

Pharmaceuticals

Lecture -7

Tincture & Cataplasma (poultice)



Tinctures



cataplasma

Tinctures

Tinctures:-are alcoholic or hydroalcoholic solutions prepared from vegetable materials or from chemical substances.

- **They vary in:-**

- 1-Method of preparation.

- 2-Strength of the active ingredient.

- 3-Alcoholic content.

- 4-Intended use in medicine or pharmacy.

- **Depending on the preparation**, tinctures contain alcohol in amounts ranging from approximately 15 to 80%. The alcohol content protects against microbial growth.

- **Other solvent , such as glycerol.**

- **Tinctures must be storage cool and dry place, tightly stoppered and keep away from sunlight, use amber colored bottles.**

Classification of Tincture

Tincture can be classified on the basis of :-

- 1-presences of active ingredients (medicated , non medicated).

- 2- Methods of application (Oral, Topical).

Tincture can prepared by three Methods:-

1-Maceration :- by this process we can be prepare:

(Tincture of benzoin , Tincture of opium ,Tincture of Orange).

2-Percolation :- by this process we can be prepare:

(Tincture of Ginger, Tincture of Belladonna, Tincture of Digitalis)

3- By simple solution :- by this process we can be prepare:

(Tincture of Iodine).

Tincture of Iodine

It is usually **2-7%** elemental **iodine** , along with **potassium iodide** or **sodium iodide** dissolve in the mixture of **ethanol** and **water**.

Preparation:-

- 1- Dissolved 20 g of Iodine and 24 g of sodium Iodide in 500 ml of Alcohol.
- 2- Mix it properly.
- 3- Add Purified Water to make the product measure 1000ml.

Uses :-

As a disinfectant for wounds.

cataplasm

Also called (**poultice**), is a soft moist mass, often heated and medicated that is spread on cloth over the skin to treat an aching, inflamed or painful part of the body.

Types of poultice:-

- 1-Mustard poultice.
- 2-kaolin poultice.
- 3-Starch poultice.
- 4-Comfrey poultice.
- 5-Tumeric poultice.



Uses of cataplasma

- 1- Poultice are used to cure inflammation.
- 2- To relief Itching.
- 3- To relief muscle pain muscle spasm.

Pharmaceuticals

Lecture -2

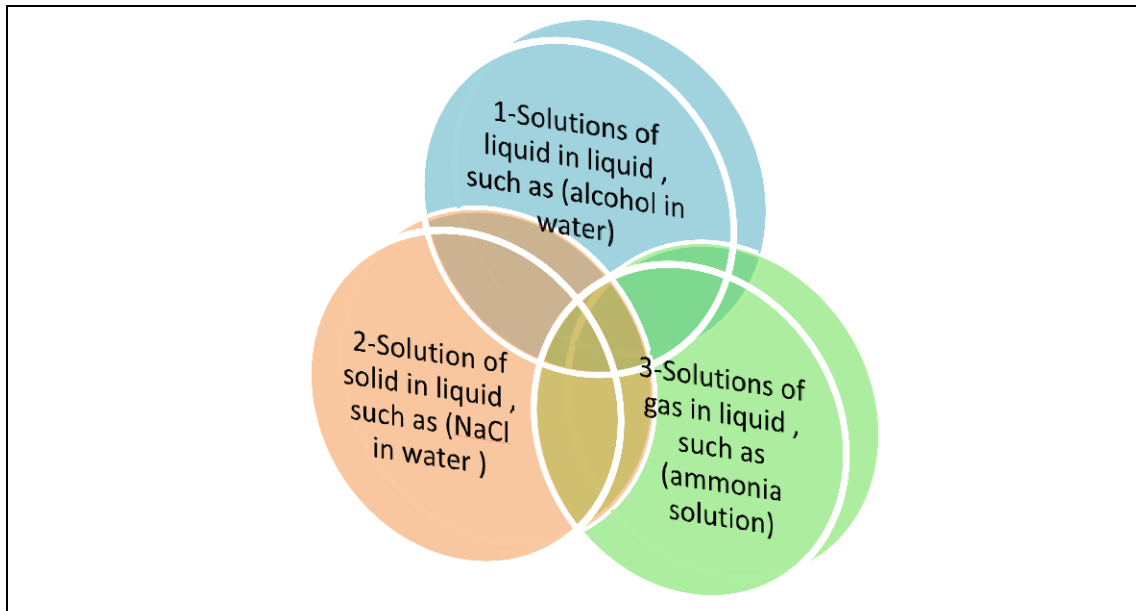
Solution



Solutions

liquid pharmaceutical preparation contain one or more chemical substances dissolved in one or more suitable solvent. The solvent used for preparing solution is water; other solvent such as alcohol & glycerin.

