



Course:

Emulsion Formulation Technology

Lectures:

Introduction to Surfactants in Solution

- Surfactant types and classification according to solution behaviour and application areas.
- Short introduction to surfactant phase diagrams
- Surfactant adsorption at solid surfaces

Emulsions and Emulsion Formulation with Surfactants I - Formulation Yardsticks

- Emulsion types and definitions
- Instability problems in emulsions
- Common formulation yardsticks/concepts: HLB, PIT, Winsor R

Emulsion Formulation with Surfactants II- Generalized Formulation Concepts and Composition Effects

- Surfactant Affinity Difference (SAD) and Hydrophilic Lipophilic Deviation (HLD) concepts - Formulation shortcuts.
- Effect of emulsion composition on emulsion properties: Formulation-Composition maps

Emulsion Inversion Phenomenology and Formulation Engineering

- Emulsification concepts
- Emulsion inversion phenomenology
- Emulsification through emulsion inversion

Polymers in Solution and Suspensions

- Polymer types
- Basics on polymers in solution and at surfaces
- Basics on surfactant/polymer systems in solution and at surfaces
- Instability issues in suspensions
- Stabilisation strategies for suspension

Suspoemulsions and Typical Instability Problems in These

- Strategies to control stability in suspoemulsions
- Particle-stabilised (Pickering) emulsions

Emulsions Stabilised with Proteins and Polysaccharides

- Typical proteins and polysaccharides used for emulsion stabilisation
- Stabilisation mechanisms
- Typical instability problems

The course also includes a short practical/demo session on emulsion characterisation during day 1 which includes:

- Evaluation of formulation scans and phase behaviour of surfactant/oil/water systems (microemulsions).
- Characterisation of emulsion morphology (conductivity and solubility tests).
- Drop size distribution determination with dynamic light scattering and laser diffraction.
- Shelf life assessment through automated turbidimetric determinations.