

**Ointments**

**LAB. THREE**

**Ointments**

Ointment can be defined as a semisolid preparation intended for external application to the skin or mucous membranes medically, ointments may be divided into:

1. **Non \_medicated ointment:** This may be used as a protector, emollient, lubricant or may be used as a vehicle for topical application of therapeutic agent .
2. **Medicated ointment:** Used for topical therapeutic effects.

**Classification of ointment bases:**

1. Hydrocarbon bases (oleaginous bases).
2. Absorption bases.
3. Water removable bases.
4. Water soluble bases.
5. **Hydrocarbon bases (oleaginous bases):**
* On application of these bases to the skin, they have emollient effect, protect against the escape moisture also they are effective as occlusive dressings, can remain on the skin for prolonged period of time without drying out.
* Because of their immiscibility with water, they are difficult to wash off.
* Water and aqueous preparations may be incorporated into them ,but only in small amounts and with some difficulty.
* When powdered substances are to be incorporated into hydrocarbon bases, liquid petrolatum (mineral oil) may be used as levigating agent.
* Example on hydrocarbon bases: petrolatum, white petrolatum, white ointment and yellow ointment.

Yellow ointment (simple ointment) USP

Rx

Yellow wax 50g

Petrolatum 950g

**Method:**

This ointment is prepared by melting the yellow wax on a water bath, then we add the petrolatum until mixture is uniform, then cooling with stirring until congealed.

**2. Absorption bases:**

These bases are of two types:

1. Those that permit the incorporation of aqueous solution resulting in the formation of w/o emulsion (e.g. hydrophilic petrolatum).
2. Those that are w/o emulsion (synthetic emulsion bases)and permit the incorporation of additional quantities of aqueous solutions(e.g. Lanolin).
* These bases may be used as emollients although they do not provide the degree of occlusion afforded by the hydrocarbon bases.
* These bases are not easily removed from the skin with water

 washing since the external phase of the emulsion is oleaginous.

* These bases are useful as pharmaceutical adjunct to incorporate

 small volumes of aqueous solutions into hydrocarbon bases (this is

 accomplished by incorporation the aqueous solution into the

 absorption base and then incorporation this mixture into the

 hydrocarbon base.

* Example on absorption bases:

Rx

Cholesterol 30g

Stearyl alcohol 30g

White wax 80g

White petrolatum 860g

**Method:**

It is prepared by melting the stearyl alcohol and the white wax on a steam bath, then we add the cholesterol with stirring until dissolved, then we add the white petrolatum and allowing the mixture to cool while being stirred until congealed.

**3**. **Water removable bases:**

These bases are o/w emulsions resembling creams in appearance.

* Because the external phase of the emulsions is aqueous, they are easily washed from skin and often called “water –washable”bases.
* They may be diluted with water or aqueous solutions.
* They have the ability to absorb serous discharges.
* Example on water removable bases.

Hydrophilic ointment

Rx

Methyl paraben 0.25g

Propyl paraben 0.15g

Sodium lauryl sulfate 10g

Propylene Glycol 120g

Stearyl Alcohol 250g

White Petrolatum 250g

Purified Water 370g

**Method:**

Stearyl alcohol and white petrolatum are melted together at about 75°C. The other agents are dissolved in purified water are added with stirring until the mixture congeals.

1. **Water soluble bases:**
* These bases don’t contain oleaginous components.
* They are completely water-washable and often referred as greaseless.
* Because they soften greatly with the addition of water, larger amount of aqueous solutions are not effectively incorporated into these bases.
* They mostly are used for the incorporation of solid substances.
* Examples on water soluble bases:

Polyethylene Glycol Ointment.

Rx

Polyethylene Glycol 3350 400g

Polyethylene Glycol 400 600g

**Method:**

We combine PEG 3350 which is solid with PEG 400 which is liquid.

