Industrial Pharmacy II
5th Stage
College of Pharmacy



Lab 3:
Dry Granulation Method

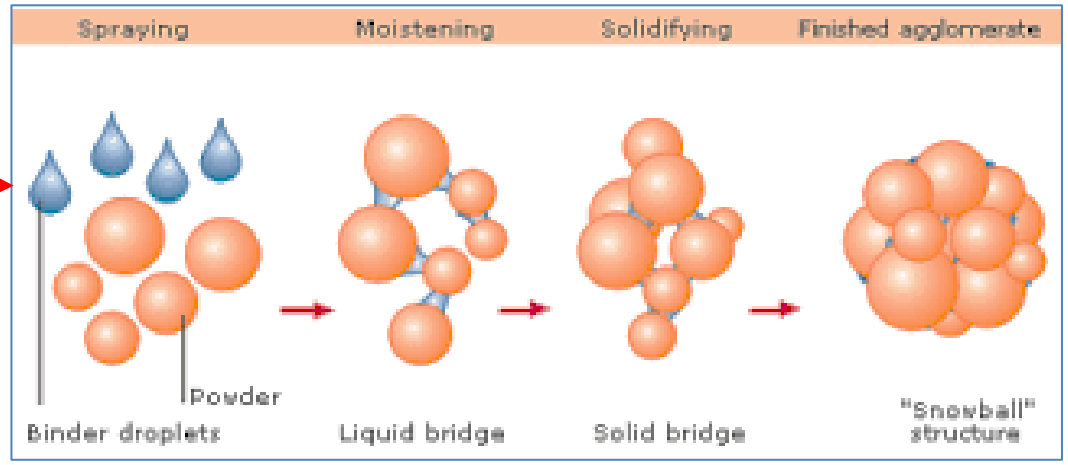
2025 -2026

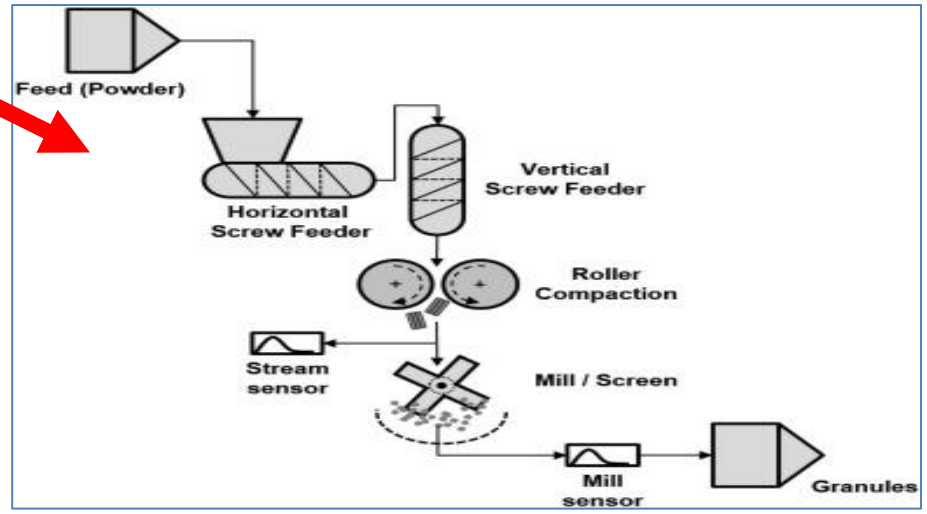
By : Dr. Mahmood Raad Atta
Msc in Pharmaceutics

