

Dairy Pipeline

Volume 26 Number 1, 2014

A Technical Resource for Dairy Manufacturers

20TH Anniversary Special

Reflecting on the Wisconsin Master Cheesemaker® Program

Designed to honor the very best in the cheese industry and inspired by a strong tradition of dairy excellence, the Wisconsin Master Cheesemaker® program was established in 1994 as an advanced education program for experienced Wisconsin cheesemakers.

Made possible through joint sponsorship with the Wisconsin Center for Dairy Research (CDR), UW-Extension, and the Wisconsin Milk Marketing Board (WMMB), the Wisconsin Master Cheesemaker® program has grown to include more than 58 Masters from more than 33 companies. A testament to the dedicated cheesemakers and industry staff, the Wisconsin Master Cheesemaker® program, the only of its kind in the United States, continues to move the industry forward while preserving traditions passed down from generation to generation.

This year, as the Wisconsin Master Cheesemaker® program celebrates its 20th anniversary, CDR reflects on the program's first two decades.

How it all began

"There was a tremendous amount of cooperation to get this program up and running," said Jim Path, co-creator of the Wisconsin Master Cheesemaker® program and

retired CDR specialty cheese coordinator. "It was really a combination of the right people coming together at the right time."

The right people included a number of staff from WMMB such as Mike Dean, Andrea Neu and Cathy

Hart who helped to secure the funding and support necessary to make the program a success. The Wisconsin Cheese Makers Association board also supported the program by providing input early on and allowing the program to be highlighted during their annual cheese conference. Dr. Bill Wendorff from Food Science and staff from CDR including Path were also deeply involved in the development of the program.

"My father only had a seventh grade education but I can remember how much his

experience at the UW Dairy School meant to him," said Path. "It really stuck with me how much that hands-on education helped my father and how proud he was to have been a part of that program."

Path found inspiration in his father's love for dairy, working many years as a cheesemaker before moving to dairy research in 1988. While Path enjoyed his many years in the plant, he always had a passion for continuing dairy education and he felt a strong need to preserve the tradition of cheesemaking. ➤



“My heart was always in specialty cheese,” said Path. “When I joined CDR as a specialty cheese coordinator and we started talking about the Master program I knew I had to travel to Europe to learn more about their cheese varieties. In doing so, I also learned more about their cheesemaker recognition programs and I brought all of this information back to the WMMB board.”

The board was interested in creating a cheesemaker recognition program, but a set of guidelines and a curriculum needed to be established first. That’s where Dr. Wendorff was able to step in and assist the team with setting up a proper curriculum that would challenge and enrich an already experienced cheesemaker.

“We questioned, how do we shape this program so that everyone has a vested interest in it?” said Path. “We knew that the program would succeed if we could build ties for practical cheesemakers and if everyone had pride in the program.”

Dr. Wendorff had already established a few short courses at Babcock Hall including Cheese Technology and Cheese Grading, so it was a matter of teaming up with WMMB, Path and CDR Directors Dr. Norm Olson (1986-1993) and Dr. Rusty Bishop (1993-2010) to create additional short courses, including the more than eight required Master Cheesemaker courses that are currently offered through CDR.

“It was great to see some of the curriculum come back to specialty cheese,” said Path “I truly believed that specialty cheese would be the salvation for smaller cheese plants so it was great to see that part of the Master education was bringing over cheesemakers fluent in a specialty cheese and really targeting those styles.”

While the curriculum certainly helped the Master program to succeed, specialty cheese production in Wisconsin has also grown steadily since the curriculum was developed in the early ‘90s. In fact, specialty cheese production in Wisconsin has grown more than 18 percent since 1991.

“We just didn’t want the program to be generic, we wanted to explore everything from safety to specialty cheese,” said Path. “We wanted the program to be respected by cheesemakers. You know, any person has the right to call themselves a Master but it’s another thing for your peers to call you a Master. That’s really what the program is all about. Collaborating, learning and earning respect from your fellow cheesemakers.”

Given the emphasis on collaboration, WMMB and CDR decided to create a Master Cheesemaker board, which would consist of CDR staff, Food Science staff, WMMB staff members and select Wisconsin Cheesemakers. The board was given the power to make decisions about Master coursework and they reserved the right to vote on all matters concerning the program.

