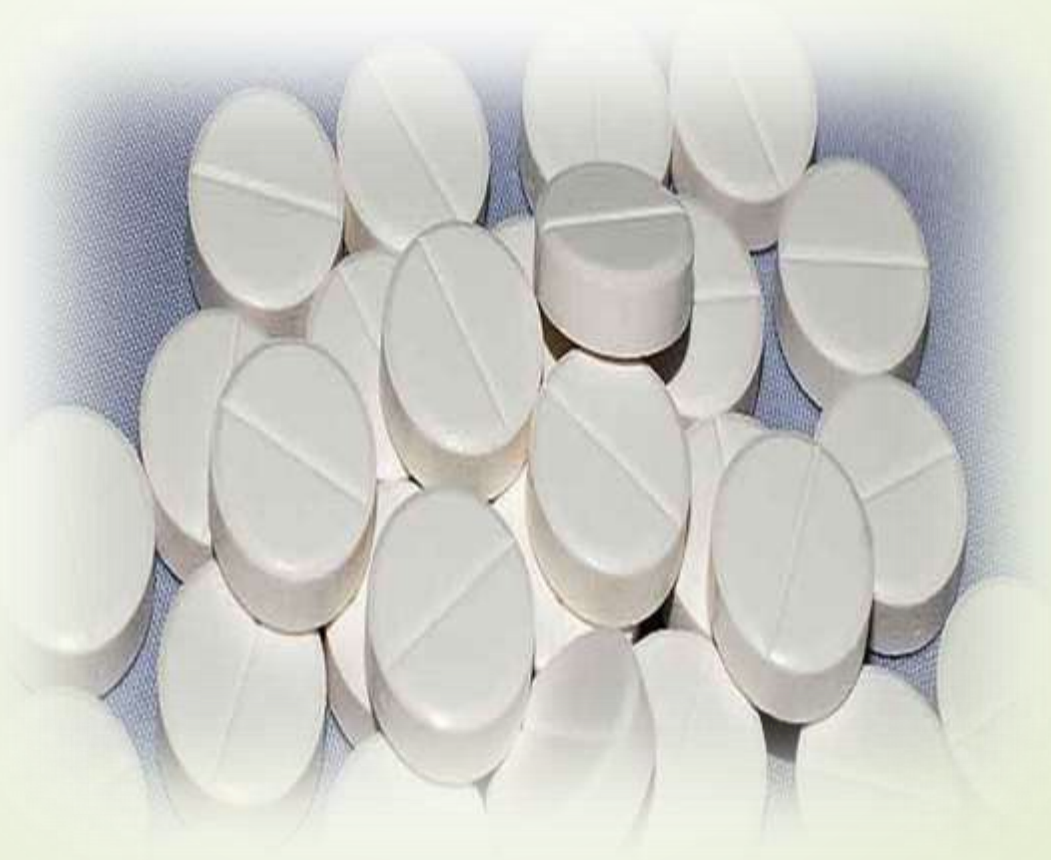
TABLET



INTRODUCTION

According to USP

Tablet is defined as a compressed solid dosage form containing medicaments with or without excipients.

According to the Indian Pharmacopoeia

Pharmaceutical tablets are solid, flat or biconvex dishes, unit dosage form, prepared by compressing a drug or a mixture of drugs, with or without diluents.

INTRODUCTION

Tablets are solid dose pharmaceutical preparation containing drug substances usually prepared with the aid of suitable pharmaceutical excipients.

They may vary in size, shape, weight, hardness, thickness, disintegration and dissolution characteristics and in other aspects, depending on their intended use and method of manufacture.

Tablets constitute approximately 90% of all dosage forms clinically used to provide systemic administration of therapeutic agents.

This widespread use of tablets has been achieved as a result of their convenience and also the diversity of tablet types.

Tablets are prepared primarily by compression of granules or powder blends, with a limited number prepared by moulding.

Most tablets are used in the oral administration of drugs. Many of these are prepared with colourants and coatings of various types.

Other tablets, such as sublingual, buccal, or vaginal tablets, are prepared to have features most applicable to their particular route of administration.

Aadvantages of the Tablet dosage form are:

- They are unit dosage form and offer the greatest capabilities of all oral dosage form for the greatest dose precision and the least content variability.
- Cost is lowest of all oral dosage form.
- Lighter and compact.
- Easiest and cheapest to package and strip.
- Easy to swallowing with least tendency
- Sustained release product is possible by enteric coating.

