

PHARMACEUTICS

COMPLETE UNIT 2 NOTES

- **POWDERS**
- **LIQUID DOSAGE FORMS**

POWDERS

Powders are the pharmaceutical preparation of finely divided solid loose dry particles, containing one or more active ingredient with or without excipients.

They may be intended for either internal or external use.

Advantages of Powder

- They are easy to prepare and easy to use/apply.
- They are more stable than liquid and semi-solid preparations.
- They are used both internally and externally.
- The high dose of drugs in powder form easily administered by mixing them with food and drinks.
- Powders having a large surface area that help in its rapid absorption / dissolution.

Disadvantages of Powder

- Inaccuracy in dose
- It is very difficult to mask the bitter / unpleasant taste of drug in powder form
- Deliquescent and hygroscopic drugs cannot be dispense in powder form
- Drugs which get affected by atmospheric condition are not suitable for dispense in powder form.

CLASSIFICATION OF POWDERS

Powders are classified on the basis of following three categories :

- Based on Particle size
- Based on Uses
- Based on Physical form / Dispensing

Classification based on Particle size

On the basis on particle size powder are classified in 5 categories

- (1) Very Coarse Powder
- (2) Coarse Powder
- (3) Moderately Coarse Powder
- (4) Fine Powder
- (5) Very Fine Powder

PARTICLE SIZE	SIEVE NUMBER
Very Coarse	All Particles pass through sieve no. 8
Coarse	All Particles pass through sieve no. 20
Moderately Coarse	All Particles pass through sieve no. 40
Fine	All Particles pass through sieve no. 60
Very Fine	All Particles pass through sieve no. 80

Classification based on Uses

On the basis of uses powders are classified into two categories :

- (1) Powders for Internal use
- (2) Powders for External Use

Powder for Internal Use :

It consist of drugs in the form of powder intended to be swallowed directly or with water / another suitable liquid. Powders for internal use can be taken orally , administered through nose as snuffs or can be taken into body cavity as insufflation.

They are of basically two types

- Simple Powders
- Compound Powders

Simple Powders

These are the powders that contain only 1 active ingredient either in crystalline or amorphous form. Crystalline materials are generally reduced to fine particle size before dispensing.

Compound Powders

These are the powder that contain two or more than two ingredients (API) , the different ingredients mixed together either in bulk form or wrapped separately into individual doses.

Powder For External Use :

Powder for external use are pharmaceutical preparation consisting of solid, loose, dry particles of varying degree of fineness.

They are generally meant to apply on the outer body areas.

They basically includes :

- Dusting Powders
- Surgical Powders
- Dentifrices etc.

Dusting Powder

Dusting powder are very fine, free flowing powders meant for application to unbroken skin. These powder works as protectives and having antiseptic, antifungal properties

A good dusting powder includes :

- ease of flow
- Non-irritability
- Good- absorption and adsorption
- Good stability

Surgical Powder

These are also a type of dusting powder consist of sterile product intended to be used on open large wounds or on damaged skin.

Dentifrices

Dentifrices are tooth cleaning powders used with a toothbrush for the purpose of cleaning teeth.

Classification Based on Physical Form / Dispensing

On the basis of physical form / Dispensing powders are classified into two categories :

- Bulk Powders
- Divided Powders

Bulk Powders :

Bulk Powders refer to a mixture of materials packed into properly designed bulk containers such as tight, wide-mouthed glass / plastic bottle and are intended for either internal or external administration.

Divided Powders :

Divided Powders are single doses of powdered drug mixtures. In divided powders each dose of medicament is separately packed and dispensed to the patient. Divided powders offer the advantage of accurate dose.

SOME MORE IMPORTANT POWDERS

Efferescent Powders

Efferescent powder is generally a combination of citric acid, tartaric acid and sodium-bi-carbonate. They are generally meant for internal administration. Before administration, the desired quantity is dissolved in water, the acid & bi-carbonate reacts together and release carbon-di-oxide that produces efferescence.

Efflorescent Powders

Efflorescent powders are crystallized powders that contain water of hydration or crystallization and when they exposed to atmosphere, they partially or completely release its water.

Hygroscopic Powders

Hygroscopic powders are those which absorb moisture from the atmosphere, although they absorb moisture (water vapours) but do not convert into liquid.

Deliquescent Powders

These are those powders that absorb moisture to such a great extent that they convert into liquid form. Deliquescent powders have a very high affinity towards water.

Snuffs

Snuffs is a smokeless tobacco made from finely ground tobacco leaves used by peoples especially in past to breath up into the nose in the form of powder

Insufflations

Insufflations are extremely fine powders that are used to be injected/ introduced into the body cavities. It is mainly used with the help of a device named 'Insufflator'

LIQUID DOSAGE FORM

Liquid dosage form are meant for either internal or external use. They are prepared by dissolving 'Active Pharmaceutical Drug' (API) in aqueous or Non-aqueous solvent.

