PHB EDUCATION

ALL PHARMA EXAM CRACKER POINT

DIPLOMA IN PHARMACY

DPEE

PHARMACEUTICS

(Tablet Dosage Form)

By:

Dr. Arvind Gupta

Dr. Anuj Mittal

Dr. Shaweta Sharma

Ms. Shikha Rathi

Diploma in Pharmacy
DPEE Pharmaceutics
D. Pharm First Year
(As per PCI latest Syllabus)

Authors

Dr. Arvind Kumar Gupta
(M. Pharm., PDCR, PGDMM & Ph.D)
Dr. S. N. Dev College of Pharmacy Shamli (U.P.)

Dr. Anuj Mittal
(M. Pharm., PGDPM, LLB & Ph.D)
HIMT College of Pharmacy
Greater Noida (U.P.)

Dr. Shaweta Sharma
(M. Pharm, Ph.D)
School of Medical & Allied Sciences
Galgotias University, Greater Noida (U.P.)

Ms. Shikha Rathi
(B.Pharm, M. Pharm.)
Sri Sukhmani Institute of Pharmacy
Derabassi, SAS Nagar Mohali (Punjab)

PHB EDUCATION ONLINE BOOKS
SHAMLI (U.P.)-247776

Course Name	**: D. Pharm**
Year	**: First Year**
Subject Name	**: Pharmaceutics**
Topic Name	**: Tablets**

Ch – 10

Tablets

. Tablets are solid unit dosage form containing medicament or medicaments usually circular flat or biconvex.

Advantages of tablet dosage form:

1. They are easy to carry.
2. They are easy to swallow.
3. They are attractive in appearance.
4. Unpleasant taste can be masked by sugar coating.
5. They do not require any measurement of dose. It provides a sealed covering which protects the tablets from atmospheric conditions like air, moisture and light etc.
6. Tablets provide prolonged stability to medicament. They have the best combined properties of chemical, mechanical and microbiological stability of all the oral dosage forms.
7. The incompatibilities of medicaments and their deterioration due to environmental factors are less in tablet forms.
8. Since they are generally produced on a large scale, therefore, their cost of production is relatively low, hence economical.

Disadvantages of tablet dosage forms:

- Some drugs resist compression into dense compacts, owing to their amorphous nature or flocculent, low-density character.
- Drugs with poor wetting, slow dissolution properties, intermediate to large dose, or any combination of these features may be difficult or impossible to formulate and manufacture as a tablet that will still provide adequate bioavailability.

Classification of tablets:

A. Tablets ingested orally:

a. Compressed tablet: **e.g.** Paracetamol tablet
b. Multiple compressed tablets:
c. Multi-layered tablets:
d. Sustained release tablets: **e.g.** Diclofenac (Voveran SR)
e. Enteric coated tablets: **e.g.** Aspirin Tablet
f. Sugar coated tablets: **e.g.** Multivitamin tablet
g. Film coated tablets: **e.g.** Metronidazole tablet
h. Chewable tablets: **e.g.** Antacid tablet

B. Tablet used in oral cavity:

a. Buccal tablets: **e.g.** Vitamin- C tablet
b. Sublingual tablets: **e.g.** Vicks Menthol tablet
c. Lozenge tablets and traches: **e.g.** Strepsils Orange with Vit C
d. Dental cones

C. Tablets administered by other routes:

1. Implantation tablets: **e.g.** Disulfiram Tablet
2. Vaginal tablets: **e.g.** Clotrimazole vaginal tablets

D. Tablets used to prepare solutions

1. Effervescence tablets: **e.g.** Dispirin tablet (Aspirin)
2. Dispensing tablets: **e.g.** Enzyme tablet
3. Hypodermic tablets: **e.g.** Morphine tablet
4. Tablet triturates: **e.g.** Enzyme tablet

Formulation of Tablet with API & Common Excipients:

1. **Diluents:** essential excipients for tablets to increase the weight or volume.
   E.g.: Dextrose, Lactose and Sucrose etc**.**
2. **Binders:** vital excipients for tablets to facilitate the agglomeration of powder into granules.
   E.g.: Starch Paste, Gelatin Solution etc.
3. **Disintegrants:** essential excipients for tablets to assist dosage form's breakup or disintegration into small units/fragments.
   E.g.: Starch, clays, celluloses, alginates, gums and cross-linked polymers.
4. **Lubricants:** vital excipients for tablets to reduce the frictional forces between particle-particle as well as particles and metal-contact surfaces.
   E.g.: Talc, magnesium stearate, calcium stearate, stearic acid, hydrogenated vegetable oils and polyethylene glycols (PEG).
5. **Glidant:** to promote the flow properties of tablet granules or power materials.
   E.g.: Corn Starch, Talc etc.
6. **Coloring agent:** to give a color or identification of the tablets as either pigment or coating materials.
   E.g.: FD&C (food, Drug & Cosmetic Dyes)
7. **Flavoring agent:** used only in some types of tablets such as chewable tablets or dispersible tablets or in coating suspension for bad smelled tablets. **E.g.:** Amlodipine + Olmesartan Medoxomil tablet.