“What is so beautiful about this type of structure and program is the discussion and consensus that comes from having a board of peers,” said Path. “Having cheesemakers on the board and making the decisions really adds credibility to this program.”

Growing the Program

Path retired in 2005 after more than a decade coordinating the Master Cheesemaker program. Fortunately, CDR safety/quality coordinator Marianne Smukowski and outreach specialist Joanne Gauthier were there to continue the success of the program. Smukowski was named the technical coordinator for the program working with Dr. Wendorff and the board to set and maintain standards for the program. Smukowski also took over the plant visit and audit portion of the program and began assisting Dr. Wendorff with the Master cheese grading. Gauthier, who had worked on the program since the beginning, was named as the administrator for the program working to set up all courses and events related to the program.

“The goal was always to maintain the integrity of the program and keep Path’s dream alive by helping this program to grow and succeed,” said Smukowski. “We’ve made a few changes over the years but the end goal remains the same.”

While changes included program pre-requisites, rotations on the Master Cheesemaker board, and the Master Mark® the program has maintained its integrity and continues to see a growing interest from cheesemakers.

“We have certainly seen an increase in the number of Master candidates,” said Smukowski. “This is likely due to the respect the program garners from cheesemakers and retailers.”

In fact, the program is already full through 2016 as just 10 Masters can graduate each year.

“It’s great to see the new Masters and even a second generation coming through the program,” said Smukowski. “When we have a Master return for another cheese we



always hear that he or she learned something new and was happy to be back in the program.”

Smukowski and Gauthier plan to continue to work on the curriculum to keep the information new and on the cutting edge of dairy science.

“This program is really all about educating the cheesemakers,” said Smukowski. “It’s about making them a better cheesemaker and helping them to put out the best possible product.”

The Future of the Program

Today, the Wisconsin Master Cheesemaker® program continues to expand, adding to its course selection and welcoming a new class of Masters each year. While there have been many changes over the years the program’s goal of educating the cheese industry has remained the same.

“The program is truly for the good of the industry,” said Path. “So many people wanted to see the program succeed. We really fought to keep the standards high and maintain the integrity of the program. I just can’t say enough about those who have been involved in the program over the years.”

To commemorate all those who have been a part of the success, CDR and WMMB will be inviting all Masters to participate in a group photo and special presentation before the April ICTE awards banquet in Milwaukee.

“I’m so proud to know that the Masters will lead the dairy industry forward. It makes me feel so good to see them succeed and to know that I played a part in that,” said Path. “You know, a while ago, I saw an old creamery torn down and I realized, you can spend your life building bricks and mortar or you can build a legacy that goes on forever. It might not have your name on it, you might not own it but when you’re part of a legacy like the Wisconsin Master Cheesemaker® program, you just feel good about it. To see this program succeed is a dream and a gift.”

2014 Master Cheesemakers

Michael Brennenstuhl
Great Lakes Cheese, Seymour
(Formerly Seymour Dairy Products)
Certified Master: Blue & Gorgonzola



Growing up in Manawa, Wisconsin, Mike Brennenstuhl spent many hours at the Symco, WI cheese plant, which also happened to be his home. He can recall the many years he spent observing, training and immersing himself in the business.

“It’s all I’ve really ever known,” said Brennenstuhl of the cheesemaking industry. “I’ve worked for a lot of different companies over the years and I’ve even had the good fortune to build a successful business, but I’m really just a cheesemaker by trade.”

Brennenstuhl’s love of the trade has led him to many successes, including the start of his company, Seymour Dairy Products, which was purchased by Great Lakes Cheese in 2012. Seymour was started in 2005 when Brennenstuhl obtained an empty cheese plant. Knowing he wanted to make a unique cheese that would satisfy the needs of consumers, Brennenstuhl enlisted the help of the Center for Dairy Research to develop a new blue cheese. In the end, Seymour Dairy ended up with several different varieties of cheese including the popular, Ader Käse,™.

Now, after more than 40 years in the cheese industry, Brennenstuhl has met yet another milestone by becoming a Master Cheesemaker. Having made more than 100 kinds of cheese in his lifetime, Brennenstuhl has decided to focus on blue cheese and gorgonzola for his Master certification.