Advantages of the Tablet dosage form are:

- Objectionable odour and bitter taste can be masked by coating technique.
- Suitable for large scale production.
- Greatest chemical and microbial stability over all oral dosage form.
- Product identification is easy and rapid requiring no additional steps when employing an embossed and/or monogrammed punch face.

Disadvantages of Tablet dosage form are:

- Difficult to swallow in case of children and unconscious patients.
- Some drugs resist compression into dense compacts, owing to amorphous nature, low density character.
- Drugs with poor wetting, slow dissolution properties, optimum absorption high in GIT may be difficult to formulate or manufacture as a tablet that will still provide adequate or full drug bioavailability.
- Bitter testing drugs, drugs with an objectionable odor or drugs that are sensitive to oxygen may require encapsulation or coating. In such cases, capsule may offer the best and lowest cost.

General properties of Tablet dosage forms:

1. A tablet should have elegant product identity while free of defects like chips, cracks, discoloration, and contamination.

2. Should have sufficient strength to withstand mechanical shock during its production packaging, shipping and dispensing.

3. Should have the chemical and physical stability to maintain its physical attributes over time

4. The tablet must be able to release the medicinal agents in a predictable and reproducible manner.

5. Must have a chemical stability over time so as not to follow alteration of the medicinal agents.

Different types of Tablets

(A)Tablets ingested orally:

1.Compressed tablet, e.g. Paracetamol tablet

2.Multiple compressed tablet

3.Delayed release tablet, e.g. Enteric coated Bisacodyl tablet

4.Sugar coated tablet, e.g. Multivitamin tablet

5.Film coated tablet, e.g. Metronidazole tablet

6.Chewable tablet, e.g. Antacid tablet

(B)Tablets used in oral cavity:

1. Buccal tablet, e.g. Vitamin-c tablet
2. Sublingual tablet, e.g. Vicks Menthol tablet
3. Troches or lozenges
4. Dental cone

(C) Tablets administered by other route:

1. Implantation tablet
2. Vaginal tablet, e.g. Clotrimazole tablet

(D) Tablets used to prepare solution:

1. Effervescent tablet, e.g. Disprin tablet (Aspirin)
2. Dispensing tablet, e.g. Enzyme tablet (Digiplex)
3. Hypodermic tablet
4. Tablet triturates e.g. Enzyme tablet (Digiplex)

Different types of Tablets

(A) Tablets ingested orally:

1.Compressed tablet, e.g. Paracetamol tablet

1.Compressed tablets represent a significant proportion of tablets that are clinically used to provide systemic administration of therapeutic agents either in an uncoated state (i.e., in their simplest form) or in a coated state.

2.These tablets are designed to provide rapid disintegration in the gastric fluid following ingestion hence, allowing rapid release of the drug and, ultimately, systemic absorption of the dosage form.

3. Compressed tablets are formed by compression of powdered, crystalline, or granular materials into the required geometry by the application of high pressures, utilizing steel punches and die.

Different types of Tablets

(A) Tablets ingested orally:

1.Compressed tablet, e.g. Paracetamol tablet

4.In addition to the Active Pharmaceutical Ingredient(s) (APIs), compressed tablets usually contain a number of pharmaceutical excipients e.g., bulking agents, disintegrants, binders, lubricants, controlled-release polymers and other miscellaneous adjuncts such as colourants and flavourants which serve different and specialized purpose during tablet manufacture, storage, and use.

5.Examples of compressed tablets include tablets for oral, buccal, sublingual, or vaginal administration.

Different types of Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

1. Multiple compressed tablets, also called multi-compressed tablets are tablets that are composed of two or more layers.

2. These tablets are prepared by subjecting the fill material to more than one compression cycle.

3. The result may be a multiple-layer tablet or a tablet within a tablet, the inner tablet being the core and the outer portion being the shell.

4. This process is best used when separation of active ingredients is needed for stability purposes or if the mixing process is inadequate to guarantee uniform distribution of two or more active pharmaceutical ingredients.

5. Multiple compressed tablets can also be used when there is a need to mask the bitter taste of a drug substance or where the drug substance in question is irritant to the stomach.

