also has a drying effect on the skin. Because of this reason, these are used particularly in hot climates which cause perspiration on the skin. □

- **Foundation creams:** These creams serve as a foundation base for make-up. It acts as an adherent base for application of make-up powders. They provide emollient action and a protective action against environment to the skin which is neither too greasy nor too dry. It is multi colored make up applied on the face to create an even, uniform colour similar to the complexion, to cover flaws and to change the skin tones □



. Figure no 10: Foundation Cream

2. Cleansing creams: These creams are used for body cleaning purposes and it is used for personal hygiene and beautification which is important for cosmetics. Cleansing creams or lotions can be used for the removal of make-up, surface grim, oil mainly from the face and neck.

3. Winter creams: These are w/o type of formulation and in this formulation oil content will be more than water content. These creams are mainly used for chapped and dry skin.

4. All-purpose creams and general creams: These creams are used more nowadays than before. These creams are somewhat oily but non-greasy type and can spread on the skin easily. This can also be used as a night cream, nourishing creams, protective creams for prevention or alleviation of sunburns or for the treatment of roughened skin areas.

5. Night cream or massage creams: Creams are mainly used for the nourishing the skinor as a treatment to dry skin. Creams which are generally applied on skin and left for few or several hours over night are mainly known as night creams. Creams which acts as an emollient by rubbing the cream on the skin with massage is known as massage cream.



Figure no 11: Night Cream

6. Skin protective creams: These creams are smooth, thick bodied creams formulated to provide an invisible, uniform protective film barrier to the skin. It helps to maintain the barrier between the skin and contaminants that may irritate the skin (contact dermatitis and occupational dermatitis). Strengthens the natural properties of the skin and maintains the balance of normal to combination skin.

7. Hand and body creams: Hands are one of the first places to show signs of aging. So always tend to wash hand several times a day, stripping off moisture. Applying cream softens and protects the skin and it keeps the skin looks younger. Since the skin on palms and fingers needs oil to stay supple and to prevent it from chapping and cracking, it is sensible to use hand creams that puts plenty of oil back in. It is used on the hands more than other parts of the body (15) .



Figure no 12: Hand Cream

MANUFACTURING PROCESS PREPARATION OF O/W EMULSION CREAM

The oil-soluble and the emulsifiers are mixed in a container in a water bath. In a separate beaker of water, preservatives and water-soluble components are added. After the oil phase has been heated, it is

placed in a mortar and pestle, and the water phase is gradually added and triturated until a clicking sound can be examined. At the end, preservatives and a few additives are added.

Example: Cold cream

PREPARATION OF OIL-FREE EMULSION CREAM

In a beaker, mix the oil-soluble components and the emulsifier. Another beaker is used to collect the water and water-soluble components. The aqueous phase should be triturated in a mortar and pestle before adding the oil phase. At the end, preservatives and a few additives are added ⁽¹⁶⁾.

Evaluation parameters of creams

Evaluation of creams are based on following parameters:

- pH determination
- Physical Appearance
- Spreadability
- Viscosity
- Homogeneity
- Removal
- Type of Smear
- Irritancy study
- Stability Study
-

pH determination: The pH of the cream can be determined using a sufficient amount of the diluted with a solvent in a beaker of the cream at room temperature. One gram of each formulation (including the blank, i.e., formulation without any active ingredients or preservatives, and drug-loaded formulation) was dispersed in 25 mL of deionized water, and the pH was determined using a pH meter (Mettler-Toledo Ingold Inc., Billerica, MA).

Measurements were made in triplicate.

The pH meter was calibrated with standard buffer solutions (pH 4, 7, and 10) before each use.

Physical appearance: The cream's physical appearance is determined by its colour, roughness, and texture. All blank formulations (i.e., formulations without any active ingredients or preservatives) and drug-loaded formulations were tested for physical appearance, colour, texture, phase separation, and homogeneity. These characteristics were evaluated by visual observation. Homogeneity and texture were tested by pressing a small quantity of the formulated cream and gels between the thumb and index finger.