Types of solutions



Solution classified According to dosage forms:

1. Syrups (Aqueous solution containing sugar).
2. Elixirs (sweetened hydro-alcoholic solution).
3. Spirits (solution of aromatic material with alcohol solvent).
4. Aromatic water (solution of aromatic material in water as solvent).
5. Tinctures or fluid extract (prepared by extracting active constituent from crude drug).

Solution Classified as Pharmaceutical solution:-

1. Oral solution.
2. Ophthalmic solution.
3. Otic (Ear) and nasal solution.
4. Topical solution.
5. Parenteral solution.

Advantages and disadvantages of pharmaceutical Solution for oral administration:-

Advantages

- 1- Therapeutic agents can easily be administered orally to individuals who have difficulty in swallowing, e.g. elderly patients, infants.
- 2- The therapeutic agent is dissolved in the formulation and is therefore immediately available for absorption. Providing the drug does not precipitate within the gastrointestinal tract, the bioavailability of pharmaceutical solutions is greater than that of oral solid-dosage forms.
- 3-Taste-masking of bitter therapeutic agents may be readily Achieved.

Disadvantages

- 1-Pharmaceutical solutions for oral administration are unsuitable for therapeutic agents that are chemically unstable in the presence of water.
- 2-The poor solubility of certain therapeutic agents may prohibit their formulation as pharmaceutical solutions. The reader should note that certain techniques are available to enhance the solubility of poorly soluble drugs. These will be highlighted later in this chapter.
- 3-Pharmaceutical solutions are expensive to ship and are bulky for the patient to carry due to the associated mass of the product.

Solubility:

Most of solutions are example of solid in liquid solution. The solubility of an agent in a particular solvent indicates the maximum concentration to which a solution may be prepared with the solute and the solvent.

Table 1 Relative terms of solubility

Descriptive term	Part of solvent required for 1 part of solute
Very soluble	< 1
Freely soluble	1-10
Soluble	10-30
Sparingly soluble	100-1000
Slightly soluble	1000-10000
Practically insoluble or insoluble	> 10000

Factors affecting solubility

- 1. Nature of solute and solvent:** When two substances are similar they can dissolve each other (like dissolve like). Polar solutes dissolve in polar solvent and vice versa.
- 2. Temperature:** Most chemicals absorb heat when they are dissolved and are said to have a positive heat of solution, resulting in increased solubility with an increase in temperature. A few chemicals have a negative heat of solution and exhibit a decrease in solubility with a rise in temperature.
- 3. Particle size of the solute.**
- 4. Agitation.**
- 5. Effect of pH on solubility:** The pH of medium is important for certain compounds such as weak acid and weak base; it affects the degree of dissociation and the ratio of ionized to unionized form of the compound.

Methods for preparation of solution:

1. Solution prepared by simple solution.
2. Solution prepared by chemical reaction.
3. Solution prepared by simple solution with sterilization.
4. Solution prepared by extraction.

Simple Solutions:-

Are clear homogenous solutions in which the solute is either Soluble Solid or gas or miscible liquid .

General procedure of preparation of simple solution:-

1. weigh the solid ingredient and put in beaker.
2. calculate $\frac{3}{4}$ (three quarters) of the total volume of vehicle & subtract from the volume of any liquid component. Measure the resultant volume of the vehicle & add it to the content of the beaker. Stir until the solid medications dissolves
3. measure accurately the liquid ingredient & add it to the contents of the beaker. Stir until becomes homogenous.
4. Transfer the contents of the beaker to suitable measuring cylinder & add a sufficient vehicle to reach the volume.
5. Transfer the mixture to suitable "Dispensing bottle". Attach a label with following instruction:

Simple Solution of Iodine

Liquor solution of Iodine :-

R /

Iodine crystal 90 grams

Alcohol 25% Q.S to 1000 ml.

Method :-

Add 90 gm. Of Iodine crystal to Alcohol of 25% concentration with mixing then complete the volume to final volume of 1000ml.

It is used as antiseptic for skin infection.

Rx.

Sodium Chloride 0.9 gm.

Purified water ad 1000 ml.

Rx.

Bismuth Carbonate 3 gm.

Tincture of orange 2 ml.

