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## REVIEW ON: TABLET

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**ABSTRACT:** Medicine are not only a science it is also dosage form have been used widely for decades mainly due, to their convenience of administration and their suitability for delivery of drugs for systemic effects. The tablets can be made directly form or form, granules pellets or form film coated multiple unit tablet are now the most popular dosage form according for some 70% of all ethical pharmaceutical preparation produced. Hence, Tablet can be broadly classified as compressed Tablet and moulded tablet, compressed tablet can be further classified as directly compressible tablet further chewable tablets and tablet triturates etc.

**Keywords:** Binders, coated tablet, compression, ingredients, granulation

### INTRODUCTION: <sup>(1-2)</sup>

The primary necessity and requirement of today is for the drug to be formulated into a presentable form. The dosage form is a common method of medication administration that is applied to a living body. Various dosage forms: are available, including tablets, syrups, suspensions, suppositories, injections, transdermal patches, and injections. In order to get the desired effect, the drug should be delivered to its site of action at such rate and concentration to achieve the maximum therapeutic effect and minimum adverse effect. Because both these traditional and modern dosage forms have benefits and drawbacks, the development of an ideal drug delivery system is a major challenge for the pharmacist in the presence scenario. A detailed investigation of the physiochemical principle that controls a particular medication formulation should be made in order to establish an appropriate dose form.

Solid dosage forms are popular due to their convenience of administration, correct dosage self-medication, pain avoidance, and most significantly, patient compliance. The most popular solid dosage forms are tablets and capsules, which account for up to 50–60% of all dosage forms.

These dosage forms, together known as solid unit dosage forms, include a quantity of medication that is administered as a single unit.

Tablets are a traditional solid dose form that have many advantages over other dosage forms.

Tablet are the most popular dosage form about 70% of the total medicines are dispensed in the form of tablet.

**DEFINATION:** <sup>(2)</sup> Pharmaceutical tablets are solid, flat or biconvex dishes that are made by compressing a medicine or a drug mixture, with or without diluents, according to the Indian Pharmacopoeia. Tablets are characterised as compacted solid dosage forms that can include either excipients or medication. They vary widely in size, therapeutic ingredient, intended mode of administration, and shape.

**PROPERTY:** (2-3)

- 1) A beautiful product with a distinct personality should be devoid of flaws like chips, cracks, discolouration, and contamination.
- 2) It should be strong enough to survive the strains and shocks that it will experience during production, packaging, shipping, and dispensing.
- 3) It should be physically stable enough to hold onto its physical characteristics over time.
- 4) Must be able to consistently and predictably deliver the medication agent(s) into the body.
- 5) Must maintain a reasonable level of chemical stability throughout time to prevent the therapeutic substance from changing.

**ADVANTAGE:** (4) The following are a few potential benefits of the pill.

1. They are the unit dosage form with the lowest content variability and the highest dose precision of all oral dosage forms.
2. They are the least expensive oral dose form.
3. Out of all the oral dose forms, they are the lightest and most portable.
4. Packing and shipping them is simple and inexpensive.
5. They suit some products with unique release profiles, like enteric delayed release products.
6. When compared to other unit oral dose forms, tablets are more suited to large-scale manufacture.

**DISADVANTAGE:** (2,5) These dose forms are the most acceptable and most well, with very few drawbacks.

1. Due to their flocculent, low-density nature or amorphous nature, several medicines defy compression into dense particles.
2. For the formulators, it can be quite difficult to formulate medications with poor wetting, slow dissolution characteristics, intermediate to large doses, optimal absorption high in the GIT, or any combination of these characteristics.
3. Patients who are unconscious or children may have difficulty swallowing.
4. The potential for bioavailability issues brought on by gradual deterioration and dissolution

**TYPES OF TABLETS:** (2,6-18)**Oral Tablets for Ingestion.**

1. Standard Compressed Tablets

2. Multiple Compressed Tablets

compression Coated Tablets- a) Sugar Coated, b) film Coated Tablets, c) gelatine Coated Tablets, d) Enteric Coated Tablet.

Layered Tablet

Inlay Tablet

3. Targeted Tablets- a) Floating Tablet, b) Colon Targeting Tablet

4. Chewable Tablet

5. Dispersible Tablets

**Tablets Used in The Oral Cavity:**

1. Lozenges and troches
2. Sublingual Tablet
3. Dental Cones
4. Buccal Tablet
5. Mouth Dissolved/rapidly dissolving

**Tablet Administrated by Other Routes:**

1. Vaginal Tablet
2. Rectal Tablet
3. Implants

**Tablets Used to Prepare Solution:**

1. Effervescent Tablet

2. Molded Tablet

Hypodermic Tablet

Dispensing /soluble Tablet

3. Tablet Triturate.

**Structure wise:**

1. Divisible Tablet

2. Aperture Tablet

3. Concave Tablet

4. Core Tablet

**Action Wise:**

1. Modified release Tablet

**oral tablet for ingestion:**

More than 90% of produced tablets are taken orally. With the exception of chewable tablets, these are meant to be swallowed complete.