8. **Sweetener or Sweetening agent:** especially used in the chewable, dispersible, sublingual tablet. E Sugar, Mannitol (72% as sweet as sugar, cooling & mouth filling effect), Saccharin, Cyclamate and Aspartame.
9. **Surfactant:** used for low solubility tablets to improve wetting and deaggregation of drug particles to get a rapid and improved dissolution.
10. **Release - Modifying Agents:** especially used to control drug release in modified-release formulations (prolonged-release or controlled-release tablet).
11. **Coating materials:**
    - Film former which may be enteric or non-enteric
    - Solvent
    - Plasticizer
    - Colorant
    - Opaquant-Extender
    - Miscellaneous coating solution components.

Techniques / Methods Used in Tablet Formulation

Tablets are commonly manufactured by

1. **Direct compression**
2. **Dry granulation**
3. **Wet granulation**

1. Direct Compression

1. Wet granulation and dry granulation methods having series of unit operations, both time consuming and potentially costly.
2. Potentially more attractive option for the manufacture of tablets involves powder mixing and subsequent compression of the powder mix, thereby obviating the need for granulation. This process is called direct compression.
3. The mechanism of particle-particle interactions in tablets produced by direct compression are similar to those operative in tablets produced by dry granulation and roller compaction.

2. Dry Granulation

- When tablet ingredients are sensitive to moisture and unable to withstand elevated temperature during drying and when the tablet ingredient have insufficient cohesive properties, slugging may be used to form granules.
- This technique is used in preparation of aspirin, aspirin combination, and acetophenetidin.

Excipients used in this method:

- **Diluents/ filler:** anhydrous lactose/ lactose monohydrate, starch, dibasic calcium phosphate, and MCC
- **Disintegrants:** Starch, MCC, Sodium starch glycolate, Croscarmellose sodium, Crospovidone.
- **Lubricants:** Stearates (Mg. stearate, steric acid), Glyceryl fatty acid esters, poly oxy ethylene stearates, SLS.
- **Glidants:** Talc, Colloidal silicon dioxide.
- **Miscellaneous Excipients:** Colours, sweetening agents, etc.

3. Wet Granulation:

- It is most commonly used method for the manufacturing of tablets.
- Water is frequently used as the granulation fluid (and heat is employed to dry the formed granules), it is important to ensure that the therapeutic agent is chemically stable during the granulation process.
- The wet granulation exhibit sufficient mechanical properties to be subsequently exposed to other unit operations, Eg: film coating.
- Tablet quality is directly affected by the choice and concentration of binder and the type and volume of granulation fluid. Due to the number of unit operations to the required, the manufacture of tablets by wet granulation is not as efficient as other methods. Eg: direct compression.

Tablets defects/ special problem in compressing tablet process

- Weight variation (granule size and size distribution)
- Capping and lamination
- Picking of tablets
- Chipping and splitting
- Sticking
- Embossing/print defect
- Layered tablet splitting
- Low hardness/ low mechanical strength
- Variable hardness
- Mottling
- Double impression
- Black spot/stain

Quality control of tablets

Tablets should be subjected to a number of tests before they are deemed fit for marketing and consumption. These tests can be divided into two broad categories namely

1. **Pharmacopoeial or official tests**
    1. Content of active ingredient/ absolute drug content test/ assay of active ingredient.
    2. Weight uniformity test/ weight variation test
    3. Content uniformity test
    4. Disintegration time test
    5. Dissolution test
2. **Non-pharmacopoeial or non-official tests**
    1. Crushing strength test/ hardness test
    2. Friability test.
    3. Tensile strength determination.

1. **Shape of tablets:** Circular with flat or convex faces.
2. **Appearance:** Uncoated tablet under lens either a relatively uniform texture or a stratified structure. No signs of coating.
3. **Content of active ingredient:** The amount of active ingredient in tablet is determined

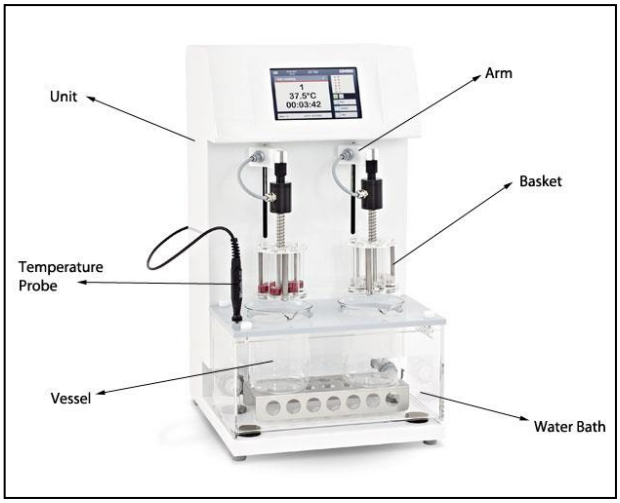
by doing the assay. Generally 20 tablets or such other number as may be indicated in the monograph are used in the assay. The result lies within the range for the content of active ingredient in the monograph. The stated limits are between 90 and 110%.

