

# SOLID DOSAGE FORM

# Introduction

## POWDER

1. Powders consist of a mixture of finely divided drugs or chemicals in dry form.
2. They can be utilized for both internal and external applications.
3. Crystalline or amorphous forms are available for use.
4. The particle size of a powder is closely related to the dissolution, absorption, and therapeutic effect of the drug.

# Advantages of Powders

1. Powders are generally considered more stable than liquid dosage forms and have a lower risk of incompatibility issues.
2. Compared to other solid dosage forms like tablets and capsules, powdered drugs can have a more rapid onset of action due to their smaller particle size, which allows for faster dissolution in body fluids.
3. Powdered drugs can be administered in larger quantities by dissolving or mixing the powder in a suitable liquid.
4. Powders are also convenient for small children or elderly patients who can easily take the drug as is or dispersed in water or another liquid.
5. In addition to being easy to use, powders are also more economical than other dosage forms because they do not require special machinery or techniques.
6. Finally, powders are portable and easier to carry than liquid dosage forms, making them a convenient option for travel or on-the-go use.

# Disadvantages of Powders

1. Drugs that have a bitter, nauseating, or unpleasant taste cannot be dispensed in powdered form.
2. Deliquescent and hygroscopic drugs are also unsuitable for dispensing in powder form.
3. Drugs that are sensitive to atmospheric conditions are not appropriate for dispensing as powders.
4. The process of dispensing powder can be time-consuming.

# Classification of Powders

1. Bulk powder for internal use.
2. Bulk powder for external use.
3. Simple and compound powder for internal use.
4. Powders enclosed in cachets and capsules.
5. Compressed powders (tablets).

# Bulk Powder for Internal Use

1. Powders may be dispensed in bulk form when accuracy of dosage is not required or is not important.
2. A bulk powder typically contains several doses of the powder and is supplied in wide-mouthed containers that permit easy removal of a spoonful of powder.
3. Non-potent substances that are supplied in bulk include antacids and laxatives, among others.
4. Rhubarb powder is an example of a bulk powder.



# Bulk Powder for External Use

Non-potent bulk powders intended for external use are generally packaged in cardboard, glass, or plastic containers that are specifically designed for the method of application.

Dusting powders are typically supplied in containers with perforated or sifter tops. The following bulk powders are commonly used for external applications: Dusting powders

1. Insufflations
2. Snuffs
3. Dentifrices

# Bulk Powder for External Use

- **Dusting Powders:**

Dusting powders are designed for external application to the skin and should be applied finely to avoid local irritation. For optimal effectiveness, these powders are typically passed through a sieve no. 80 or 120.

There are two types of dusting powders: medical and surgical. Both types are free of pathogenic microorganisms. Prior to use, medical and surgical dusting powders must be sterilized using the dry heat method at 160°C for 2 hours.

Surgical dusting powders are appropriate for use in body cavities, on burn wounds, and on the umbilical cords of infants. In contrast, medical dusting powders are generally used to treat superficial skin conditions.



# Bulk Powder for External Use

- Cont..

Talc, kaolin, and starch are commonly used in the preparation of dusting powders due to their chemical inertness. However, these ingredients are prone to contamination with pathogenic bacteria and must be sterilized using dry heat before use.

Dusting powders are typically packaged in sifter or aerosol containers and are generally considered safe. However, inhalation of the fine powder by infants can cause pulmonary inflammation, so it is essential to handle these powders with care.  
**Use : Antiseptic, Astringent, Absorbent, Antiperspirant**

# Bulk Powder for External Use

Example of Dusting Powder Rx:

- Purified talc, sterilized 50 gm
- Starch powder 25 gm
- Zinc oxide powder 20 gm
- Salicylic acid powder 5 gm

Procedure:

- Weigh all powders accurately and mix them in ascending order of their weight.
- Pass the mixed powder through a sieve no. 85 or 120.
- After sieving, mix the powders lightly and transfer into a sifter top container, protecting it from atmospheric contamination.

Directions:

- Apply on the affected part two or three times a day.

Use:

- Zinc oxide is used for its astringent and antiseptic properties.
- Salicylic acid is used for its antiseptic and fungicidal properties.

# Bulk Powder for External Use

## ● Insufflations:

- 1.The use of medicated dusting powders dates back to ancient times when they were used to treat various ailments.
- 2.Insufflators were traditionally made of glass or metal, but modern insufflators are usually made of plastic.
- 3.Insufflators can be used to deliver medication to the sinuses, which can be a more effective way of treating sinusitis than oral medication.
- 4.The use of insufflators is also common in veterinary medicine, where they are used to deliver medication to animals.



