Types of Dosage Forms

1

Drug:

- Drug may be defined as an agent or substance, intended for use in the diagnosis, mitigation, treatment, cure or prevention of disease in human beings or animals.
- Drugs are rarely administered in their original or crude forms. They are administered in different dosage forms by converting them into suitable formulations.

Crude Drugs

2

Dosage Forms:

- Dosage forms are the carrier through which drug molecules are delivered to sites of action within the body.
- Every dosage forms is a combination of the drug and different kinds of non–drug components called as Excipients or additives.
- The additives are used to give a particular shape to the formulation, to increase stability, palatability & more elegance to preparations.

3

Need for Dosage Forms:

1. Accurate dose.
2. Protection e.g. coated tablets, sealed ampoules.
3. Protection from gastric juice, e.g. enteric coated tablets.
4. Masking unpleasant taste and odor.
5. Provide drugs within body tissues, e.g. injection
6. Sustained release medication.
8. Facilitation of Insertion of drugs into body cavities (rectal, vaginal) Provide optimum drug action through inhalation therapy.
9. Provide drug action through topical administration at local area of body. e.g. creams, ointment, emulsion, lotions etc.
10. Use of desired vehicle for insoluble drugs.

4

What is Pharmaceutics?

- **"Pharmaceutics** is the discipline of pharmacy that deals with the process of turning a new chemical entity (NCE) or old drugs into a medication to be used safely and effectively by patients."
- It is also called the science of dosage form design.

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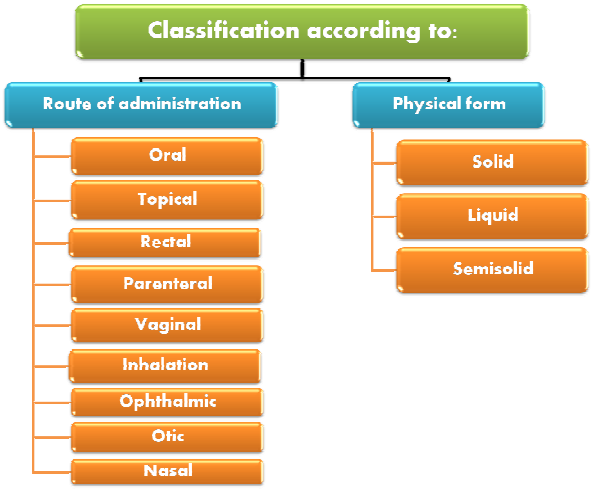
Classification:



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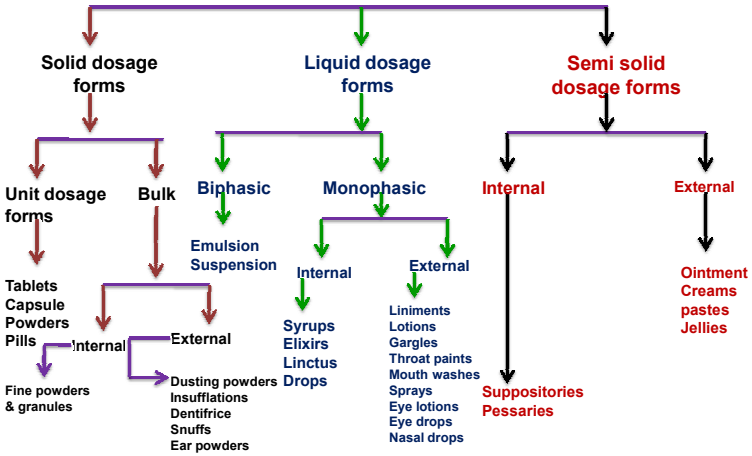

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Oral Dosage Forms:

Tablets

Pills

Capsules

Granules

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Oral Dosage Forms: CONTD...

1. Solid dosage forms one of the oldest dosage forms and most of the solid dosage forms are available in Unit dose.
2. Unit dose may be defined as a exact quantity of the drug administered at once. e.g. Tablets, Capsule, pills, cachets, powders etc.
3. When drugs are to be administered orally in dry state, then tablets, capsules are most convenient dosage forms.
4. Some solids are supplied in bulk (Means quantity available in large). Bulk powders can be supplied as Internal (Granules, Fine powders) as well as External (Dusting Powders, Insufflations etc)

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Oral Dosage Forms: CONTD...