## 1) Standard Compressed Tablets:

These are common uncoated tablets produced by double, direct, or wet granulation compression. It offers quick medication release and breakdown. Their primary goal in GIT is to impose local action. It frequently contains water-insoluble medications like antacids and adsorbents. Compressed tablets typically include a variety of pharmaceutical adjuvants, including diluents, binders, disintegrants, etc

## 2) Multiple compressed tablets:

More than one compression cycle is used to generate multiple compressed tablets. This method works best when two or more active ingredients need to be separated for stability reasons or when the mixing process cannot ensure an even distribution of the constituents.

These tablets are frequently referred to as multi-layered tablets or tablets within tablets. This class includes the three subcategories of compression coated tablets, layered tablets, and inlay tablets.



### 3) Compression Coated tablets:

This tablet is very conducive to repetition. The outer layer delivers the initial dose, and the inner core later releases the medicine. In light of this, it is helpful for the releases of two active pharmaceutical ingredients (APIs), one of which is an immediate release formulation that is entrapped in the coat and the other of which is a sustained release formulation that is entrapped in the core. Using this idea, it is also possible to provide a loading dosage and a maintenance dose for a single medication. The tools used to make compression-coated tablets are the Colton 232, Stock 538, and Manesty Drycota 900.



#### a: - Sugar Coated Tablets:

The sugar covering shields the medicine inside from contaminants and acts as a defence against offensive flavours or odours. It also results in a sophisticated, glossy appearance. The sweet flavour of the pill contributes to an increase in patient acceptance. widely used in the preparation of multivitamin and mineral combinations.



#### B: -Film Coated Tablets:

It is a form of coated tablet when coating is not necessary for the medicine. Film coating is used as an alternative to sugar coating when the tablet needs to be stronger. This method makes use of polymers like Ethyl cellulose, HPC (Hydroxypropyl cellulose), and HPMC (Hydroxypropyl methyl cellulose). In comparison to the sugar-coating method, it is also a quicker process. Although it has certain advantages over sugar coating in terms of durability, volume, and application time, it lacks sugar coating's physical elegance and appeal. The covering is intended to burst, exposing the core tablet where it is desired in the digestive tract.



#### c) Gelatine Coated Tablets:

The ground-breaking gel cap is a compressed tablet in the shape of a capsule that makes it possible for the coated product to be around one-third smaller than a capsule containing an identical amount of powder. Gelatine-coated tablets are easier to swallow than unopened capsules and are more tamper-evident.

#### d) Enteric Coated Tablets:

The enteric coated pills' coating is resistant to the acidic conditions of the stomach, thus the medication cannot be released there. However, it quickly releases the medication in the alkaline media of the intestine. Drugs must therefore pass through the stomach, delaying their time of release, which is why they are known as delayed action tablets.



#### i) Layered tablets :

are made up of two or three layers of granulation that have been compacted together. The borders of each layer are visible, giving them the appearance of a sandwich. The greatest option for the formulation pharmacist would be to create a multi-layered tablet when two or more active pharmaceutical ingredients need to be supplied at the same time but are incompatible. A single tablet is made up of two or more layers, typically with a different colour on each layer to create a unique-looking tablet Equipment-Versa press.

#### ii) Inlay Tablets:

The inlay, dot, or bull's-eye tablet is a variant of the compression coated tablet. The top surface of the core tablet is entirely visible rather than being completely encased by the coating. In sustained release preparations, this form can help to lighten and reduce the weight of the tablet. One medication is in the core and one is in the coat of each pill. Both medications are released right away, but the coating causes the delayed release and the core causes the instant release of incorporated drugs. With the use of the Stokes, Colton, or Kilian machines, inlay tablets are created. Only the absence of the feed frame and hopper, which typically give the top coating, necessitates equipment modifications. 4) Targeted Tablets: This category includes two different kinds of tablets.

- a. Floating tablets: These are made to increase the dose form's time spent in the GI tract. This not only extends GI residence time but does so at a region of the GI tract where the drug's chances of arriving at the absorption site in solution and thus ready for absorption are increased. These tablets have a low density. In a stomach environment, it can expand, maintaining the drug's floating state through diarrhoea, gastrointestinal condition to receive a comparatively better response. controlled drug delivery By slowly releasing the medication, it reduces mucosal irritation. used as a therapy for digestive issues such gastroesophageal reflux. More effective patient compliance and simplified administration
- b. Colon Targeting Tablets: provide a therapeutic dose of medication to a target region, in this case the colon, allowing for the appropriate drug concentration in the body. It is appropriate and necessary for medications that are unstable, poorly soluble, have a short half-life, are widely distributed, have poor absorption, have low specificity, and have a low therapeutic index. The pH in this area (colon) ranges from 6.4 to 7. The microbial flora is present and has a significant impact on drug release. Coating with pH-sensitive polymers, such as Eudragit S100 and L100; biodegradable polymers that are sensitive to colonic bacteria; and bio-adhesive polymers, such as poly carbophils, are some of the processes used for drug release in this area. polymers with redox sensitivity. By eliminating the medicine's drug interactions, it allows for precise drug administration into the lower GI tract.

