



## CDR 25th Anniversary

The Wisconsin Center for Dairy Research (CDR) is celebrating 25 years as one of the premier dairy research centers in the world. Over the past quarter century, CDR has worked with industry and research leaders to provide them with the best educational opportunities and support that can only come from the Dairy State.

When CDR began in 1986, the University of Wisconsin-Madison had already established itself as a leader in dairy research through the work of the Walter V. Price Cheese Research Institute (1976) and the establishment of the first in the nation Dairy School Short Courses (1890).

The official establishment of CDR as a designated U.S. dairy research center meant that Wisconsin now had a broad-based program that could offer necessary services to the dairy industry, which provides more than 26 billion dollars to Wisconsin's economy.

"To me, CDR's greatest contribution has been the facilitation of multi-disciplinary research and outreach," said Norm Olson, Ph.D., who served as Director of CDR from 1986-1993 and helped to create the center by encouraging the U.S. government to create dairy research centers and by working with the Wisconsin Milk Marketing Board (WMMB) to secure funding for CDR. Today, WMMB continues to be a major funder.

"The Wisconsin Milk Marketing Board (WMMB) has viewed CDR as a strong partner since providing the startup funding back in 1986," said Matt Mathison, Vice President Cheese Company Communications and Technical Services at WMMB. "Over the past 25 years, CDR has evolved to become a vital asset to the Wisconsin dairy industry and WMMB looks forward to continuing our great partnership well into the future."

CDR was originally established with the goal of developing, supporting and coordinating multidisciplinary research programs in economics and marketing, modification of properties and composition of milk, new uses for milk components and by-products, dairy product (e.g. speciality cheese) and process development, defining the role of dairy

products in human nutrition and enhancing the nutritional quality of dairy products.

As CDR worked to meet those goals, new needs and objectives began to develop. Only one year after its establishment, CDR had formed four main areas of study including milkfat utilization, nonfat solids utilization (primarily whey), cheese (specialty types and flavor and texture improvement), and safety.

As industry needs changed, so did CDR's services, allowing staff members to grow from six in the beginning to nearly 35 employees today.

"The strategic growth of CDR was aimed at meeting the needs of the industry and our funders," said Rusty Bishop, Ph.D., Director of CDR from 1993 – 2010. "CDR's job is not only to conduct research, but to also teach it and apply it. In order to accomplish this 3-pronged mission, it was necessary to build a staff and Food Science faculty with the top researchers, teachers, and communications experts in the world."

In addition to CDR's growth in staff, CDR continues to provide the bridge between research and applicable knowledge in the field. One way CDR has done that is with its continued outreach efforts.

"An important part of the center's outreach work has been the

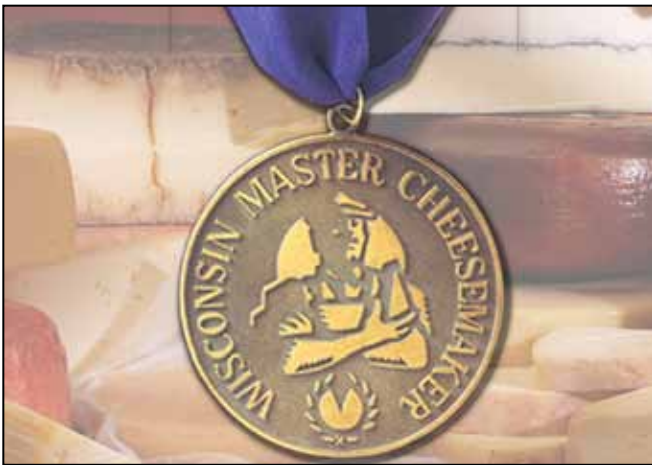




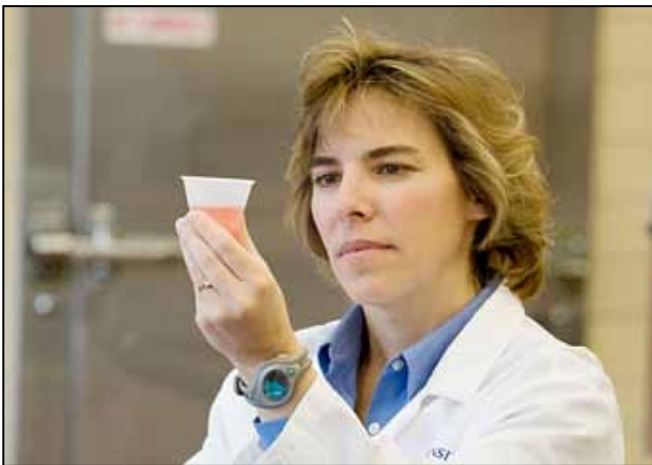
courses combined with the collaboration of Food Science faculty and CDR has had a major impact on the center's success."