Tablets:

1. These are solid unit dosage forms of medicaments intended for oral administration which are prepared by moulding or by compression with or without excipients.
2. The tablets can be prepared by two methods namely as a

   I) Dry granulation, II) Wet Granulation

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Oral Dosage Forms: CONTD...

3. The excipients include:

- Binders, glidants (flow aids) and lubricants to ensure efficient tabletting.
- Disintegrants to ensure that the tablet breaks up in the digestive tract.
- Sweeteners or flavours to mask the taste of bad-tasting active ingredients.
- Pigments to make uncoated tablets visually attractive.

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Oral Dosage Forms: CONTD...

A coating may be applied to:

1- hide the taste of the tablet's components.

2- make the tablet smoother and easier to swallow .

3- make it more resistant to the environment.

4- extending its shelf life.

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Buccal and Sublingual Tablet:

- Sublingual and buccal medications are administered by placing them in the mouth, either under the tongue (sublingual) or between the gum and the cheek (buccal).
- The medications dissolve rapidly and are absorbed through the mucous membranes of the mouth, where they enter into the bloodstream.
- Avoid the acid and enzymatic environment of the stomach and the drug metabolizing enzymes of the liver.
- Examples of drugs administered by this route: e.g. vasodilators, steroidal hormones.

Effervescent Tablets:

- Effervescent tablets are uncoated tablets that generally contain acid substances (citric and tartaric acids) and carbonates or bicarbonates and which react rapidly in the presence of water by releasing carbon dioxide.
- They are intended to be dissolved or dispersed in water before use providing:

  A- Very rapid tablet dispersion and dissolution.

  B- pleasant tasting carbonated drink.

Chewable Tablet:

- They are tablets that chewed prior to swallowing.
- They are designed for administration to children e.g. vitamin products.

Capsule:

1. Capsules are solid unit dosage forms in which one or more medicaments enclosed within a gelatin shell.
2. Capsules mainly divided in to two parts namely as –

   Body (Longest part of capsule shell), Cap (Smallest part of capsule shell)

1. The capsule are generally prepared by gelatin.
2. Depending on their formulation, two types of gelatin are used namely as – I) Hard gelatin, II) Soft gelatin.

Oral Dosage Forms: CONTD...

Lozenges:

1. It is a solid preparation consisting of sugar and gum, the latter giving strength and cohesiveness to the lozenge and facilitating slow release of the medicament.
2. It is used to medicate the mouth and throat for the slow administration of indigestion or cough remedies.

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Oral Dosage Forms: CONTD...

Pastilles:

- They are solid medicated preparations designed to dissolve slowly in the mouth. They are softer than lozenges and their bases are either glycerol and gelatin, or acacia and sugar.

Dental Cones:

- A tablet form intended to be placed in the empty socket following a tooth extraction, for preventing the local multiplication of pathogenic bacteria associated with tooth extractions.
- The cones may contain an antibiotic or antiseptic.

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Oral Dosage Forms: CONTD...

Pills:

1. These are small, rounded solid dosage forms containing medicaments intended for oral use.
2. The medicaments are mixed with excipients to forms a firms plastic mass.
3. The mass is rolled to uniform pill pipe, which cut into numbers of uniform pills. The pills are spherical in shape & produced by rolling them under wooden pill rounder.
4. Sometimes pills are coated with varnish, gold leaf, etc to improve finish, unpleasant taste & stability.
5. Now a days pills are outdated preparations because of number of disadvantages such as -

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Oral Dosage Forms: CONTD...

6. Disintegration time of pill is uncertain means freshly prepared pills are disintegrates readily rather than old dried pills.
7. It is difficult to prepare pills of uniform size & weight.

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Oral Dosage Forms: CONTD...

Granules:

1. Granulation is the process in which primary powder particles are made to adhere to form larger multiparticle or large particles entities called **granules.**
2. The bitter, nauseous, unpleasant powders can not be given tablets, capsule due to bulk quantity are required to be taken, as well as they are not given in liquid dosage forms due to their stability such powders are given in the granules forms.
3. These powders are mixed with suitable exicipent along with granulating agent, prepare a coherent mass then dried & passed through the sieve to obtained desired size of granules.