### 5) Chewable Tablets:

Colon Targeting Tablets: These need to be broken and chewed in between the teeth before ingesting in order to transport a therapeutic amount of drug to a target region, which is the colon. This results in the desired drug concentration in the body. Children who have trouble swallowing and adults who detest swallowing are given these tablets. These pills are designed to break down in the mouth at a moderate rate and smoothly with or without chewing. Chewable tablets are frequently used when an active ingredient is meant to operate locally rather than systemically. Gum core, which may or may not be coated, makes up the chewable tablet's makeup. An insoluble gum foundation, similar to fillers, makes up the core.



### 6) Dispersible Tablet:

Colon Targeting Tablets: They deliver a therapeutic dose of the drug to a target site in the colon to achieve the desired drug concentration in the body. According to the European Pharmacopoeia, dispersible tablets are uncoated or film-coated tablets meant to be dissolved in water before administration to create a homogeneous dispersion. A dispersible pill is typically dissolved in 5 to 15 ml of water (for example, in a tablespoon or a glass of water), and the patient is then given the resulting dispersion. Dispersible tablets must dissolve in 3 minutes in water with a pH of 15 to 25. Additionally, the dispersion made by a dispersible tablet must pass through a sieve screen with a standard mesh opening.



### b) tablets used in oral cavity:

#### 1) Lozenges and Torches:

Colon Targeting Tablets: They deliver a therapeutic dose of the drug to a target site in the colon to achieve the desired drug concentration in the body. Lozenges are flavoured, medicinal dose forms that are meant to be held in the mouth or pharynx while being sucked. Hard (or boiling) candy lozenges and compressed tablet lozenges are two different types of lozenges (TROUCHES). Lozenges can be used for systemic drug absorption as well as local treatments in the mouth or throat. A pastille is a soft type of lozenge that contains medicine in gelatine, glycerol-gelatin, or a base of acacia, sucrose, and water. The composition of compressed lozenges does not contain a disintegrant. Other additives (binders and fillers) need to dissolve with a pleasing flavour or sensation. Common fillers and binders found in compressed lozenges include gelatine.



#### 2) Sublingual Tablets:

By allowing the drug to be absorbed directly through the mucosal lining of the mouth beneath the tongue, they enable immediate systemic effects. The tablets are typically flat and small, with a light compression to keep them soft. In order for the drugs to be quickly absorbed, the tablet needs to dissolve quickly. It's made to dissolve in just a little bit of saliva. Sublingual refers to a method of administering medications by mouth in such a way that the medications are quickly absorbed via the blood vessels under the tongue rather than through the digestive tract, with the term "sublingual" meaning literally "under the tongue."



### 3) Buccal Tablets:

These medications are meant to dissolve in the buccal pouch. Tablets are not intended to break down. It is positioned close to the parotid duct opening to supply the medium needed to dissolve the pill. The most popular form of treatment for replacement hormonal therapy is buccal pills. In order to provide a hydrated surface layer from which the medication slowly diffuses and is available for absorption through buccal mucosa, long-acting buccal tablets contain viscous natural or synthetic gums or combinations of gums that can be crushed. PANA and Carbopol 934, two mucoadhesive polymers, are used.

### 4) Dental Cones:

The purpose of these tables is to be placed loosely inside the empty socket that remains after a tooth extraction. The main reason for using this tablet is either to stop bacterial growth in the socket by using a slow-releasing antibacterial substance, or to stop bleeding by using an astringent or coagulant-containing tablet. It is designed to gently disintegrate or erode in the presence of a little amount of serum or fluid over the course of 20 to 40 minutes. Sodium chloride, sodium bicarbonate, or amino acids are frequently utilised as transportation.



### 5) Mouth Dissolved or Rapid Dissolving Tablets:

A solid dose form containing pharmaceutical ingredients that dissolves quickly, typically in a matter of seconds, when placed under the tongue. The mouth-feel of the Mouth Dissolving Tablet is pleasant, and it doesn't require water to be swallowed. MDT quickly disintegrated or was easily dissolved in saliva within a short period of time (15 s to 3 min). True fast-dissolving tablets are those MDT pills that are made to dissolve in saliva amazingly quickly, in just a few seconds. Others are better referred to as fast-disintegrating tablets since they contain substances that speed up tablet breakdown in the mouth; they may take up to a minute to completely dissolve. good hardness, equal dosage, and ease of administration

## C) Tablets Given Through Different Routes:

1) Vaginal Tablets: Can be placed with the use of an applicator and are intended for vaginal administration in the treatment of local vaginal infections. They are also designed for systemic absorption and absorption into vaginal tissue. in the treatment of localised vaginal infections caused by *Haemophilus vaginalis*, yeast, and *Candida albicans*. These are uncoated ovoid or bullet-shaped tablets. designed to dissolve slowly and distribute medication into the vaginal cavity. Plastic tube inserter is pleased in the upper portion of the vaginal tract. may have astringents, antibacterials, or antiseptics.

