

MIXING : Theory and

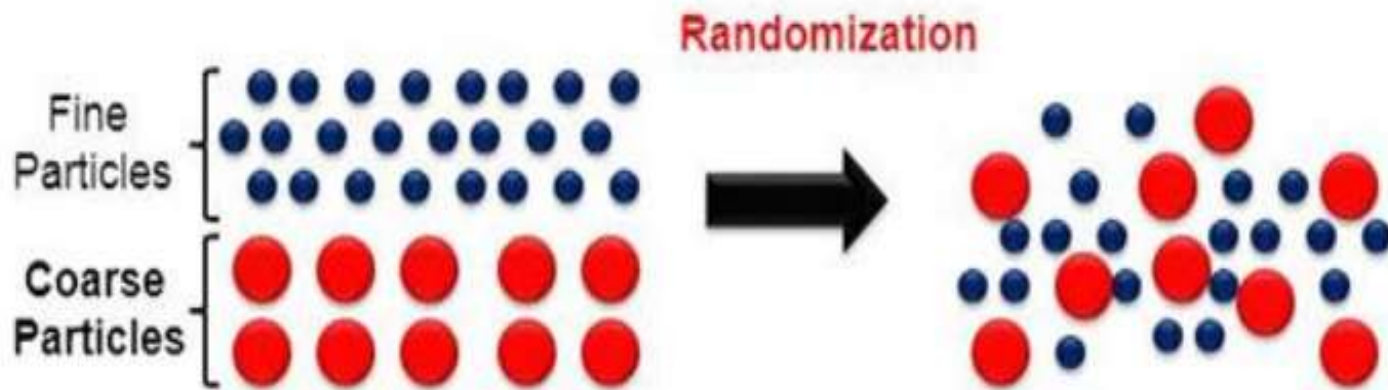
**Objectives, applications & factors affecting mixing, Difference
between solid and liquid mixing**

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Definition

- Mixing is a process that results in **randomization** of dissimilar particles within a system.



Objective of mixing

- ▶ To ensure uniformity
- ▶ To initiate or to enhance the physical or chemical reactions e.g. diffusion, dissolution etc.
- ▶ To make the following products:
 - Tablets
 - Suspensions
 - Emulsions
 - Pastes
 - Creams
 - Ointments
 - Solutions
 - Syrups
 - Tablet coatings

Factors influencing mixing



- Nature of the surface
- Density of the particles
- Particle size
- Particle shape
- Particle charge
- Proportion of materials

1. Nature of the surface:

Rough surface of one of the components does not induce satisfactory mixing. This can be due to the entry of active substances into the pores of the other ingredients. Adding a substance, which will be adsorbed on rough surface particles, decrease aggregation.

2. Particle size :

It is easy to mix two powders having approximate the same particle sizes. The variation of particle size can lead to separation also, because the small particles move downward through the spaces between the bigger particles.

3. Particle shape :

The ideal particle is spherical in shape for the purpose of uniform mixing. The irregular shapes can become interlocked and there are less chances of separation of particles once these are mixed together.

4. Particle charge : Some particles exert attractive forces due to electrostatic charges on them. This can lead to separation.

5. Material density :

It is difficult to mix two powders having different density. This is due to the fact that dense material always moves downward and settles down at the bottom. Therefore, for uniform mixing of powders, proper attention should be given to their density.

6. Proportions of materials :

The best results can be achieved if two powders are mixed in equal proportions by weight or by volume. In case there is a large difference in the proportion of two powders to be mixed the mixing of powders is always done in the ascending order of their weights.

Liquid mixing	Solid mixing
Flow currents are responsible for transporting unmixed material to the mixing zone adjacent to impeller.	Flow currents are not possible.
Truly homogeneous liquid phase can be observed.	Product often consists of two or more easily identifiable phases.
Small sample size is sufficient to study degree of mixing.	Large sample size required.
Mixing requires low power.	Mixing requires high power.

Classification of mixing

- A. Mixing of solids
- B. Mixing of liquids
- C. Mixing of immiscible liquids
- D. Mixing of semisolids