# Bulk Powder for External Use

## ● Snuffs:

1. These medicaments are finely divided into solid dosage forms.
2. They are typically inhaled through the nostrils to achieve antiseptic, bronchodilator, and decongestant effects.
3. Snuffs are commonly packaged in flat metal boxes or glass containers with hinged lids.



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# Bulk Powder for External Use

## ● Dentifrices:

1. Toothpaste is applied to the surface of the teeth using a brush.
2. The composition of toothpaste typically includes a suitable detergent or soap, as well as abrasive substances and flavoring agents.
3. Abrasive agents such as calcium sulfate, calcium carbonate, sodium carbonate, and sodium chloride are used in the form of a fine powder.
4. For instance, toothpaste is a common product that uses these ingredients to promote dental hygiene.

Rx,

Hard soap powder	50 gm	Calcium
carbonate powder	935 gm	Saccharin
sodium	2 gm	Peppermint
oil	4 ml	
Cinnamon oil	2 ml	
Methyl salicylate	8 ml	



## Simple & Compound Powders for Internal Use

1. This type of powder is packaged in individual doses enclosed in paper.
2. There are two types of powders: simple powders containing a single ingredient and compound powders containing more than one ingredient.
3. Each individual ingredient in the powder should have a minimum quantity of 100 mg to allow for convenient handling by the patient and accurate weighing.

# Simple & Compound Powders for Internal Use

## SIMPLE POWDER:

- 1.- A simple powder typically contains only one ingredient, either in crystalline or amorphous form.
- 2.If the powder is in crystalline form, it is first reduced to a fine powder. The powder is then weighed and divided into a specific number of doses, which are wrapped as individual doses.
- 3.For example, six powders of aspirin may be dispensed, with each powder containing 300 mg of aspirin.

- Rx,

Aspirin 300 mg

**Procedure:** To prepare the aspirin powder, first grind the aspirin and then measure out 300 mg of the powder for each dose, wrapping each dose in individual paper packets. The recommended dosage is one powder to be taken every eight hours.

**Direction:** One powder to be taken after every eight hours.

# Simple & Compound Powders for Internal Use

## ● COMPOUND POWDERS:

1. Compound powders consist of two or more substances that are mixed together.
2. The mixture is then divided into the desired number of individual doses.
3. Each dose is dispensed into a separate powder paper.
4. For example, eight powders of A.P.C can be dispensed, with each powder containing 500mg of A.P.C.

### - Rx,

Aspirin	300 mg
Paracetamol	150 mg
Caffeine	50 mg

**Procedure:** To prepare the doses, accurately weigh each powder and mix them in ascending order of their weight, then measure out 500 mg of the mixed powder for each dose and wrap it individually in powder paper.

# Powders enclosed in cachets & capsules

1. Cachets, also known as wafer capsules, are a type of solid dosage form for drugs.
2. They are molded from rice flour.
3. Rice paper is made by mixing rice flour with water and enclosing it between two hot, polished cylinders.
4. The water is then evaporated, and a wafer is formed.
5. Cachets typically enclose 0.2 to 1.5 grams of nauseous or disagreeable drugs in powder form.

# Powders enclosed in cachets & capsules

1. Cachets are a type of solid dosage form that can be quite hard.
2. Before swallowing, they are typically dipped in water for a few seconds to soften them.
3. Once softened, they are placed on the tongue and swallowed with a draught of water.
4. After swallowing, the cachets disintegrate and release the drug.

## ● ADVANTAGES OF CACHETS:

- Made easily.
- Disintegrate quickly in stomach
- Drug can be easily dispensed
- Large dose of drug can be swallowed by using cachets.



# Powders enclosed in cachets & capsules

## ● DISADVANTAGES OF CACHETS:

1. Before use or swallowing, these need to be softened.
2. They are easily damaged and cannot protect the enclosed drug from light and moisture.
3. The shells of cachets are fragile, so the drug contents cannot be compressed.
4. They are not suitable for filling drugs on a large scale.
5. Compared to tablets and capsules, they require more space as a solid dosage form.

# Powders enclosed in cachets & capsules

- Cachets are two types:

- Wet seal cachets
- Dry seal cachets

- **WET SEAL CACHETS:**

1. A wet seal cachet is composed of two identical, convex halves that have flat edges.
2. The measured amount of powdered drug is placed in one half of the cachet, while the edges of the other half are moistened with water.
3. The second half of the cachet is then placed directly over the first half, which contains the drug.
4. The flat edges of both halves are then pressed together to create a perfect seal.