2) Rectal tables: This is an established and legal method of treatment. Although they all play a significant role in this and are subject to broad variation, even within a single subject, surface tension, pH, and volume and type of rectal fluid, as well as its buffer capacity, all contribute to the diversity of absorption through this route. Rectal tables don't need to be refrigerated. even at room temperature, better product stability.

3. Implants: These pills are inserted into the body cavities for a lasting effect that can last for a few days to a few months or even a year. These pills have a cylinder-like shape and are quite small. They are made to be surgically implanted under the skin, where they progressively dissolve over the course of a month or a year. The special injector has a hollow needle and plunger.

**d) tablets used to prepare solution:****Effervescent Tablets:**

The advantage of effervescent pills is that they dissolve completely and evenly, preventing the development of localised concentrations of the contents. Effervescent tablets are made to dissolve when they come into contact with liquids like water or juice. This results in not only improved flavour but also a reduced risk of irritability and a more effective way to consume the contents. When an organic acid mixture that is soluble comes into contact with water, effervescence results. They could tolerate the stomach and intestines well.

**2) Molded Tablets:****a. Hypodermic Tablets:**

These are one type of sterile preparations. In these, tablets are dissolved in the WFI or sterile water to inject before the actual injection in the hypodermic cavity. They are intended to be added in WFI of sterile water to form a clear solution which is to be injected parentally. They are widely used by rural physician due to its portability. It can be used for medicaments whose stability in water is very poor. Their use in this manner should be discouraged, since the resulting solutions are not sterile.

**b) Dispensing or Soluble Tablets:**

These should be mixed with water or other solvents to create a solution with a certain amount of API in it. Should not contain any insoluble substances (such as binders or glideants), as they will be converted into a clear solution. Mercury bichloride, quaternary ammonium compounds, and mild silver proteinate are among the ingredients used in distributing pills. If these tablets are accidentally swallowed whole, they are quite hazardous. These tablets deliver a practical dosage of a powerful medication.

**3) Tablet Triturate:**

Small, typically cylindrical, compressed or moulded tablets are known as tablet triturates. The medications used in these preparations were frequently highly strong and combined with lactose and perhaps a binder, like powdered acacia. Triturates used in tablets are often friable and soft.

Given the potency of several of the medications used in these tables, drug migration might happen as the alcohol evaporated. Since they must be instantly and totally soluble in water, just a small amount of pressure is used during their production.

**Structure Wise:**

1) Divisible Tablet: When administering one-half or one-fourth of a tablet, it may be required to score the tablet once or twice in the centre, with the lines perpendicular to one another. Double layer tablets in the shape of a V have been created, and the centre has been scored.

2) Aperture Tablets: These tablets were created with the goal of maintaining surface area throughout disintegration and dissolution.

3) Concave-convex Tablets: These tablets were created with the goal of maintaining the structure's surface area largely constant while it dissolves. On convex surfaces, space is lost; at concavities, it is gained.

4) Core Tablets: These tablets often feature a central core over which a second layer of material is squeezed.

**Action wise:**

## 1) Modified Release Tablet:

After taking a single tablet, the medication is released gradually over an extended period of time. used to target releases that are site-specific. Any adjuvant that can change the pace at which water is absorbed, how quickly things expand and gel, or how quickly things gel can change the release rate of API. By maintaining an appropriate pH level in the tablet's microenvironment, the drug release can be altered. The addition of alkaline polymers causes acidic medications to be released in a desired manner.

**Ingredient:** <sup>(2)</sup>

tablets contain a variety of inert substances known as excipients or additives in addition to the active components. various excipients are:

S.no	Ingredients	Examples
1	Diluents	Calcium phosphate, caroxymethylcellulose calcium, cellulose ; dextrin, lactose, microcrystalline cellulose, PR gelatinized starch; sorbitol; starch
2	Binders	Acacia; Alginic acid carboxymethylcellulose, cellulose; dextrin gelatin; Liquid glucose; magnesium aluminum silicate maltodextrin; methylcellulose; providone; sodium alginate; starch; zein.
3	Lubricant	Calcium stearate; glyceryl palmitostearate; magnesium oxide; poloxamer; polyvinyl alcohol; sodium benzoate sodium lauryl sulfate; sodium stearyl sulfate; stearic acid; talc; zinc stearate.
4	Glidants	Magnesium trisilicate; cellulose; starch; talc; tribasic calcium phosphate.
5	Anti-adherents	Corn starch; metallic stearate; talc
6	Disintegrants	Alginic acid; carboxymethylcellulose; cellulose; colloidal silicon dioxide; croscarmellose sodium; crospovidone; potassium potassium polacrilin; povidone.
7	Coloring agents	FD&C or D&C dyes or lake pigments
8	Flavouring agents	Ethyl maltol; ethyl vanillin; menthol; vanillin
9	Absorption	Kaolin; magnesium aluminum silicate; tricalcium phosphate