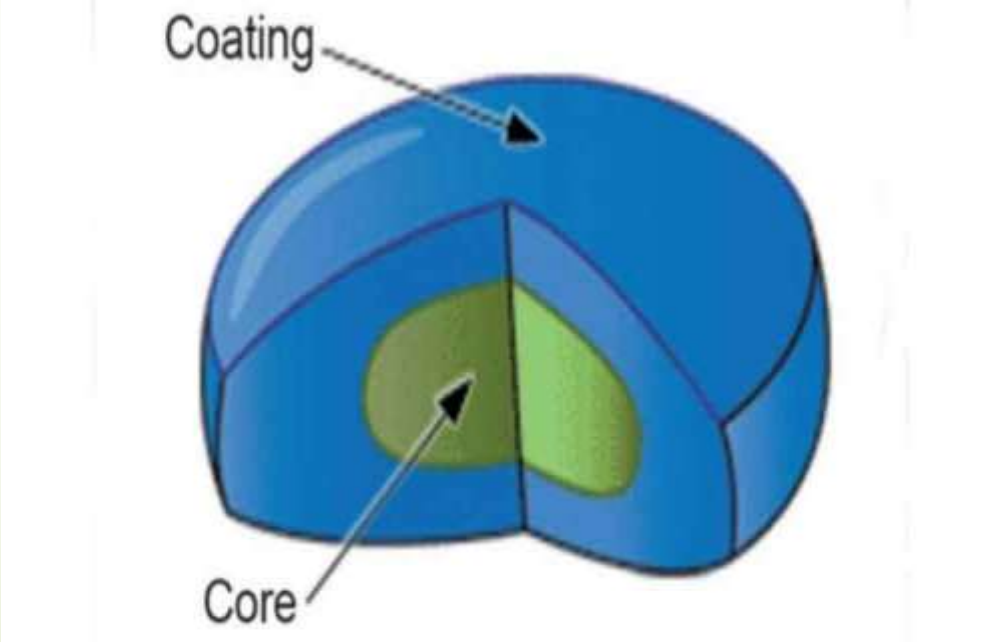
6 There are three subclasses of multiple compressed tablets and they include:

Different types of Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

i. Compression Coated Tablets



Different types of Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

i. Compression Coated Tablets

1.Compression coated tablets also referred to as dry-coated tablets or press-coated tablets, are tablets with two parts; internal core and surrounding coat.

2.These tablets are prepared by feeding previously compressed tablets into a special tablet press (e.g., Manesty Drycota) and compressing another granulation layer around a preformed tablet core.

3. Compression coated tablets have all the advantages of compressed tablets (i.e., slotting, monogramming, speed of disintegration) while retaining the attributes of sugarcoated tablets in masking the taste of the drug substance in the core tablets.

4. These tablets can also be used to separate incompatible drug substances (one in the core and the other in the coat); in addition, they can provide a means of giving an enteric coating to the core tablets.

Different types of Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

ii. Layered Tablets

Different types of Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

ii. Layered Tablets

1.They are tablets composed of two or more layers of ingredients.

2.Layered tablets are prepared by compressing additional tablet granulation on a previously compressed granulation to form two-layered or three-layered tablets, depending on the number of separate fills.

3.Each layer may contain a different medicinal agent, separated for reasons of physical or chemical incompatibility, staged drug release, or simply the unique appearance of the layered tablet.

4.Unlike conventional tablets where we have a single piece of substance moulded to shape, layered tablets have the appearance of a sandwich because the edges of each layer are exposed.

(A)Tablets ingested orally:

2.Multiple compressed tablet

iii. Inlay Tablets

(A)Tablets ingested orally:

2.Multiple compressed tablet

iii. Inlay Tablets

1.Inlay tablets also referred to as dot, or bull's-eye tablet is a variation of compressed tablet with a partially surrounded core.

2.Instead of the tablet core being completely surrounded by the coating, its top surface is completely exposed.

3.Inlay tablets are prepared by feeding previously compressed tablets into a prefilled die cavity of Stokes, Colton, or Kilian machines.

4.When compressed, some of the coating material is displaced to form the sides. With a yellow core and a white coating, Inlay tablets resemble a fried egg. Inlay tablets can be useful in sustained release preparations to reduce the size and weight of the tablet.

5.A typical example is a European preparation containing 25 mg of hydrochlorothiazide in the bull's-eye and 600 mg of potassium chloride in the outside portion.

(A)Tablets ingested orally:

3. Delayed release tablet,

(A)Tablets ingested orally:

3. Delayed release tablet

1.Enteric-coated tablets are compressed tablets that have delayed-release properties.