# Powders enclosed in cachets & capsules



1) Wet Seal



2) Dry Seal  
(without dome)



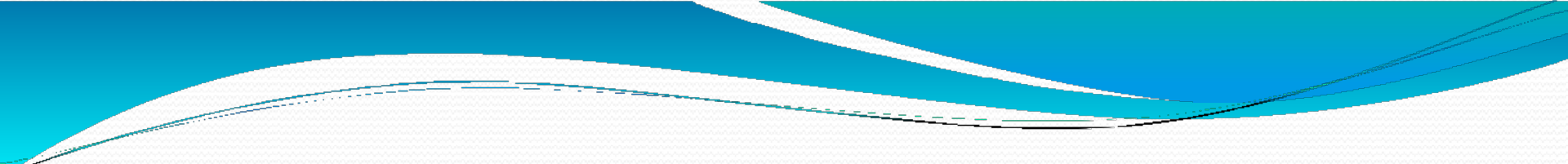
3) Dry Seal  
(with dome)

# Powders enclosed in cachets & capsules

## ● DRY SEAL CACHETS:

1. Dry seal cachets are made up of two halves, an upper half and a lower half.
2. The diameter of the upper half is slightly larger than that of the lower half.
3. The powdered drug is filled in the lower half and the upper half is then fitted over it.
4. The filled cachets are sealed in a machine by pressing the two halves together, then removed and packed into boxes.

- B.P.C includes two cachets sodium aminosalicylate & sodium aminosalicylate with isoniazid.



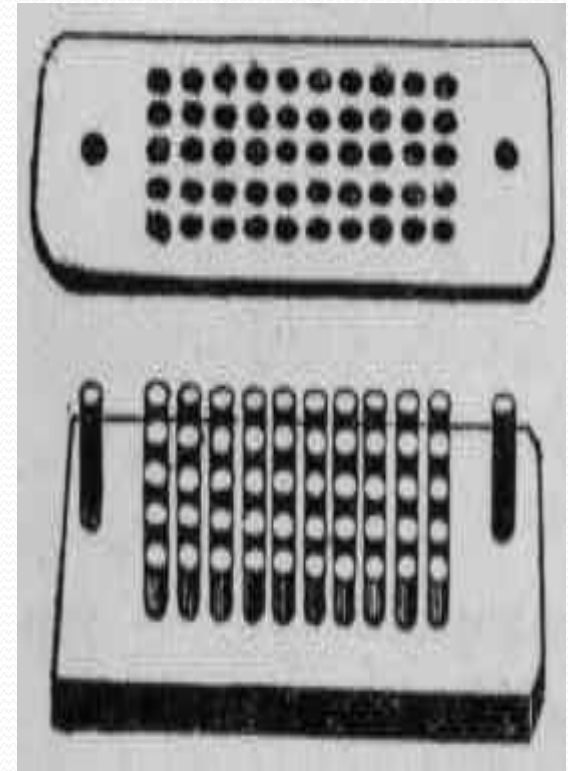
## Compressed powders (Tablets) or Tablet Triturates or Moulded Tablets

1. Powders are molded into tablets.
2. These flat, circular discs usually contain potent drugs.
3. The potent drugs are mixed with lactose, dextrose, or other diluents.
4. The apparatus used to make the tablets is made of stainless steel or plastic and consists of upper and lower perforated plates with the same number of halves.
5. The lower plate also has two large pegs to ensure correct fitting of the plates.
6. Tablet triturates are available in several sizes with a capacity ranging from 30 to 250 mg.
7. Generally, 50 to 250 tablet triturates can be prepared at a time using a tablet triturate mold.



## Compressed powders (Tablets) or Tablet Triturates or Moulded Tablets

- 1.The powder and diluents are mixed together and made into a stiff paste using 60% alcohol.
- 2.The paste is then introduced onto the upper plate with a spatula, filling all the holes and removing excess.
- 3.The upper plate is then placed over the lower plate.
- 4.A little pressure is applied over the top plate, which forces the plate to move downward, leaving the molded tablet on the projected pegs.
- 5.Finally, the prepared tablets are dried either in a hot air oven or by keeping them in a warm place.



# Dispensing of Powders Involving Special Problems

## ● Volatile Substances:

1. Certain vegetable powders contain volatile oils.
2. To prevent the loss of volatile oils, these vegetable drugs should be lightly powdered in a mortar.
3. Menthol, camphor, and essential oils can also be incorporated into powder form.
4. The final product is typically packaged with double wrapping.

# Dispensing of Powders Involving Special Problems

## ● Hygroscopic & deliquescent powders:

1. Powders that absorb moisture from the atmosphere are called hygroscopic powders.
2. Powders that absorb moisture and convert it into a solution are called deliquescent powders.
3. Examples of deliquescent powders include ammonium chloride, ammonium citrate, pepsin, phenobarbitone, and sodium iodide.
4. These substances are typically provided in granular form to reduce their surface area and prevent conversion into fine powder.
5. To maintain their effectiveness, these powders should be double wrapped to protect them from exposure to air and moisture.