“Becoming a Master Cheesemaker is a big accomplishment,” said Brennenstuhl. “This is a truly great program and it garners a lot of respect from the industry. I am honored to be a Master and a Wisconsin cheesemaker because I believe there really is a difference.”

In the future, Brennenstuhl hopes to expand the artisan cheeses offered by Great Lakes Cheese and promote the growth of the specialty cheese business.

Brian Renard
Renard’s Cheese, Sturgeon Bay
Certified Master: Cheddar & Colby



In 1961, Brian Renard’s father, Howard, purchased Renard’s Cheese and started making Cheddar style cheeses, a tradition that has continued for more than 50 years. Now, as a part-owner in the business, Brian is focused on maintaining the “family oriented operation” that has defined Renard’s Cheese for three generations.

“I grew up making cheese,” said Brian. “In fact, most of my chores involved the cheese plant.”

Brian can recall the days when the family run operation had only two vats and the technology was minimal. Today, Renard’s Cheese manufactures five vats a day and sells several varieties of cheese including Cheddar, colby, brick, muenster and mozzarella.

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The Importance of Good Air Quality Management in Cheese Plants

Dean Sommer, CDR; Thomas Milhoua, Air Quality Process

It's often been said that the boiler is the heart of the dairy plant mechanical system. If this is true, then the air management system must be the lung of a cheese plant. Despite the importance of good air quality management in any dairy plant this is one part of a safety, quality program that can easily be overlooked. Air in a dairy plant potentially touches all products, so understanding and investing in a system that regulates the microbial quality, composition, humidity and particulate matter in the plant air will only have a positive impact on the products you manufacture.

While there are several options for good air quality systems on the market today, it is important for every dairy manufacturer to know the basics of proper air handling. Proper air filtration, flow patterns, humidity control and air distribution are key to the success of an air quality program. To assist manufacturers in better understanding these key areas, each topic has been highlighted in detail below.

Air Filtration and Flow Patterns

It's important to first understand that cheese is very sensitive to air contamination, especially during certain parts of the manufacturing process such as during curd formation and handling. Based on this, rooms with the most sensitive products should be constantly protected by filtered fresh air with the air flow moving towards less sensitive rooms. For example, in cheese plants that still use bulk starter, this room is considered the most sensitive room and therefore it should have positive pressure with fresh air. On the other hand, rooms containing raw milk are normally separated from pasteurized milk areas to minimize the risk of pathogenic bacteria contamination of pasteurized products. These raw rooms normally should be under negative air pressure to minimize the risk of airborne microbes contaminating pasteurized products in other rooms.

To achieve truly clean air handling, a proper high-efficiency particulate absorption (HEPA) air filtering quality system should be installed. While HEPA H13 filters come highly recommended, your air handling system supplier can help you to select the proper equipment for your plant.

Essentially, all new air entering the plant should always go through the filtration system and avoid rigid duct networks that cannot be easily cleaned. The air should then continue to flow from an area of high sensitivity such as vat rooms

and curd handling rooms, to warehouse areas, and finally to loading dock areas.

The rate at which the air flows through these areas should be determined by the air quality company based upon the layout of your plant. The key here is that filtered air is moving in the right direction at a proper rate.

Also note, that in cheese packaging operations, those areas where the cheese is exposed to the air are the most critical to control, so rooms where the cheese is pre-chunked, shredded, exposed on conveyor belts, and packaged are those areas needing the cleanest air and the highest pressurization. Specialists also recommend separation between areas with pallets and corrugated boxes from areas of exposed cheese to avoid any contact of airborne dirt and cardboard dust with exposed cheese.

Particulate Matter and Air Flow

It is still common to see older dairy plants with screened windows and doors that are open in the warm weather months to allow fresh air to enter a plant. Unfortunately, screens do not capture anything but very coarse particulate matter and are generally meant to prevent insects from entering the manufacturing environment. Microbes including bacteria, yeast and molds as well as viruses such as bacteriophage readily pass through screens. It is well known that during certain times of the year when microbial counts are high in outside air that fresh air passing through screened windows and doors can contribute significant counts of these microbes to the plant environment and perhaps your products. In today's world which, requires utmost sanitation practices and detailed scrutiny of product microbial counts, using screened doors and windows as a source of fresh air need to be replaced with a proper air handling system.