1) Diluents: When the medicine dosage alone is insufficient to produce the necessary bulk of the tablet, diluents are fillers employed to achieve so. Additionally used to enhance cohesiveness and enable direct compression.

2) Binders: to create cohesive compacts for tablets that are immediately compressed.

3) Lubricants: Lubricants are used to reduce friction between particles, prevent adherence of tablet materials to die and punch surfaces, and they may also speed up the flow of tablet granulation.

4) Glidants: By lowering the friction between the particles, gliders are designed to improve the flow of granules or powder material.

5) Anti-adherents: To stop the material from adhering to the tablet press walls, anti-adherents are added to the formulations of the tablets.

6) Disintegrates: A component added to a tablet formulation to help it break or dissolve when it comes into touch with fluids in the gastrointestinal tract.

7) Coloring Agents: There are three reasons why a tablet can contain colours and dyes: Drugs with unnatural colours can be concealed, products can be identified, and a more elegant product can be created.

8) Flavoring Agents: For chewable pills, flavouring oils are required. Typically, the oil is added in a dry form, such spray-dried beadlets. 9) Absorbents: If a tablet formulation calls for an ingredient with a strong affinity



for water, absorbents must be included. If hygroscopic ingredients are present, the blend becomes moist and challenging to manage throughout product.

### Method of Tablet: (5)

All across the world, pharmaceutical products are processed utilising the direct compression, wet granulation, or dry granulation techniques. The method employed depends on the unique properties of the materials, such as flow property, compressibility, etc. The proper method selection necessitates a careful examination of each suggested component in the recipe for a comprehensive approach for interactions and stability.

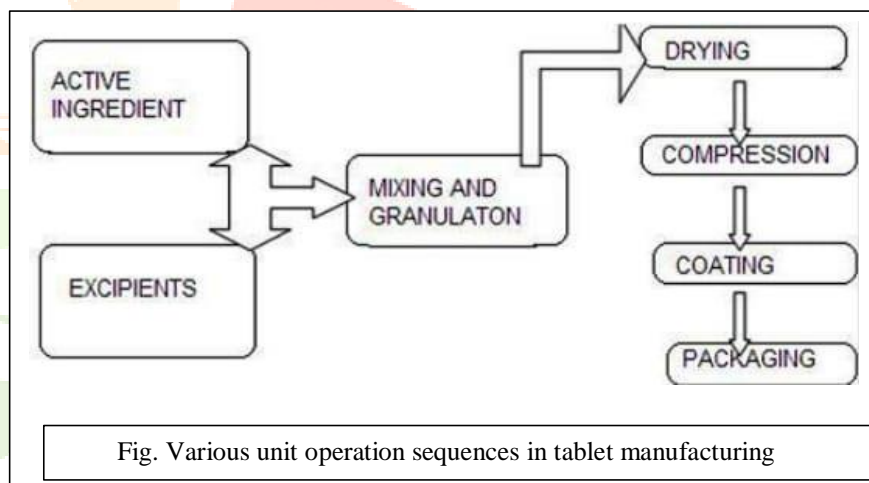
Direct compression:

Without changing the materials' physical properties, the powdered ingredients are directly compressed to create the tablets. For crystalline materials with good physical characteristics, such as flow property, compressibility, etc., direct compression is typically used. Time savings, operational safety, and cost savings are the three main benefits.

Wet granulation:

The preparation of tablets using this approach is the most popular. This approach uses "adhesion" to bind the powders to a suitable binder. Before adding the binder to the powders that have been blended, a suitable solvent is diluted to create wet granules, which are then dried to remove the solvent and create dried granules. The initial generation of granules is mostly caused by surface tension forces and capillary pressure. Despite being multistage and time-consuming, the key benefit is that it satisfies all requirements for tablet formation.