Weight of medicament in each tablet	Subtract from the lower limit for the sample of			Add to the upper limit for sample of		
	15	10	5	15	10	5
0.12 g or less	0.2	0.7	1.6	0.3	0.8	1.8
More than 0.12 g and less than 0.3 g	0.2	0.5	1.2	0.3	0.6	1.5
0.3 g or more	0.1	0.2	0.8	0.2	0.4	1.0

4. **Uniformity of weight:** Weigh 20 tablets selected at random and determine their average weight. Not more than 2 of the individual weights may deviate from the average weight by more than the percentage deviation given in the table and none should deviate by more than twice that percentage.

Sr. No	Average weight of a tablet deviation	Percentage
1	80 mg or less	10
2	More than 80 mg and less than 250 mg	7.5
3	250 mg or more	5

5. **Uniformity of content:** Percentage of medicament is calculated by doing assay for a particular drug. 20 tablets are taken, powdered and assayed. The average weight of medicament present in each tablet is calculated which is then compared with the desired weight. The pharmacopoeia has prescribed the limit in percentage of medicament per tablet in the monograph.
6. **Disintegration test:** Disintegration of a tablet means to break a tablet into smaller particles after swallowing. The time required to disintegrate the tablet is called disintegration time.



The apparatus consists of a rigid basket-rack assembly supporting 6 cylindrical glass tubes held vertically by two superimposed transparent plastic plates with six holes having the same diameter as the tubes. Woven wire gauze made from stainless steel is attached to the underside of the lower plate. The assembly should be raised and lowered between 28 and 32 times per minute in the liquid at 37^0C.

The tablets are kept immersed in the liquid within the tubes by means of cylindrical Guided discs. The assembly is suspended in the liquid medium in a 1000 ml beaker. The apparatus is operated generally for 15 minutes and observed for disintegration of tablets. The tablets pass the test if all the tablets disintegrate. In case one or two tablets fail to disintegrate, repeat the test on 12 additional tablets. The tablets pass the test if not less than 16 of the total 18 tablets tested have disintegrated.

7. Dissolution test: The test is done for measuring the amount of time required for a given percentage of drug substance in a tablet to go into solution under specified condition in vitro.

The apparatus consists a cylindrical covered vessel made of glass or other transparent material having 1000 ml capacity. The vessel is fitted with a lid having 4 holes, one for shaft of stirrer, second for placing thermometer and remaining two for removing the sample.

An electric motor which is capable of rotating the basket (woven wire cloth having aperture size 425 micrometer) in the vessel at varied speed between 25 and 150 revolutions per minute.

1000 ml of water at 37^0 C + 0.5 ^{o} C in placed and specified number of tablets are placed in the dry basket. The motor is started and the rotation speed is adjusted to 1000 rpm or as directed in the monograph. Withdraw the stated volume of solution from the vessel after 45 minutes or after the time specified in the monograph. Filter and determine the amount of active ingredient present in it. The tablets pass the test if for each of the five replicates; the amount of active ingredient in solution is not less than 70% of the stated amount

Diagram:

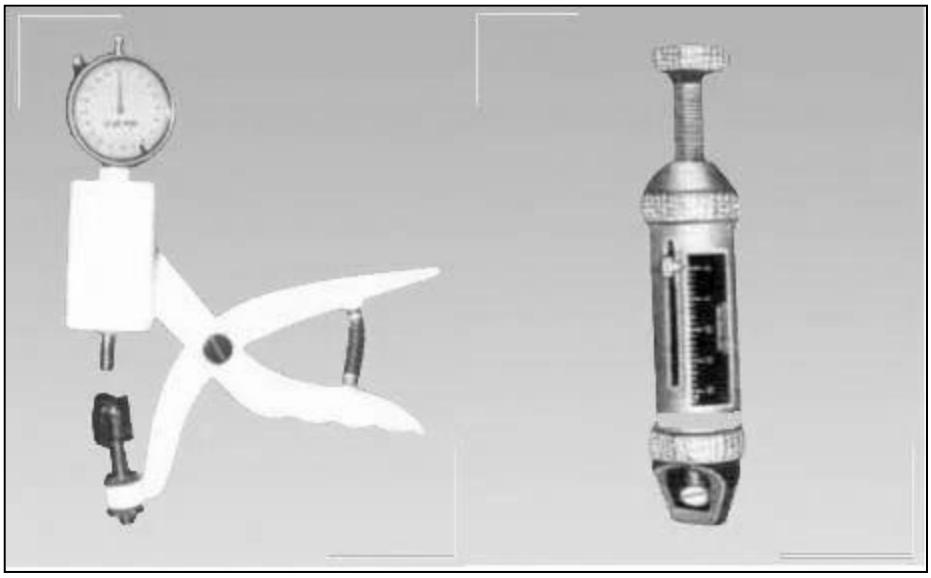
Dissolution Test Apparatus

8. Hardness test: Manufacturers have set their own limit for the hardness. Monsanto hardness tester or Pfizer tablet hardness tester are the devices used for finding the mechanical strength of tablets.

Monsanto hardness tester has a graduated scale which gives the reading in kg/sq. cm. The tablet to be tested is placed between the spindle and anvil. The pressure is applied till the tablet breaks.

Pfizer tablet hardness tester is based on the principle of an ordinary plier. The tablet is placed between the jaw of the plier and the pressure is applied by pressing the handles with hand until the tablet breaks.

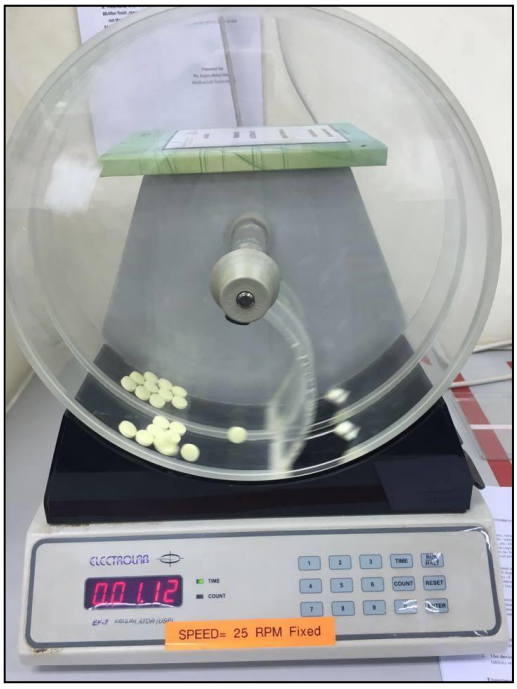
Diagram:



9. Friability test: This test is performed to evaluate ability of the tablet to with stand wear and tear in packing, handling, and transporting. The apparatus used to perform this test is known as "Friabilator".

The apparatus consists of a plastic chamber, which is divided into two parts and it revolves at a speed of 25 rpm. Twenty tablets are weighed and placed in a plastic chamber. The chamber is rotated for 4 minutes or 100 revolutions. During each revolution the tablet falls from a distance of 6 inch. The tablets are removed from the chamber after 100 revolutions and weighed. Loss in weight indicates the friability. The tablets are considered to be of good quality if the loss in weight is less than1%.

Diagram:



TYPE OF TABLETS

1. Which of the following is not a type of tablet?

a) Effervescent tablet

b) Buccal tablet

c) Suppository tablet

d) Sublingual tablet

Answer: c)

2. Enteric-coated tablets are designed to:

a) Dissolve in the stomach

b) Dissolve in the small intestine

c) Dissolve rapidly upon swallowing

d) Dissolve in the oral cavity

Answer: b)

3. Chewable tablets are used primarily for:

a) Fast onset of action

b) Patients with difficulty swallowing

c) Controlled drug release

d) Sustained drug release

Answer: b)

4. Which tablet is placed under the tongue for absorption?

a) Buccal tablet

b) Sublingual tablet

c) Lozenges

d) Effervescent tablet

Answer: b)

5. Which type of tablet is intended for insertion into the rectum?

a) Coated tablet

b) Buccal tablet

c) Suppository tablet

d) Vaginal tablet

Answer: c)

6. Effervescent tablets are dissolved in:

a) Water

b) Alcohol

c) Saline solution

d) Milk

Answer: a)

7. Which of the following tablets releases the drug over an extended period?

a) Effervescent tablet

b) Sustained-release tablet

c) Chewable tablet

d) Sublingual tablet

Answer: b)

8. Buccal tablets are designed to dissolve in the:

a) Small intestine

b) Oral cavity between the cheek and gums

c) Stomach

d) Bloodstream

Answer: b)

9. Which type of tablet is formulated to provide a local effect in the oral cavity?

a) Effervescent tablet

b) Buccal tablet

c) Lozenges

d) Coated tablet

Answer: c)

10. Vaginal tablets are used for:

a) Systemic drug delivery

b) Localized drug delivery in the vagina

c) Pain relief

d) None of the above

Answer: b)