Classification

Liquid dosage form can be further classified into two categories :

- Monophasic Liquid dosage form
- Biphasic Liquid dosage form

Monophasic Liquid Dosage Form

These liquid dosage form consist only single phase and consist either true or colloidal solution. They consist aqueous or Non-aqueous solvent as a base.

Biphasic Liquid Dosage Form

They are generally represented by emulsion & suspension and consist of two immiscible phases i.e., continuous phase and dispersed phase.

Advantages

- Drugs in the form of liquid dosage are easily and fastly absorbed compared to solid dosage form.
- Liquids are easier to swallow than tablets / capsules
- Drugs with large doses can be easily administered
- Drugs with bitter and unpleasant taste can be easily masked by adding sweetening and flavouring agents
- These are the most suitable dosage form for patients having difficulty taking tablets or capsules i.e. children and old aged patients.

Disadvantages

- Liquid dosage forms are usually less stable compared to solid dosage form.
- They are bulky and therefore inconvenient to transport and store.
- High chances of microbial contamination specially in aqueous preparations
- Inaccuracy in doses compared to tablet, capsules.

EXCIPIENTS USED IN THE FORMULATION OF L.D.F.

Excipients are those substances which included during the formation of dosage form but do not having any therapeutic activity of their own. A number of excipients/ additives are used during the formation of liquid dosage form. These included :-

- Vehicle / Solvent
- Co-solvent
- Preservatives
- Antioxidants
- Suspending / Emulsifying Agents
- Viscosity Enhancing Agents
- Buffering Agents / Buffers
- Sweetening Agents
- Flavouring Agents
- Colouring Agents

Vehicle / Solvents

In liquid dosage form vehicles/ solvents are major components used as a base in which drugs or other excipients/ ingredients are dissolved. Vehicles used in the formulation of liquid preparations may be aqueous or oily. The choice of vehicle used depends on the nature and physiochemical properties of Active Pharmaceutical Ingredient (API).

Co-Solvents

Co-solvents are basically liquid components often used to increase the solubility of drugs in the desired solvent i.e., ethanol, glycerol.

Preservatives

Preservatives are chemical compounds that are added to formulation to protect them from microbial contamination. Only a limited no. of anti-microbial preservatives are appropriate for oral administration.

Anti-Oxidants

These are the substances added to prevent oxidative degradation / oxidation of substances used in liquid preparations. The ideal antioxidant should be non-toxic, soluble in vehicle and stable at all temperatures.

Suspending and Emulsifying Agents

These are the excipients that are mainly used in the formulation of emulsions and suspensions. They are basically used to help the Active Pharmaceutical Ingredient to stay dissolved in the formulation.

Viscosity Enhancing Agents

They are basically used to increase the viscosity of the solvent.
They are mainly used to convert liquids to gels / pastes.

Buffering Agents / Buffers

Buffers are used to maintain the stability and pH of liquid preparation as pH of most of the body fluid is 7.4, hence liquid preparations such as injection / eye drops and nasal drops should be buffered at pH 7.4 to avoid irritation.

Sweetening Agents

Sweetening agents are used to mask the unpleasant / bitter taste of the formulation. Sugar, Glucose, Sucrose, Sacharin and Honey are some commonly used sweetening agents.

Flavouring Agents

Flavouring agents are used to overcome the unpleasant smell / taste of the formulation. Apple, Ginger, clove, rose, orange are commonly used flavouring agent.

Colouring Agents

They are generally used in the liquid dosage form to mask the unpleasant appearance of the preparation and to improve the acceptance of consumers.

SOLUBILITY ENHANCEMENT TECHNIQUES

The term 'solubility' is defined as the maximum amount of solute / substance that will dissolve in a given amount of solvent at a specified temperature, pressure and pH.

In liquid preparations sometimes the 'active pharmaceutical ingredient' is poorly dissolved or insoluble in the desired solvent. In such cases the following techniques have been used to increase the solubility of drug substances.

Particle size reduction

Surfactant

pH- adjustment

Co- solvency

Salt formation

Temperature Increase

Particle Size Reduction

Surface area and particle size are inversely proportional to each other. Decrease / Reduction in the particle size of the drug substances will increase the surface area of drug which enhances the overall solubility of drug substances.

Surfactants / Surface Active Agents

A surfactant is a substance which reduces the interfacial tension between the solute and the solvent to form thermodynamically stable solution. An ideal surfactant should be Non-toxic, stable and compatible with other ingredients in the formulation.

pH - Adjustment

Most of the drugs are either weak acid or weak base. The solubility of these drugs substances is greatly influenced by the pH of the solution. Hence solubility of drug that is either a weak acid or weak base can be easily increased / enhanced by adjusting the pH of the solution.

Cosolvency

Cosolvency is the technique of increasing the solubility of poorly soluble drug by addition of a co-solvent such as ethanol, glycerol in which both drugs and solvent are highly soluble.

Salt Formation

Most acidic and basic drugs dissolves very rapidly when they are dissolved in salt. Hence by the formation of salt in the given solvent we can easily enhance the solubility of the drug.