   E.g. Effervescent granules

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Oral Dosage Forms: CONTD...

Effervescent Granules:

1. Effervescent granules are meant for internal use.
2. They contained medicaments mixed with citric acid, tartaric acid & sodium bi carbonates, sometime saccharin or sucrose may be added for sweetening taste.
3. Before, administration desired quantity of granules are dissolved in water, the acid & bicarbonate reacts with each other to produce effervescence.
4. Effervescent granules are prepared by two methods, namely as, I) Heat method, II) Wet method

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Oral Dosage Forms: CONTD...

Powder (Oral):

There are two kinds of powder intended for internal use.

1-**Bulk Powders:** are multidose preparations consisting of solid, loose, dry particles of varying degrees of fineness. They contain one or more active ingredients, with or without excipients and, if necessary, coloring matter and flavoring substances.

- e.g. antacids since the patient measures a dose by volume using a 5ml medicine spoon. The powder is then usually dispersed in water or, in the case of effervescent powders, dissolved before taking.

2-**Divided Powders:** are single-dose presentations of powder (for example, a small sachet) that are intended to be issued to the patient as such, to be taken in or with water.

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Oral Dosage Forms: CONTD...

Liquid Oral (Internal) Dosage Forms:

1. **Oral Solution**
2. **Oral Suspension**
3. **Oral Emulsion**
4. **Syrup**
5. **Elixir**
6. **Linctuses**
7. **Oral Drops**

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Liquid External Dosage Forms:

1. **Liniments**
2. **Lotions**
3. **Gargles**
4. **Mouthwashes**
5. **Throat Paints**
6. **Sprays**
7. **Eye Lotion**
8. **Eye Drop**
9. **Nasal Drop**

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Liquid dosage forms:

1. It may be defined as "a solution is a liquid-preparation that contains one or more soluble chemical substances dissolved in a specified solvent"
2. liquid dosage forms are intended for external, internal or parenteral use.
3. The component of the solution which is present in a large quantity is known as "solvent" where as the component present in small quantity is termed as "solute"
4. They mainly classified in to two category namely as –

   I) Monophasic liquid dosage forms.

   II) Biphasic liquid dosage forms.

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Advantage:

1. Immediately available for absorption.
2. Administration convenient, particularly for infants, psychotic patients.
3. Easy to color, flavor & sweeten.
4. Liquids are easier to swallow than solids and are therefore particularly acceptable for pediatric patient.
5. A solution is an homogeneous system and therefore the drug will be uniformly distributed throughout the preparation.
6. Some drugs like aspirin, KCl can irritate gastric mucosa if used orally as a solid dosage forms. But this effect can be reduce by solution system.

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Disadvantage:

1. Less stable in aqueous system. Incompatibility is faster in solution than solid dosage form.
2. Patients have no accurate measuring device.
3. Accident breakage of container results in complete loss.
4. Solution often provide suitable media for the growth of micro organisms.
5. The taste of a drug, which is often unpleasant, is always more pronounced when in solution than in a solid form.
6. Bulky than tablets or capsule, so difficult to carry transport.

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Monophasic Liquid Dosage Forms:

1. Monophasic liquid dosage forms are represent by true or colloidal solution.
2. The component of the solution which is present in a large quantity is known as "SOLVENT" where as the component present in small quantity is termed as "SOLUTE".
3. A solution is homogenous because the solute is an ionic or molecular forms of subdivision.
4. In case of colloidal solutions, the solutes are present as aggregates although they cannot be seen by necked eye or ordinary microscope.
5. It is sub classified as –

