Tishk International University
Pharmacy Faculty

Pharmaceutics II

TOPIC: Semisolid Dosage Form (Creams and Pastes)

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Creams

Pharmaceutical creams are semisolid preparations containing one or more medicinal agents dissolved or dispersed in either an oil-in-water or water-in-oil emulsion.

Classification of Creams According to their use:

Creams can be classified into two categories:

Medicated Creams: Medicated creams have active pharmaceutical ingredients with a particular pharmacological activity such as antibacterial, antifungal, or antipruritic

Non-medicated Creams: Creams used for cosmetic purposes to moisturize, beautify, and nourish the skin.

Uses of Creams

Skin cream reduces surface roughness and increases the hydrophilic properties of skin.

Creams are widely used in cosmetics they are an essential part of daily make-up used to moisturize skin. These viscous semisolid emulsion systems have an opaque appearance in contrast to translucent ointments.

This dosage form can penetrate the outer layer (keratinized layer) of the skin and provide emollient effect

Creams find primary application in topical skin products and in products used rectally and vaginally.

Pharmaceutical manufacturers frequently manufacture topical preparations of a drug in both cream and ointment bases to satisfy the preference of the patient and physician

Cream became more official with the introduction of formula for sun cream.

Types of Cream

There are two general type of cream:

1- Oil- in-water creams:

- Are non-greasy and can be easily removed by rinsing with water. Since the external phase is water, these creams can be easily diluted with water and therefore are water washable.

o/w-based creams are thicker than lotion and easier to spread than ointments, work by penetrating the wall of the skin's stratum corneum to achieve a local effect

- They are good for most topical purposes and are considered particularly suited for application to oozing wounds because they have a tendency to absorb water.

- All emulsions, whether o/w or w/o, require an emulsifier to provide them with stability; o/w emulsions often require more than one emulsifier for optimal stability, but a variety of emulsifiers exist to suit this function.
- Polysorbate, sorbitan laurate, and cetearyl alcohol are just a few examples of emulsifiers that are compatible with o/w emulsions

Properly designed (o/w) creams make a good topical drug delivery system for the following reasons:

- Have a pleasing appearance.
- Provide a good feeling after application.
- non-greasy and washable.
- suitable for oozing wounds.

Examples for Oil-in-water (o/w) creams

- Vanishing cream
- Foundation creams
- Hand creams
- Day and Night creams

1. VANISHING CREAM

- These are named so as they seem to vanish when applied to the skin.
- High quantity of stearic acid used as oil phase. This provides an oil phase which melts above body temperature
- Main component is emollient esters , stearic acids.
- Part of stearic acid is saponified with an alkali & rest of stearic acid is emulsified.
- The quality of cream depends on the amount of acid saponified & nature of alkali used.
- NaoH makes harder cream than KOH.
- Borax makes cream very white but product has tendency to grain.
- Pearliness can be attained using liquid paraffin, cocoa butter, starch, castor oil, almond oil.
- Ammonia solution has a tendency to discolor creams made with it after some time.
- Cetyl alcohol improves texture and stability at low temperature.

- After application, the continuous phase evaporates leaving behind a thin residue film of the stearic acid.
- Used as adhesive for makeup powders, moisturizer, smoothens the skin.

Rx/ Formulation of vanishing cream

- Stearic acid 3g
- Potassium hydroxide 0.14g (alkali)
- Glycerin 1.6g (humectant)
- Purifies water 15.3g

Procedure:

1- dissolve stearic acid on water bath using mortar (oil phase)

2- dissolve KOH in water again on water bath, then add glycerin to the solution to form aqueous phase.

3- add aqueous phase to the oil phase, mix continuously until white cream is formed

2. FOUNDATION CREAM

- Applied to skin to provide a smooth emollient base or foundation for the application of face powder & other make up preparations.
- They help the powder to adhere to skin. They are almost o/w type.

3. HAND & BODY CREAM

- The repeated or constant contact with soap and detergent damages & removes film of sebum thus this cream is used to impart following functions to the skin. The function of these creams are : -
- Replace/reduce water loss.
- Provide oily film to protect the skin.
- Keep the skin soft, smooth but not greasy.

4.DAY & NIGHT CREAM

- These are generally applied on the skin and left for several hours(overnight) and assist in the repair of skin which has been damaged by exposure to various elements or exposure to detergent solution or soap.
- They mostly have a moisturizing & a nourishing effect of affected skin.
- These also contain vitamins and hormones basing on the application.
- This cream give better look to the skin and prevent dryness.
- Night creams revive and repair, while day creams protect and prevent

2-Water- in-oil creams:

Are composed of small droplets of water dispersed in a continuous oily phase.