Semester: 1st

Methods used in Manufacturing Tablets

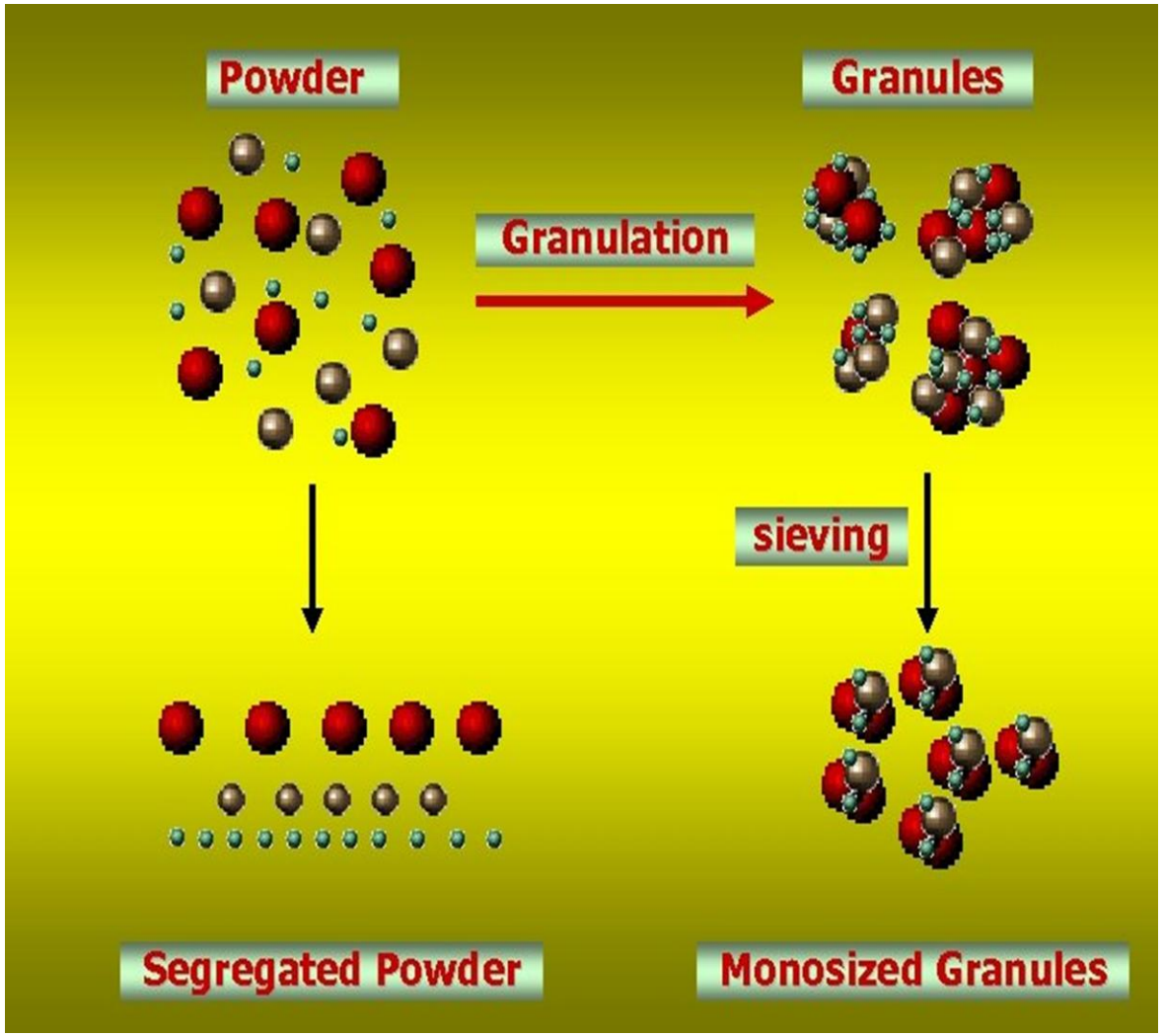
- Wet granulation
- Dry granulation
- Direct compression





Granulation: is a process where the primary powder particles are made to adhere to form large multi-particle entities

- Granulation is a process of forming sphere-like or regular-shaped aggregates called granules
- **Primary reasons for granulation:**
  I. To improve flow properties of the mix.
  II. Increase bulk density
  III. Improve mixing homogeneity and prevent segregation.
  IV. To improve compaction characteristics of the mix.



Dry Granulation

- It is the process of powder granulation by compression without using heat or solvent.
- This method can be used when the drug cannot be compressed directly and at the same time it is heat and/or moisture sensitive (cannot be prepared by direct compression or wet granulation).