Chloroform Water ad 60 ml.

Rx.

Glucose 3 gm.

Purified water ad 20 ml.

Pharmaceuticals

Lecture -3

Ointments



Ointments, creams and gels

Ointments creams and gels are semisolid dosage forms intended for topical application. They may be applied to the skin, placed onto the surface of the eye or used nasally, vaginally or rectally.

Ointments

Are semisolid preparations intended for external application to the skin or mucous membranes.

The active ingredients mixed with oil or fatty substance or beeswax.

Ointments may be:-

1-medicated **2-non medicated**, non medicated ointments are used for the physical effects that they provide as protectants, emollients or lubricants.



Uses Ointments

Are which include:- 1-medicines, 2-moisturizers, 3-cosmetics, can be applied to the eyes, skin, and mucus membranes to help treat anything from dry skin to cuts, scrapes, burns, bites, and hemorrhoids.

Advantages of semi-solid dosage form:

- It is used externally
- The side effect can be reduce
- First pass gut and hepatic metabolism is avoided.
- Local action and Site specific action of drug on affected area.
- Convenient for unconscious patient or patient having difficulty on oral administration.
- Suitable dosage form for bitter drugs.
- More stable than liquid dosage form.

Disadvantages of semi-solid dosage form:

- There is no dosage accuracy in this type of dosage form.
- The base which is used in the semi-solid dosage form can be easily oxidized.
- May cause staining.
- They are bulky to handle.
- Application with finger may cause contamination.
- Physio-chemically less stable than solid dosage form.
- May cause irritation or allergy to some patients.

Ideal Properties Of Ointment:-

1-PHYSICAL PROPERTIES:

- Elegant in appearance
- Non dehydrating
- Non greasy .
- Non hygroscopic.

2-PHYSIOLOGICAL PROPERTIES:

- Non irritating
- Do not alter membrane / skin functioning
- Miscible with skin secretion Have low sensitization index.

3-APPLICATION PROPERTIES:

- Easily applicable with efficient drug release.
- High aqueous wash ability.

Type of ointments

1-Water-soluble ointment

2-Water-insoluble ointment

Classification of Ointment:-

1-According to penetration:-

1-Epidermic ointment: These ointments are intended to produce their action on the surface of the skin and produce local effect, they are not absorbed. • They acts as protective, antiseptics and parasiticides

2-Endodermic ointment: These ointments are intended to release the medicaments that penetrate into the skin. They are partially absorbed and acts as emollients, stimulants and local irritants.

3-Diadermic ointment: These ointments are intended to release the medicaments that pass through the skin and produce systemic effects (absorb & produce systemic effect).

2-According to therapeutic use:-

(Antibiotic, Antifungal, Anti-inflammatory).

Preparation of ointments:-

The method used **depends primarily on the nature of the ingredients.** Ointments are prepared by three general methods:

1. Incorporation
2. Fusion
3. Emulsification method.

Incorporation

The incorporation method, the components are mixed until a uniform preparation is attained, on a small scale the pharmacist may mix the components using a mortar and pestle or a spatula and slab

(a glass or porcelain plate).

Fusion

This method used when the base are solid and not will be grinding by **mortar and dissolve the bases according to descending order of Melting – point**

to avoid over heating.

Emulsification

In the preparation of ointments having an emulsion base, the method of manufacture involves both a melting and an emulsification process.

❖ **Ingredients used in preparation of ointment:-**

**1-Base 2-preservative 3-Humectants 4-Antioxidants
5-Emulsifier 6-Gelling agent 7-Premeation enhancer
8-Buffer.**

1.Bases used in semisolid dosage form

It is one of the most important ingredients used in the formulation of the semisolid dosage form. Ointment bases do not merely act as the carriers of the medicaments, but they also control the extent of absorption of medicaments incorporated in them.

Ideal Properties of Bases

- Inert ,non irritating and non sensitizing
- Good solvent and/or emulsifying agent
- Emollient , protective , non greasy and easily removable
- Release medicaments easily at the site of administration
- Pharmaceutical elegant and possess good stability.

Classification of bases:-

1-Hydrocarbon bases (oleaginous bases).(Paraffin ,Lanolin)

2-Absorption bases. (cold cream, anhydrous).

3-Water- removable bases. (Oil in water).

4-Water-soluble bases.(poly ethylene glycol).

2.Preservatives

To inhibit the growth of contaminating microorganisms, so required the addition of chemical antimicrobial preservatives to the formulation ,ex phenols, benzoic acid, sorbic acid, quaternary ammonium.

