Dairy Membrane Filtration, Concentration & Separation Technology

April 7-9th, 2015

Part of the Cornell University Dairy Foods Certificate Program






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Cornell University
Dairy Foods Extension
Stocking Hall
Ithaca, NY

Dairy Membrane Filtration, Concentration & Separation Technology

Program Agenda

Day One

Separation by Membrane Filtration & Centrifugation

8:30am-9:00am
Coffee & Breakfast – Sponsored by Synder Filtration

Synder® Filtration Membranes that Perform. People who Deliver.

9:00am-9:30am
Welcoming Remarks
Tristan Zuber, Dairy Foods Specialist, Cornell University

9:30am-10:30am
Membrane Technology, Terminology & Applications
Understanding the theory and terminology behind membrane filtration are critical to operating and troubleshooting your system. This presentation will provide an overview of the terminology and theory behind the operation of a membrane filtration system as it applies to the dairy foods industry.
Speaker: Carmen Moraru, PhD, Associate Professor, Cornell University Department of Food Science

10:30am-10:45am
Break

10:45am-12:00pm
Membrane Design & Construction
Membrane technology continues to play an important and growing role in the separation and purification of bulk dairy products as well as in the development of nutraceutical, pharmaceutical grade and value-added specialty products. The industry will look to membrane and system suppliers to pioneer the next generation of membrane products in pursuit of even finer separations and greater processing efficiency. Understanding how membranes function in your process is imperative to a deep understanding of filtration technology.
Speaker: Jeff Yeh, President, Synder Filtration

12:00pm-1:00pm
Networking Lunch – Sponsored by Tetra Pak Processing Equipment, Inc.

PROTECTS WHAT'S GOOD™ Tetra Pak

1:00pm-2:00pm
Polymeric Filtration Design, Performance & Mass Balance
Attendees will be exposed to the basics of polymeric spiral wound membrane system design and operation. System performance, mass Balances and system yield will also be discussed.
Speaker: Tim Eilrich, Technical Sales & Service Manager, Tetra Pak Processing Equipment, Inc, Filtration Engineering

2:00pm-2:45pm
Fouling Reduction & Cleaning of Membrane Systems
Membrane performance and product quality can be optimized by proper cleaning and handling. Different cleaning methods will be explored as well as ways to reduce chemical use while retaining optimal performance.
Speaker: Reda Yacoub, Senior Membrane Program Manager, Hydrite Chemical Company

2:45pm-3:00pm
Break

3:00pm-3:15pm
Centrifugation Principles & Terminology
Centrifugation is a technology that utilizes physics principles to separate out dairy components. Dr. Moraru will provide a broad overview of the theory behind the concept of centrifugation.
Speaker: Carmen Moraru, PhD, Associate Professor, Cornell University Department of Food Science

3:15pm-5:00pm
Practical Applications for Centrifugation
Centrifugation can be applied to many areas within dairy foods manufacturing. We will walk through the different applications, centrifuge types, operations and cleaning for optimal performance and experience a hands on component in the Cornell Food Processing Development Laboratory.
Speaker: Mark Litchfield, Dairy Market Manager, GEA Mechanical Equipment – Westfalia Separator Division



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Program Agenda (cont'd)

Day Two

Drying Technology, Product Quality & Sustainable Dairy Operations

8:30am-9:00am
Coffee & Breakfast– Sponsored by GEA Mechanical Equipment

9:00am-9:45am
Drying & Evaporation Principles & Terminology
Evaporation and drying are two critical steps in creating high quality dry dairy ingredients. This presentation will discuss the theory behind these processes and explain how evaporation and drying work, as well as will discuss some aspects of equipment design, types of driers and evaporators used in dairy facilities.
Speaker: Carmen Moraru, PhD, Associate Professor, Cornell University Department of Food Science

9:45am-10:30am
Practical Applications of Drying & Evaporation
Practical examples of evaporating and drying of dairy-based products will be discussed. In particular, critical factors, like composition of starting materials, process temperatures, mechanical design process conditions, and other extrinsic effectors are reviewed that play a critical role in final composition and performance of condensed and dried products.
Speaker: Craig Schroeder, PhD, Science Solutions LLC

10:30am-10:45am
Break

10:45am-12:00pm
Lactose Crystallization & Its Role in Concentrated & Dried Dairy Products
This presentation will describe the basic chemistry of lactose including: mutarotation, solubility, and the various crystalline forms. The relationship between this basic chemistry and hygroscopocity, stickiness and caking in dried dairy products will then be discussed. Edible and pharmaceutical lactose manufacturing processes will be described and the major factors influence yield during lactose manufacture.
Speaker: Lloyd Metzger, Professor & Alfred Chair in Dairy Education, South Dakota State University Dairy Science Department

12:00pm-1:15pm
Networking Lunch

1:15pm-2:00pm
Dry Cleaning Technologies & Chemistry of NPE
In certain areas of dairy manufacturing facilities, water is unable to be used for cleaning purposes. Certain techniques can be implemented to assure your facility will not harbor pathogens or spoilage organisms. The chemistry of nonyl phenol ethoxylates will also be covered along with regulatory requirements of use for products shipped internationally.
Speaker: Leo Bohanon, Director of Technology, Hydrite Chemical Co.