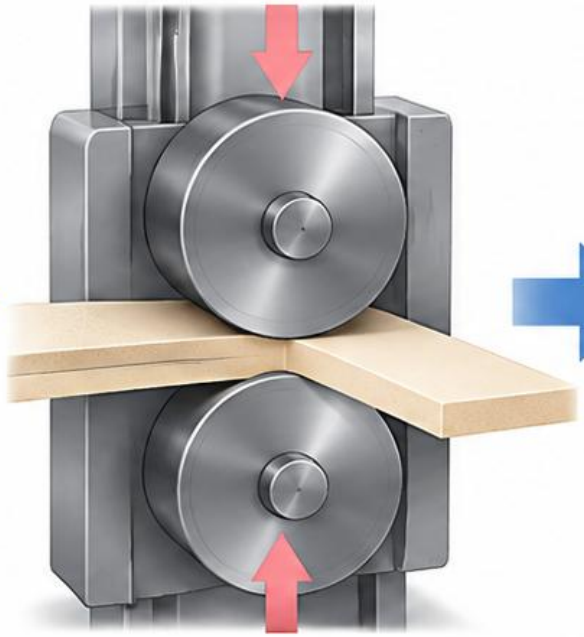
Principle of Dry Granulation

1 Blend powder mixture



Drug and excipients are blended to obtain a uniform powder mixture.

2 Compression into compact



The blended powder is slightly compressed to form a compact (slug or sheet).

3 Milling of compact



The compact is milled to obtain granules of suitable size.