11. Which tablet type disintegrates rapidly when placed in the mouth?

a) Sustained-release tablet

b) Orally disintegrating tablet (ODT)

c) Enteric-coated tablet

d) Layered tablet

Answer: b)

12. Layered tablets are used for:

a) Achieving multiple release profiles

b) Enteric coating

c) Delayed absorption

d) Chewing purposes

Answer: a)

13. Which tablet requires an external liquid for dissolution before administration?

a) Lozenges

b) Effervescent tablet

c) Chewable tablet

d) Buccal tablet

Answer: b)

14. What is the primary purpose of sugar-coated tablets?

a) To control release

b) To mask the taste of the drug

c) To reduce disintegration time

d) To enhance bioavailability

Answer: b)

15. Film-coated tablets differ from sugar-coated tablets in that they:

a) Dissolve faster

b) Are lighter and less bulky

c) Provide sustained release

d) Are absorbed sublingually

Answer: b)

16. Which tablet is designed for prolonged action and administered once daily?

a) Immediate-release tablet

b) Controlled-release tablet

c) Orally disintegrating tablet

d) Chewable tablet

Answer: b)

17. What is the main advantage of an orally disintegrating tablet (ODT)?

a) Provides delayed action

b) Requires no water for administration

c) Is absorbed in the small intestine

d) Requires chewing before swallowing

Answer: b)

18. Which type of tablet contains multiple layers of drugs?

a) Sublingual tablet

b) Layered tablet

c) Buccal tablet

d) Effervescent tablet

Answer: b)

19. Compressed tablets are formed by:

a) Granulation

b) Direct compression

c) Milling

d) Both a and b

Answer: d)

20. The term "orodispersible tablet" refers to tablets that:

a) Are coated with sugar

b) Dissolve in the stomach

c) Disperse in the oral cavity

d) Require chewing before swallowing

Answer: c)

FORMULATION OF TABLETS

1. What is the primary function of an Active Pharmaceutical Ingredient (API) in a tablet formulation?

a) To improve taste

b) To provide therapeutic activity

c) To enhance flow properties

d) To increase bulk

Answer: b)

2. Which of the following is a commonly used diluent in tablet formulation?

a) Talc

b) Lactose

c) Magnesium stearate

d) Povidone

Answer: b)

3. What is the role of a disintegrant in a tablet?

a) To mask the taste

b) To enhance binding

c) To facilitate tablet break-up in the gastrointestinal tract

d) To improve the flow of powder

Answer: c)

4. Which of these is a commonly used binder in tablet formulations?

a) Starch

b) Povidone

c) Talc

d) Stearic acid

Answer: b)

5. Which of the following is an example of a lubricant?

a) Lactose

b) Magnesium stearate

c) Microcrystalline cellulose

d) Gelatin

Answer: b)

6. A glidant is used to:

a) Prevent sticking during compression

b) Improve flow properties of powders

c) Facilitate tablet disintegration

d) Reduce tablet weight variation

Answer: b)

7. Which of the following is a superdisintegrant?

a) Crosslinked polyvinylpyrrolidone (Crospovidone)

b) Microcrystalline cellulose

c) Stearic acid

d) Talc

Answer: a)

8. What is the primary purpose of coatings on tablets?

a) To enhance stability

b) To improve taste and appearance

c) To control drug release

d) All of the above

Answer: d)

9. Which excipient is used as a sweetener in chewable tablets?

a) Saccharin sodium

b) Talc

c) Povidone

d) Dicalcium phosphate

Answer: a)

10. What is the function of a diluent in tablet formulation?

a) To act as a lubricant

b) To provide bulk to the tablet

c) To enhance solubility

d) To prevent sticking

Answer: b)

11. Microcrystalline cellulose (MCC) is used in tablet formulation as a:

a) Binder

b) Lubricant

c) Disintegrant

d) Glidant

Answer: a)

12. Which of the following is a commonly used film-forming agent in tablet coatings?

a) Hydroxypropyl methylcellulose (HPMC)

b) Talc

c) Magnesium stearate

d) Starch

Answer: a)

13. Which excipient is often used to enhance the solubility of poorly water-soluble drugs?

a) Sodium lauryl sulfate

b) Starch

c) Talc

d) Calcium carbonate

Answer: a)

14. Talc is commonly used in tablet formulation as a:

a) Diluent

b) Lubricant

c) Glidant

d) Binder

Answer: c)

15. The primary function of a plasticizer in tablet coating is to:

a) Provide flexibility to the coating

b) Improve flow properties

c) Reduce hardness

d) Act as a disintegrant

Answer: a)

16. Which of the following is used as a preservative in tablet formulations?

a) Sodium benzoate

b) Lactose

c) Povidone

d) Stearic acid

Answer: a)

17. An example of a commonly used wetting agent in tablet formulation is:

a) Talc

b) Sodium lauryl sulfate

c) Lactose

d) Stearic acid

Answer: b)