2.They are coated with polymeric substances (such as cellulose acetate phthalate/cellulose acetate butyrate ;hydroxypropylmethylcellulose succinate; and methacrylic acid copolymers) that resist solution in gastric fluid but disintegrate and allow drug dissolution and absorption in the intestine.

3.Enteric coatings are primarily employed when the drug substance is inactivated or destroyed by gastric acid (e.g., erythromycin) or is particularly irritating to the gastric mucosa (e.g., non-steroidal anti-inflammatory drugs) or when bypass of the stomach substantially enhances drug absorption.

4. Example of enteric-coated tablets includes Lofnac 100 – Diclofenac sodium delayed-release tablet USP 100mg (bliss GVS Pharma Ltd), Ecotrin tablets (GlaxoSmithKline).

(A)Tablets ingested orally:

4.Sugar coated Tablets

(A)Tablets ingested orally:

4.Sugar coated Tablets

1.These are compressed tablets that have been coated with concentrated sugar solution to improve patient's compliance, increase aesthetic appeal, mask objectionable tastes or odours, increase stability and/or modify the release of therapeutic agent(s).

2.Sugar coating was once quite common but lost commercial appeal due to the time and expertise required in the coating process, the increase in size and weight of coated tablets, high cost of process validation and shipping.

3.The advent of film-coated tablets has also greatly decreased use of sugar coatings due to the improved mechanical properties of the technique.

4. Examples of sugar-coated tablets include Reasulf tablets – dried ferrous sulphate BP 200mg (Reagan Remedies Ltd.), Advil – Ibuprofen tablet BP 200mg (Pfizer Consumer Healthcare), Ebu-200 – Ibuprofen tablet BP 200mg (Me cure Industries Ltd) etc.

(A)Tablets ingested orally:

5.Film coated Tablets

5.Film coated Tablets

1. Film-coated tablets are conventional tablets coated with a thin layer of polymer (e.g., hydroxypropyl methylcellulose, hydroxypropyl cellulose) or a mixture of polymers (e.g., Eudragit E100) capable of forming a skin-like film.

2.The film is usually coloured and also impacts the same general characteristics as sugar coating with the added advantage of being more durable, less bulky, and less time-consuming to apply.

3.By its composition, the coating is designed to break and expose the core tablet at the desired location in the gastrointestinal tract.

Examples of Film-coated tablets

Curefenac 100 – Diclofenac potassium USP 100mg (Unicure Pharmaceutical Ltd)

Valsartan 320mg Film-coated Tablets (Actavis UK Ltd), etc.

(A)Tablets ingested orally:

6.ChewableTablets

6.ChewableTablets

1.Chewable tablets are big sized tablets which are difficult to swallow and thus, are chewed within the buccal cavity prior to swallowing.

2.They are especially useful for administration of large tablets to children and adults who have difficulty swallowing conventional tablets or antacid formulations in which the size of the tablet is normally large and the neutralisation efficacy of the tablet is related to particle size within the stomach.

3.These tablets are not conventionally used if the drug has issues regarding taste acceptability.

Examples of chewable tablets include
Danacid – compound magnesium trisilicate tablet B.P. (Dana Pharmaceuticals Limited),
Gestid – tasty chewable antacid (Ranbaxy) etc.
Gelucil

(B)Tablets used in oral cavity:

1. Buccal tablet e.g. Vitamin-c tablet
2. Sublingual tablet, e.g. Vicks Menthol tablet
3. Troches or lozenges
4. Dental cone

(B)Tablets used in oral cavity:

1 Buccal tablet or Sublingual Tablet

Buccal and sublingual tablets are small, flat, oval tablets that are intended to be dissolved in the buccal pouch (buccal tablets) or beneath the tongue (sublingual tablets) for absorption through the oral mucosa to produce a systemic effect.