Cheese plants have frequently reported anecdotally that during certain times, perhaps when the wind is coming from the "wrong direction" that starter culture activity is slowed. There is little doubt that at times exterior air, if not properly filtered, can contribute significant and potentially damaging microbial loads to the air in your cheese plant.

Due to the issues noted above it is best to locate intake air vents on the west end of your plant due to prevailing westerly winds. This helps to minimize the potential for recycled air to come back into your plant through your intake vents. It is also best to locate intake vents away from any flat roofs of plants because the roof can serve as harborage for microorganisms. Vents should also not be located near unpaved parking lots because traffic generates dust and particulate matter.



Opinions vary on the amount of fresh or “make-up” air you need to properly run your air handling system. Traditionally a percentage of the air is exhausted (to the outside) from the dirtiest area of your plant, such as washing rooms, while the balance of the air is renewed with independent filtered fresh air. Exhausting more air will help rid your air of humidity and perhaps odors and particulate matter that are picked up inside your plant. On the other hand, exhausting large percentages of air, particularly in the cold weather months, is energy intensive as it will take a lot of heat to temper your replenished fresh air up to proper temperatures. Many plants historically have somewhat mitigated this cost by running their systems at higher velocities (i.e. more air exchanges per unit time) in the summer months and lower velocities in the winter months. This is closely related to the question of how many air exchanges per hour are sufficient. This is plant dependent and is influenced by plant layout and the sum of openings through which it is necessary to ensure a constant air velocity. You should work with your air quality handling supplier to determine what is right for your plant as you may find a significant energy savings by more precisely estimating the amount of fresh air needed.

Humidity

Humidity control is also important with respect to incoming air. Many air handling systems pass incoming air over some cooling coils to remove moisture in the air to assist with removing inherent heat and moisture in the plant caused by processing equipment, cleaning operations, people and even sunlight. Depending on plant conditions, this air cooling process can sometimes be followed by a reheating of the air before discharging it into the plant. This dries the air and gives it the ability to pick up excess moisture and humidity in the plant environment. If this isn't done, at certain times the humidity levels in the plants will be oppressively high,

cold pipes will sweat and drip, and floors and equipment will not dry out properly. This can be dangerous and also lead to unsanitary conditions.

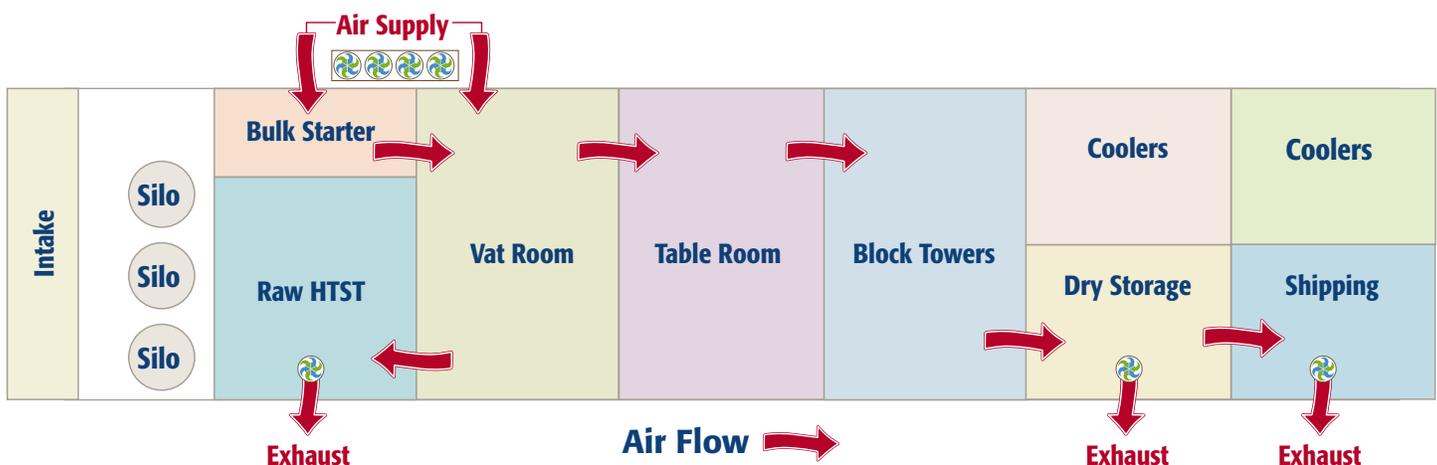
Installing a proper air handling system will greatly enhance the ability of a cheese plant to operate under a dry floor program. With drier incoming air, coupled with sufficient air volume and exchanges, plant floors can be kept relatively dry. Since bacteria, yeasts and molds need water to grow, keeping the floors of your plant dry greatly reduces the risk of growth and establishment of bacteria. Furthermore, bacteriophage need actively growing bacteria in order to propagate. Keeping a dry floor program will significantly reduce the likelihood of general phage contamination of your cultured dairy product areas.

