COBBLESTONE

COURSE ID 2890

NEW!

REVISED!

Practical Aspects of Emulsions

for the Pharmaceutical, Cosmetic and Related Industries

DIRECTED BY

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12 HOUR

ACCREDITED COURSE

Course Topics Include:

- Outsourcing - a Global Perspective
- Scale Up, Formulation, Delivery of Activities
- Emollients, Emulsifiers & Structuring Agents
- Technologies for Emulsions (Lamellar Gel Network Model), Micro/Nano Emulsions, Liposomes and Micellar Soluti

about the course

While it is common knowledge that water and oil do not mix, it is less known that given the right chemistry and processing, a cosmetically elegant emulsion of these two immiscible liquids can be made stable for years. But without proper knowledge of the science behind emulsions, failures can occur.

This 12-hour accredited training course is designed to provide both theoretical understanding and practical application of the complex behavior of emulsions. The course uses a unique approach based on combining the different but totally related learnings of parts 1 and 2.

Part 1 is dedicated to studying in depth the physical chemistry of the key raw materials used to make emulsions. The materials are divided in the categories of emollients, emulsifiers and structuring agents.

Part 2 will apply the acquired knowledge to the understanding and learning of the various technologies obtained by the synergistic physical interactions of the raw materials. The Lamellar Gel Network Model (LGNM) is described in detail with emphasis in its practical application to controlling the sensorial properties of emulsions, its stability and scale up during the manufacturing process. Formulation examples are used to illustrate the application of the technologies.

There is a specific section dedicated to the delivery of actives, and its release from the emulsions. Specific cases of non-delivery through the skin, such as sunscreen actives, are also addressed.

In addition, other types of emulsions, such as nano and micro, as well as micellar solutions and dispersions will also be discussed.

who should attend

This course is designed for professionals working in the field of emulsions in the pharmaceutical, cosmetic and allied industries. It is targeted, but not limited, to those working in the areas of:

• Product Development, Applications and R&D	• Research and Development and Synthesis of Raw Materials
• Analytical Service	• Pilot Plant and Scale-up Operations
• Technical Service and Technology Transfer	• Marketing Services Requiring Technical Background

learning objectives

Upon completion of this course, you will be able to:

- Describe the physical chemistry characteristics of the key materials used to make emulsions
- Explain the physical interactions of those materials in the creation of the multiphases that form the internal structure of emulsions
- Define the Lamellar Gel Network Model and its application to controlling the sensorial properties and stability of emulsions, as well as the delivery of actives
- Describe the details of the scale-up operation from lab samples to plant batches
- List ten model emulsion prototypes that cover a wide range of properties, as well as a review of commercial products

course outline

Review of Learning Objectives

- From Nivea Cream to the Lamellar Gel Network
- Emulsions, nano-emulsions, micro-emulsions, micellar solutions and suspension. What is the difference?
- Negative impact of the Griffin's HLB method on emulsions
- Emulsions as multiphase systems based on physical interactions
- Balancing the sensorial aspects and efficacy of pharmaceutical and cosmetic products with new materials and technologies

Raw Materials Emollients. Detailed View:

- Physical chemistry of the 7 main categories of emollients used in emulsions
- Key differences of carbon based vs. silicone based materials

Emulsifiers and Structuring Agents. Overall View:

- Emulsifier types: Discrete, oligomeric and polymeric
- Structuring agents: Crystalline and polymeric

Emulsifiers. Detailed View:

- Physical chemistry of the 14 main categories of emulsifiers
- Discrete vs. Oligomeric
- Ethoxylated vs. non-ethoxylated materials
- Crypto-anionic emulsifiers. Unique properties

Structuring agents. Detailed view

- Crystalline vs. polymeric. Performance differences
- Crystalline structuring agents defined in terms of emulsifying and hydrogen bonding properties
- Polymeric structuring agent. Types and performance differences

Technologies

- Physical interactions of emollients, emulsifiers and structuring agents
- Gibbs Equation and the three energies for emulsion making
- Impact of the emulsifier content on the formation of the emulsion type
- Instrumental techniques for characterization: XRD, DSC, Microscopy

Micro, Nano Emulsions, Liposomes and Micellar Solutions

- Chemical vs. mechanical energy
- Strengths and weaknesses of each system

The Skin as a Barrier

- Physical chemistry of the skin. The chemistry by analysis and the physics by XRD, DSC and Microscopy

Emulsions: The Lamellar Gel Network Model (LGNM)

- Emulsions as multi-phase systems
- Fundamental components of the LGNM: the gel, the cogel, and the □ lamellar phase. Nomenclature confusion
- The LGNM as key to controlling emulsion properties, from sensoriality to product stability
- The LGNM and the “free vs. trapped water” concept. Practical application
- Structural changes of emulsions during usage, from initial application to final residue

Scale-Up

- Lab vs. pilot vs. plant batches. “Hidden” factors that affect the scale-up

Formulation Examples as a Matter Applied Technology

- Ten model formulations based on the LGNM that cover a wide range of sensorial properties

The Delivery of Actives

- Delivery from emulsions
- The impact of the LGNM on the delivery of actives
- Delivery of oil soluble actives (Wiechers methodology)
- Delivery of water-soluble actives
- Delivery from micro and nan emulsions, and liposomes
- Limitations

Assessment Opportunity

course instructor

Ricardo Diez, Ph.D, has more than four decades of experience in Research and Development and Product Development in the industry in both consumer product companies while employed with Procter & Gamble, Dial Corp and Chanel, and raw material manufacturers such as Miranol, Stepan and Witco.

In the area of raw materials, he has twenty years of direct, hands-on experience in the synthesis, manufacturing, and QA of materials used to make emulsions. In the field of emulsions, he has many years of hands-on experience in controlling emulsion properties and stability using the Lamellar Gel Network Model, including identification techniques.

He has imparted seminars for the SCC and for IFSCC in many countries, focusing on raw materials and emulsion technologies. He is currently an Adjunct Professor at Rutgers University where he teaches applied cosmetic science in the Master of Business and Science.

Accreditations

International Accreditors for Continuing Education and Training (IACET)
Cobblestone has been approved as a CEU Accreditor by IACET and awards CEUs for participation in qualified courses. Cobblestone has demonstrated that it complies with the ANSI/IACET Standards and is authorized to offer IACET CEUs for its programs. CEUs will be awarded for participation in Cobblestone's courses at the rate of .1 CEU per contact hour upon successful completion of the entire course and 70% accuracy in the required Learners' Assessment. A minimum score of 80% is required for all courses within a Cobblestone Certification Program. This course offers a total of 12 contact hours, or 1.2 CEUs. For further information, visit www.iacet.org