18. Which excipient improves the taste of a tablet?

a) Povidone

b) Mannitol

c) Crospovidone

d) Stearic acid

Answer: b)

19. An effervescent tablet contains:

a) Sodium bicarbonate and citric acid

b) Povidone and stearic acid

c) Talc and lactose

d) Gelatin and starch

Answer: a)

20. What is the role of coloring agents in tablet formulation?

a) To improve bioavailability

b) To enhance aesthetic appeal and identification

c) To control the release of the API

d) To act as a binder

Answer: b)

METHODS USED IN TABLET FORMULATION

1. Which of the following is the most commonly used method in tablet formulation?

a) Wet granulation

b) Direct compression

c) Dry granulation

d) Hot melt extrusion

Answer: a) Wet granulation

2. Which method involves compressing powder directly into tablets without modification?

a) Wet granulation

b) Direct compression

c) Dry granulation

d) Extrusion

Answer: b)

3. Dry granulation is also known as:

a) Slugging

b) Wet mixing

c) Spray drying

d) Spheronization

Answer: a)

4. In wet granulation, which of the following is used as a binding solution?

a) Alcohol

b) Starch paste

c) Talc

d) Stearic acid

Answer: b)

5. Which equipment is commonly used for mixing powders during wet granulation?

a) Ball mill

b) V-blender

c) High-shear granulator

d) Fluidized bed dryer

Answer: c)

6. Which process is used to convert fine powders into granules in dry granulation?

a) Roller compaction

b) Spray drying

c) Coating

d) Sintering

Answer: a)

7. Direct compression is suitable for:

a) Drugs with poor flow properties

b) Highly compressible drugs

c) Drugs with high moisture content
d) Thermolabile drugs
Answer: b)

8. Which of the following is an advantage of wet granulation?
a) Improves compressibility of powders
b) Suitable for moisture-sensitive drugs
c) Eliminates the need for binders
d) Requires no drying step
Answer: a)

9. Lubricants are added to tablet formulations to:
a) Enhance tablet disintegration
b) Reduce friction during compression
c) Bind particles together
d) Improve solubility
Answer: b)

10. Spray drying is commonly used in tablet formulation to:
a) Improve drug solubility
b) Enhance tablet hardness
c) Increase the particle size of powders
d) Reduce moisture content
Answer: a)

11. Which granulation method does not involve the use of a liquid binder?
a) Wet granulation
b) Dry granulation
c) Direct compression
d) Melt granulation
Answer: b)

12. What is the primary purpose of granulation in tablet formulation?
a) To increase powder density and flowability
b) To enhance tablet dissolution
c) To improve the color of the tablet
d) To increase tablet hardness
Answer: a)

13. Granules prepared in wet granulation are dried using:
a) Hot air oven
b) Freeze dryer
c) Fluidized bed dryer
d) Both a and c
Answer: d)

14. Which type of granulation is preferred for heat- and moisture-sensitive drugs?
a) Wet granulation
b) Dry granulation
c) Direct compression
d) Melt granulation
Answer: b)

15. Which equipment is used for roller compaction in dry granulation?
a) Ball mill
b) Oscillating granulator
c) Chilsonator
d) Fluidized bed processor
Answer: c)

16. What is the role of pre-compression in tablet manufacturing?
a) To reduce air entrapment
b) To improve tablet coating
c) To increase friability
d) To avoid granulation
Answer: a)

17. Which of the following is an example of melt granulation?

a) Using a waxy binder like polyethylene glycol (PEG)

b) Applying a liquid binder solution

c) Sintering at high temperatures

d) Roller compaction without liquid

Answer: a)

18. What is the main limitation of direct compression?

a) High cost of excipients

b) Incompatibility with thermolabile drugs

c) Complexity of process

d) Requires large amounts of binder

Answer: a)

19. Which of the following methods is used to prepare orodispersible tablets?

a) Freeze drying

b) Wet granulation

c) Melt granulation

d) Spray drying

Answer: a)

20. The uniformity of granule size is evaluated using:

a) Sieve analysis

b) X-ray diffraction

c) FTIR spectroscopy

d) Hardness tester

Answer: a)

TABLETS DEFECTS IN COMPRESSING TABLET PROCESS

1. What is a common reason for capping in tablets?

A. High compression force

B. Insufficient binder

C. Excessive lubrication

D. Large particle size

Answer: B

2. Which defect occurs due to air entrapment in the granules?

A. Lamination

B. Capping

C. Picking

D. Sticking

Answer: A

3. What is the term for the separation of the top or bottom layer of a tablet?

A. Lamination

B. Chipping

C. Capping

D. Mottling

Answer: C

4. What causes sticking during tablet compression?

A. Excessive moisture in granules

B. Poorly polished punch surfaces

C. Improper lubrication

D. All of the above

Answer: D

5. Picking is primarily caused by:

A. Excessive tablet hardness

B. Material adhesion to punches
C. Non-uniform die filling
D. Inadequate disintegrant
Answer: B

6. Which defect is associated with uneven distribution of color in a tablet?
A. Lamination
B. Mottling
C. Capping
D. Cracking
Answer: B