   I) Internal Use, II) External use

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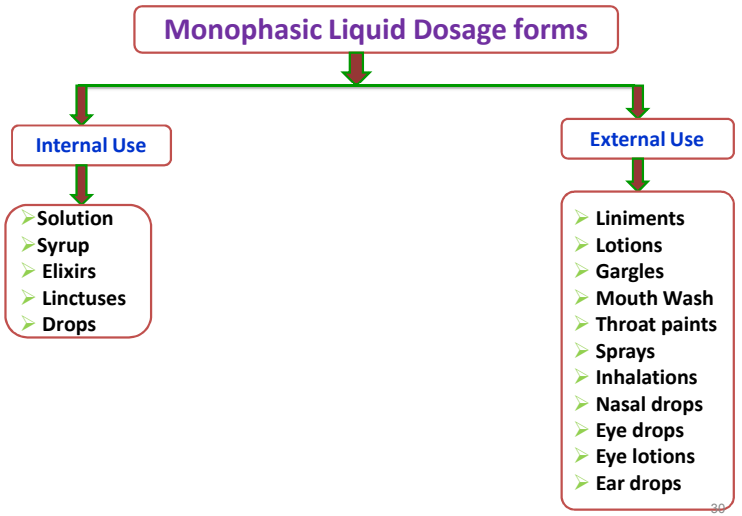

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Monophasic Liquid Dosage Forms for Internal Use:

- **Oral solutions** are clear Liquid preparations for oral use containing one or more active ingredients dissolved in a suitable vehicle.

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Syrup:

1. It is a concentrated or saturated solutions of sucrose in purified water.
2. The concentration of sucrose is 66.7% w/w & due to that it is a viscous preparations.
3. The syrup which contains medical substance called as a medicated syrup & those containing aromatic or flavored substance known as a flavored syrup.

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Oral Dosage Forms: CONTD...

Importance of syrup:

1. It retards oxidation because its partly hydrolyzed into reducing sugar.
2. It prevents decomposition of many vegetable substance because its have high osmotic pressure which prevent the growth of bacteria.
3. They are palatable due sweet taste.

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Oral Dosage Forms: CONTD...

Elixirs:

1. It is clear, sweetened, aromatic, hydro-alcholic preparations meant for oral use.
2. The medicated elixirs are generally contained potent drug like as antibiotics, antihistamine or sedative, where as non – medicated elixirs contained flavoured.
3. The composition of elixirs contained mainly as ethyl alcohol (active ingredients),water, glycerin or propylene glycol, colouring agent, flavouring agent & preservative.

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Oral Dosage Forms: CONTD...

Linctuses:

1. These are viscous liquid preparations that's are used for the treatment of cough.
2. They contain medicaments which have demulcent, sedative, expectorant action.
3. They are taken in small doses without diluting with water to have prolonged effect of medicines.
4. Simple syrup is used as a vehicle for most of the linctuses.
5. Tolu syrup is preferred in certain cases because of its aromatic odour & flavour. Moreover it have a mild expectorant action

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Oral Dosage Forms: CONTD...

Drops:

1. These are liquid preparations meant for oral administration.
2. The oil soluble vitamins, such as vitamin A & D concentrates in fish – liver oil are presented as drops for administration.
3. Since these preparations contain potent medicaments, the dose must be measured accurately
4. The following two methods are commonly used for this purpose.
5. Use of a dropper which is accurately graduated in fractions of a milliliters.
6. Use of a pre – calibrated dropper.

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Monophasic Liquid Dosage Forms for External Use:

Liniments:

1. Liniments are liquid or semi- liquid preparations meant for external application to the skin.
2. They are usually applied to the skin with friction & rubbing of the skin.
3. They are usually alcoholic and oily liquid preparations (Monophasic) or emulsion (Biphasic).
4. Alcoholic liniments are used generally for their rubefacient and counterirritant effects. Such liniments penetrate the skin more readily than do those with an oil base.
5. The oily liniments are milder in their action and may function solely as protective coatings
6. Liniments should not be applied to skin that are bruised or broken.

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Lotions:

1. They are usually aqueous, alcoholic or oily liquid preparations.
2. They are intended for external application without friction or rubbing to the affected area
3. Usually applied with the help of some absorbent material such as cotton wool or gauze.
4. It is generally used to provide cooling, soothing and protective & antiseptic action.

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Gargles:

1. Gargles are aqueous solutions used for treating throat infection (pharynx and nasopharynx part).
2. Supplied in concentrated forms with directions of dilution with warm water before use.
3. They are used into intimate contact with the mucous membrane of throat for few seconds, before they are thrown out of the mouth.
4. They are used to relieve soreness in mild throat infection.
5. They are also used for their antiseptics, antibiotics and/or anesthetics.