Water-in-oil creams are more difficult to handle and are not water washable. Since many drugs that are incorporated into creams are hydrophobic, they are released more readily from water-in-oil creams than oil-in water creams.

Water-in-oil creams are also more moisturizing because they provide an oily barrier that reduces water loss from the stratum corneum, the outermost layer of the skin, and are widely used as cold creams where the oil phase forms a protective covering and prevents excessive loss of moisture from the skin in the winter season.

Examples for Water-in-oil (w/o) creams

- Cleansing cream
- Emollient creams
- All-purpose creams

1. CLEANSING CREAM

Cleansing cream is required for removal of facial make up, surface grime, oil.

Characteristic of a good cleansing cream:-

- Be able to effectively remove oil soluble & water soluble soil, surface oil from skin.
- Should be stable &have good appearance.
- Should melt or soften on application to the skin
- Should spread easily without too much of drag.

Examples of cleansing cream

- Cold Cream:- Cooling effect is produced due to slow evaporation of the water contained in the formulation. These are w/o type.
- Beeswax Borax type:- These contain high percentage of mineral oil.

These are o/w type. This cream contains high amount of mineral oil for cleansing action. Basically these are o/w type emulsion. After the cream is being rubbed into the skin sufficient quantity of water evaporates to impart a phase inversion to the w/o type. The solvent action of the oil as external phase imparts cleansing property. In this type of cream borax reacts with free fatty acids present in the bees wax and produces soft soap, which acts as the emulsifying agent and emulsifies the oil phase.

Rx 1/ Prepare cold cream U.S.P.

- Cetyl ester wax 12.5 g
- White wax 12 g
- Mineral oil 56 g
- Sodium borate 0.5 g
- Purified water 19 g

Procedure

1- Melt Cetyl ester, White wax and Mineral oil on a water bath until the mixture reach 70 Cº (A).

2- Dissolve sodium borate in purified water and heat to 70 Cº in separate beaker (B).

3- Gradually add aqueous solution (B) to the mixture of oily phase (A) with continuous stirring until congeal and cooled.

Used as emollient and cleansing cream.

Rx2 / CLEANSING CREAM

- Bees wax 2 g
- Borax 2 g
- Almond oil 50 g
- Rose water 35.5 g
- Lanolin 0.5g
- preservative and perfume q.s

Procedure:

1- Mix almond oil, Beeswax, and Lanolin in a water bath to 70Cº.

2- Dissolve borax in water and heat to 72Cº.

3- Add the aqueous phase to oily phase with stirring until congealed and then add preservative and perfume with continues stirring until cooled.

2. Emollient creams

Body cream with nourishing and moisturizing actives that help restore areas of dryness.

Helps relieve the feeling of itchiness, irritation and tightness.

Brings immediate comfort and softness. Acts on atopic dermatitis.

3. ALL PURPOSE CREAMS

All-purpose means it is suitable for hands, face and body. They are w/o types.

PASTES

Pastes are semi-solid preparations intended for external application to the skin.

They generally contain a larger proportion of solid material (such as 25%) than ointments and therefore are stiffer and very thick.

They do not melt at ordinary temperature and thus form a protective coating over the area where they are applied.

They are used mainly as antiseptic protective or soothing dressings, which are often spread on lint before being applied.

There are two types of pastes:

- Fatty pastes (e.g., zinc oxide paste)
- Non-greasy pastes (e.g., bassorin paste, which is also named tragacanth jelly since the hydrophilic component of tragacanth gels in water).

Pastes can be prepared in the same manner as ointments

Bases Used for Pastes:

1 .Hydrocarbon bases

2- Water miscible base: emulsifying ointment use as a base.

3- Water soluble base: combination of high and low molecular weight of PEG are mixed together as paste.

Soft paraffin and liquid paraffin are commonly used bases for the preparation of pastes.

Example / Prepare and dispense 100.0 g of compound zinc paste B.P.

Zinc oxide, finely sifted	25.0 g
Starch, finely sifted	25.0 g
White, soft paraffin	50.0 g

Make a paste

Procedure

- Melt the white soft paraffin on a water bath .Separately pass the zinc oxide and starch through sieve.
- Mix the required weight of powder in a warm mortar .
- Add small amount of melted base, with continuous trituration until smooth paste is obtained.
- Add the remaining part of the base and mix until cold and uniform paste is obtained