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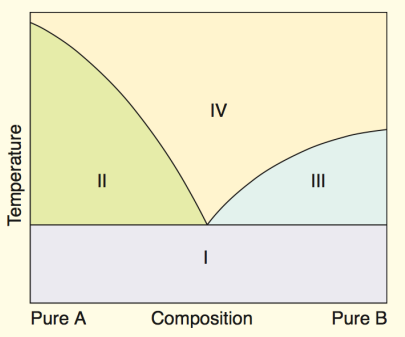
Phase rule (Binary system)

- As the purity increases, melting point elevated.
- Eutectic point: is the point at which lowest melting point exist.



I. Solid A + solid B
II. Solid A + melt
III. Solid B + melt
IV. Melt

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Phase rule

- Phase diagrams are valuable for interpreting interactions between two or more components through:

1. Effect on melting point depression and possible liquefaction at room temperature.
2. Formation of solid solutions.
3. Co-precipitates.
4. Co-crystal

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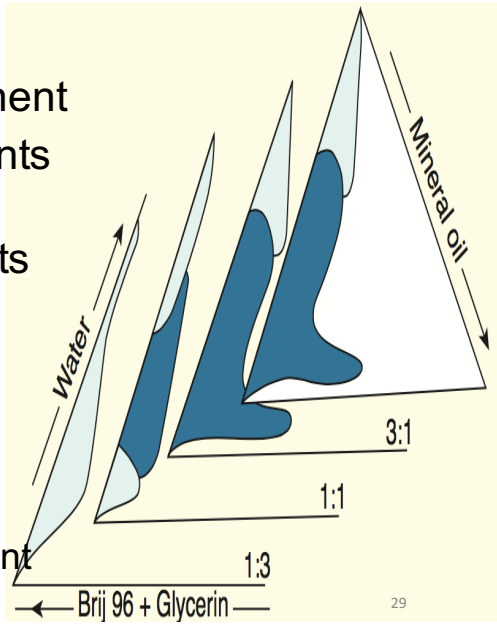
Phase rule (Tertiary system)

1. The corners are100% of one component
2. The three lines joining the corner points represent two-component mixtures.
3. The area within the triangle represents all the possible combinations of A, B, and C.
4. They are used for determining:
   1. **Miscibility/solubility**,
   2. **Coacervation** regions,
   3. **Gel-forming** regions for multicomponent mixtures



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Particle Size and Particle Size Distribution

- It can affect on:

1. Solubility and Dissolution rate
2. Content uniformity.
3. Taste and color.
4. Stability.
5. Flow properties.
6. Suspendibility and Sedimentation rate.
7. Penetrability and Absorption rate.
8. Small vein closures.

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PARTICLE SIZE

- Particle size is characterized using these terms :
  i. Very coarse (#8)
  ii. Coarse (#20)
  iii. Moderately coarse (#40)
  iv. Fine (#60)
  v. Very fine (#80)

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Methods to Determine Particle Size

- Sieving
- Microscopy
- Sedimentation rate method
- Light energy diffraction
- Laser holography
- Cascade impaction

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Particle size Effect on Dissolution

- Poorly aqueous soluble drugs showing a dissolution rate-limiting step in the absorption process will be more readily bioavailable when administered in a finely subdivided form with a larger surface than as a coarse material. Examples include griseofulvin, tolbutamide, indomethacin and nifedipine.