Air Distribution

Air distribution is absolutely critical in order to keep all areas of your plant supplied with conditioned, filtered air. Any rigid duct work present should be made out of stainless steel so that it can be vacuumed, washed, and will be resistant to corrosion over time. Fabric socks have also come into favor in the last 20 years because they are good at evenly distributing the air and they have the ability to be washed. In either case, the key is to evenly distribute the air and keep a certain level of equilibrium throughout the plant.

While an air handling system may be complex and perhaps even a bit costly, it's important to remember that ultimately, the air in your plant touches all the products you manufacture. Controlling the air in your plant is an important step in maintaining a good manufacturing environment and not compromising the integrity of the cheese products you manufacture. 🍷

Air Flow in Linear Cheese Plant



Celebrating 20 years of Wisconsin Master Cheesemakers



“It’s been great to see the continual growth. We’ve really found a niche and we’ve worked to keep it,” said Brian. “Some things have changed but the tradition remains the same.”

It’s that passion for quality and tradition that led Brian to the Master Cheesemaker program. Seeking a greater understanding of the industry and a unique experience, Brian has spent the past three years gaining knowledge and applying it to his family’s business.

Now a Master in Cheddar and colby, Brian hopes to continue the tradition of manufacturing quality cheddar style cheeses alongside his family, just as the Renards have done for a half-century.

Christopher Renard
Renard's Cheese, Sturgeon Bay
Certified Master: Cheddar & Mozzarella



A part-owner of Renard’s Cheese and a member of the Renard family, Chris Renard is proud to be a part of his family’s cheesemaking tradition.

Growing up near the cheese plant, Chris always had a passion for cheesemaking.

“We really learned to take pride in our work and the quality of our product,” said Chris. “I’ve always been proud that we’ve remained a very hands-on business and not just a push button operation. While some of our technology has changed, the tradition is still there.”

Chris was drawn to the Master Cheesemaker program as a way to better understand the science behind cheesemaking and make new industry connections.

“I really wanted a better understanding of cheese including the cultures and the business,” said Chris. “I was interested in how other companies were run and I wanted to learn the science from the best.”

Now a Master in mozzarella and Cheddar, Chris is proud to be a part of the Wisconsin cheesemaking tradition. “This program has really opened my eyes to everything,” said Chris. “From cultures and technology to new ideas in the industry, I’ve really learned a lot.”

Patrick Doell
Agropur, Luxemburg
Certified Master: Mozzarella & Provolone



Pat Doell was born into the dairy industry. He spent his childhood living next door to a cheese plant in which his mother and Uncle Roger Krohn were part-owners and his dad was the plant manager. Known once as Krohn Dairy, and now a part of Agropur, there is still a picture of Doell’s childhood home hanging on the conference room wall; a nod to the Krohn and Doell family tradition.

“I was lucky to have the childhood I did as it allowed for a lot of hands-on experience,” said Doell. “I was able to work in the plant during high school, focusing on packaging and eventually work my way up to cheesemaking.”

In addition to obtaining his cheesemaker licence in 2000, Doell also received an associate degree in Food Science. Doell credits his dad with his work ethic and drive to succeed and Doell is thankful to his Uncle Roger for starting him on his path to becoming a Master Cheesemaker.