3.Humectant

Is hygroscopic substances ,Humectants are used to :-

To increase the solubility of the active ingredients.-

-To elevated its skin penetration.

-To elevate the hydration of skin .

4. Antioxidants

Oxygen is highly reactive atom that is capable of becoming part of potentially damaging molecules commonly called "free radicals" free radicals are capable of attacking the healthy cells of the body, causing them to lose their structure and function to prevent for this antioxidants are add. Ex: Butylated hydroxyanisole, : Butylated hydroxy toluene.

5. Emulsifier Is substances that stabilizes an emulsion by increase its kinetic stability.

- Must reduce surface tension for proper emulsification
- prevents coalescence.
- Ability to increase the viscosity at low concentration.

Emulsifying agents:-

1- Sodium lauryl sulfate: Oil/Water emulsion - Sodium stearate and calcium stearate

2-Glyceryl monostearate: This is a weak Water/Oil emulsifying agent and it is used as a stabilizer and emollient in the Oil/Water emulsion.

6. Permeation enhancer

Skin can act as barrier with introduction of various penetration enhancer penetration of the drug through the skin can be improved. Ex Oleic acids

7. Buffers

Buffers are added for various purposes such as

1-Compatibility with skin.

2-Drug solubility

3- Drug Stability.

8. Antimicrobial preservatives

To inhibit the growth of contaminating microorganisms, so require the addition of chemical antimicrobial preservatives to the formulation. Ex , phenols , benzoic acid , sorbic acid, quaternary ammonium salts.

Creams

are semisolid preparations containing one or more medicinal agents dissolved in either an o/w or w/o emulsion. **Creams** find primary application in topical skin products and also in products used rectally and vaginally.

-Many patients prefer creams to ointments because they are easier to spread and remove than ointments

Gels

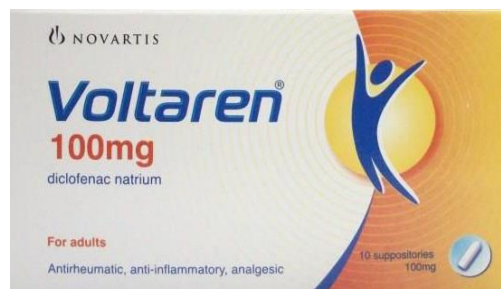
Are usually clear, transparent non greasy semisolids containing solubilised active substances in an aqueous liquid vehicle rendered jelly like by the addition of a gelling agent Among the gelling agents used are synthetic macromolecules such as carbomer934, cellulose derivatives as carboxymethyl cellulose - hydroxypropyl methyl cellulose- Natural gum,such as tragacanth.

**Q/what is difference between ointment
and cream?**

Pharmaceuticals

Lecture -4

Suppositories



Suppositories

Are solid dosage forms intended for insertion into body cavities where they melt, soften, or dissolve and exert local or systemic effects such as (the rectum, vagina, etc.).they are melt at normal body temperature after introducing in body cavity produce their effect.

Uses of Suppositories

1-Suppositories are great for patients with constipation. There are various types of laxative suppositories like bisacodyl suppositories, glycerin suppositories.

2-Rectal suppositories are very useful for hemorrhoids.it reduces swelling and discomfort.

3-Vaginal and urethral suppositories are great for fungal infection in the vagina and urethra. (clotrimazole, miconazole, are used as a drug).



Advantages of Suppository

- 1-It's easy to use for those patients, who are unable to take oral medication. (like unconscious patients, children).
- 2- Increase the bioavailability of drugs.
- 3-Very useful to get local effects.
- 4- It avoids the first-pass metabolism.
- 5-It provides rapid action.
- 6-Best for vaginal and rectum fungal infection.

Disadvantages of Suppository

- 1-It can cause irritation to mucous membrane in some patients.
- 2-Some patients feel embarrassed.
- 3-Preparation is complicated compared to liquid and tablets.
- 4-Need low temperature to storage (10-20 C).
- 5-Very few drugs can be delivered by this type of dosage form.

Classification of suppositories

There are 5 types of suppositories according to **the Route of administration**

- 1- Rectal suppositories.
- 2- Vaginal suppositories.
- 3- Urethral suppositories.
- 4- Nasal suppositories.
- 5- Ear suppositories.

There are 4 types of suppositories in other dosages form.