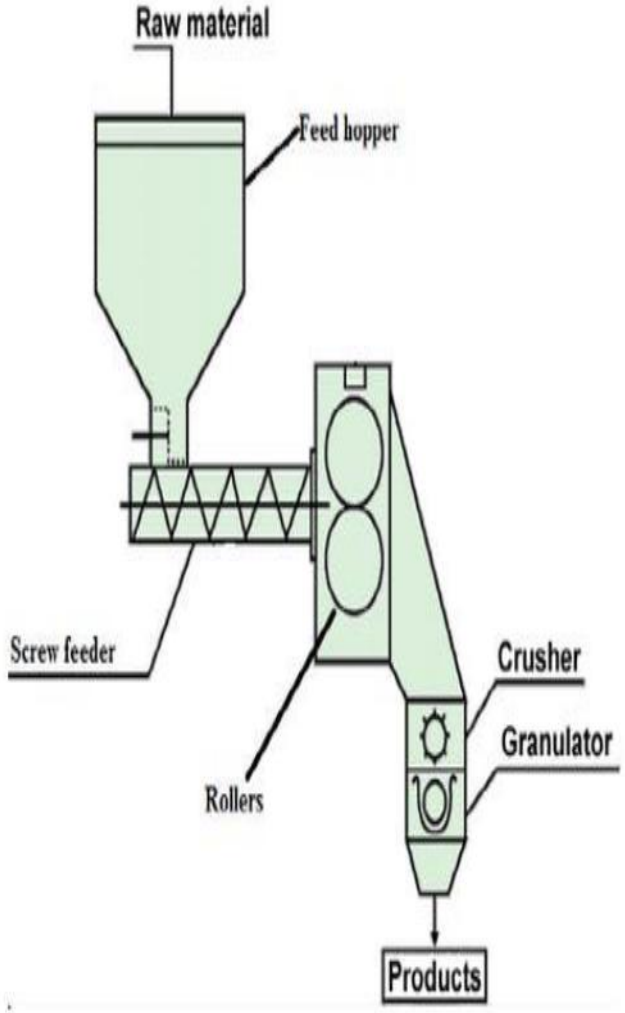
4 Dry granules ready for compression

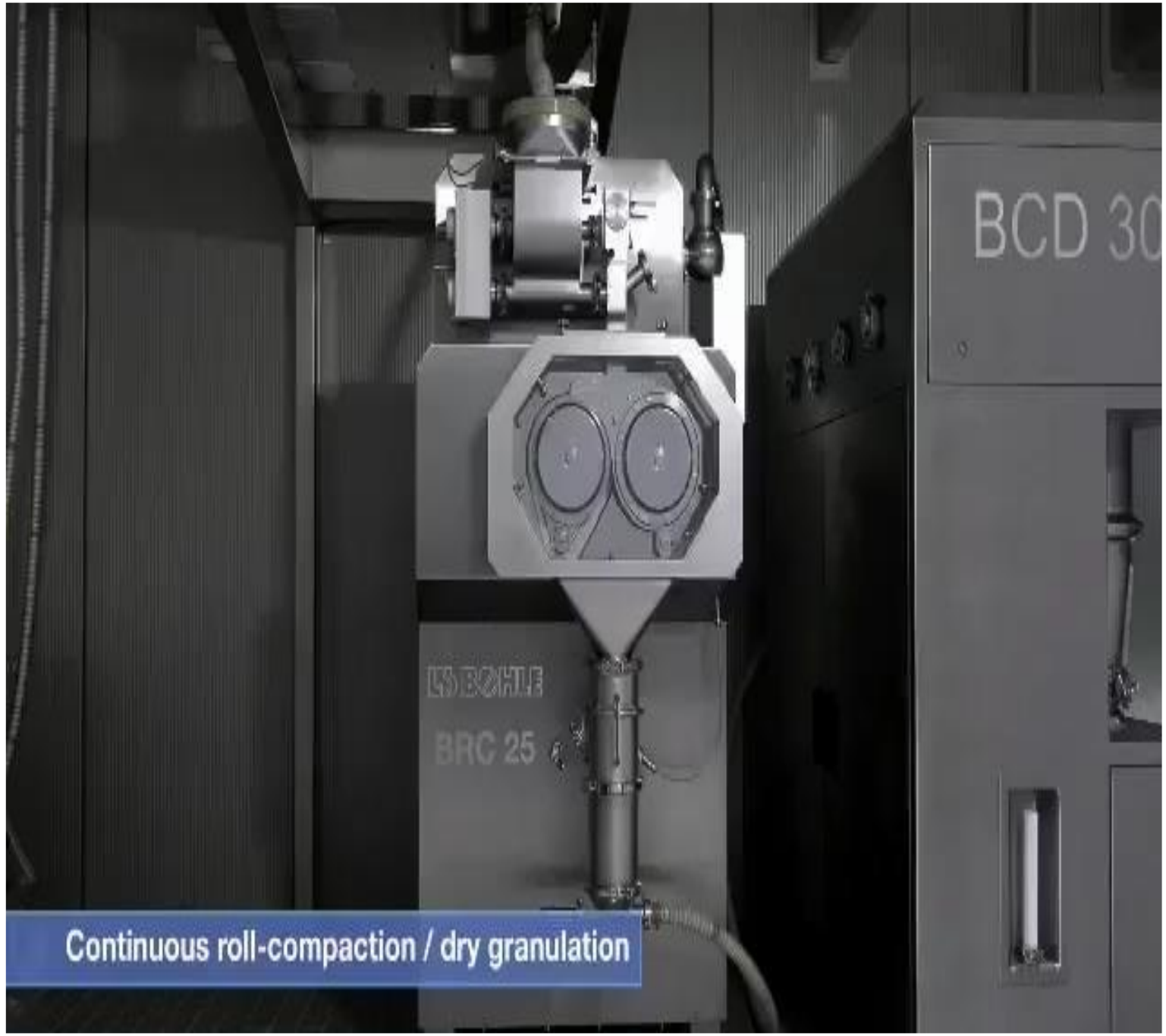


Dry granules are obtained and ready for final compression into tablets.

Dry Granulation

- Two methods have been presented for dry granulation:
  1. **Slugging method (also called double compression):**
     - In this method, the powder is pre-compressed by heavy duty tablet press or machine. The resulting tablets called slugs are then milled to yield granules.
     - 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 tablet.





Continuous roll-compaction / dry granulation

Dry Granulation

2. Roller compactor:

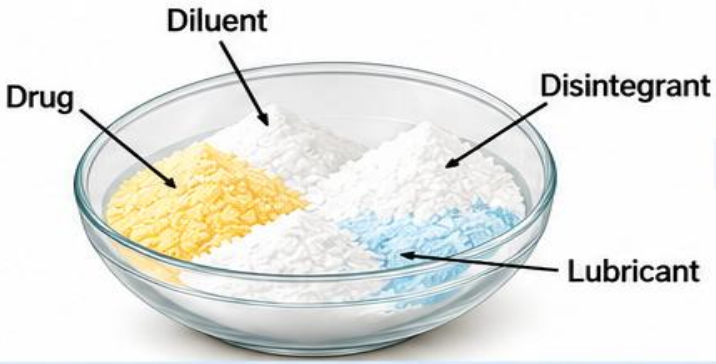
- In this method, Two rolls rotate against each other, to increase the density of powder by pressing it between the rollers and get a thin wide sheet or ribbon equivalent to the slug produced by slugging, then these ribbons or aggregates are screened to produce uniform granules.
- Roller compaction process is capable of handling a large amount of material in a short period of time.