“It was a personal choice to become a Master, but Roger and Terry Lensmire really encouraged the process and they provided me with great resources,” said Doell.





2005
Jim Path Retires, Marianne Smukowski is named the New Coordinator of the Program

2006
Three Brothers from the Same Family (Buholzer's) Complete the Master Program

2008
50th Wisconsin Cheesemaker Completes the Master Program

2010
WMMB Promotes Master Cheese in Retail Accounts

2004
10th Anniversary of the Master Cheesemaker Program

2007
Marks the Year the 30th Variety of Cheese is Certified in the Program

2013
• Scott Erickson Approved for Juusto, a Fresh Cheese Developed at CDR

Now a Master in mozzarella and provolone Doell is proud to represent his family and Agropur in a positive way.

“I’m so thankful to Agropur for investing in me,” said Doell. “This is truly a great accomplishment for both myself and the company.”

Returning Master Cheesemakers

Bruce Workman
Edelweiss Creamery, Monticello
Certified Master: Cheddar & Gouda



With eleven Wisconsin Master Cheesemaker® certificates under his belt, Bruce Workman holds the most Master certifications of any cheesemaker. A unique achievement, it is Workman’s passion for education that has been the driving force behind his 40 plus years in the cheese industry.

“I’m a firm believer in education and an advocate for what the Center for Dairy Research has to offer,” said Workman. “The Master program has given me an opportunity to learn, network and grow my business.”

A business owner since 2004, Workman has continued to expand his manufacturing business Edelweiss Creamery into other ventures, opening Edelweiss Cheese Shop in Verona, WI in 2012. He currently sells more than 100 varieties of Wisconsin cheese including many varieties with a Master Mark. A Master himself in gruyere, baby swiss, butterkase, havarti, raclette, emmental, specialty swiss, brick, muenster, cheddar and gouda, Workman knows good cheese.

“Our goal is always to manufacture and sell quality cheese that is consistent,” said Workman. “Education and our small company’s excellent staff have made all the difference in the quality of our products. In the end, we know it’s about the quality and consistency of the product going out the door.”

Mark Gustafson
Sartori, Plymouth
Certified Master: Fontina and Romano



Mark Gustafson has always had a passion for cheese. As a kid he listened to his Dad tell stories about the cheese plant and once in a while Gustafson even had a chance to visit his Dad ➤



Bruce Workman

Paul Reigle

Mike Brennenstuhl

Patrick Doell

Mark Gustafson

Brian Renard

Chris Renard

Photos © WMMB

at work in the cheese plant. It was clear early on that this is what Gustafson wanted to do and by high school he was working in a plant. In 1997 Gustafson received his cheesemaker license.

A few years ago, already a Master in asiago and parmesan, Gustafson decided to return to the program to earn a certification in fontina and romano.

“I really wanted a chance to learn more about cheesemaking and focus on mastering a few more of Sartori’s most popular cheese varieties,” said Gustafson. “Cheesemaking provides me with a challenge and I love that I am consistently learning something new.”

Gustafson appreciates the honor and prestige that comes along with the Master certification but more than anything he enjoys the experience of learning and the opportunity to perfect his craft.

“The Master program has been a great resource and an excellent experience,” said Gustafson. “I would go through it all again if I could.”

Paul Reigle

Maple Leaf Cheese Coop, Monroe
Certified Master: Cheddar



Paul Reigle was just looking for a job to help him pay for school when he began working at Maple Leaf in 1983. However, he soon fell in love with cheesemaking and now, more than 30 years later, Reigle is still passionate about cheesemaking.

“The art of cheesemaking is what really interests me,” said Reigle.

“It takes a lot to make cheese. It’s not an assembly line thing; it requires the cheesemaker to adapt and change.” Reigle received his first three Master certificates in yogurt cheese, monterey jack and gouda cheese. This year he adds Cheddar to his repertoire.

