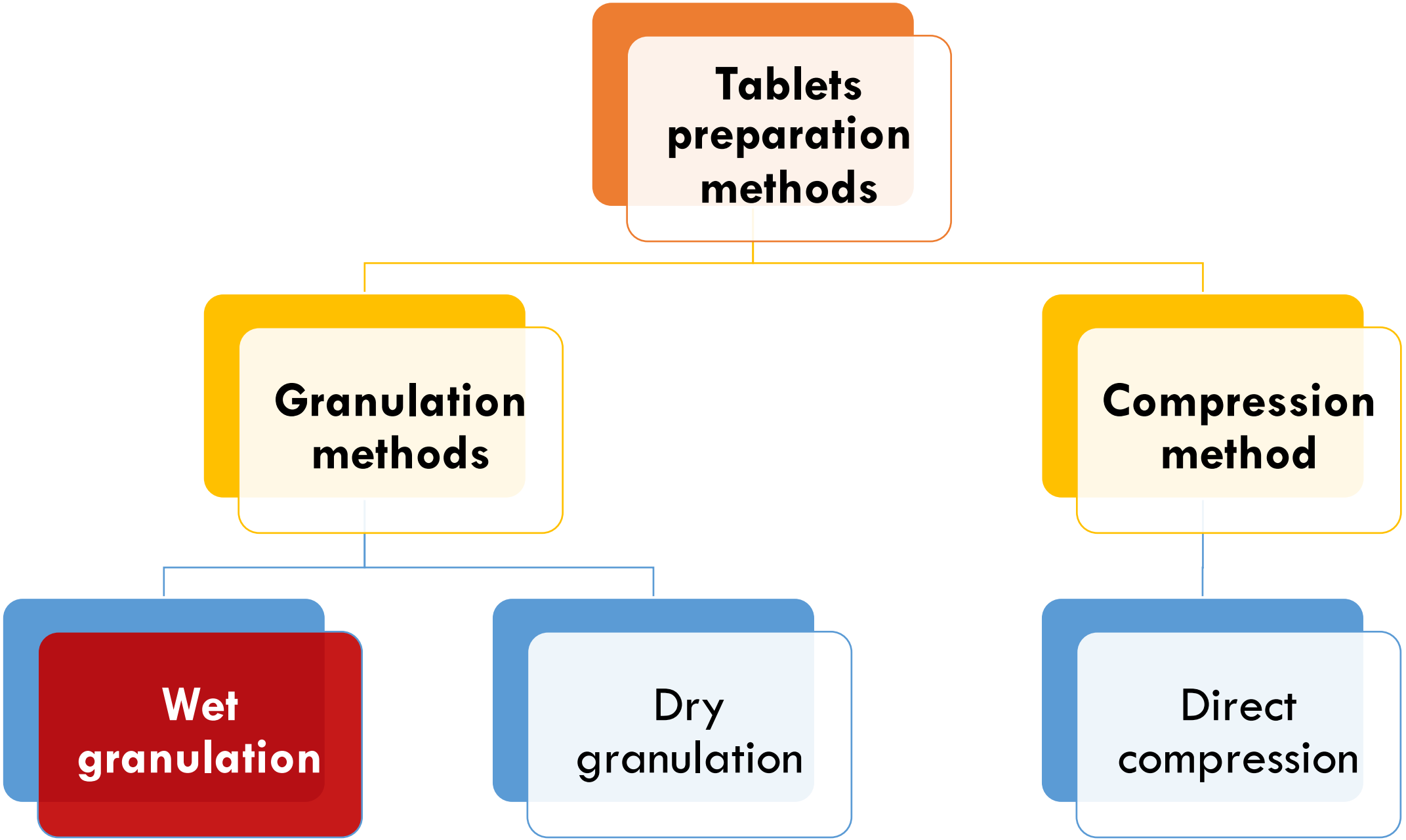
University of Tikrit
College of Pharmacy
Department of Pharmaceutics

# Practical Industrial Pharmacy II

## Lab 8

# Wet Granulation Method for Preparation of Tablets

Assist. Lec. Ahmad Abdullah Essa


Tablets preparation methods
Granulation methods
Compression method
Wet granulation
Dry granulation
Direct compression