The consistency of the formulations and presence of coarse particles were used to evaluate the texture and homogeneity of the formulations. Immediate skin feels (including stiffness, grittiness, and greasiness) was also evaluation ⁽¹⁷⁾.

Spreadability: A requisite amount of sample is divided between two glass slides, and the slides are weighted for 5 minutes with 100gm weight. Spreadability of the formulations was determined by measuring the spreading diameter of 1 g of sample between two horizontal glass plates (10 cm × 20 cm) after one minute.

Viscosity: Viscometers can be used to determine the viscosity of formulated creams. A Brookfield viscometer DV-I (Brookfield Engineering Laboratories, Middleboro, MA) was used with a concentric cylinder spindle 29 to determine the viscosity of the different topical formulations. The tests were carried out at 21°C. The spindle was rotated at 0, 0.5, 1, 2, 2.5, 4.5, 10, 20, 50, and 100 rpm values. All measurements were made in triplicate ⁽¹⁹⁾.

Homogeneity: The homogeneity of the formulation was assessed visually and tactilely.

Removal: The ease with which the creams applied could be removed was tested by washing the affected area with tap water.

Type of smear: The type of film or smear formed on the skin after application of the cream was examined.

Irritancy study: Irritation, erythema, and oedema were all examined, for regular intervals up to 24 hrs and reported.

Stability study: This study is performed on the prepared product as per the ICH guidelines. The antibacterial activity of all selected drug-loaded formulations was tested against *E. coli* using the above-described agar well diffusion assay for 12 weeks (measurements were made on day 1, week 3, week 6, week 9, and week 12). The antibacterial activity of the formulations was compared for samples stored at room temperature (25°C) and in the refrigerator (4°C) as well as those packaged into glass containers versus plastic containers. In addition to the antibacterial activity, pH values, colour, physical appearance, and texture were also tested during the 12 weeks with the above- described methods ⁽²⁰⁾.

DISCUSSION:

Topical preparation that will be applied to the skin are called creams. Liquid or semisolid viscous emulsions with varying consistency depending on the oil and water. Creams are used for a range of cosmetic

functions, as well as cleansing, beautifying, improving, aesthetics, protection and therapeutic functions. Creams are semisolid dosage forms containing one or more drug substances dissolved or dispersed in a suitable base. This term has traditionally been applied to semisolids that possess a relatively fluid consistency formulated as either water-in-oil (e.g., Cold Cream) or oil-in-water (e.g., Fluocinolone Acetonide Cream) emulsions. Cold cream is useful for keeping your skin moisturized all time, especially during the winters. Cold cream uses are also associated with preparation of facial paints for kids. Cold creams not only moisturize the skin but are also used for removing makeup and temporary tattoo marks. Cosmetic creams serve as a skin food for hard, dry and chapped skin. It mainly lubricates, softens and removes unwanted dirt from the skin. Creams are non-irritating when applied to the skin. They are less hydrophobic than other semi solid preparation, so risk of contamination is higher. Herbal cream is the best choice to reduce the skin disorder like skin wrinkling, skin aging, and rough skin texture etc. Skin cream include water, petroleum oil, vegetable oils, fats as well as their derivatives, humectants and emulsifying agent.

CONCLUSION:

Creams are semisolid dosage forms containing one or more drug substances dissolved or dispersed in a suitable base. Cosmetics like creams, gels, and colognes are used on a daily basis by both women and men. Creams act as a cleanser for the face in many circumstances. More recently antiaging creams have been manufactured which can retain younger looking skin for many years. The best cleansing agents are cleansing cream, soap and water. Cosmetic creams serve as a skin food for hard, dry and chapped skin. It mainly lubricates, softens and removes unwanted dirt from the skin. Evaluation of creams based on pH determination, physical appearance, spreadability, stability studies etc.

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