**Factors that affect selection of appropriate bases:**

1. Desired release rate of the drug substance from the ointment base.

2. Desirability for topical or percutaneous drug absorption.

3. Desirability of occlusion of moisture from the skin.

4. Stability of the drug in the ointment base.

5. Effect of the drug on the consistency or other features of the ointment base.

6. The desire for a base that is easily removed by washing the water.

**Method of preparation of ointment:**

1. Incorporation.

2. Fusion.

**Note:**  **Methods used for preparation of ointment depend on the nature of ingredients**.

**1.Incorporation:**

By this method, the components are mixed until a uniform preparation is attained; this is done by using mortar and pestle or slab and spatula. We can sub divided this method into:

**A) Incorporation of solids:**

The ointment base is placed on one side of the working surface and the powdered components (previously reduced to fine powders and thoroughly blended in a mortar) on the other side a small portion of the powder is mixed with a portion of the base until uniform ;the process is continued until all portions of the powder and the base are combined and thoroughly and uniformly blended.

**Notes:**

* When an ointment is prepared by spatulation ,the pharmacist works the ointment using a stainless steel spatula having a long ,broad blade and periodically removes the accumulation of ointment on the large spatula with a smaller one.
* If the components of the ointment are reactive with the metal of the spatula (as in phenol for example) , hard rubber spatula may be used.
* Solids that are soluble in a common solvent that will not affect the stability of the drug or the efficacy of the product may first be dissolved in the solvent and the solution added to the ointment base by spatulation or by using a mortar and pestle.
* It is desired to reduce the particle size of a powder or crystalline material before incorporation into the ointment base so that the final product will not be gritty. This may be done by levigation (mixing the solid material in a vehicle which it is insoluble to make smooth dispersion).
* The ***levigating agent*** used for example: ***mineral oil*** for oleaginous bases where oils are the external phase or ***glycerin*** for bases where water is the external phase.
* The levigation is done using mortar and pestle.

**B) Incorporation of liquids:**

When it is necessary to add an aqueous preparation to hydrophobic base.

The solution first may be incorporated into a minimum amount of a hydrophilic base and then that mixture added to the hydrophobic base.

**Notes:**

* Liquid substances or solutions are added to an ointment due consideration of an ointment bases capacity to accept the volume required .e.g.: only very small amounts of an aqueous solution may be incorporated into an oleaginous ointment whereas hydrophilic ointment bases readily accept aqueous solutions.
* Mortar and pestle are used when we want to incorporate large quantity of liquid or if large quantity of ointment is wanted to be prepared.

**2**. **Fusion:**

By fusion method, all or some of the component of an ointment are combined by being melted together and cooled with constant stirring until congealed. Component not melted are added to the congealing mixture as it is being cooled and stirred.

 Melting of the substances is done by one of the following three methods:

1. the material with the highest melting point are heated to the lowest required temperature to produce a melt, the additional materials then are added with constant stirring during cooling of the melt until the mixture is congealed.
2. Melting the component having the lowest melting point first then adding the remaining components in order of their melting points.
3. Melting the entire component together under slowly increasing temperature.

**Notes:**

* Heat –labile substances and any volatile components are added last when the temperature of the mixture is low enough not cause decomposition or volatilization of the components.
* Solutions and insoluble powders (levigated with portion of the base) may be added to the congealing mixture.
* The fusion process may be conducted in a porcelain dish or glass beaker.
* The fusion method is used when we have waxes ,paraffin ,fatty alcohol ,fatty acids, or any hard waxes in the prescription and also used when we have medicament soluble in melts base.
* The fusion process may be conducted in a porcelain dish or glass beaker.

Rx

Simple ointment (B.P)

Wool fat 50g

Hard paraffin 50g

Ceto acetyl alcohol 50g

Yellow soft paraffin 850g

**Method of preparation:**

We weight the ingredients ,then we take the one with the highest melting point, put it in the beaker and in water bath till it melt (hard paraffin) then we add another ingredient with thelower m.p.(ceto acetyl alcohol) then wool fat, soft paraffin .After they melt we leave the beaker to cool ,then the content will be semisolid.

Rx

Zinc oxide ointment (B.P)

Zinc oxide 150gm

Simple ointment 850gm

**Method of preparation :**

We put the ointment base on the slab and gradually add to it a powder of zinc oxide ,then mix the quantity of the ointment base with powder mix until it will be homogenized.

\*zinc oxide as astringent and protective action used in napkin rash.

Rx

Zinc and caster oil ointment (body cream) (B.P)

Zinc oxide 7.5gm

Caster oil 50gm

Cetostearyl alcohol 2gm

White bees wax 10gm

Arachis oil 30.5gm

This Rx is ointment rather than cream but due to the present of caster oil it gives them smooth appearance.