“I got into the Master program because it not only offered excellent continuing education, but also a chance to really separate myself as a cheesemaker and join a prestigious group,” said Reigle. “I entered the program again to focus on other cheeses and continue to learn. It’s important to never stop learning and the Master program teaches you that. I can’t thank CDR and WMMB enough for starting this great program.” 🍌



World Championship Cheese Contest

The World Championship Cheese Contest hosted by Wisconsin Cheese Makers Association (WCMA) and held March 18-19, 2014 at the Monona Terrace in Madison, Wisconsin welcomed more than 2,600 cheese and butter entries from around the world. CDR's own John Jaeggi, Luis Jimenez-Maroto, Dr. Mark Johnson and Carol Chen were among the judges selected for this year's event.

Wisconsin lived up to its reputation as the dairy state with more than 30 cheesemakers taking home gold medals and four Wisconsin cheeses making it to the sweet sixteen. 🍌



John Jaeggi, CDR



Luis A. Jimenez-Maroto, CDR/ UW Food Science



Arnoldo Lopez-Hernandez, UW Food Science



Mark Johnson, CDR



Curd Clinic: Frozen Culture Storage

Curd Clinic Doctor: Dean Sommer

Question: I've noticed that some of the direct set cultures that have been in my freezer at my cheese plant for longer periods of time seem to be losing activity. Do frozen cultures lose activity over time? What am I doing wrong?

Answer: Yes, frozen cultures are damaged and lose activity over long term storage, especially if they are not handled correctly. It's not sufficient to merely keep the cultures in a "frozen" condition. Proper frozen storage of starter cultures for the manufacture of cheese and other fermented dairy products is a lot more complicated than that. Randall K. Thunell, Ph.D., (Waterford Food Products, Inc.) wrote an excellent article on this topic many years ago for our Dairy Pipeline, Vol 8, No.4, Fall 1996. You can read the entire article by searching on our website. But let me summarize a few key points that Dr. Thunell made in that article:

- ▶ Starter cultures are perishable and have a finite shelf life
- ▶ Cell death increases with extended storage time
- ▶ Lower storage temperatures reduce cell death rates
- ▶ Optimal storage temperatures are -40C (-40F) or colder
- ▶ Storage temperatures at or warmer than -20C (-4F) result in marked and rapid decreases in cell viability and activity
- ▶ Fluctuations in temperatures during frozen storage are very detrimental to starter culture activity

Healthy cultures are key to cheesemaking consistency and quality cheese production. All efforts should be made to ensure that you are starting your cheesemaking process with healthy, vibrant cultures.

When you receive your frozen cultures they should be packed in excess dry ice. You should promptly

unpack your cultures and immediately place them in a proper freezer with a temperature of -40C or colder. Temperatures of -45C to 80C (-49F to -112F) will give even longer stability.

Most home freezers are not suitable for culture storage, for two reasons. First, home freezers are simply not cold enough. Second, most have self-defrosting cycles which are extremely detrimental to culture viability. Even small temperature fluctuations which occur during defrosting cycles cause intracellular ice crystals to grow in size and damage the starter culture cells.

Dr. Thunell provided this table as a rule of thumb guideline regarding reliable storage times for frozen bulk and direct vat set (DVS) cultures:

Reliable Storage Times for Bulk and DVS Cultures Held at Different Frozen Temperatures		
Reliable Storage Time	Temperature	
5-10 days	-20C	-4F
3-6 months	-40C to -45C	-40F to -49F
12 months	-75C or lower	-103F or lower
* Freeze-dried cultures can be stored at 40C for longer than 12 months		

So, please remember that frozen starter cultures are perishable and are susceptible to damage and loss of activity from improper frozen storage. Maintaining optimum activity is dependent on keeping the stored cultures cold enough and not subjecting them to temperature fluctuations. Overall, the cost of purchasing the proper culture freezer is minor compared to the cheese problems associated with inconsistent culture performance due to improper storage. Combining proper storage conditions along with good culture inventory rotation (first in, first out) will go a long way toward ensuring maximum culture activity and consistency. 🍌



CDR Frozen Cultures ©



Don't Miss the 2014 International Cheese Technology Expo

Here's your opportunity to learn about the latest in cheese and whey technologies, hear perspectives on food safety, celebrate Master Cheesemakers and cheese contest champions and see the latest products on the trade show floor, and it's all happening at this year's International Cheese Technology Expo.