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Mouthwash:

1. These are aqueous solutions with pleasant or acceptable taste & odor.
2. These are used to make clean & deodorize the buccal cavity or used for oral hygiene and to treat infections of the mouth.
3. They mainly contain antibacterial agent, alcohol, glycerin, sweetening agent, flavoring agent & colouring agent.

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Throat paints:

1. Throat paints are viscous liquid preparations used for mouth and throat infections.
2. Glycerin is commonly used as a base because being viscous it adheres to mucous membrane for long period and it possess a sweet taste.

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Sprays:

1. These are the preparations of drugs in media which may be aqueous, alcoholic, or glycerin.
2. They are applied to the mucous membrane of throat or nose with an atomizer.
3. The throat sprays must be sprayed from a special type of atomizer known as a nebulizer, which removes the large droplets by baffling system. Only precaution should be taken that the fine droplet will used to easily reach the lungs.

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Biphasic Liquid Dosage Forms:

1. The liquid which consist of two phases are known as a biphasic liquid dosage forms.
2. They are sub categorized into two different forms namely as –

   I) Emulsion

   II) Suspension

1. In emulsion both phases are available in liquid where as in suspension, finely divided solid particles are suspended in liquid medium.

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Emulsion:

1. Emulsion is a biphasic liquid preparations containing two immiscible liquid (Continuous Phase & dispersed phase) made missicible.
2. The liquid which is converted into minute globules is called as dispersed phase & the liquid in which the globules are dispersed is called the continuous phase

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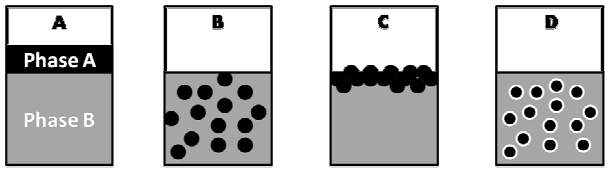
3. An emulsion is a thermodynamically unstable system consisting of at least two immiscible liquid phases one of which is dispersed as globules in the other liquid phase stabilized by a third substance called emulsifying agent.
4. The globule size in emulsion varies from 0.25 to 25 µm.



A. Two immiscible liquids not emulsified
B. An emulsion of Phase A dispersed in Phase B
C. Unstable emulsion slowly separates.
D. The emulsifying agent (white film) places it self on the interface between Phase A and Phase B and stabilizes the emulsion by preventing phase separation.

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Types of Emulsions:

Simple type:

- Water in oil (w/o)
- Oil in water (o/w)

Depending on globule size:

- Micro emulsion
- Fine emulsion

Special type:

- Multiple emulsion (w/o/w, o/w/o)

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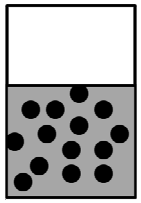
Water in Oil (W/O) Emulsion:

1. In this types of emulsion water is dispersed phase & oil is continuous phase
2. W/O types of emulsion generally meant for External use.
3. Examples are butter, lotions, creams etc.
4. In rare case they are used internally.

Water is Dispersed Phase: ●

Oil is Continuous Phase: ▭



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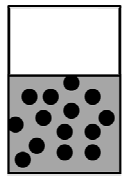
Oil in Water (O/W) Emulsion:

1. In this types of emulsion oil is dispersed phase & water is continuous phase
2. O/W types of emulsion meant for both Internal use & External use.
3. Examples for internal use are Vitamin A in corn oil, liquid paraffin in water etc.
4. Examples for External use are Benzyl benzonate emulsion.

Oil is Dispersed Phase: ●

Water is Continuous Phase: ▭



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Micro Emulsion:

1. These are clear dispersions of O/W or W/O in which the globules have small size like as a 10 nm or 0.01 µm..
2. Being cleared products micro emulsion are more popular now a days.
3. Micro emulsions are thermodynamically stable optically transparent, mixtures of a biphasic oil–water system stabilized with surfactants.

Fine Emulsion:

1. Normally these have a milky appearance.
2. The globule size ranges from 0.25 to 25 µm.

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Multiple Emulsion:

1. These are emulsion with in emulsion & designated as W/O/W or O/W/O.
2. The drugs that is incorporated in the innermost phase must cross two phase boundaries before getting absorbed.
3. It is generally used in oral sustained release or intramuscular therapy.