# Dispensing of Powders Involving Special Problems

## ● Efflorescent powders:

1. Some crystalline substances may release water of crystallization partially or entirely when exposed to humid air.
2. Examples of such substances include citric acid, caffeine, and ferrous sulfate.
3. This issue can be addressed by mixing the substance with an inert material or by using an anhydrous salt.

# Dispensing of Powders Involving Special Problems

- Eutectic mixture:

- Liquids:

1. Some prescriptions incorporate both liquid and powdered medications.

1. When the liquid quantity is small, it may be mixed with an equal amount of powder, and then the remaining ingredients are added in small proportions while continuously stirring.



# Dispensing of Powders Involving Special Problems

## ● Potent drugs:

1. In some prescriptions, liquid medications are combined with powders.
2. Substances with a maximum dose of less than 60 mg and poisonous substances are considered potent drugs.
3. Potent drugs can be difficult to weigh accurately using a dispensing balance.
4. To make weighing easier, potent drugs are often combined with diluents like lactose before being weighed.
5. For example, the following powder may be dispensed in 5 packets.

- Rx,

Codeine phosphate	10 mg
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In certain prescriptions, liquid medications are combined with powders, requiring the mixing of 100 mg of codeine phosphate and 900 mg of lactose in ascending order using a spatula; 100 mg of each powder, containing 10 mg of codeine phosphate, is then weighed out from 1 gm of triturate and packed into powder paper.

# Dispensing of Powders Involving Special Problems

## ● Granular powders:

1. In some prescriptions, liquid medications are combined with powders.
2. Some solid medications need to be administered orally in large doses, but cannot be converted into tablets or capsules because too many would be needed for a single dose.
3. However, these medications can be difficult to dispense in powder form due to their bitter, nauseous, or unpleasant taste.
4. In such cases, the solid medication is mixed with sweetening, flavoring, and coloring agents, as well as a suitable granulating agent, to create a moistened powder that can be formed into a coherent mass.
5. The mass is then passed through a sieve to create granules, which are dried in a hot air oven at 60°C before being passed through another sieve and packed into wide-mouth containers.
6. For example, antibiotics like erythromycin and ampicillin are now available in granular powder form because they are unstable in liquid form.



- **Effervescent granules:**

1. Granular medicaments of this type are intended for internal use.

2. These granules are typically composed of medicaments mixed with citric acid, tartaric acid, sodium bicarbonate, and sweetening agents.

3. When in contact with water, the granules release carbon dioxide, which helps to mask the bitter and saline taste of the drug.

4. Additionally, the release of carbon dioxide stimulates the flow of gastric juice and facilitates the absorption of the medicament.

## OF PREPARATION OF EFFERVESCENT

- METHODS

GRANULES:

- Heat Method

- Wet Method

## Heat Method:

- To prepare the powder, it is necessary to first heat the porcelain dish on a water bath before transferring the powder.
- 1.The medicament is transferred along with citric acid and other ingredients.
  - 2.During this stage, the citric acid liberates the water and produces a damp mass.
  - 3.The damp mass is then heated for 1 to 5 minutes.
  - 4.Next, the damp mass is passed through a sieve and dried in a hot air oven at 60°C.
  - 5.Finally, the dried medicament is packed into an air-tight container.

# Wet Method

1. In this method, the ingredients are mixed with alcohol to produce a coherent mass.
2. The produced mass is passed through a sieve, typically number 10 or 8, and dried in a hot air oven at 60°C.
3. The dried granules are then passed through a sieve once again to break up any lumps that may have formed during drying.
4. Finally, the prepared granules are packed in air-tight containers to maintain their quality and stability.



# MIXING OF POWDERS

- Spatulation
- Trituration
- Geometric dilution
- Sifting
- Tumbling

## Cont..

- 1.Spatulation is the process of mixing powders using a spatula on a paper or sheet.
- 2.Trituration is a process used to reduce the size of powders and to mix them together.
- 3.Geometric dilution is a technique used for potent drugs to ensure that the active ingredient is evenly distributed throughout the mixture.
- 4.Sifting involves mixing powders by passing them through sifters to ensure a consistent particle size and eliminate any clumps.
- 5.Tumbling is the process of mixing powders in a large container that is rotated by an electric motor. This type of blender is widely used in industry for large volume powder mixing.

# Packing of Powder

- **Double wrapping:**

1. When wrapping powders, two different types of paper are typically used.

2. The outer paper is plain, while the inner wrapping is made of gelatin paper.



# Reference

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