CDR and the Wisconsin Cheese Makers Association are co-hosting the Expo, April 23-24, at the Wisconsin Center in Milwaukee, WI. It is the world's largest gathering devoted solely to the multi-billion dollar market for cheese and related dairy products. This is your chance to network with cheese manufacturers and suppliers from across the nation and around the world. Visit with CDR staff during the following activities:

Wednesday, April 23

11:30 – 5:00 CDR Booth #1019 Trade show floor

Ideas Showcase Stage A

12:30, 1:30, 2:30, 3:30 (tradeshow floor)

- ▶ Gas formers in cheese
- ▶ The latest in dairy beverages
- ▶ Milk yield calculations & standardization
- ▶ Economic evaluation of UF membrane performance

Thursday, April 24

9:00 – 11:30 am New Learnings in Cheese Production

9:00 – 11:30 am Growth in Whey and Dairy Ingredients

11:30 – 4:00 pm Booth #1019 Trade show floor

5:00 – 8:30 pm Banquet and Celebration of Master Cheesemaker Program 20th Anniversary

CDR will also be hosting an invitation only kickoff networking event and reception on Tuesday, April 22 highlighting the i6 funded commercialization TURBO program. If your company is interested in exploring new dairy related technologies and products for commercialization, contact Vic Grassman, vgrassman@cdr.wisc.edu for more information.

Plan to join us in Milwaukee! For more information or to register please visit www.cheeseexpo.org



2013 WCIC

Mike Roemer Photography Inc.



RESEARCH SHOWCASE TUESDAY, APRIL 22, 4-6:00 PM

BY INVITATION ONLY, ICTE, WISCONSIN CENTER, MILWAUKEE, WI | communications@cdr.wisc.edu

Building Industry Advisory Committee

On January 17, 2014 the CDR Building Industry Advisory Committee met for the first time. The group spent several hours discussing the various aspects of the project and even broke out into specialized groups to focus on specific product areas or facility issues. As the building project progresses the Industry Advisory Committee will continue to meet from time to time (or as smaller groups) and provide input on the building project. Given the complexity of this project this committee will play an important advisory role in the development of a world class dairy research center.



CDR would like to thank all of the committee members for volunteering their time and expertise. If you are interested in joining the committee, now is the perfect time. Please contact Dr. John Lucey (jlucey@cdr.wisc.edu) or Dean Sommer (dsommer@cdr.wisc.edu) to learn more about becoming a CDR building advisor.



Front Row: Mike Green (Emmi), Glenn Goldschmidt, Peter Zoltai (HP Hood), Karl Linck (Sargento)

Middle Row: Jeff Allman (Saputo), Brian Riesterer (Sargento), Tom Witte (Zimmerman Architects), Gary Ellingson (Ivarson), Axel von Wardenburg (Alpma USA), Ron Buholzer (Klondike)

Back Row: Pat Muga (Satori), Mark Schleitwiler, Lyle Clem (Electrol Specialities), Dave Jelle (Foremost), Bob Fassbender (TC Jacoby), Dave Kreider (HP Hood), Tim Lukavsky (Kraft), Randy Brandsma (Schreiber), Greg Mergen (not present) 🍌



A ONE DAY, HANDS-ON WORKSHOP, LED BY CDR STAFF AND RUMINANT EXPERT MARIANA MARQUES DE ALMEIDA OF LISBON, PORTUGAL. DISCOVER THE SCIENCE BEHIND SHEEP, GOAT AND MIXED MILK COMPOSITION, COAGULANTS, MANUFACTURING PROTOCOLS AND MUCH MORE.
REGISTER ON-LINE & PAYMENT www.cdr.wisc.edu/shortcourses



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The Dairy Pipeline is published by the Center for Dairy Research and funded by the Wisconsin Milk Marketing Board.

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Short Course Calendar:

Goat and Sheep Milk Cheeses of Spain and Portugal, April 15

World of Cheese, Apr. 27 – May 1

Cleaning and Sanitation, May 6

HACCP, May 7

Applied Dairy Chemistry, May 13-14

Cheese Grading, June 3-5

For detailed information on each CDR short course
www.cdr.wisc.edu/shortcourses

Events:

2014 International Cheese Technology Exposition

April 22-24, 2014 | Wisconsin Center, Milwaukee, Wisconsin