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Suspension:

1. Suspensions are the biphasic liquid dosage forms of medicament in which finely divided solid particles ranging from 0.5 to 5 micron are dispersed in a liquid or semisolid vehicle, with aid of **single or combination of suspending agent.**
2. In which solid particles acts as disperse phase where as liquid vehicle acts as continuous phase
3. The external phase (suspending medium) is generally aqueous in some instance, may be an organic or oily liquid for non oral use.
4. The particle size for non oral suspension is so important to avoid grittiness to skin.

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Topical Dosage Forms:

Ointments:

1. Ointment are semisolid preparation meant for application to skin or mucous membrane.
2. The ointments are mainly used for their protective or emollient properties
3. It may be defined as a medicament or medicaments dissolved, suspended or emulsified in ointment base.
4. There is no single ointment base which possesses all the qualities of ideal ointment base, so it become necessary to use more than one ointment base in the preparation of ointment.

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Topical Dosage Forms: CONTD...

Creams:

1. These are viscous semisolid emulsions which are meant for external use.
2. Cream is divided in to two types namely as

   I) Aqueous creams (O/W)

   II) Oily creams (W/O)
3. In case of aqueous creams the emulsions are o/w type & it is relatively non greasy. The emulsifying waxes are anionic, cationic & non–ionic used. Generally polysorbate, triethanolamine soap are used as emulsifying agent.
4. In case of oily creams w/o type & it is relatively greasy. The emulsifying agent such as wool fat, wool alcohols, beeswax & calcium soap is used.

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Topical Dosage Forms: CONTD...

Pastes:

1. Pastes are semisolid preparations intended for external application to skin.
2. The pastes are generally very thick & stiff.
3. They do not melt at ordinary temperature & thus forms a protective coating over the area where they are applied.
4. Pastes are differ from ointment as they contain a high proportion of finely powdered medicaments.
5. They are mainly used as a antiseptic, protective, soothing dressings.
6. Pastes should be stored & supplied in containers made of materials which do not allow absorption or diffusion of content.

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Topical Dosage Forms: CONTD...

Gels (Jellies):

- Gels are semisolid system in which a liquid phase is constrained within a 3-D polymeric matrix (consisting of natural or synthetic gum) having a high degree of physical or chemical cross-linking.
- They are used for medication, lubrication and some miscellaneous applications like carrier for spermicidal agents to be used intra vaginally.

Poultice:

- It is soft, viscous, pasty preparation for external use. They are applied to skin while they are hot. Poultice must retain heat for a considerable time because they are intended to supply warmth to inflamed parts of body.
- E.g. Kaolin poultice (B.P.C.)

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Topical Dosage Forms: CONTD...

Jellies:

1. Jellies are transparent or translucent, non greasy, semi solid preparations mainly used for external application to skin.
2. These are also used for lubricating catheters, surgical gloves & rectal thermometer.
3. The substance like gelatin, starch, tragacanth, sodium alginate & cellulose derivatives are used for the formulation of jellies.
4. Jellies are of three types namely as:

   a) Medicated jellies
   b) Lubricating jellies
   c) Miscellaneous jellies

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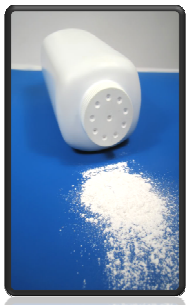
Topical Dosage Forms: CONTD...

Dusting Powders:

1. Dusting powders are applied externally to skin, so they should be applied in very fine state to avoid local irritation.
2. Dusting powders are prepared by mixing of more than one ingredients.
3. Generally talc or kaolin are used because they are inert in nature.
4. Dusting powders are used for antiseptic, astringent, absorbent, antiperspirant etc.
5. Dusting powders are of two sub type they are as

   I) Medical dusting powder

   II) Surgical Dusting powders



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Topical Dosage Forms: CONTD...

Transdermal Patch:

- A **transdermal patch** or **skin patch** is a medicated adhesive patch that is placed on the skin to deliver a specific dose of medication through the skin and into the bloodstream.
- An advantage of a transdermal drug delivery route over other types such as oral, topical, etc is that it provides a controlled release of the medicament into the patient.
- The first commercially available patch was scopolamine for motion sickness.

