

UNIT – 3

Coarse Dispersion:

1. Suspension:

- **Definition:** A coarse dispersion where solid particles are dispersed in a liquid medium.
- **Interfacial Properties:** The properties of suspended particles at the liquid-solid interface play a crucial role in the stability and behavior of suspensions.

Settling in Suspensions:

- **Sedimentation:** The process by which suspended particles settle at the bottom of a container over time due to gravitational forces.
- **Factors Affecting Settling:** Particle size, density, viscosity of the liquid medium, and the presence of flocculating or deflocculating agents.

Formulation of Flocculated and Deflocculated Suspensions:

- **Flocculated Suspensions:** Particles are loosely aggregated into flocs, enhancing sedimentation. Flocculating agents are added.
- **Deflocculated Suspensions:** Particles remain dispersed without forming flocs, minimizing sedimentation. Deflocculating agents are added.

2. Emulsions:

- **Definition:** A dispersion of one liquid phase (dispersed phase) in another liquid phase (continuous phase).
- **Theories of Emulsification:**
 - **Mechanical Theories:** Emphasize the need for external energy to break down larger droplets into smaller ones.
 - **Ostwald's Theory:** Describes the emulsification process based on the reduction of interfacial tension between the two immiscible liquids.
- **Microemulsion and Multiple Emulsions:**
 - **Microemulsion:** A thermodynamically stable, clear, isotropic liquid system of water, oil, and amphiphile. It forms spontaneously without external energy input.
 - **Multiple Emulsions:** Emulsions containing droplets of another emulsion as the dispersed phase.
- **Stability of Emulsions:**
 - **Factors Influencing Stability:** Interfacial tension, viscosity, particle size, and the presence of emulsifying agents.

- **Creaming:** The upward movement of fat globules in an emulsion due to differences in density.
- **Coalescence:** The merging of small droplets into larger ones.
- **Preservation of Emulsions:**
 - Addition of preservatives to prevent microbial growth.
 - Antioxidants to prevent oxidation of oil phases.
- **Rheological Properties of Emulsions:**
 - **Viscosity:** Influenced by the droplet size and the degree of flocculation.
 - **Thixotropy:** Some emulsions exhibit shear-thinning behavior, becoming less viscous under stress.
- **Emulsion Formulation by HLB Method:**
 - **HLB (Hydrophilic-Lipophilic Balance):** A numerical scale that characterizes the hydrophilic and lipophilic balance of an emulsifying agent.
 - **Selection of Emulsifying Agent:** Based on the HLB value required for a specific oil-in-water or water-in-oil emulsion.

Understanding the principles of suspension and emulsion formation, stability, and rheological properties is essential in various industries, including pharmaceuticals, food, and cosmetics, where these systems are commonly utilized.