PHARMACEUTICAL POWDERS

- Historically, powders represent one of the' oldest dosage forms.
- A pharmaceutical powder is solid dosage form which contains mixture of finely divided drugs or chemicals in a dry form meant for internal or external use.
- It is a preparation in which drug is blended with other powdered substances and used for internal or external purpose.
- Powder as a dosage form permits drugs to be reduced to a very fine state of division, which often enhances their therapeutic activity or efficacy by an increase of dissolution rate and/or absorption.
- Divided powders are also found to be convenient for administering drugs that are excessively bitter, nauseous, or otherwise offensive to the taste.
- Although powders are not used now-a-day's extensively as a dosage form, they are widely used in preparation of various dosage forms
- Powdered drugs can be blended with . other powdered materials (additives) prior to fabrication into other solid dosage forms such as tablet and capsule
- Powdered drugs are frequently added to other ingredient to make ointments, pastes, suppositories, and others
- Powder properties relevant to pharmaceutical formulations are single particle (fundamental) properties and bulk (derived) properties
- Collectively these includes particle-particle interactions, powder morphology (particle size, specific surface area, porosity, and particle shape), and mixing and blending properties (types of mechanism of mixing. types' mixing equipment, and minimizing segregation tendencies)
- It is also important for preparing powder formulation to understand hoppers and powder transfer method, mechanisms of particle size reduction, and various types of mills used.

- Powders are subdivided solids which are classified in the BP according to the size of their constituent particles ranged from 1.25 mm to 1.7 mm in diameter.
- A good powder formulation has a uniform particle size distribution. If the particle size distribution is not uniform, the powder can segregate as per to particle size which may result in inaccurate dosing or inconsistent performance.
- A uniform particle size distribution ensures a uniform dissolution rate if the powder is to dissolve, a uniform sedimentation rate if the powder is used to remain in a suspension, and minimizes stratification when powders are stored or transported.
- Reduction in particle size of a powder results in-a uniform distribution of particle size‘
- The process of reducing the particle size is called comminution.
- In extemporaneous compounding, there are three methods of comminution:

Trituration:- Trituration is the continuous rubbing or grinding of the powder in a mortar with a pestle. This method is used when working with hard, fracturable powders.
Pulverization by intervention:- Pulverization by intervention method is used with hard crystalline powders that do not crush or triturate easily, or gummy-type substances.
The first step is to use an "intervening" solvent (such as alcohol or acetone) that will dissolve the compound.
The dissolved powder is then mixed in a mortar or spread on an ointment slab to enhance the evaporation of the solvent. As the solvent evaporates, the powder will recrystallize out of solution as fine particles.
Levigation:- Levigation reduces the particle size by triturating it in a mortar or spatulating it on an ointment slab or pad with a small amount of a liquid in which the solid is not soluble.
The solvent should be somewhat viscous such as mineral oil or glycerin.
This method is also used to reduce the particle size of insoluble materials when compounding ointments and suspensions.

Advantages:-

(i) Drugs that have to be given in bulk can be best administered in powder form by mixing them with food or drinks.
(ii) Useful for bulky drugs with large dose.
(iii) Powders are more stable than liquid dosage form; hence many antibiotics and injections are manufactured as powder for reconstitution in respective vehicle.
(iv) More convenient to swallow than tablet or capsules.
(v) Powder possesses good chemical stability.
(vi) Since powders are in the form of small particles; they offer a large surface area and are rapidly dissolved in the gastrointestinal tract minimizing the problems of local irritation.
(vii) Rapid dissolution powder facilitates rapid absorption.
(viii) Highly compatible compared to liquid dosage tom.

(ix) Manufacturing of powder is economic hence product coat is quite low as compared to other dosage forms.

Disadvantages:-

(i) Bulk powders are not suitable for administering potent drug with low dose.
(ii) Not suitable for drugs which are unstable in normal atmospheric condition
(iii) Powder form is not suitable for drugs that are inactivated in. or cause damage to stomach: these should he presented as enteric-coated tablets.
(iv) Not suitable for bitter. nauseating and corrosive drugs,
if are meant tor oral administration.
(V) The masking unpleasant tastes may be a problem with this type of preparation a method of attempting this is by formulating the powder‘ into a pleasantly tasting or taste- masked effervescent product. whereas tablets and capsules are a more common alternative for low-dose products
(vi) inaccuracy of dose in case of bulk powder.
(vii) inconvenient to carry.
(viii) They are susceptible to physical instability

1.Powders for internal use
(a) Divided powders
(i) Simple powders
(ii) Compound powders
(iii) Powders enclosed in cachet
(iv) Tablet triturates
(b) Bulk powders
(i) Antacid
(ii) Laxative
2. Powders for external use
(a) Dusting powders
(i) Medicated dusting powders
(ii) Surgical dusting powders
(b) insufflations
(c) Douche powder
(d) Dentifrices
3. Special powders
(a) Eutectic mixtures
(b) Effervescent powders