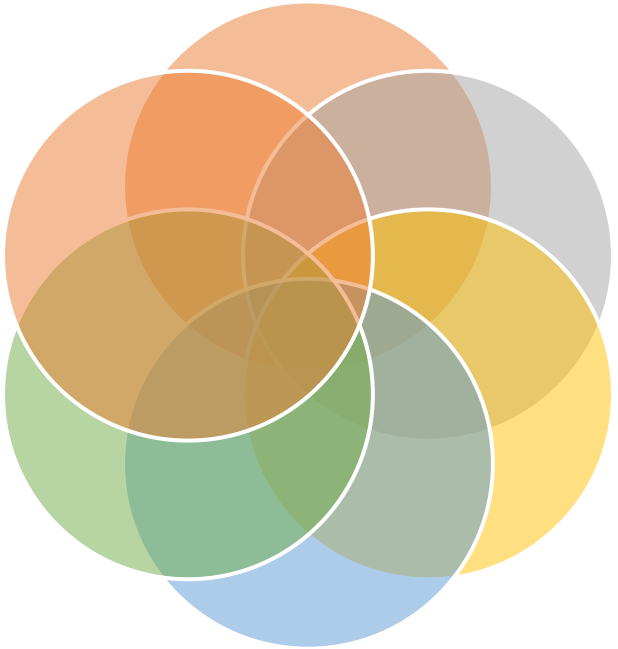
# Wet granulation

- The wet granulation technique uses the same preparatory and finishing steps of direct compression and dry granulation (dry screening and mixing); it also involve additional steps of wet massing, wet screening and drying.

# Steps of Wet Granulation

1.Mixing (blending) of the drug, diluent and disintegrant

2.Wet massing by addition of binder or adhesive or called granulation agent.



3.Granulation by sieving (wet screening).

4.Drying.

5.Homogenizing by second sieving (dry screening).

6.Mixing (blending) by addition of glidant and lubricant.

# Wet granulation

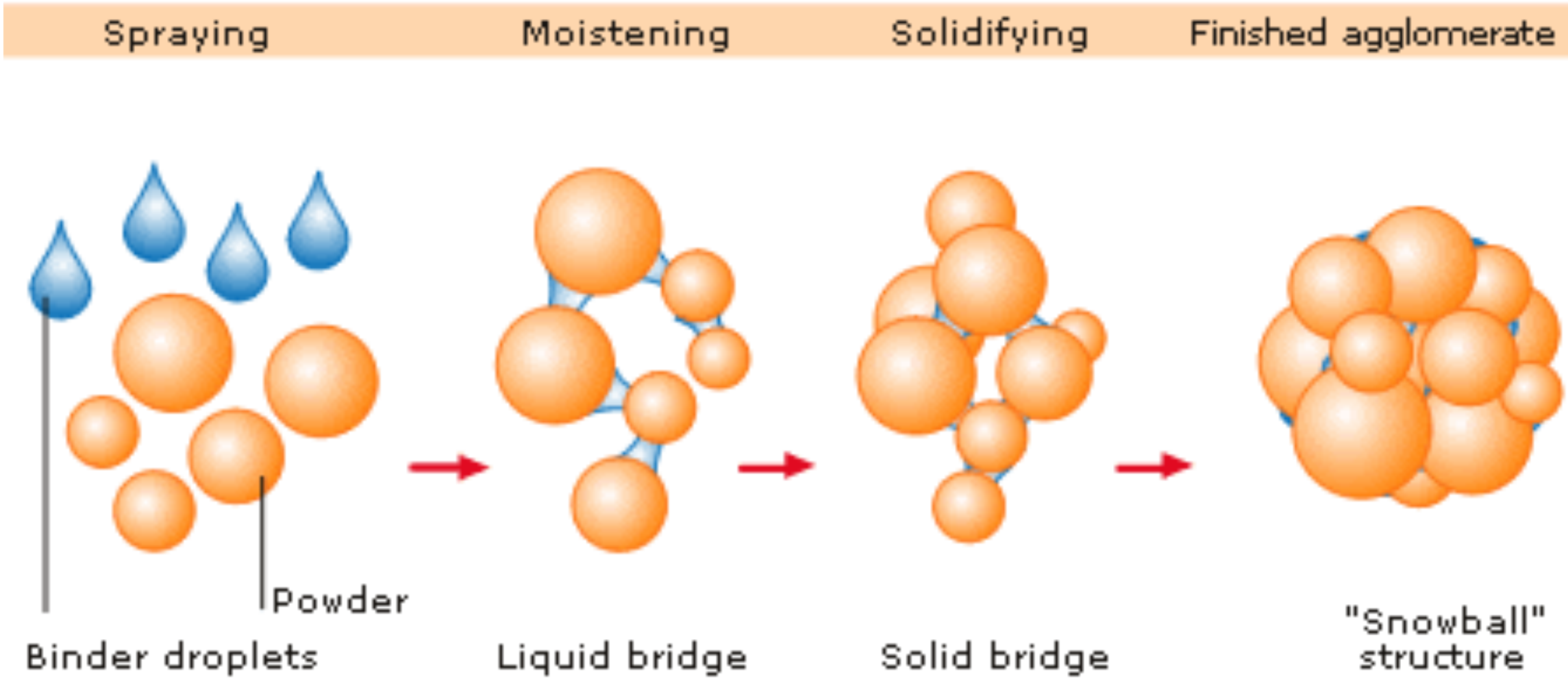
- The granules produced using liquid binder instead of compaction
- The length off wetting time depends on the wetting property of the powder mix. and the granulating fluid, and on the efficiency of the mixer.
- The end point can be determined by the press mass test (ball test) as the mass must be moisten rather than pasty or wet, it is done by pressing a portion of the mass in the palm if the ball crumbles under a moderate pressure, the mixture is ready for the next step (wet screening).

