Dry Granulation

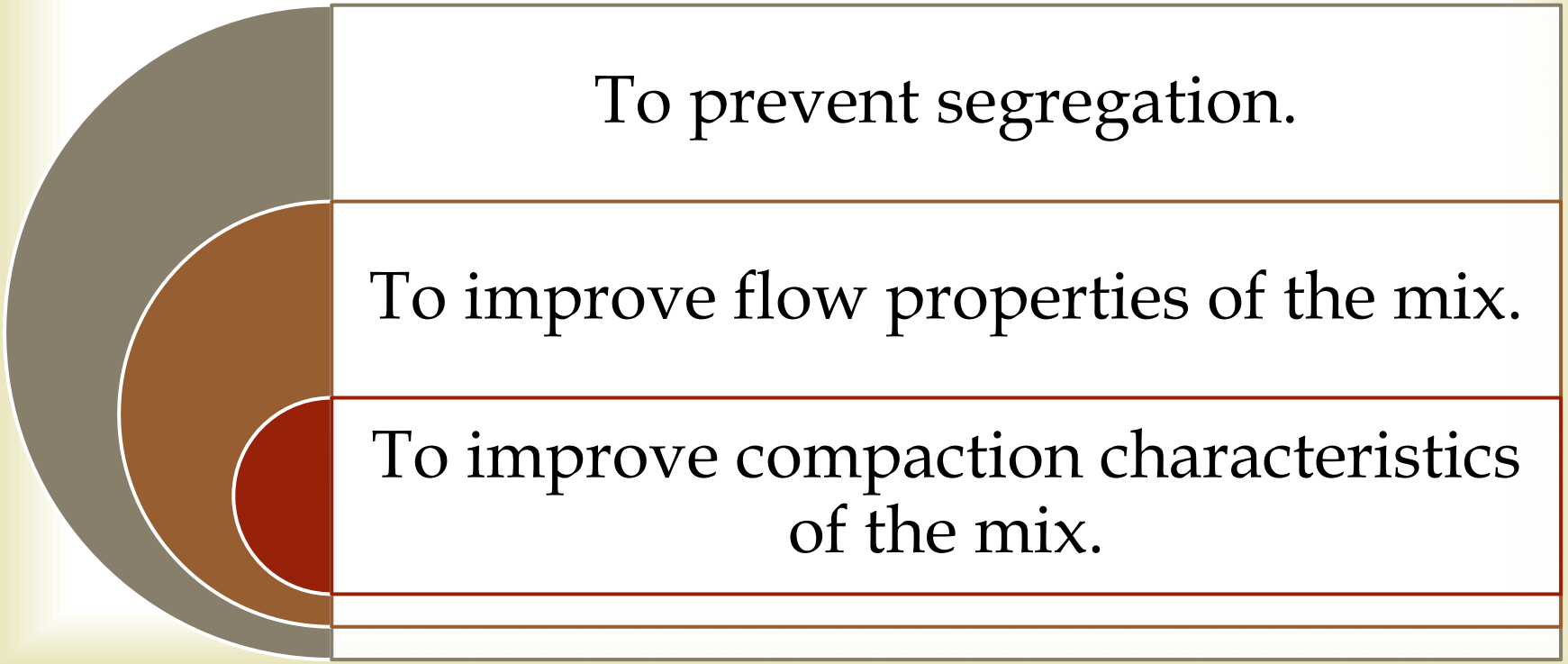
Lab 3

Industrial pharmacy

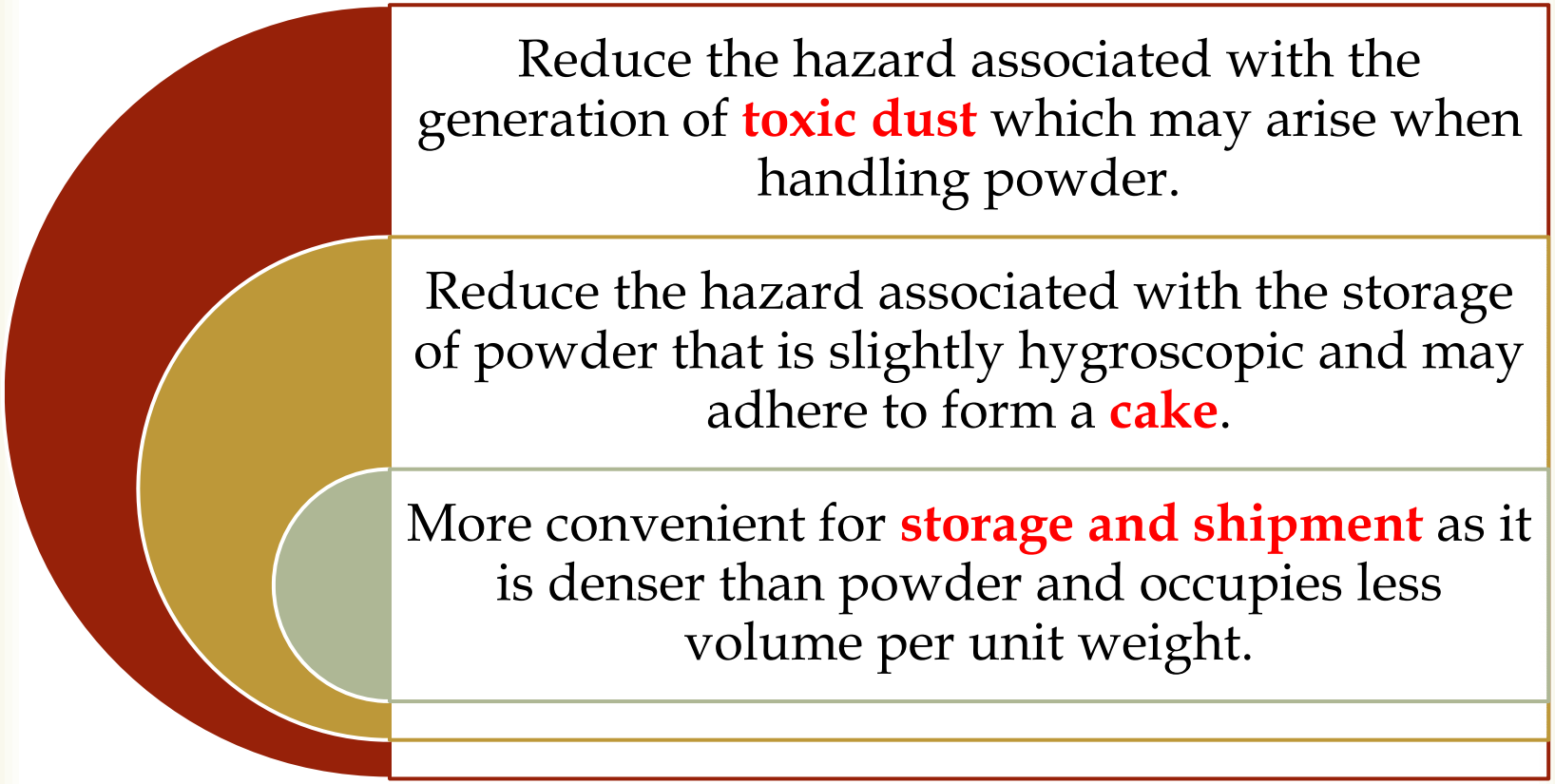
Dry granulation

Granulation is the process in which the primary powder particles are made to adhere to form large multi –entities called granules.

Primary reasons for granulation:



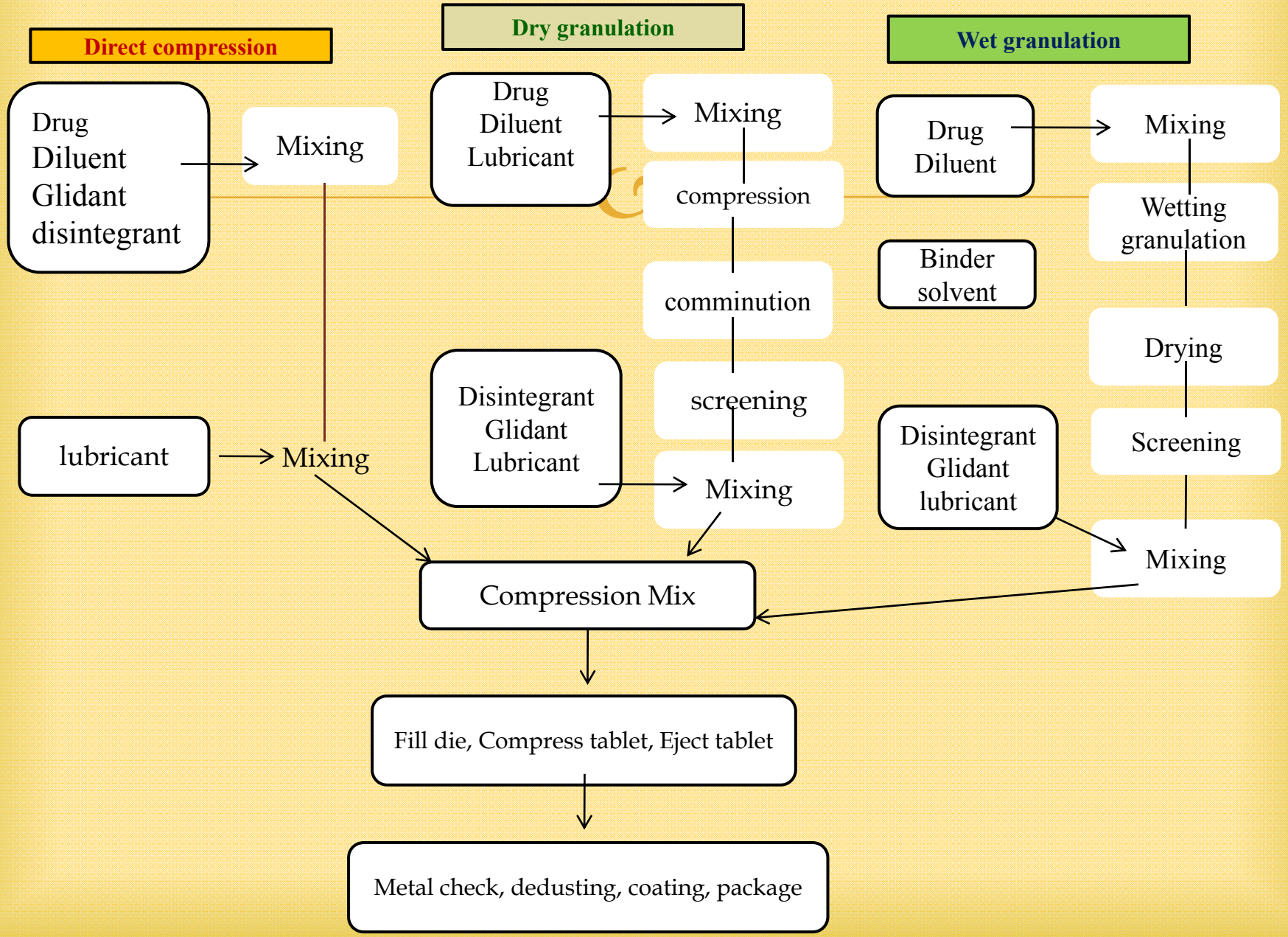
Secondary reasons for granulation



- **Dry granulation** → preparation of granules by dry compression [compaction] **(powder particles aggregate at high pressure)** Then → milling to random size Then → in dry granulator or homogenizer To → get certain size.

- **Wet granulation** → granules are formed by addition of binder solution and sieving.

Unit operations in tablet manufacturing



Methods of dry granulation

A. Slugging technique (double compression)

B. Roller compaction technique

A- Slugging technique:

Slug: large flat tablet (large compact) or pellets contains half amount of lubricant, but its not actually tablet because it doesn't obey the method of evaluation or assay of the tab.

1. Prepare the formula
2. Milling
3. Weigh all the substances and ½ amount of lubricant. (Because it is needed during slugging by tablet machine to eject the slug from die).
4. Mix well by mixer and compress into large tab. (slug) using large punch and die (diameter ¾ to 1.25 inch).
5. Grinding slug by dry granulator or homogenizer to convert slug to granules.

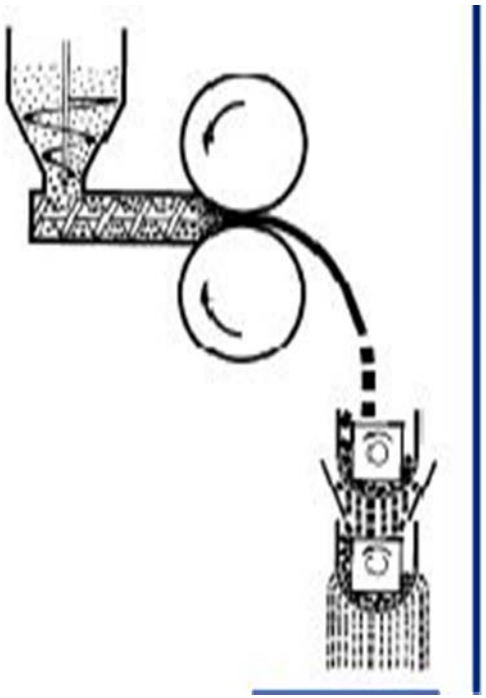
6. Weigh granules and divide by weight of single tablet to get real no. of tablets

(Real no. of tablets =total weight of granules/wt. single tab.)

