

- 1. Introduction & Overview of the US Dairy Industry – Dairy Co-ops, Private Dairy Companies, Processing Plants, US Dairy Products Produced for the Domestic and International Market**
- 2. Dairy State & Federal Regulations 101: Government Requirements for Dairy Plants including FSMA's PCHF Regulation**
 - NCIMS Grade "A" and USDA Plant Survey Program
 - FDA Requirements including FSMA Preventive Controls, Sanitary Transport & Food Defense Vulnerability Assessment
 - Food Safety Plan Builder Demo & Vulnerability Assessment Demo
- 3. Dairy Microbiology 101: Fundamental aspects of Dairy Microbiology and Microbiological Challenges**
 - Microbiology and Microorganisms- Definition, Scope and Significance and General characteristics
 - Microorganisms in Milk- Good, Bad and Ugly
 - Growth and Reproduction
 - Milk Quality and Mastitis
 - Psychrotrophs, Thermotolerant and Sporeforming Organisms
 - Important Microorganisms in Milk and Cheese Quality and Spoilage
 - Pathogens in Milk and Cheese
 - Strategies and approaches for controlling microorganisms
- 4. Dairy Chemistry 101 – Part "A" General Milk Chemistry & Composition**
 - Milk Components & Nutrients
 - Milk Fat Structure & Chemistry
 - Lactose Chemistry
 - Vitamins
 - Minerals
 - Enzymes
- 5. Dairy Protein Chemistry 101- Part "B" Whey & Casein Proteins - Their Characteristics Including Proteolysis & Iso-electric Points**
 - Alpha Caseins (α) are in multi-phosphorylated forms (as2, as3, as4, as5, and as6)
 - Beta Casein (β) is a major casein in cow milk, but is the minor casein in human milk
 - Kappa Casein (κ) is a glycoprotein, distributed throughout the casein micelle and acts to stabilize the micelle
 - Gamma-caseins (part of the protease peptone fraction of milk) are C-terminal fragments of β -casein, which are released by plasmin digestion, mostly while the milk is in the gland.

6. Dairy Farming 101

- Dairy Animal Breeds & Milk Physiology
- Dairy Housing & Milk Facility Basics
- Mastitis 101 & the National Animal Drug Monitoring Program
- Issues Impacting Milk Composition
- Seasonal Differences
- State of Lactation Differences
- Animal Feeding

7. Dairy Pricing 101

8. Hands-on Practical Knowledge of Dairy Laboratory Testing Systems and Capabilities

- Dairy Laboratory Testing Technologies – Microbiological
- Dairy Laboratory Testing Technologies – Chemical
- Dairy Laboratory Testing Technologies – Drug Residues
- Milk Quality test – Microbiological, sensory attributes & shelf life

9. Demonstrations of Various Drug Screening Kits, Allergen Screening Kits, ATP Screening Kits, etc.

10. Dairy Processing 101 – Overview & Diagrams

- Equipment & Configuration
- Raw Milk Receiving & Storage
- Blending
- Pasteurization
- Filling & Packaging

11. Dairy Heat Treatment & Pasteurization 101 – Fundamentals

- Vat
- Plate Heat Exchangers
- Shell & Tube Systems
- UHT Systems
- Required Public Health Controls

12. Cultured Dairy Product Processing Systems 101

- Cheese
- Sour Cream
- Buttermilk
- Yogurt
- Kefir

13. Membrane Processing 101

14. Milk, Whey and Lactose Processing & Drying

15. Butter & Ice Cream Processing 101

16. Basics of Cleaning and Sanitizing of Dairy Processing Equipment

17. Science of Cleaning Chemistry and Verification Technologies for Dry and Wet Cleaning

18. Building Blocks for an Effective Food Safety Program in Dairy Plants