# Over wetting causes:

1.Hard aggregates of powder during milling process.

2. Some of the material may block the sieve or screen (sticky).

3. Slow drying process.


Spraying
Moistening
Solidifying
Finished agglomerate
Powder
Binder droplets
Liquid bridge
Solid bridge
"Snowball" structure

# Advantages of wet granulation method

1. Improve flowability, cohesiveness and compressibility of the powder, so the powder is easily compressed with lower binder concentration (due to the stick of powder particles together that are surrounded by layer of a binder) in addition to the low pressure and low energy comparing to dry granulation (prolong machine age).
2. Can be used for high dose drug with weak compressibility that is not affected by heat and moisture.
3. Maintaining uniform distribution for low dose drug and water soluble dyes (coloring agent).

# Advantages of wet granulation method

3

- Improve the dissolution rate of hydrophobic drug because of the presence of moisture of the already used water.

4

- Maintaining good content uniformity due to prevention of particle segregation since all the granules will have the same density (same constituent of the powder mixture).

# Disadvantages of wet granulation method

| 1 | 2 | 3 |
| --- | --- | --- |
| • Cost-time consumer<br>• (More complex techmique) | • Personal and environmental hazards upon using organic solvents represented by the flammability and toxicity of these solvents after evaporation during drying, handling or storage. | • Stability problem because of the presence of moisture speeds up the reaction between active ingredients and the additives and the additives itself. |

# Experimental Part

# Wet granulation formula

1. Drug
2. Diluent
3. Granulating liquid : Binder solution ( solvent either water or alcohol)
4. Disintegrant
5. Lubricant

Note : the volume of the binder solution affect the granules hardness

# Procedure

1. According to the optimized formula, weigh the ingredients except the lubricant and binder and mix them.

2. Prepare granulation liquid ( acacia 10%).

3. Add the binder solution drop by drop to the mixture until a wet mass is obtained (positive ball test).

4. Sieve the wet mass to obtain suitable granules size.

5. Dry the wet granules.

# Procedure

6. Sieve the dried granules in oven for 30 minutes at 40° C.

7. Weight the obtained dry granules to calculate amount of lubricant that must be added.

8. Add lubricant and mix it with the formula ( not mill to powder again???).

9. Compress after addition of lubricant.

# Calculation

- **Amount of lubricant that must be added =**

1% * weight of the dry granules obtained in mg

# Aspirin Formula

- Aspirin 75mg
- Lactose 200 mg
- Starch 35 mg
- Acacia 10%
- Magnesium stearate ?

prepare 5 tablet