Dry granulation: Granules are created utilising the dry granulation method without the need of a liquid solution. For materials that are delicate to heat and moisture, this type of procedure is advised. Compacting and densifying the powders is necessary to produce granules devoid of moisture. Slugging tooling can be used to perform dry granulation on a tablet press. Chilsonator is the name for a large-scale roller compactor. Slugging is the procedure and the term for the compacted bulk. The slugs are then



screened or milled to create tablet materials in granular form, which have better flow characteristics than the initial powder mixture. The primary benefit of dry granulation is that it requires less equipment and does not require the addition of heat or moisture, as is the case with wet granulation. dry granulation technique. Before the final dosage form is created, the beginning components undergo a number of physical changes during the complex multi-stage process used to create oral solid dosage forms like tablets. Tablets have traditionally been produced by the granulation process, which imparts the two main requirements for formulation: fluidity and compactibility. Slugging and roll compaction, two types of granulations, are employed. The first phase, milling and mixing, is the same whether tablets are formed by direct compression or granulation; the next step varies. Making tablets involves many different unit operations, such as particle size reduction and sizing, mixing, granulation, drying, compaction, and (often) coating. These processes' associated variables may significantly impact content stability, bioavailability, or homogeneity.

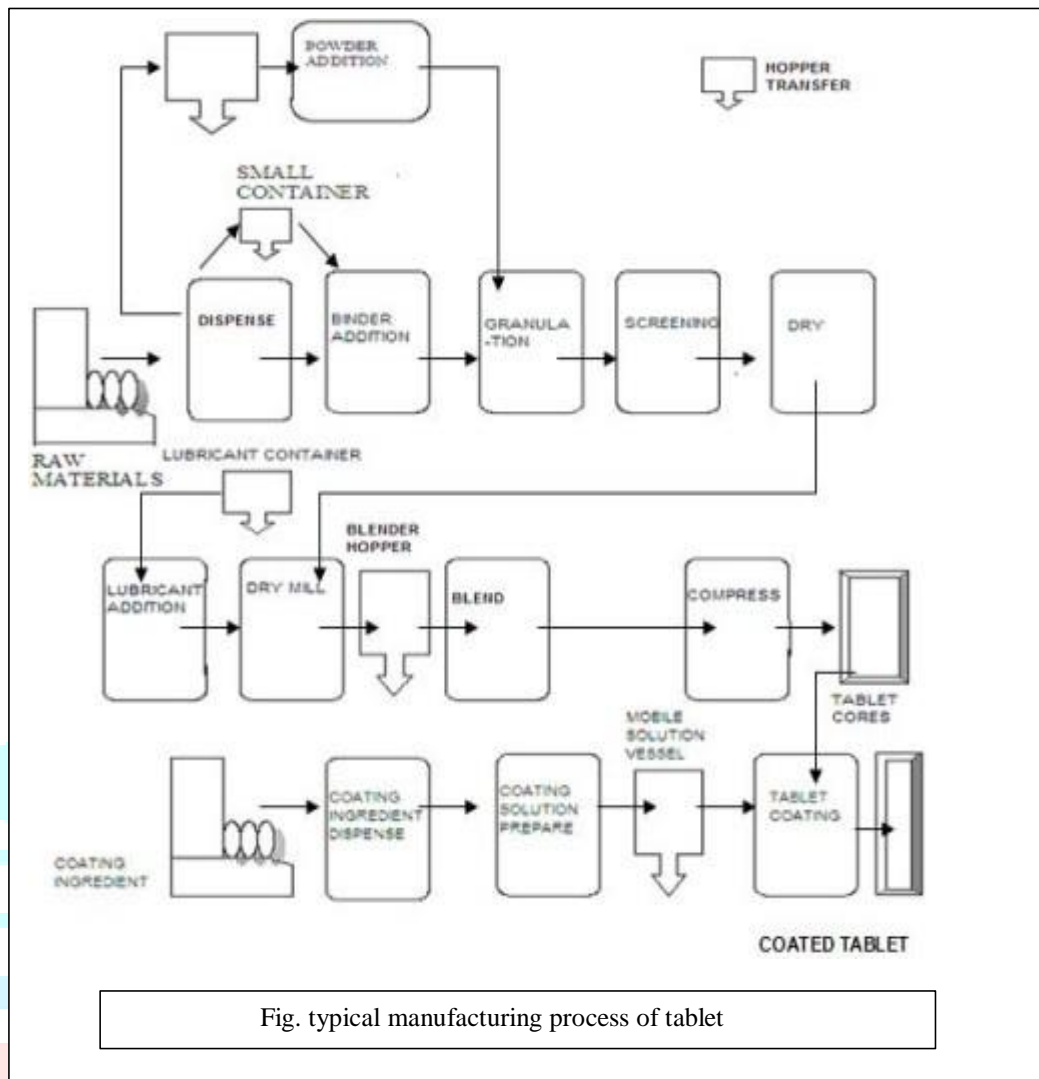


Fig. typical manufacturing process of tablet

Wet granulation	Dry granulation	Direct compression
1.Milling and mixing of drugs and excipient.	1.Milling and mixing of drug and excipient.	1.Milling and mixing drug and excipient
2.Preparation of binder solution	2.compression into slugs or roll compaction	2.Compression of tablet
3.Wet massing by addition of binder of solution or granulating solvent	3.milling and screening of slugs and compacted powder.	
4.Screening of wet mass	4.Mixing with lubricant and disintegrant	
5.Drying of wet granules	5.comprssion of tablet	
6.Screening of dry granules		
7.Bindening with lubricant and disintegrant to produces running powder		
8.compression of table		