7. Second compression after addition of calculated amount of lubricant, mix and compress by normal machine.

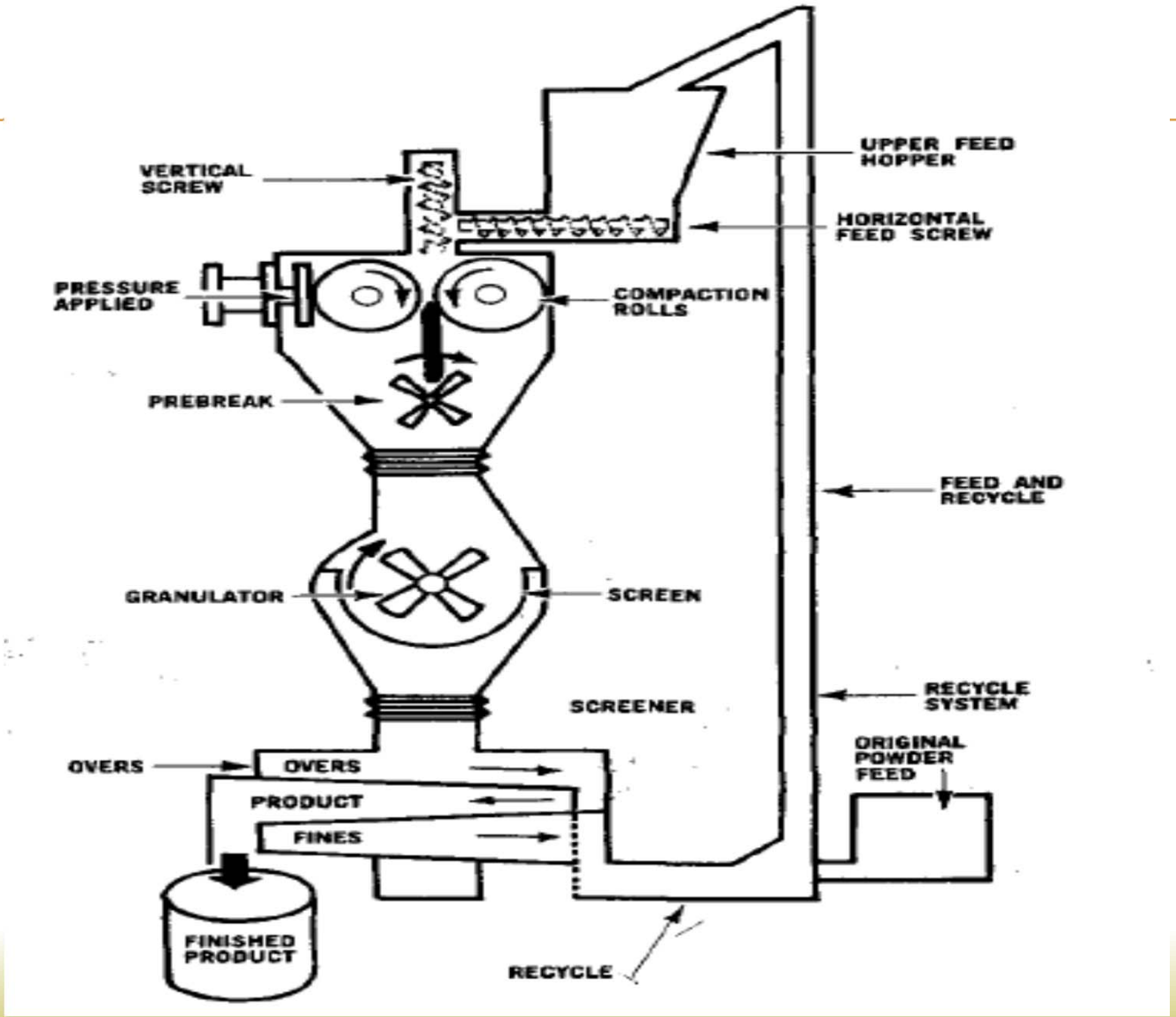
Question ; why we calculate the real no. of tablets?