7. Tablet cracking is often due to:
A. Overdrying of granules
B. Use of improper binders
C. Low compression force
D. Soft punches
Answer: A

8. Chipping is the result of:
A. High moisture content
B. Excessive friability
C. Weak punch edges
D. Insufficient compression force
Answer: C

9. What defect involves the breaking or flaking of the edges of tablets?
A. Capping
B. Chipping
C. Sticking
D. Lamination
Answer: B

10. Excessive binding agents in the formulation can lead to:
A. Cracking
B. Hard tablets with poor disintegration
C. Mottling
D. Sticking
Answer: B

11. What is the main cause of lamination?
A. Low moisture content in granules
B. Excessive lubrication
C. Rapid decompression
D. All of the above
Answer: D

12. Over-lubrication of granules can cause:
A. Sticking
B. Capping
C. Poor tablet hardness
D. Picking
Answer: C

13. What can help minimize sticking during tablet compression?
A. Increasing tablet size
B. Using colloidal silica as a glidant
C. Polishing punch surfaces
D. Both B and C
Answer: D

14. Which defect is caused by poor flow properties of granules?
A. Weight variation
B. Lamination
C. Capping
D. Mottling
Answer: A

15. What is a major cause of friability in tablets?
A. Low binder content

B. High compression force

C. Uneven particle size distribution

D. Excessive lubrication

Answer: A

16. High moisture content in granules is most likely to result in:

A. Sticking and picking

B. Lamination

C. Friability

D. Weight variation

Answer: A

17. What defect is characterized by the tablet splitting into multiple horizontal layers?

A. Capping

B. Lamination

C. Mottling

D. Sticking

Answer: B

18. Which of the following is not a cause of picking?

A. Soft punch faces

B. Low moisture content in granules

C. Use of fine powders with high adhesion

D. Insufficient lubricant

Answer: B

19. Which of the following techniques can minimize capping?

A. Reducing compression speed

B. Increasing granule moisture content

C. Pre-compression step

D. All of the above

Answer: D

20. Uneven color distribution in tablets can be minimized by:

A. Using a uniform particle size

B. Reducing drying temperature

C. Proper mixing of colorants

D. All of the above

Answer: D

SUGAR TABLET PROCESS

1. What is the primary purpose of sugar coating tablets?

A. To increase dissolution rate

B. To improve taste and appearance

C. To reduce tablet weight

D. To improve friability

Answer: B

2. Which of the following is the first step in the sugar coating process?

A. Smoothing

B. Subcoating

C. Sealing

D. Polishing

Answer: C

3. The sealing step in sugar coating is performed to:

A. Protect the tablet core from moisture

B. Provide the final glossy appearance

C. Add color to the tablet

D. Improve tablet weight uniformity

Answer: A

4. Which material is commonly used in the sealing process?

A. Sucrose

B. Shellac
C. Talc
D. Titanium dioxide
Answer: B

5. What is the main purpose of the subcoating step?
A. To make tablets more glossy
B. To build tablet strength and shape
C. To improve dissolution properties
D. To mask the tablet taste
Answer: B

6. Which ingredient is often included in the subcoating layer?
A. Calcium carbonate
B. Gelatin
C. Sucrose
D. All of the above
Answer: D

7. The smoothing step in sugar coating is performed to:
A. Mask tablet defects
B. Add the coloring layer
C. Enhance the flavor of the tablet
D. Make the coating more glossy
Answer: A

8. The color coating step involves:
A. Applying pigment or dye to the tablet surface
B. Polishing the surface with wax
C. Adding a protective shell
D. None of the above
Answer: A

9. What is a common pigment used in the color coating of sugar-coated tablets?
A. Iron oxides
B. Titanium dioxide
C. FD&C dyes
D. All of the above
Answer: D

10. The polishing step in sugar coating is used to:
A. Add a smooth layer of sucrose
B. Provide the final glossy appearance
C. Increase tablet weight
D. Improve dissolution properties
Answer: B

11. Which material is commonly used for polishing sugar-coated tablets?
A. Beeswax
B. Carnauba wax
C. Paraffin wax
D. All of the above
Answer: D

12. What is a disadvantage of sugar coating?
A. It increases the tablet weight significantly
B. It requires specialized equipment
C. The process is time-consuming
D. All of the above
Answer: D