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Topical Dosage Forms: CONTD...

Other Topical Dosage Forms:

- **Liniments**
- **Lotions**
- **Throat Paints**
- **Aerosol sprays**

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Rectal Dosage Forms:

1- Suppository:

It is a small solid medicated mass, usually cone-shaped,that is inserted either into the rectum (rectal suppository), vagina (vaginal suppository or pessaries) where it melts at body temperature.

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Rectal Dosage Forms: CONTD...

2- Enema:

An **enema** is the procedure of introducing liquids into the rectum and colon via the anus.

Types of enema:

1. **Evacuant enema:** used as a bowel stimulant to treat constipation. E.g. soft soap enema & $Mgso_4$ enema

- The volume of evacuant enemas may reach up to 2 liters.
- They should be warmed to body temperature before administration.

2. **Retention enema:**

- Their volume does not exceed 100 ml.
- No warming needed.

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Parenteral Dosage Forms:

- An injection is an infusion method of putting liquid into the body, usually with a hollow needle and a syringe which is pierced through the skin to a sufficient depth for the material to be forced into the body.

There are several methods of injection, including:

1. **Intravenous injection:**

- It is a liquid administered directly into the bloodstream via a vein.
- It is advantageous when a rapid onset of action is needed.

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Parenteral Dosage Forms: CONTD...

2. **Intramuscular injection:**

- It is the injection of a substance directly into a muscle.
- Many vaccines are administered intramuscularly.
- Depending on the chemical properties of the drug, the medication may either be absorbed fairly quickly or more gradually.
- Intramuscular injections are often given in the deltoid, vastus lateralis, ventrogluteal and dorsogluteal muscles.
- Injection fibrosis is a complication that may occur if the injections are delivered with great frequency or with improper technique.

3. **Subcutaneous injection:**

- **Subcutaneous** injections are given by injecting a fluid into the subcutis, the layer of skin directly below the dermis and epidermis.

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Vaginal Dosage Forms:

1- Pessary:

- Pessaries are solid medicated preparations designed for insertion into the vagina where they melt or dissolve.
- There are three types:

A- Moulded pessaries: they are cone shaped and prepared in a similar way to moulded suppositories.

B- Compressed pessaries: made in a variety of shapes and are prepared by compression in a similar manner to oral tablets.

C- Vaginal capsules: are similar to soft gelatin oral capsules differing only in size and shape.

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Vaginal Dosage Forms: CONTD...

2- Vaginal ring:

Vaginal rings are 'doughnut-shaped' polymeric drug delivery devices designed to provide controlled release of drugs to the vagina over extended periods of time.

3- Douche:

A **douche** is a device used to introduce a stream of water into the body for medical or hygienic reasons.

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Vaginal Dosage Forms: CONTD...

4- Intrauterine device:

- It is a birth control device placed in the uterus, also known as an **IUD** or a **coil.**
- The IUD is the world's most widely used method of reversible birth control.
- The device has to be fitted inside or removed from the uterus by a doctor.
- It remains in place the entire time pregnancy is not desired. Depending on
- the type, a single IUD is approved for 5 to 10 years use.
- There are two broad categories of intrauterine contraceptive devices:
  - A- inert and copper-based devices.
  - B-hormonally-based devices that work by releasing a progesterone.

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Inhaled Dosage Forms:

1- Inhaler :

- Inhalers are solutions, suspensions or emulsion of drugs in a mixture of inert propellants held under pressure in an aerosol dispenser.
- Release of a dose of the medicament in the form of droplets of 50 um diameter or less from the container.
- In some types, the valve is actuated by finger pressure, in other types the valve is actuated by the patient breathing in through the mouthpiece.
- It is commonly used to treat asthma and other respiratory problems.

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Inhaled Dosage Forms: CONTD...

