

# Module Content

## **Module #1 Understanding Milk**

Overview of chemistry and composition of milk including milk from other animal species. Structure of milk and function of components such as water, fat, protein, lactose, minerals and enzymes. Basic properties of milk such as pH, titratable acidity, freezing point and denaturation.

## **Module #2 Dairy Microbiology, Testing and Equipment 101**

Overview of coliforms, yeasts, molds, spores, pathogens and biofilms and their importance in dairy manufacturing. Testing milk for composition and microorganisms. Stainless steel and passivation and other metals used in dairy plants. Equipment such as pumps, motors and heat exchangers covered.

## **Module #3 Processing Equipment**

Equipment used in processing dairy products including centrifuges, homogenizers, pasteurizers, membrane systems, evaporators and spray dryers.

## **Module #4 Milk Quality from Farm to Plant**

Farm impacts on milk quality including cleaning farm milking systems, cooling milk and sanitizing bulk tanks. Testing requirements for milk received from farms and milk hauler requirements. Dairy plant requirements for construction, pest control, lighting, etc. Overview of Dairy Farm and Dairy Plant regulations.

## **Module #5 Food Safety and Sanitation**

Safety systems and regulations such as Good Manufacturing Practices, Safe Quality Foods, Pasteurized Milk Ordinance and Code of Federal Regulations. Inspections, audits and environmental sampling. Sanitation and cleaning procedures and requirements. Types of cleaners and sanitizers.

## **Module #6 Production of Cheese**

Concepts of cheese manufacture such as distribution of milk solids, cheese yield and milk standardization. Basic steps in manufacture of cheese including heat treatments, starter, bacteriophage, casein and gel formation, separating curds and whey and salting. Basic types of cheeses such as mozzarella, eyed and milled cheeses.

## **Module #7 Cheese Ripening and Defects**

Changes that occur during ripening and why. Categories of aged cheeses include naturally aged cheeses, lipase aged cheeses, smeared ripened cheeses and mold ripened cheeses. Common defects and source of the problem.

## **Module #8 Cheese Usage, Evaluation, and Functionality**

Understanding the basic usage of cheese as an ingredient and common evaluation techniques: sensory analysis, melting, shredding, and lab testing protocols. The life cycle of cheese from production to table and the impact of manufacturing on end-user quality control.

## **Module #9 Production, Functionality, and Applications of Dairy Ingredients**

Basic manufacturing processes for dairy ingredients such as nonfat dry milk, whey, and whey protein concentrates. Functional properties of milk and whey ingredients; applications for dairy ingredients.

## **Module #10 Production of Other Dairy Products**

Fluid milk, butter, ice cream and cultured products. Cultured products include yogurt, and kefir. Production flow diagrams, from incoming milk through finished product and byproducts.

# CERTIFICATE IN DAIRY PROCESSING

