PHA 390 PHARMACEUTICAL TECHNOLOGY II

12ND WEEK

SEMISOLID DOSAGE FORMS II

Enhancement of percutaneous penetration

1- Physical methods

- Sonophoresis / Phonophoresis
- Iontophoresis
- Electroporation
- Microneedles

2- Chemical methods

Penetration enhancers

The chemical compounds which provide the better and higher penetration of drugs from skin or biological membranes.

3- Drug delivery systems

Penetration enhancers;

1- Provide the faster release of drug from preparation.

2- Shorten the lag time in absorption process.

3- Accelerate the percutaneous penetration of drug.

Surface active agents, Azon, Ethyl alcohol, Isopropyl alcohol, Propylene glycol, Polyethylene glycol, Dimethyl sulphoxide (DMSO), Pyrolidones, Urea

Mechanism of action of penetration enhancers

- Increasing the water content of skin
- Decreasing the electrical resistance of skin
- Interaction with the polar groups or alkyl chains of membrane lipids
- Interaction with keratin
- Increasing the diffusion coefficient of active molecule
- Changing the partition properties of drug into stratum corneum
- Increase the storage effect of water insoluble materials in the stratum corneum

Preparation methods of semi solids

* Cold preparation (Preparation at room temperature)

* Hot preparation (Preparation by melting)

Cold preparation (Preparation at room temperature)

This method is used;

-When the ingredients are in semi solid or liquid state at room temperature

- When a single-phase semi solid formulation is prepared

- When a lab scale formulation is prepared

- Formulation is prepared using mortar. First the solid particles are milled. Then they are mixed with low viscous excipients in order to provide the homogenous mixing with semi solid base.

Hot preparation (Preparation by melting)

This method is used;

- When the components of base are in solid state at room temperature (waxes, hard paraffin etc)
- When the active substance is soluble in the melting base
- When a multi-phase semi solid formulation is prepared
- When a large scale formulation is prepared

Controls for semi solid dosage forms

- Homogenity control
- Physical controls
- Rheological controls
- pH control
- Weight control
- Microbiological controls
- Sterility controls
- Determination of quantity of active substance
- Stability tests
- In vitro drug release
- In vivo studies

Homogenity control

The semi-solid preparation is checked for homogeneity (microscope or inspection)

Physical controls

Existence of odor, colour or viscosity change, rancidity, drying and phase separation in formulation is checked.

Particle contamination

It is important for ocular semi solid formulations.

Eye ointments must not contain metal particles or particles larger than 20 µm.

Rheological controls

Rheological properties are important in terms of;

- The viscosity of product
- The ease of use of product
- The spreadability of product
- The drug release from product

* Viscosimeters are used for determining the viscosity of the preparation.

Microbiological controls

- The microorganisms below should not exist in a semi solid preparation for cosmetic or therapeutic purposes.

- For this purpose, appropriate antimicrobials should be used at accurate concentrations.

Staphylococcus aureus

Serretia marcescens

Escherichia coli

Acinebacter anitratus

Proteus mirabilis

Pseudomonas species

Candida species

Clebsiella species

Sterility controls

Ocular semi solids and burn / wound ointments should be sterilized.

They are either prepared aseptically or sterilized after production.

Sterility controls should be performed.

Drug release from semi solid preparations

a) In vitro methods

   - Qualitative methods

   - Quantitative methods

b) In vivo methods