Today, short courses allow industry personnel to attend trainings that provide hands-on research based education. To date, nearly 10,000 individuals have attended Dairy Short Courses that have been cosponsored by CDR.

"Short Courses really help people to see us as a resource," said Senior Scientist Mark Johnson Ph.D, who has been with CDR since the beginning. "When we started the center, we mostly did contracting and ingredient work, but now CDR has become an industry icon through our trouble shooting, research and education efforts."



In conjunction with the dairy short courses, CDR, the Food Science Department and WMMB also established the Master Cheesemaker® Program in 1994 with the goal of providing advanced education to experienced cheesemakers. Jim Path, a retired CDR Specialty Cheese Outreach Coordinator originally suggested the program after traveling to Europe and observing their cheesemaker recognition programs. Upon his return, Bill Wendorff, Cathy Hart and Mike Dean joined forces to establish the program in Wisconsin. The program is the only one of its kind in the United States and offers those experienced cheesemakers who pass the extensive courses and training the opportunity to earn the Master's designation which includes the use of the WMMB developed Master's Mark on their products. The Master's Mark represents Wisconsin's "cream of the crop" dairy manufacturers.



"The Master Cheesemaker® Program has grown to be much more than I ever anticipated," said University of Wisconsin Food Science Professor Emeritus Bill Wendorff Ph.D, who has been collaborating with CDR for many years and was one of the masterminds behind the program. "I think the program really took off when companies began to see the outstanding quality of cheese coming from those individuals who had gone through the program."

While CDR's programs continue to expand, so does its research. In 2010 alone, CDR worked with over 100 companies as well as 30 organizations and regulatory agencies both nationally and internationally to provide cutting edge research and support. While research regarding cheese continues to be a major area of focus for CDR, research into dairy ingredients, cultured products and sensory services continues to increase as well.



"With the continued expansion of whey and dairy research, we see an increased number of companies and people who come to CDR for dairy expertise and expert problem solving," said Wendorff.

CDR works to support the growing demand for its dairy expertise, the 60 year old dairy plant in Babcock Hall, which

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is home to CDR, struggles to provide CDR staff and industry members with the modern and spacious facility that is needed to maintain CDR and Wisconsin as a world-class leader in the dairy industry.

So this year, as Babcock Hall celebrates 60 years of service and CDR celebrates its 25th, CDR and Food Science have announced plans to build a world-class dairy research and education facility at Babcock Hall in order to pave the way for future advances in dairy product research. As part of the plan, the dairy industry will be asked to help raise half of the approximately \$32 million dollars needed to build the facility which will include a state-of-the-art dairy plant.

“Our vision for the future is to create a center of excellence within Babcock Hall to provide dairy education and research support to Wisconsin as well as the entire dairy industry,” shares CDR Director and Food Science Professor John Lucey Ph.D. “This facility will train the next generation of dairy leaders and provide research support for the continuing growth in specialty cheese, protein ingredients, cultured products and nutritionally enhanced dairy components. We have the outstanding staff but our industry needs a world class facility to do training and research.”

As the dairy industry looks towards the future, CDR will continue its work to support the industry and maintain its position as a unique location where industry can receive assistance from a passionate staff, including world-renowned scientists with over 250 years of combined industry experience.

“CDR has survived through some ups and downs and will continue to grow stronger,” added Olson. “I think the best years for the center are yet to come.”

**For more information regarding the building project fund visit [www.cdr.wisc.edu/building](http://www.cdr.wisc.edu/building)**



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*With the goal of building a world-class dairy research center, the architectural renderings at left depict the 3-story addition which will be built on the west end of Babcock Hall. This area will include a modernized dairy plant as well as training and education facilities. The middle image illustrates what the training center could look like, with the bottom rendering showing the renovated dairy plant. The addition will have open spaces and flexibility to accommodate the future needs of the dairy industry in the areas of cultured products, mold and smear ripened cheeses, membrane filtration, and much more.*

*CDR Director and Food Science Professor John Lucey Ph.D.*

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## 2012 IDF Cheese Ripening & Technology Symposium



**The Wisconsin Center for Dairy Research (CDR) and the United States National Committee of the International Dairy Federation (IDF) are proud to host the 2012 IDF Cheese Ripening and Technology Symposium, May 21-24, 2012 at the Monona Terrace in Madison, Wisconsin.**

The three-day event, which will bring together over 350 of the world's leading cheese scientists and researchers from more than 30 countries, offers dairy industry members a chance to discover and discuss innovative technologies and scientific findings in relation to cheese. The 2012 symposium will also offer American cheesemakers and R&D staff a particularly unique opportunity as this is the first time the event will be held in the United States.