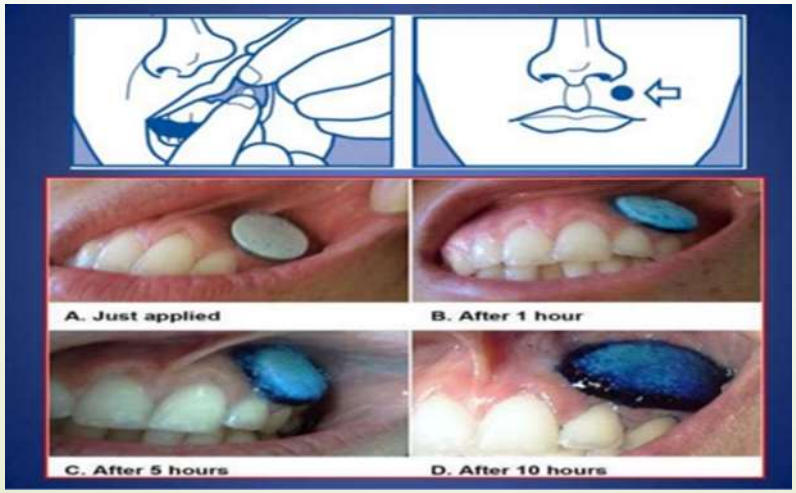
These tablets are employed to achieve either rapid absorption into the systemic circulation e.g. glyceryl trinitrate sublingual tablets or, alternatively, to enable oral absorption of drugs that are destroyed by the gastric juice and/or are poorly absorbed from the gastrointestinal tract.

(B)Tablets used in oral cavity:

1 Buccal tablet

These tablets are to be placed in the buccal pouch or between the gums and lips or cheek where they dissolve or disintegrate slowly and are absorbed directly without passing into the alimentary canal.

e.g. tablets of ethisterone.



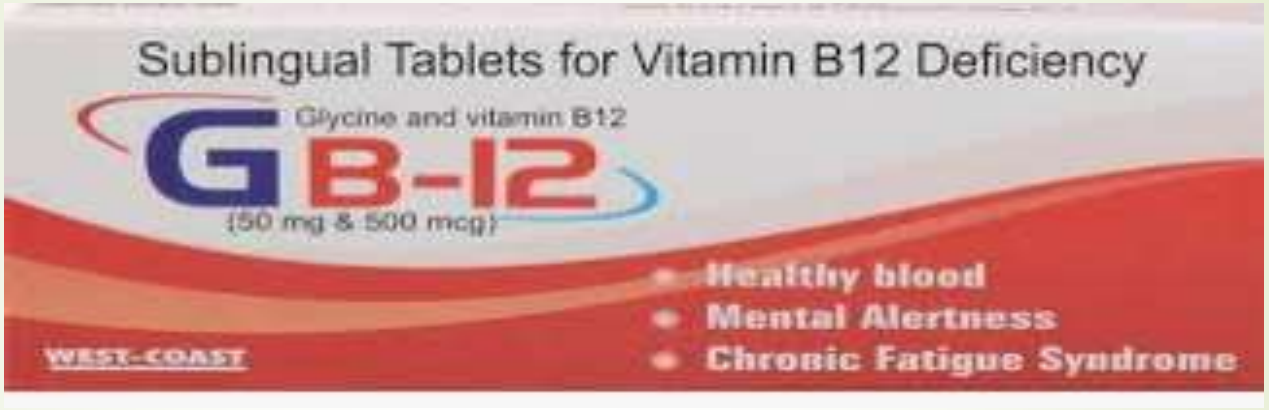
(B)Tablets used in oral cavity:

1. Sublingual tablets

These tablets are to be placed under the tongue where they dissolve or disintegrate quickly and are absorbed directly without passing into GIT (gastro intestinal tract). e.g. tablets of glyceryl trinitrite

(B)Tablets used in oral cavity:

1 Buccal tablet or Sublingual Tablet



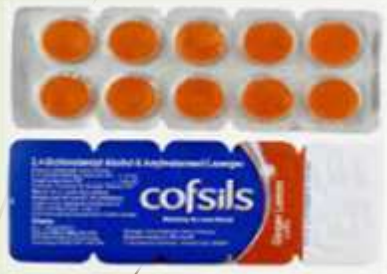
(B)Tablets used in oral cavity:

3.Troches or lozenges

- These are disc-shaped solid preparations containing medicinal agents and generally a flavouring substance in a hard candy or sugar base.
- They are intended to be slowly dissolved in the oral cavity, usually for local effects.
- These tablets are designed to exert a local effect in the mouth or throat.
- These tablets are commonly used to treat sore throat or to control coughing in common cold.
- They may contain local anaesthetics, antiseptic, antibacterial agents, astringents and antitussives.
- These are prepared by compression at a high pressure or by the moulding process and generally contain a sweetening agent, a flavouring agent and a substance which produces a cooling effect along with medicaments.

