

B. TRITURATION:

It is used for both reduce particle size and mix powders. If the particle size reduction is desired along with mixing of powders, a porcelain mortar with a rough inner surface is preferred to glass mortar with a smooth working surface.





C. GEOMETRIC DILUTION

The method is used when potent substances are too mixed with a large amount of diluents. The potent drug is placed upon an approximately equal volume of the dilute in a mortar and the substances are slightly mixed by trituration.

A second portion of diluents equal in volume to the powder mixture in the mortar is added and trituration is repeated. The process is continued adding diluents equal in volume to the mixture in the mortar at each step until all the diluents is incorporated.



For example,

if 100mg of potent drug is required to be mixed with 900mg of lactose then according to geometric dilution, the following procedure should be followed:-

100mg of potent drug + 100mg of lactose = 200mg of mixture,

200mg of the mixture + 200 mg of lactose = 400 mg of mixture

400mg of the mixture + 400mg of lactose = 800mg of mixture

800mg of the mixture + remaining portion = 1000mg of mixture of lactose

D. SIFTING:

The powders are mixed by passing through sifters. This process results in a light fluffy product and is generally not acceptable for incorporation of potent drugs into a diluent base.





E. TUMBLING:

Is the process of mixing powders in a large container rotated by an electric motor. These blenders are widely employed in industry as large volume powder mixers



Step (3) Packaging of powders

Bulk powders for external use are often dispensed in a shaker top container to facilitate topical application. They may also be dispensed in a wide mouth jar or a plastic container with flip-top lid. The jar or plastic container can be closed tightly to provide increased stability and protection from light and moisture, especially for compounds that contain volatile ingredients. Package should contain label as “For external use only”



Double- Wrapping:

Double-wrapping is essential for volatile or hygroscopic drugs like Menthol, thymal, citric acid, Pepsin etc. Double wrapping is also must for drugs those are sensitive to the atmospheric conditions For this purpose a wax paper is cut slightly smaller than the demy paper each way and fold both paper at once similar to the single wrapping method Labelling: Patient should be instructed that individual powder should be dispersed in a little water or placed on the back of the tongue before swallowing.



Dispensing of powders involving special problems

Dispensing of powders involving special problems/problems encountered in powder formulation A number of problems arise while dispensing a powder containing volatile substances, hygroscopic and deliquescent powders, eutectic mixtures, efflorescent powders, liquids, explosive substance and potent drugs. So special consideration are done while dispensing such powders. Volatile substances Certain vegetable powders contain volatile oils. To prevent the loss of volatile oils, these vegetable drugs must be powdered lightly in a mortar.



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Similarly the volatilization of substances like menthol, camphor and essential oils may take place on incorporation in powders. This is prevented or at least minimized by the use of double wrapping. The inner wrapper should be of wax paper and outer wrapper may be of any thick paper.



Hygroscopic powders and deliquescent powder

The powders which absorb moisture from the atmosphere are called hygroscopic powders. But certain powders absorb moisture to such a great extent that they go into solution and are called deliquescent powders. Examples of such substances include ammonium citrate, pepsin, phenobarbitone, sodium bromide, sodium iodide, potassium citrate, zinc chloride etc. Such substances are usually supplied in granular form in order to expose less surface area to the atmosphere.



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These powders should not be finely powdered. Such powders should be double wrapped. In humid weather or when dealing with very deliquescent substances, for there wrapping in aluminium foil or plastic cover is advisable.

Efflorescent powders

Some crystalline substances liberate water of crystallization wholly or partly on exposure to humid atmosphere or during trituration and thus become wet or liquefy. Example of such substances include caffeine, citric acid, ferrous sulphate etc. the difficulty may be overcome by using corresponding anhydrous salt or an inert substance may be mixed with efflorescent substance before incorporating with other ingredients. Problems pertaining to efflorescent powder include: water liberated when the drug or chemical is triturated may cause the powders to become damp or pasty.



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If water is released to the atmosphere because of low relative humidity, the drug loses its crystallinity and becomes powdery. Water of hydration is given off; a given weight of the resulting powder no longer contains the same amount of the drug. Hence strategies for handling efflorescent powders includes: storage and dispense of these powders in airtight containers. The anhydrous form of the drug may be substituted for the hydrate, but be sure to make appropriate dose corrections..

Eutectic mixtures:

When two or more substances are mixed together they liquefy due to formation of new compound which has lower melting than room temperature, these substances are called eutectic mixture. Ex: methol, thymol, camphor, phenol, etc.

Dispense by two methods:

- Dispense as separate set of powders with directions that one of each kind shall be taken as a dose.
- An equal amount of any of inert absorbent like magnesium carbonate, light magnesium oxide kaolin starch may be mixed with eutectic substance then blended together lightly with a spatula on a sheet of paper.



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When in addition to liquefying substances, other ingredients also present, the liquefiable substances should first be triturated together to form the eutectic mixture. Then the remaining ingredients of the prescription are incorporated and mixed together.



Effervescent Powders or Granules

Effervescent granules are the specially prepared solid dosage form of medicament meant for internal use.

They contain the medicament mixed with citric acid, tartaric acid and sodium bicarbonate.

Before administering the required quantity is dissolved in water, the acid and the bicarbonate reacts together producing effervescence.

The carbon dioxide stimulates the flow of gastric juices and helps in absorption of medicament.

PREPARATION

Effervescent granules are prepared by two general methods.

1. The dry or fusion method
2. The wet method

WET METHOD

- ⦿ The source of binding agent is not water of crystallization from the citric acid but the water added to the mass of powder as moistening agent.
- ⦿ In this method all of powder may be anhydrous as long as water is added to the moistening agent.
- ⦿ Just enough liquid is added to prepare a mass of proper consistency then the granules are prepared and dried.

Heat or fusion method

- In fusion method the one molecule of water present in each molecule of citric acid acts as the binding agent for the powder mixture. Before mixing the powder the citric acid crystals are powdered and then mixed with other powders of the same size to ensure uniformity of the mixture.
- After mixing the powder is placed in an oven at 34–40°C.



- ⦿ Heating causes the release of water crystallization from the citric acid causing softening of powder, when it reached the proper consistency it is removed from the oven and rubbed through a sieve produced large granules.
- ⦿ Sieve 4 produce large granules, sieve 8 produce medium size granules and sieve 10 produce small granules
- ⦿ Dry at 54⁰c and transferred into Air tight container.

Dusting powders

- These are meant for external application on to the skin and are applied in a very fine state of sub division to avoid local irritation.
- Medical – for superficial skin infections
- Surgical – Body cavities and on wounds.
- The major ingredients include:
 - Talc, starch and Kaolin
 - Antiseptic, Astringent, Absorbent, Antiperspirant and Antipruritics.
- Dispensed in sifter top container or aerosol container



- **Medical dusting** powders are mainly used for superficial skin condition .
- **Surgical dusting** powders are used in body cavities or wound or umbilical cords of infants . It must be sterilized before used.(Hot air oven, at 160° C for 2 hrs)
- Dusting powders are generally prepared by mixing two or more ingredients (Talc/ Kaolin).
- DUSTING POWDERS contains antiseptic , astringent , antiperspirant ,antipruritic.
- These may also applied with powder puff or sterilized gauze pad.

Example of Dusting powder

Rx

1. Purified talc, sterilized -50.0 g
2. Starch, in powder -25.0 g
3. Zinc oxide, in powder -20.0 g
4. Salicylic acid, in powder- 5.0 g

Direction: Applied on the affected part two or three times a day.