**Manufacturing of Tablets: (24-35)**

Manufacture of tablets involves certain well-defined steps: namely: -

- i)Pulverization and mixing.
- ii)Granulation.
- iii)Compression.

iv)Coating (if required)

Pulverization and mixing

- Particles of different sizes will separate during mixing, hence in this phase, the various solid / powder materials are ground to the same size.
- A variety of machinery, including a cutter mill, hammer mill, roller mill, and fluid energy mill, is needed to break up the huge lumps. Technology for Granulation Granulation is the process by which small, single-particle primary powders are made to stick together to form larger, multi-particle entities. Size range: 0.2 mm to 4 mm. (0.2 – 0.5 mm)

(A) Wet Granulation

Step I: The medication and excipients are ground.

The active components, excipients, and other ingredients are milled to ensure homogeneity in the final granulation. If the medication is administered as a solution, it will rise to the top during drying. Drug is finely combined with other excipients to avoid this issue.

Step-II Weighing

- All ingredients should not be brought into the weighing room at once to prevent cross-contamination.
- Weighing should be done in a clean environment with an air flow system.

Step-III Mixing

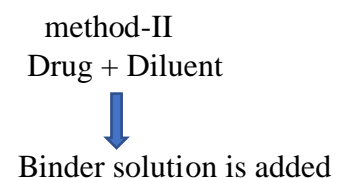
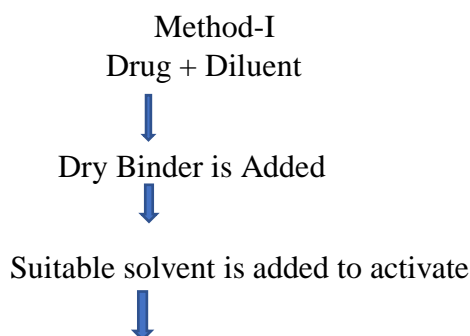
Commonly used blenders are:

- Double cone blender
- V – blender
- Ribbon blender
- Planetary mixer

Any one of the blenders may be used to mix dry powder mass

Step-IV Wet Massing:

- Using an adhesive to bind the particles together, wet granulation creates the granules.
- There are two methods for adding binders.



Blended in a Sigma - mixer or Planetary mixer till properly wet mass is formed

Therefore, technique I is used when a modest amount of solvent is acceptable and method II is used when a significant amount of solvent is needed.

If the amount of binder stays constant, method-II will provide higher cohesion than method-I.

- If granulation is over-wetted, the granules will be hard and require a lot of pressure to form the tablets, which could cause the finished tablets to seem mottled.

- Too-soft granules will result from insufficient wetting of the powder combination, which will make compression difficult and cause breakdown during lubrication.

#### Step-V –

the wet screening the wet screening process entails passing the damp mass through a manual screen (in small-scale production) or a hammer mill fitted with oscillatory granulators that have screens with large perforations (# 6–8 mesh screen).

- Intention I To increase the particle contact point (ii) To increase the surface area to aid drying

#### Step-VI Drying

- Drying is frequently done at 60°C. The temperature can be optimised based on how thermolabile the medication is.
- Drying is necessary in all wet granulation processes in order to get rid of the solvent, but it shouldn't be done completely because it would cause issues later. As a result, a small amount of moisture—referred to as residual moisture—between 1 and 4 percent is left inside the granules.

Methods: You can dry things out.

Tray dryers: drying time of up to 24 hours

Truck dryers: The entire dryer cabinet can be removed

Fluid-bed dryer: complete drying in 30 minutes

#### Step-VII

Dry Sifting The granules are made monosize by passing through a mesh screen after drying.

The size of the screen to be used for drying granules depends on the punch's diameter. The following measurements are advised:

Tablet diameter upto	Mesh Size
3 /16"	# 20
3.5 /6 – 5/16	# 16
5.5/16 – 6.5/16"	# 14
7.0/16 or larger	# 12

#### Step-VIII Lubrication of granules

- The lubricant is applied as a fine powder after dry granulation. It is often screened onto the granulation using 60 or 100 mesh nylon fabric to remove any minute lumps and to improve the lubricant's ability to cover more surface area.

Too much fine powder is undesirable because it may not feed into the die uniformly, producing variation in weight and density. The lubricant is blended very gently using tumbling motion to preserve the homogeneous granule size.

- Because of the hydrophobic surface that lubricants naturally form on their particles, over-blending hinders the inter-granule bonding that occurs during compression.

