الكلية	الصيدلة
القسم	الصيدلانيات
المادة باللغة الانجليزية	Practical Industrial Pharmacy
المادة باللغة العربية	عملي صيدلة صناعية
المرحلة الدراسية	الرابعة
اسم التدريسي	م.م. علي فخري جميل
عنوان المحاضرة باللغة الانجليزية	Flow properties of powders and granules
عنوان المحاضرة باللغة العربية	خصائص التدفق للباودر والحبيبات
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المصادر والمراجع	The Theory and Practice of Industrial Pharmacy by Leon Lachman

محتوى المحاضرة

Importance of flow rate:

Tablet and capsules are examples of solid dosage forms.

Requiring measured filling for production of desired tablet or capsule.

Uniformity of these products need uniform flow rate of ingredients.

Uniform flow rate must be considered in order to meet the requirements of high-speed machines.

Factors affecting flow rate:

Particle size: increasing particle size increases flow rate to certain limit, after that inversion of the relationship will take place.

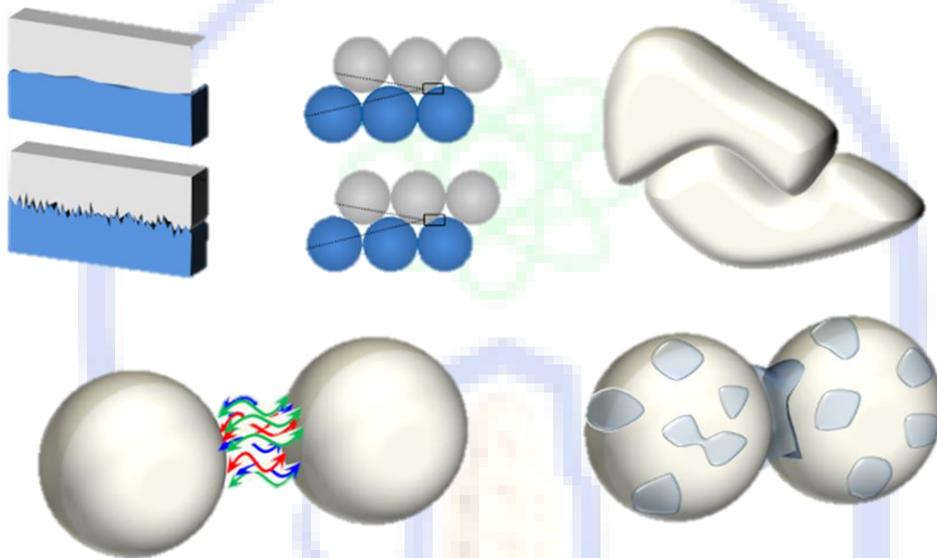**Particle shape: higher flow rate with spherical particles.**

Intermolecular forces: weak forces on surface of particles with different charges affect flowability, for example Vander Waals forces.

Frictional forces (electrostatic forces): induced by friction among particles during movement.

Moisture: causing sticking of particles.

Lubricants and glidants: decrease frictional forces.

Gravity force: large particles have high density and high gravity force resulting in increased flow rate.

Experimental work
1.Measuring angle of repose:

This method is achieved by using funnel and shallow petri dish and powder allowed to flow from the funnel on the center of petri dish until the circumference of the petri dish is touched by a pile of the powder.

Then the height of the pile and the radius of the petri dish are measured.

Calculate tan Θ = h/r

$$\theta = \tan^{-1}\left(\frac{h}{r}\right)$$

Value of angle	Flow property
20-40	Good
41-59	Intermediate
60	Bad

2.Measuring flow rate:

Fixing the time and measuring the weight
the powder should be weighed at constant time intervals (2,4,6,8, and 10 sec) using stopwatch
draw the weight of powder versus time.

Fixing the weight and measuring time by using flow meter.