- 1- Tablet Suppositories.
- 2- Layered Suppositories.
- 3- Coated Suppositories.
- 4- Capsule Suppositories.

1-Rectal Suppositories

- It is inserted in the rectal.
- The weight of suppository used in the children is about 1 g, and adult about 2 g.
- The shape of suppository used in rectal is Torpedo shape with length about 3 cm.

2-Urethral Suppositories

- It is inserted in the Urethral.
- The weight of suppository is about 2g and 60 -75 mm long in female. And in male weight 4 g100 -150 mm long in.
- The shape of suppository is pencil.

3-Vaginal Suppositories

- It is inserted in the vaginal .
- The weight of suppository is about 3-5g.
- It is contain the drugs which are used in treatment of the infections female genitourinary tract and for contraception.
- It is contains the combination of polyethylene glycol of different molecular weight.as suppository bases.

4-Nasal Suppositories

- It is introduction in the nasal cavity.
- The weight of suppository is about 1g.
- The glycerol- gelatin is used as suppository bases.

5-Ear Suppositories

- It is introduction in the Ear.
- The weight of suppository is about 1g.
- The shape of suppository is cylindrical.

Formulation of Suppositories

- 1- Bases
- 2-Antioxidants.
- 3-Emulsifying Agents.
- 4-Hardening Agents.
- 5-Preservatives.
- 6-Thickening agents.
- 7-Plasticizers.

Suppository bases

play an important role in the release of the medication they hold and, therefore, in the availability of the drug.

Ideal suppository base possess the following properties:

- 1 It should exist in solid form at room temperature and melt at body temperature .
2. It should be inert, non-irritating and non-sensitizing.
3. It should release the medicament readily.
4. It should be compatible with a broad variety of drugs.
5. It should be stable on storage and transportation.
6. It should have wetting and emulsifying properties.
7. It should be able to incorporate a high percentage of water in it i.e., a high water number.
- 8.It should be not reacts with drugs and additives .
9. Fatty bases should have acid value less 0.2, and saponification value in between 200 to 245, iodine value less than 7 .

Classification of Supp. Bases

1. Fatty bases.
2. Water-soluble or water-miscible bases.
3. Miscellaneous bases. Combinations of lipophilic and hydrophilic substances.

1-Fatty Bases

Fatty bases are the most frequently employed suppository bases, principally because cocoa butter is a member of this group of substances. Among the other fatty or oleaginous materials used in suppository bases are many hydrogenated fatty acids of vegetable oils, such as palm oil and cotton seed Oil.

Also, fat based compounds containing compounds of glycerin with the higher molecular weight fatty acids, such as palmitic and stearic acids, may be found in fatty bases. Such compounds, such as glyceryl monostearate and glyceryl monopalmitate are examples of this type of agent.

Cocoa Butter

Is the fat obtained from seed of Theobroma oil At room temperature, it is a yellowish white solid. Chemically, it is a triglyceride cocoa butter melts at **(30 C to 36 C 86 F to 97 F)**, it is an ideal suppository base, melting just below body temperature and yet maintaining its solidity at usual room temperatures



2-Water Soluble and Water Miscible Bases

The main members of this group are glycerinated gelatin and polyethylene glycols. Glycerinated gelatin suppositories may be prepared by dissolving granular gelatin (20%) in glycerin (70%) and adding water or a solution or suspension of the medication.

glycerinated gelatin

glycerinated gelatin base is most frequently used in the preparation of vaginal suppositories ?

- *prolonged local action of the medicinal agent is usually desired The glycerinated gelatin base is slower to soften and mix with the physiologic fluids than is cocoa butter and therefore provides a slower release.*

The water present in the formula for the suppositories minimizes this action however, if necessary, the suppositories may be moistened with water prior to insertion to reduce the initial tendency of the base to draw water from the mucous membranes and irritate the tissues

- Urethral suppositories may be prepared from a glycerinated gelatin base.

Polyethylene glycols

Are polymers of ethylene oxide and water prepared to various chain lengths, molecular weights, and physical states They are available in liquid and solid. Liquid have molecular weight about ranges (200-600), solid have molecular weight more than 1000. Such as Carbowaxes

3-Miscellaneous Bases

Are mixtures of the oleaginous and water soluble or water miscible materials. They are emulsions, generally of w/o type Mixtures of fatty bases (such as cocoa butter) with emulsifying agents capable of forming w/o emulsions have been prepared These bases have the ability to hold water or aqueous solutions.

B) Anti oxidants

It is protect the drugs and bases from getting degraded due to oxidation. These are commonly used in all types of suppositories.