- https://youtu.be/wbuC6bpWQM8

Dry Granulation

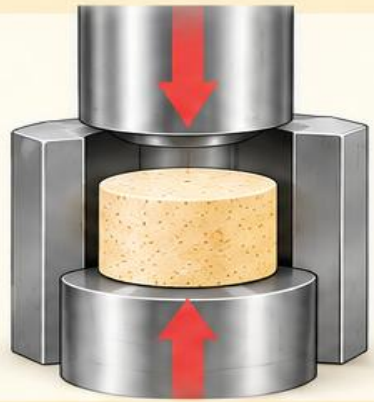
Process

1 Blending of drug and excipients



Drug and conventional excipients are blended to obtain a uniform powder mixture.

2 Compression into compact



The blended powder is slightly compressed to form a compact (slug or sheet).

3 Milling of compact



The compact is milled to obtain dry granules of suitable size ready for compression.

Advantages of Dry Granulation



No addition of moisture and no use of heat.



Less equipment (simple process).



Can be done with conventional excipients.



Fast disintegration may be attained.



Ensures uniform distribution of active ingredients (no segregation of particles).

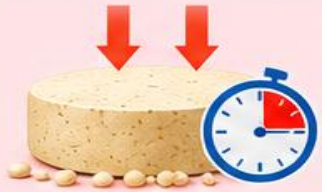
Disadvantages of Dry Granulation



Generates considerable dust which may cause cross contamination.



Requires specialised machine to obtain dry granules.



Excessive pressure is required to obtain a cohesive mass and the use of lubricant twice may prolong dissolution time.

Experimental work

⦿ Suggested formula

Metronidazole	250 mg	
Emcompress®	50 mg	
Starch	20 mg	
Zinc stearate	5 mg	(2.5 mg before first compression and the other part is calculated before the 2nd compression)

Prepare 10 tablets

Experimental work

- Metronidazole will be used as a model drug to be prepared by dry granulation method.
- It is white odourless powder with poor flowability and compressibility.
- According to its properties, the preferable method for its preparation is by dry granulation method.

Experimental work

1. According to the optimised formula, weigh all ingredients and half the amount of lubricant in case of slugging method. While in roller compactor method, lubricant is not added in this initial step before granulation.
   - half amount of lubricant in the formula is added at this stage to enhance powder flow during slugging and to prevent sticking of compressed powder on the die during precompression.
2. Mix well by suitable mixer and compress to slug using large punch die 0.75 – 1.25 inch or by using roller compactor.
3. Mill or break down the formed slugs or sheets that are formed.
4. Sieve to uniform the size of granules.
5. Weigh the granules to calculate the real no. of tablets then calculate the exact amount of lubricant needed (the other half in case of slugging method and just the required amount in case of roller compactor).

Experimental work

$$\text{Real no. of tablets} = \frac{\text{weight of granules}}{\text{weight of each tablet}}$$

Weight of each tablet (weight of each ingredient in the formula and half the amount of lubricant).

- Total amount of lubricant added before the second compression = real no. of tablets × half the amount of lubricant required for single tablet in the formula

6. Compress by tablet machine to produce the final required tablets.


תודה
Dankie
Gracias
Спасибо
شكراً
Merci
Takk
Köszönjük
Terima kasih
Grazie
Dziękujemy
Dėkojame
Ďakujeme
Vielen Dank
Paldies
Täname teid
Kiitos
谢谢
Thank You
Tak
感謝您
Obrigado
Teşekkür Ederiz
감사합니다
Σας Ευχαριστούμ
ขอบคุณ
Bedankt
Děkujeme vám
ありがとうございます
Tack