(B)Tablets used in oral cavity:

3.Troches or lozenges



(B)Tablets used in oral cavity:

DENTAL CONES

- These tables are designed to be loosely packed in the empty socket remaining following a tooth extraction.

- Main purpose behind the use of this tablet is either to prevent multiplication of bacteria in the socket by employing a slow releasing antibacterial compound or to reduce bleeding by an astringent or coagulant containing tablet.
- It's formulated to dissolve or erode slowly in presence of a small volume of serum or fluid over 20-40 minutes period.

(C) Tablets administered by other route:

1.Implantation tablet

- These tablets are placed under the skin or inserted subcutaneously by means of minor surgical operation and are slowly absorbed.
- These may be made by heavy compression but are normally made by fusion.
- The implants must be sterile and should be packed individually in sterile condition.
- Implants are mainly used for administration of hormones such as testosterone and deoxycorticosterone etc.

2.Vaginal tablet

- These tablets are meant to dissolve slowly in the vaginal cavity.
- The tablets are typically ovoid or pear shaped to facilitate retention in the vagina.
- This tablet form is used to release steroids, antibacterial agents, antiseptics or astringents to treat vaginal infections.
- The tablets are often buffered to promote a pH favourable to the action of a specified antiseptic agent.

D. Tablets used to prepare solution:

1. Effervescent tablets are tablets which are designed to dissolve in water, and release carbon dioxide.

- They are products of compression of component ingredients in the form of powders into a dense mass, which is packaged in blister pack, or with a hermetically sealed package with incorporated desiccant in the cap.
- To use them, they are dropped into water to make a solution.
- The powdered ingredients are also packaged and sold as **effervescent powders** or may be granulated and sold as **effervescent granules.**
- Generally powdered ingredients are first granularized before being made into tablets

The Effervescent Reaction

Effervescence is the evolution of gas bubbles from a liquid, as the result of a chemical reaction. The most common reaction for pharmaceutical purpose is the acid base reaction between sodium bicarbonate and citric acid. Acid-base reactions between alkali metal bicarbonates and citric or tartaric acid have been used for many years to produce pharmaceutical preparations that effervesce as soon as water is added.

For example: the reaction of Citric acid and Sodium bicarbonate

Advantages Of Effervescent Tablets

1. Fast onset of action
2. No need to swallow tablets
3. Good stomach and intestinal tolerance
5. Improved palatability
6. Accurate dosing
7. Improved therapeutic effect

2.Dispensing tablet, e.g. Enzyme tablet

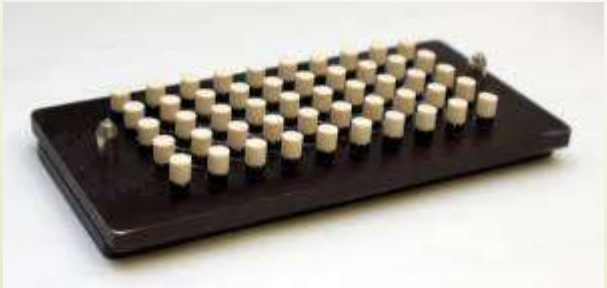
- The medicaments commonly incorporated in dispensing these tablets include mild silver proteinate, bichloride of mercury merbromin and quarternary ammonium compounds.
- These tablets contain excipient which gets dissolved quickly to form a clear solution.
- These tablets are highly toxic if taken orally by mistake.
- So, great care must be taken in the packaging and labelling of such tablets in order to prevent their misuse.

3. Hypodermic tablet

- These are compressed tablets which are composed of one or more drugs with readily water soluble ingredients.
- These tablets are dissolved in sterile water or water for injection and administered by parenteral route.
- So, special percautions are needed to be taken during their preparations.
- These tablets however are not preferred nowadays as there are chances that the solution prepared from hypodermic tablets may be a non-sterile.

4.Tablet triturates

- Tablet triturates are small, usually cylindrical, moulded or compressed tablets containing small amounts of usually potent drugs.
- Today, only a few tablet triturate products are available commercially.
- Since tablet triturates must be readily and completely soluble in water, only a minimal amount of pressure is applied during their manufacture.



- A combination of sucrose and lactose is usually the diluent.
- The few tablet triturates that mainly are used sublingually, such as nitroglycerin tablets.
- Pharmacists also employ tablet triturates in compounding. For example, triturates are inserted into capsules or dissolved in liquid to provide accurate amounts of potent drug substances.

THANK YOU