Rollers or chilsonator roller compactor



Two rolls rotate against each other, to increase the density of powder by pressing it between the rollers and get a thin wide sheet or ribbon equivalent to the slug produced by slugging, then these ribbons or aggregates are screened to produce uniform granules.

Roller compactor



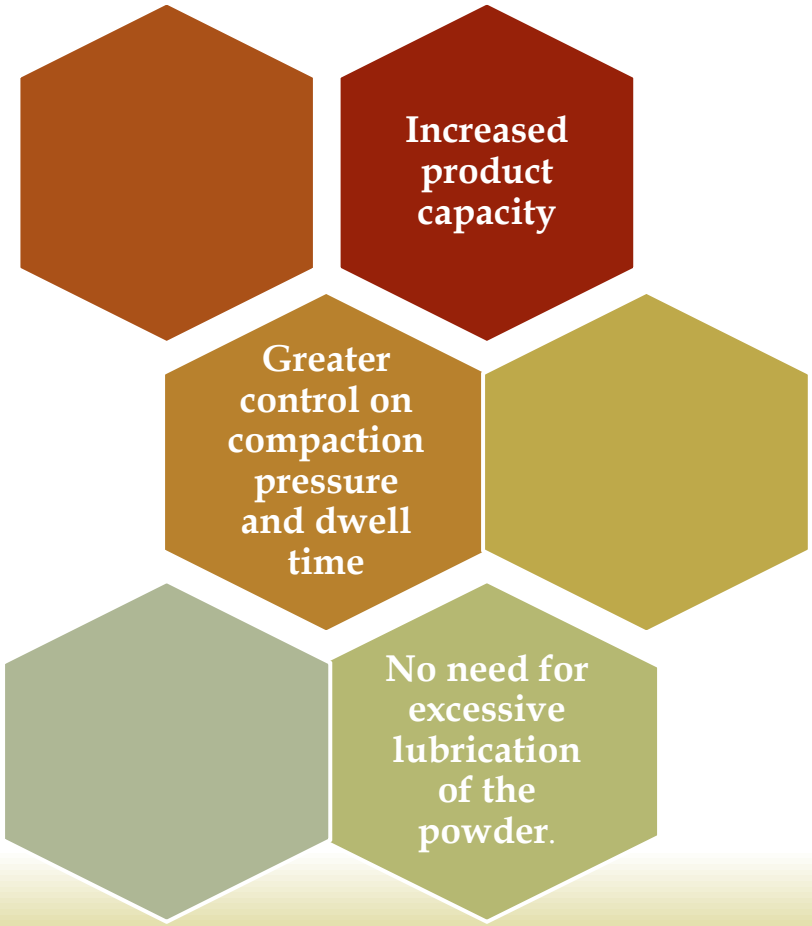
Advantages of dry granulation

- More economic, less space, less equipment than wet granulation.
- No need for drying so it is not time consuming.
- Used for moisture sensitive materials.
- The disintegration time is improved because the binder used in powder form, so the adhesive effect is less so fast disintegration.
- No migration of colors (mottling) that may occur in wet granulation because of presence of moisture.

Disadvantages of dry granulation

- Slugging required specialized heavy duty machine
- Produces more dust which may cause contamination of the product.
- Decreases the dissolution of insoluble drugs.
- Generation of charges of static electricity that affect the flowability

Advantage of roller compactor over slugging



Preparation of sodium phenobarbital tab. by using dry granulation

- **Organoleptic properties** (crystalline powder)
- **Solubility**(freely soluble in water 1:3)
- **Stability** (phenobarbitone is not affected by heat or moisture, but sod. Phenobarbital decompose by heat and moisture so it's hygroscopic by absorbing CO_2 from atmosphere to convert to phenobarbitone).

H.W.

- **Sod. Phenobarbital can not be prepared by wet method while phenobarbitone can be prepared by wet method . Why?**

- **Both of them can not be prepared by direct compression . Why?**

Formula

Sod. Phenobarbitone	15 mg	(active ingredient)
Lactose	4 mg	(diluent)
Emcompress	20 mg	(diluent)
Starch	20 mg	(disintegrant)
Acacia	10 mg	(binder)
Sod. Stearate	5 mg	(lubricant)

H.W.

- Lactose and emcompress **(dicalcium phosphate)** both are used as diluents in this formula. What are the benefits of adding both diluents in this formula?

- Two tablets, one prepared by dry granulation and the other is prepared by wet granulation.

Which one do you expect to have faster disintegration?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