2- Nebulizer or (atomizer):

- **A nebulizer** is a device used to administer medication to people in forms of a liquid mist to the airways.
- It is commonly used in treating asthma, and other respiratory diseases.
- It pumps air or oxygen through a liquid medicine to turn it into a vapor, which is then inhaled by the patient.
- As a general rule, doctors generally prefer to prescribe inhalers for their patients, because:
  - 1-These are cheaper
  - 2- more portable
  - 3- carry less risk of side effects.
- Nebulizers, for that reason, are usually reserved only for serious cases of respiratory disease, or severe attacks.

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Ophthalmic Dosage Forms:

1. Sterile, aqueous/oily solutions or suspensions intended for instillation in eye sac.
2. Eye drops may contain buffers, stabilizing agents, dispersing agents, solubilising agents, anti-oxidants & agents required for tonicity/ viscosity adjustment
3. Single dose container should not contain anti-microbial preservative.
4. In case of multi dose container a dropper should be supplied with it for administration. Maximum size of such containers is 10 ml.

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Ophthalmic Dosage Forms: CONTD...

Eye Drops:

- **Eye drops** are saline-containing drops used as a vehicle to administer medication in the eye.
- Depending on the condition being treated, they may contain steroids, antihistamines or topical anesthetics.
- Eye drops sometimes do not have medications in them and are only lubricating and tear-replacing solution.

Ophthalmic Ointment & Gel:

- These are sterile semi-solid preparations intended for application to the conjunctiva or eyelid margin.

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Ophthalmic Dosage Forms: CONTD...

Eye lotions:

1. These are the aqueous solutions used for washing the eyes.
2. These are supplied in concentrated forms & are required to diluted with warm water immediately before use.
3. They should be free from foreign particles to avoids irritation to the eye.
4. They are required to prepared fresh & should not be stored for more than two days to avoid microbial contaminations.

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Otic Dosage Forms:

Ear Drops:

1. These are the solutions of drugs that are instilled into ear cavity with the help of dropper.
2. These are generally used for cleaning the ear, softening the wax & for treating the mild infections.
3. The solutions is generally prepared in water, glycerin, propylene glycol & dilute alcohol.

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Nasal Dosage Forms:

1. Drugs in solution may be instilled into the nose from a dropper or from a plastic squeeze bottle.
2. The drug may have a local effect, e.g. antihistamine, decongestant.
3. Alternatively the drug may be absorbed through the nasal mucosa to exert a systemic effect.
4. The use of oily nasal drops should be avoided because of possible damage to the cilia of the nasal mucosa & if it is used for long period may reach the lungs & cause lipoid pneumonia.
5. Aqueous nasal solutions usually are isotonic and slightly buffered to maintain a pH of 5.5 to 6.5.

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Intermediate Products Used in Compounding:

Extracts: These are concentrated preparations containing the active principals of vegetable or animal drugs which have been extracted with suitable solvents and concentrated to form liquid, soft or dry extract.

Glycerins: These are solutions of medicaments in glycerol with or without the addition of water.

Infusions: These are dilute solutions containing the readily soluble constituents of crude drugs and prepared by diluting 1 part of concentrated infusion with 10 parts of water. Concentrated infusions are prepared by cold extraction of crude drugs with 25% ethanol.

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Oxymels: These are preparations in which the vehicle is a mixture of acetic acid and honey.

Spirits: They are alcoholic or aqueous alcoholic solutions of volatile substances used as flavoring agents.

Tinctures: These are alcoholic preparations containing the active principals of vegetable drugs. They are relatively weak compared to extracts.

Aromatic waters: These are aqueous solutions, usually saturated of volatile oils or other volatile substances. Used as flavoring agents.

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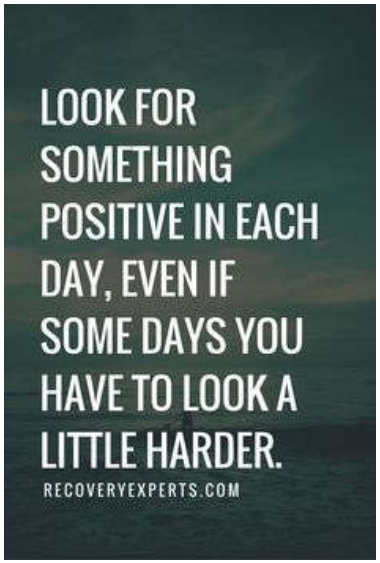

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