Ex:- Ascorbic acid , Hydroquinone ,Tocopherol .

C) Emulsifying agents

These are increase the water absorbing capacity of fatty bases.

Ex:- Poly sorbates (TWEEN 61), Wool alcohol, Wool fats.

(D) Harding Agents

These are involved in those formulation where the melting point of the bases is decrease by the drugs. These are the agents which are used to bring the melting point to normal.

EX:- Beeswax , Macrogols at high molecular weight.

(E) Preservatives

These are the agents which are used in prevent the growth of microbial in suppository which contains water soluble bases.

EX:- Chorocresol, Methyl paraben , Propyl paraben .

F) Thickening Agents

These are the agents which are used to increase the viscosity of molten bases and prevent sedimentation of suspended solids in solid bases.

EX:- Aluminium monostearate Colloidal silica Magnesium stearate Stearyl alcohol

(G) Plasticizers

These are the agents which are used to improve the flexibility of suppositories. It is also used to make the suppositories less brittle.

EX:- Castor oils, Glycerine, Glycol, Tween 80, Tween 85.

Preparation of suppositories

Suppositories are prepared by two methods:-

1. Molding from a melt
2. Hand rolling and shaping.

- **The method most frequently employed both on a small scale and on an industrial scale is molding.**

1-Molding

The steps in molding include:-

- a- Melting the base,
- b- Incorporating any required medicaments,
- c- Pouring the melt into molds,
- d- Allowing the melt to cool and congeal into suppositories, and
- e- Removing the formed suppositories from the mold

Cocoa butter, glycerinated gelatin, polyethylene glycol, and most other bases are suitable for preparation by molding.

Suppository Molds

Commercially available molds can produce individual or large numbers of suppositories of various shapes and sizes Individual plastic molds may be obtained to form a single suppository Other molds, such as those most commonly found in the community pharmacy, are capable of producing 6, 12 or more suppositories in

Poured.

Lubrication of the Mold

Depending on the formulation, suppository molds may require lubrication before the melt is poured to facilitate clean and easy removal of the molded suppositories Lubrication is seldom necessary when the base is cocoa butter or polyethylene glycol, as these materials contract sufficiently on cooling to separate from the inner surfaces and allow easy removal.

Packaging and Storage

Glycerin and glycerinated gelatin suppositories are packaged in tightly closed containers to prevent a change in moisture content. Suppositories prepared from a cocoa butter base are usually individually wrapped or otherwise separated in compartmented boxes to prevent contact and adhesion.

Suppositories containing light sensitive drugs are individually wrapped in an opaque material such as a metallic foil. In fact, most commercial suppositories are individually wrapped in either foil or plastic material.

Because suppositories are adversely affected by heat, it is necessary to maintain them in a cool place. Cocoa butter suppositories must be stored below 30 C and preferably in a refrigerator (2 C to 8 C).

Glycerinated gelatin suppositories can be stored at controlled room temperature (20 C to 25 C).

Suppositories made from a base of polyethylene glycol may be stored at usual room temperatures. Suppositories stored in high humidity may absorb moisture and tend to become spongy, whereas suppositories stored in places of extreme dryness may lose moisture and become brittle.

Rx1\

Bismuth subgallate 300 mg

Cocoa butter q.s. using 1 g mold

Ft. supp.

M.ft. 6 supp.

Rx2\

Glycerinated gelatin suppositories (B.P.)

Gelatin 14 g

Glycerol 70 g

Purified water q.s. 100 g

Ft. sup.

M.Ft. 5 supp. using 1 g mold

sig. one sup. to be used when required.

Pharmaceuticals

Lecture -5

Capsules



Capsules

Capsules are solid dosage forms in which medicinal agents and inert substances are enclosed in a small shell of gelatin.

Gelatin capsule shells may be **hard** or **soft**, depending on **their composition**.

The shells may be composed of two pieces

1- body

2- cap

or they may be composed of a single piece.

- Two piece capsules are commonly referred to as hard shell capsules, and
- one piece capsules are often referred to as soft shell capsules.

Advantages

- 1.Mask the disagreeable taste and odour of drugs.
- 2.Provide a smooth, slippery, easily swallowed and portable dosage form.
- 3.They have an elegant and characteristic shapes and color.
- 4.They are economical.
5. They are easy to handle and carry.
- 6.They are more stable and have a longer shelf life than their counterpart liquid dosage form.
- 7.Physicians can prescribe different combinations of drugs and in varying proportions to be administered in one capsule to suit the patient needs
- 8.Capsules can be used to provide an enteric coated or prolonged release dosage form by coating with different polymers and waxes.