13. The most common adhesive used in sugar coating is:
A. Gum acacia
B. Gelatin
C. Polyvinyl alcohol (PVA)

D. Sucrose solution

Answer: A

14. Excessive polishing during sugar coating may cause:

A. Uneven color distribution

B. Reduced glossiness

C. Sticky tablets

D. Cracking of the coating

Answer: B

15. What is a common defect observed in sugar coating?

A. Blooming

B. Bridging

C. Cracking

D. All of the above

Answer: D

16. Blooming in sugar coating occurs due to:

A. Use of low-quality sucrose

B. Absorption of moisture

C. Insufficient drying during coating

D. Excessive polishing wax

Answer: B

17. Cracking of sugar coating is primarily caused by:

A. High moisture content in the coating

B. Low tablet core strength

C. Rapid drying during coating

D. Excessive use of pigment

Answer: C

18. What is bridging in sugar coating?

A. Formation of cracks in the coating

B. Filling of logo or engravings by the coating material

C. Formation of a rough surface on the tablet

D. Overlapping layers of color coating

Answer: B

19. Which factor can minimize weight gain during sugar coating?

A. Using thin layers of coating

B. Increasing the drying time between steps

C. Reducing the subcoating thickness

D. All of the above

Answer: D

20. Modern alternatives to sugar coating include:

A. Film coating

B. Compression coating

C. Enteric coating

D. All of the above

Answer: D

EVALUATION OF TABLETS

1. Which of the following is a physical parameter evaluated in tablet testing?

A. Disintegration time

B. Tablet hardness

C. Drug content uniformity

D. Dissolution profile

Answer: B

2. What is the purpose of the friability test?

A. To measure tablet hardness

B. To determine the ability to withstand mechanical stress

C. To check uniformity of drug content

D. To measure disintegration time

Answer: B

3. What is the acceptable weight loss percentage in the friability test for most tablets?

A. Less than 0.1%

B. Less than 0.5%

C. Less than 1%

D. Less than 2%

Answer: C

4. The disintegration time for uncoated tablets as per pharmacopoeial standards is:

A. 2 minutes

B. 5 minutes

C. 15 minutes

D. 30 minutes

Answer: C

5. Which device is used to evaluate the hardness of tablets?

A. Friabilator

B. Dissolution tester

C. Monsanto hardness tester

D. Disintegration apparatus

Answer: C

6. What is the ideal range of hardness for most tablets?

A. 1–2 kg/cm²

B. 3–5 kg/cm²

C. 5–10 kg/cm²

D. 10–15 kg/cm²

Answer: B

7. The uniformity of weight test ensures that:

A. All tablets have the same disintegration time

B. All tablets are mechanically stable

C. Each tablet has consistent weight within limits

D. Drug release profile is similar across tablets

Answer: C

8. Content uniformity test is performed to ensure:

A. Equal weight of tablets

B. Even distribution of active ingredient

C. Proper mechanical strength

D. Rapid disintegration

Answer: B

9. Dissolution testing is performed to measure:

A. Tablet disintegration

B. Rate of drug release in solution

C. Tablet hardness

D. Mechanical integrity of tablets

Answer: B

10. The apparatus used for dissolution testing includes:

A. USP Apparatus 1 and 2

B. Friabilator

C. Monsanto hardness tester

D. Disintegration apparatus

Answer: A

11. Which dissolution testing apparatus uses a paddle?

A. USP Apparatus 1

B. USP Apparatus 2

C. USP Apparatus 3

D. USP Apparatus 4

Answer: B

12. What is the purpose of the disintegration test?

A. To check drug release profile

B. To evaluate the time taken for tablets to break into smaller fragments

C. To determine the tablet weight variation

D. To measure friability

Answer: B

13. What is the main reason for performing thickness measurements of tablets?

A. To ensure uniformity of drug content

B. To maintain tablet batch consistency

C. To evaluate dissolution rate

D. To measure mechanical strength

Answer: B

14. Which factor can significantly affect tablet dissolution?

A. Tablet hardness

B. Surface area

C. Composition of excipients

D. All of the above

Answer: D

15. What is the typical friabilator rotation speed for testing?

A. 50 rpm

B. 75 rpm

C. 100 rpm

D. 120 rpm

Answer: A

16. The ideal disintegration time for sublingual tablets is:

A. 2 minutes

B. 5 minutes

C. 10 minutes

D. 15 minutes

Answer: A

17. What is the acceptable percentage deviation for weight variation in tablets weighing 250 mg or more?

A. ±5%

B. ±7.5%

C. ±10%

D. ±15%

Answer: A

18. The standard medium used in dissolution testing is:

A. Water

B. Simulated gastric fluid (SGF)

C. Simulated intestinal fluid (SIF)

D. Both B and C

Answer: D

19. What is the function of the USP dissolution basket?

A. To hold the tablet during testing

B. To measure tablet hardness

C. To facilitate even stirring in the medium

D. To evaluate friability

Answer: A

20. Tablet friability test results are expressed in:

A. Kilograms

B. Percentage weight loss

C. Millimeters

D. Minutes

Answer: B