2:00pm-2:15pm
Break

2:15pm-2:45pm
Trading Aspects of Dry Dairy Ingredients
Today, more than 1 in 7 tankers of milk in the United States are turned into a product that is exported overseas, and it is just the beginning. With significant export opportunities, we will explore the challenges of entering the export market and how the U.S. Dairy Export Council works on your behalf to alleviate trade concerns.
Speaker: Annie Bienvenue, Vice President of Technical Services, U.S. Dairy Export Council

2:45pm-4:00pm
Sustainability in Dairy Manufacturing Operations
The need for water treatment and reuse is increasing globally. Today's main problems to the (dairy) industry are high variability in wastewater flow fluctuations and peak or seasonal variations in water quality. They can put a tremendous strain on their wastewater treatment plants, posing an undesired challenge to the industry. We will hear about some different ways of handling waste water utilizing aerobic digestion, anaerobic digestion, along with how membrane filtration can fit into this.
Speakers: Thomas Probst, President, Symphonic Water Solutions
Rick te Lintelo, Director of Sales & Marketing, Berghof Membrane Technology GmbH

4:00pm-4:15pm
Break

4:15pm-5:15pm
Spores & Dry Dairy Ingredients
Mesophilic and thermophilic sporeforming bacteria are of particular interest to the dry dairy ingredient industry because of stringent customer specifications for these organisms. These organisms, which form spores and survive harsh environmental conditions such as heat, drying, radiation and pressure, are found abundantly in dairy farm environments. Addressing sources of sporeformer contamination requires a systems approach to reducing and eliminating transmission of spores into raw milk as well as controlling contamination during processing.
Speaker: Nicole Martin, Research Support Specialist, Cornell University Department of Food Science

5:15-6:15pm
Reception – Sponsored By Hydrite Chemical Company

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Program Agenda (cont'd)

Day Three
Emerging Separation Technologies & Sensory of Dairy Ingredients

8:30am-9:00am
Coffee & Day Two Review

9:00am-10:00am
Sensory Analysis of Dry Dairy Ingredients
It is not possible to produce a high quality final product using dried dairy ingredients if these ingredients are not of a high sensory quality themselves. A number of sensory effects become apparent, arising from production methods such as drying temperature, and homogenization. A small group of trained panelists can detect such changes, which can carry over into the finished product, affecting output quality. We will discuss such factors, how they may affect the properties of the end products, and taste sample milks produced under such conditions. The basics of what a sensory program can do for you, and the kinds of questions we can ask, covering the techniques required for each setup will also be covered.
Speaker: Robin Dando, PhD, Assistant Professor, Cornell University Department of Food Science

10:00am-10:15am
Break

10:15am-11:45am
Emerging Separation Technologies in the Dairy Foods Industry
Different separation technologies are applied in other industries and have been able to make some headway in the dairy foods industry. Pall Corporation will present on direct flow filtration technologies that are used for Dairy Processing and will discuss the how the different types of direct flow filters are made and how they are rated to processers understand their uses. General Electric will be presenting on Electrodialysis, Ion Exchange and it's applications in the dairy foods industry
Speakers: Alex Gorman, Lead Applications Engineer, GE
Bob Tyler, General Sales Manager for Food and Dairy, Pall Corporation

11:45am-1:00pm
Boxed Lunch, Exam & Adjourn – Travel Safely

Thank you to all of our sponsors of this year's course!
Synder Filtration
Tetra Pak Processing Equipment
GEA
Hydrite Chemical Company
Pall Corporation

1:30pm
Optional Tour of Pall Corporation
Pall Corporation is a global supplier of filtration, separations and purification products supporting many industries, including the food, beverage and dairy industries. Headquartered in Port Washington, NY, those who have registered will be touring their Cortland, NY facility, which manufacturers direct flow filtration membranes.

Address: 3643 State Route 281
Cortland, NY 13045

PALL® Pall Corporation



This course is part of Cornell University's Dairy Foods Extension Certificate Program. To complete our Certificate Program, one has to successfully complete Basic Dairy Science and Sanitation, HACCP, HTST Pasteurization/ Vat Pasteurization, and one of the following four:

- Fluid Milk Processing for Safety & Quality
- The Science of Yogurt & Fermented Dairy Products
- The Science of Cheesemaking
- Dairy Membrane Filtration, Concentration and Separation Technologies

Advanced courses and certificates are also available in Yogurt Manufacturing and Cheesemaking. For more information, please visit: http://dairyextension.foodscience.cornell.edu