Disadvantages

1. Capsules are undesirable as a dosage form for aqueous or hydroalcoholic liquids which would dissolve the gelatin shell.
2. Not usually used for administration of extremely soluble materials such as potassium chloride potassium bromide, iodide and ammonium chloride, since sudden release of such compounds from capsule could result in irritating the stomach.

Types of capsules

- 1-** Hard gelatin capsule.
- 2-** Soft gelatin capsule.



Hard Gelatin Capsules (HGC)

The empty capsule shells are made of gelatin, sugar, and water. As such, they can be clear, colorless, and essentially tasteless.

They may be colored with various FD&C and D&C dyes and made opaque by adding agents such as titanium dioxide. Most commercially available medicated capsules contain combinations of colorants .

- Its consist two parts many with **caps and bodies** of different colors.
- The powdered material is filled in to the cylindrical body of the capsules and then the cap is placed over it.
- The empty capsules are available in various sizes .
- They are number starts from (000,00,0,1,2,3,4,5).

❖ Gelatins soluble in hot water and in gastric fluid a gelatin capsule rapidly dissolves and exposes its contents. Gelatin, being a protein, is digested by proteolytic enzymes and absorbed.

Soft Gelatin Capsules (SGC)

Soft gelatin capsules are made of gelatin to which glycerin or sorbitol has been added. Soft gelatin capsules, which contain more moisture than hard capsules, may have a preservative, such as methylparaben and/or propylparaben, to retard microbial growth. Soft gelatin capsules may be oblong, oval, or round.

They may be single colored or two toned and may be imprinted with identifying markings. As with hard gelatin capsules.

Use of Soft Gelatin Capsules

- 1-Water immiscible volatile and nonvolatile liquids such as vegetable and aromatic oils, aromatic and aliphatic hydrocarbons, chlorinated hydrocarbons, ethers, esters, alcohols, and organic acids.
- 2-Water miscible nonvolatile liquids, such as polyethylene glycols, and nonionic surface active agents, such as polysorbate 80.
- 3-Water miscible and relatively nonvolatile compounds such as propylene glycol and isopropyl alcohol, depending on factors such as concentration used and packaging conditions.

Preparation of Soft Gelatin Capsules

Soft gelatin capsules may be prepared by the plate process, using a set of molds to form the capsules, or by the more efficient and productive rotary die processes by which they are produced, filled, and sealed in a continuous operation.

Capsule Sizes Empty

gelatin capsules are manufactured in various lengths, diameters, and capacities The size selected for use is determined by the amount of fill material to be encapsulated.

- The density and compressibility of the fill will largely determine to what extent it may be packed into a capsule shell However the final determination may be largely the result of trial and error For human use, empty capsules ranging in size from 000(the largest) to 5 (the smallest) are commercially available.

Approximate Capsules size and fill capacities

Size of capsule	Capacity in gm.
000	1
00	0.65
0	0.5
1	0.32
2	0.25
3	0.2
4	0.15
5	0.1

Storage of capsules

Capsules should be stored in closed container in cool dry place (we must be avoid moisture and extreme temperature)

because high temperature make the capsule brittle and easily broken, moisture lead to microbial growth.

Preparation of capsules:

Prepare one capsule more than the required number to avoid any loss during trituration and weighing except for potent or narcotic drug, we calculate the exact number of the required capsule.

1-Mix ingredients together with trituration by ascending order (geometrical dilution).

2-Choose suitable size of capsule.

3-Fill the capsule.

4-Polish the capsule then dispense.

Rx1

Ephedrine 1 gr

Ft. capsule

M.ft . IX cap

Calculation:

We must prepare 10 capsules.

$10 * 1 \text{ gr} = 10 \text{ gr}$ of drug for preparation of 10 capsules

$= 0.66 \text{ g}$

$0.06 \text{ g} / \text{cap.}$ The nearest capsule size is (size 5)

$10 * 0.1 = 1 \text{ g}$ the weight needed for preparation

of 10 capsules of size 5

$1 - 0.66 = 0.34 \text{ g}$ diluent.

Rx2

	المطلوب من قبل الطبيب والمثبت في الوصفة	Available tablet
Paracetamol	400 mg	500 mg
Meprobamate	100 mg	200 mg
Prednisolon	3 mg	5 mg

Ft. capsule

M.ft . IX cap

Note

1-the total weight of crushed tablets 7 gm.