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Particle size Effect on Content Uniformity

- Two low-dose blends were prepared in a way that differed only in the particle size of the drug used to make the blends.
- The geometric mean particle diameters for the two lots of drug used were 18.5 and 6.1μm.
- Samples of the blends approximately equivalent to the unit dose of 10 μg per 99 mg of blend were assayed for potency.
- For the blend containing the larger particle size drug, the potency range was 88–130% compared to 97–102%

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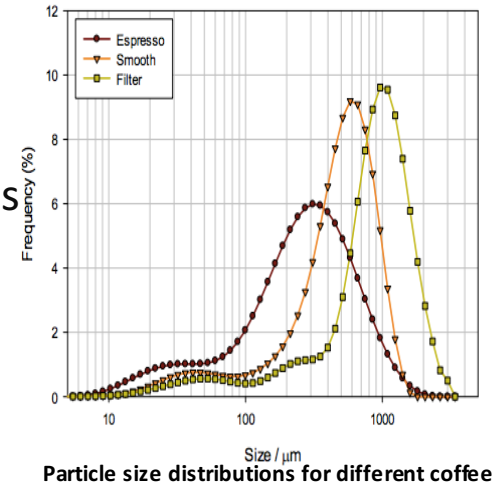
Particle size Effect on Taste

The particle size of coffee grounds greatly affects the flavour of coffee. If the coffee grind is fine then a powerful espresso-like flavor may be produced, as many of the complex organic components within the coffee bean are released during preparation. If the coffee grind is coarse then a smoother flavor may be obtained for the final product



Particle size distributions for different coffee types using Mastersizer 3000 as particle size analyzer

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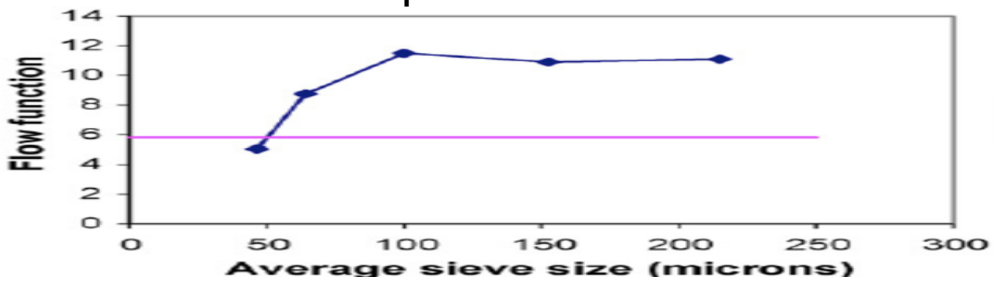
Particle size Effect on Flow Properties

- It is generally accepted that powder flowability **increases** with an **increase** in particle size
- For powders of Ibuprofen with narrow size distributions, the flowability increases significantly with the increase in particle size.



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Particle size Effect on Suspendability

- When left undisturbed for a long period of time the suspen. particles will aggregate, sediment, eventually **cake**.
- When a suspension is very well dispersed (i.e., **deflocculated**), the particles will settle as small individual particles. This settling will be very slow and will result in a low-volume, high-density sediment that may be difficult or impossible to redisperse.
- When the particles are held together in a loose open structure, the system is said to be in the state of **flocculation**.
- The rate of sedimentation, agglomeration, is affected by particle size.

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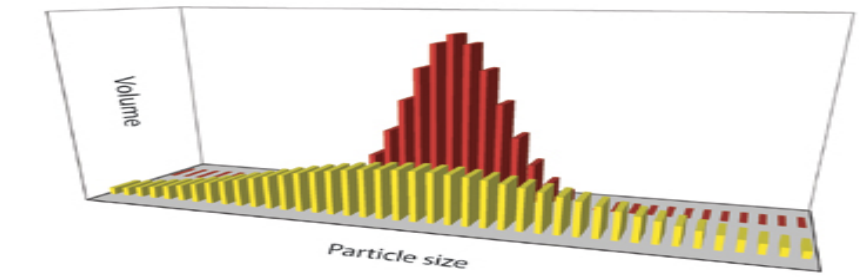
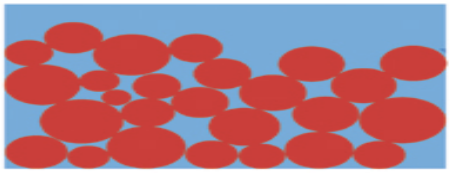
Particle size Effect on Suspendability





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