Dry Granulation (b) When the effective dose of a medicine is too high for direct compaction, dry granulation is used instead. A medicine cannot be wet granulated if it is sensitive to heat, moisture, or both, or if the effective dose is too high for direct compaction. For instance, compression granulation is used to create numerous aspirin and vitamin formulations for tableting.

Granulation processes include the following steps: milling, weighing, screening, blending, slugging, dry granulation, and lubrication compaction, and the goal is to give the ingredients cohesion so that they can form tablets with the required qualities

. method: It is done either by

- (i) high-capacity heavy duty tablet press
- (ii) Chilson Tor roller compactor.

Method of Direct Compression

blending, compression, sieving, weighing, and milling

**Evaluation:** (18-23) 1. Size & Shape: It can be described & controlled in terms of dimensions. A tablet's thickness is only subject to change. A micrometre or other equipment can be used to measure tablet thickness. Tablet thickness should not deviate from the target value by more than 5%.

2. Unique identification marking: These markings use printing, engraving, or embossing in some way. These markings include the name or symbol of the corporation, the product code, the product name, etc.

3. Compare the sample's colour to a standard colour for a visual colour comparison. An issue with stability, such as the acetic acid-specific odour of aspirin tablets, is indicated by the presence of odour in a batch of tablets. The existence of an odour may be indicative of the medicine (in the case of a vitamin), additional substances (in the case of a flavouring agent), or the dosage form (a film-coated tablet has a distinctive odour). For chewable tablets, the presence or absence of a specific taste can be determined. There may be zero defects in a tablet's amount of flaws, including chips, cracks, contamination from foreign solids (hair, oily drips, dirt), surface texture (smooth vs. rough), and look (shiny vs. drab).

4. Hardness and Friability: To endure mechanical jolts of handling during manufacture, packaging, and shipping, tablets need to have a specific amount of strength or hardness as well as resistance to friability. The strength of a tablet's crushing is typically measured by hardness. The following methods were used to gauge a tablet's strength:

(a) Cracking the tablet between the thumb and second and third fingers. The tablet is a suitable strength if there is a sharp snap.

(b) Tablet hardness can be defined as the force required breaking a tablet in a diametric compression. In this test the tablet is placed between two anvils, force is applied to the anvils, and the crushing strength that just causes the tablet to break is recorded.

Generally used Hardness testers are:

- (1) Monsanto Tester
- (2) Strong-cobb tester
- (3) Pfizer tester
- (4) Erwika tester
- (5) Schleuniger tester

Compressed tablet hardness ranges from 5 to 8 kg.

The Roche friabilator can be used in a lab to test a tablet's friability. This consists of a plastic chamber that rotates at 25 revolutions per minute while dumping the tablets into a friabilator that is operated for 100 revolutions. The pills are weighed again. Acceptable tablet compression is defined as losing between 0.5% and 1.0% of the tablet's weight.

5. Content Uniformity Test: Choose 30 tablets at random. 10 of these were individually tested. The tablet will pass the test if 9 out of the 10 tablets contain between 85% and 115% of the drug content listed on the label, while the 10th tablet cannot contain between 75% and 125%. If these parameters are not met, each of the 20 remaining tablets will be individually analysed to ensure that none of them fall beyond the 85 to 115% range.

6. Disintegration Test (U.S.P.): The U.S.P. disintegration test apparatus consists of six 3" long glass tubes that are open at the top and have a 10-mesh screen at the bottom. One tablet is placed in each tube, and the basket rack is placed in a 1-L beaker of water, simulated gastric fluid, or simulated intestinal fluid at 37°C so that the tablet stays 2.5 cm below the surface of the liquid on their upward movement and not gets any closer to

the bottom of the beaker than 2.5 cm on their downward movement. This is done to test the disintegration time. Move the tablet-containing basket up and down over a 5–6 cm distance at a cycle rate of 28–32 per minute.

7. Apparatus 1: Dissolution Test (U.S.P.) One tablet is put into a tiny wire mesh basket that is fastened to the bottom of the shaft linked to the variable speed motor. The dissolution medium, which is contained in a 100 ml flask, is submerged in the basket as directed in the monograph. The flask has a hemispherical bottom and is cylindrical in shape. A constant temperature bath keeps the flask at 37.5% of its original temperature. To calculate the amount of medication in solution, the motor is set to rotate at the desired speed and samples of the fluid are periodically removed.

**CONCLUSION:** As a solid dosage form, tablets are popular among patients and practitioners alike as they provide a means of self-administration. The formulation of a tablet contains in addition to the API, various substances to assure proper delivery of the API to the patient. With advancement in technology and awareness toward modification in standard tablet to achieve better acceptability as well as bioavailability. To understand each dosage form tablet here are classification by their route of administration and by the type of drug delivery system they represent within that route after the tablet manufacturing the evaluation best quality product. Evaluation is before and after the manufacturing that is pre and post evaluation same drawback of solid dosage (tablet, capsule) is they are not administration to the unconsciousness.

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