2-available size is 0

Calculations:

$$10 * 400 = 4000 / 500 = 8 \text{ tab.}$$

$$10 * 100 = 1000 / 200 = 5 \text{ tab}$$

$$10 * 3 = 30 / 5 = 6 \text{ tab.}$$

$$10 * 0.5 = 5 \text{g.}$$

Therefore, we multiply the number of capsule and we tell the patient to take double amount of capsule.

$10-7 = 3$ g diluent

Rx3

Meclodin	8 mg	10 mg
Valium	1 mg	2 mg
Vitamin B 6	20 mg	40 mg

Ft. capsule

M.ft . IX cap

Notes:

1-the total wt. of crushed tablets is 2.5 gm.

2-available size is 0

Calculations

$$10 * 8 = 80 / 10 = 8 \text{ tab.}$$

$$10 * 1 = 10 / 2 = 5 \text{ tab.}$$

$$10 * 20 = 200 / 40 = 5 \text{ tab.}$$

$$10 * 0.5 = 5 \text{ g}$$

$$5 - 2.5 = 2.5 \text{ g diluent}$$

Pharmaceuticals

Lecture - 8

Drops



Drops

- ❖ Are liquid preparations of drugs, usually in solution, intended to be administered to patients in small doses with the aid of suitable measuring devices (calibrated droppers).

Typical drops

1-Eye drops.

2-Nose drops .

3-Ear drops.



Eye drops:- (Ophthalmic drops)

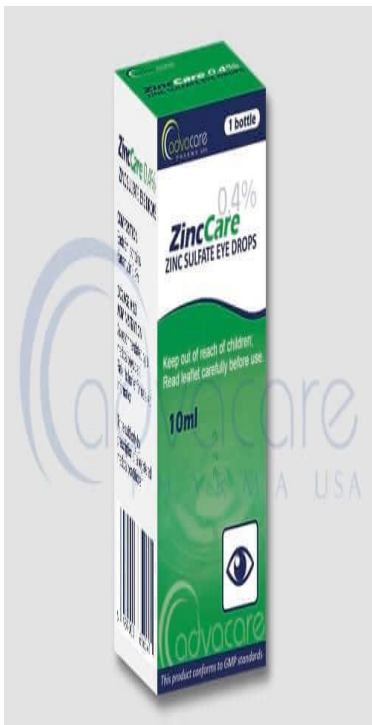
Are aqueous or oil solutions or suspensions used for eye. Eye drops

Used as (anesthetic, diagnosis agents , miotics , mydriatics , artificial tears).

Their formation involve following factors:-

- 1-Sterility:- to kill bacteria.**
- 2-Viscosity:- must be isotonic solution.**
- 3-Must be clarified to get ride of foreign particles.**
- 4-Must contain preservative .**

Example:-(Zinc sulphate Eye drops).



Nasal drops

Are aqueous solution. Which are designed to be administered to the nasal passages in drop or spray form .

They are usually aqueous solution because

- 1-Oil drops inhibit movement of cilia in nasal mucosa &
- 2-If used for long periods, may reach the lung and cause lipoidal pneumonia.

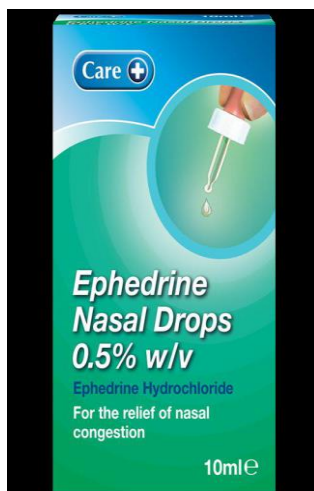
❖ They are commonly used for their:-

- 1-Antiseptic.
- 2-local analgesic .
- 3-Vasoconstrictor properties.

❖ Nasal drops must be:-

- A.Isotonic with nasal secretion.
- B. Have the same pH of nasal secretion.

Example:-(Ephedrine Nasal drop)



Ear drops

These are mostly simple solution of drugs dissolved in suitable solvent applied into ear by dropper.

❖ **Example on solvent:**(glycerin, propylene glycol, alcohol, water, alcohol)

Ear drops used as:-

- 1-antibiotic.
- 2-wax softener.
- 3-cleansing solution.

Example:- (Sodium bicarbonate Ear drop)