This year, the symposium will focus on Ripening and Flavor, Physical Properties and Performance, and Health and Wellness. Several sessions will be held each day to aid in the discussion and overall understanding of each topic. Eleven keynote speakers and 30 oral presentations will be given throughout the three-day event in addition to daily poster sessions. On Thursday, May 24 an optional technical tour will be offered for those interested in exploring the US dairy industry first hand; including a stop at CDR.

"Hosting the IDF Cheese Ripening and Technology Symposium in the U.S., and especially in Wisconsin, is a once in a generation opportunity," said Rusty Bishop, Chair of the U.S. Program Committee. "This is a chance to have our cheese industry and institutes gain exposure to the latest science from the best cheese scientists in the world."

"This is truly an industry effort," states Symposium Organizing Committee Chair Rani Govindasamy-Lucey, CDR. "We appreciate the sponsorship support from companies such as Chr Hansen, Schreiber Foods, Ecolab, Prolamina, Wisconsin Cheese Makers Association, and Wisconsin Milk Marketing Board. There are also several other companies who are finalizing their support. These partners are ensuring that we can do the best job possible show-casing the Wisconsin and US dairy industry to attendees."

The keynote speakers consisting of leading scientists and experts from five countries, are as follows:

<b>Day 1: Ripening and Flavor</b>
<b>Concepts of cheese ripening control: from science to practice</b> <i>Keynote Speaker: Ross Holland, Fonterra Research Center (NZ)</i>
<b>Microbial ecology of cheese and flavor formation</b> <i>Keynote Speaker: James L. Steele, Univ. Wisconsin-Madison (US)</i>
<b>Metabolic modeling of flavor formation</b> <i>Keynote Speaker: Eddy Smid, Wageningen Univ. (NL)</i>
<b>Sensory and flavor optimization</b> <i>Keynote Speaker: Wim Engels, NIZO Food Research (NL)</i>
<b>Day 2: Physical Properties/Performance</b>
<b>Material science approach to development of cheese structure/texture</b> <i>Keynote Speakers: Fred van de Velde, NIZO Food Research (NL) &amp; Mark Auty, Teagasc, Moorepark Food Research Centre (IE)</i>
<b>Impact of biopolymers in cheese texture</b> <i>Keynote Speaker: Tim Guinee, Teagasc, Moorepark Food Research Ctr. (IE)</i>
<b>Oral processing and sensory texture of cheese</b> <i>Keynote Speaker: Allen Foegeding, North Carolina State Univ. (US)</i>
<b>Low fat/low sodium cheese (Joint Session – Physical Properties/Performance &amp; Health and Wellness)</b> <i>Keynote Speaker: Mark Johnson, Wisconsin Center for Dairy Research (US)</i>
<b>Day 3: Health and Wellness</b>
<b>Influence of cheese on prevention of risk of disease</b> <i>Keynote Speaker: Michael B. Zemel, Univ. of Tennessee – Knoxville (US)</i>
<b>Nutrigenomics and personalized food</b> <i>Keynote Speaker: Guy Vergères, Agroscope Liebefeld-Posieux Research Station (CH)</i>
<b>Probiotics and prebiotics in cheese</b> <i>Keynote Speaker: Todd Klaenhammer, North Carolina State Univ. (US)</i>

**Register online at [www.idfcheeseus2012.com](http://www.idfcheeseus2012.com)**, a discounted rate is being offered until March 1, 2012.

Please note that attendance may be limited to the first 350 registered participants.

The program committee has finalized oral presentations. Call for Posters is open until March 1, 2012.

**For more information visit [www.idfcheeseus2012.com](http://www.idfcheeseus2012.com)**

# Research Update

By Karen Paulus, CDR and F.X. Milani, Dept of Food Science

Do you know the environmental impact of your product? Have you fielded questions from your customers? If you haven't, chances are that you will in the future. Retailers, major brands, and food service establishments are getting customer questions about the environmental impact of products from a glass of milk to a slice of cheese on a hamburger. And those questions will ascend the food chain to you, the manufacturer.

Consumers want to know if the products they buy have been produced in an environmentally sustainable way. But how do you quantify an environmental impact? Today's tool to measure environmental impact is a Life Cycle Assessment, or LCA. Concerns about energy resources and limitations on the supply of some raw materials influenced the early development of the LCA in the early 1960's; now in 2012 the tool has evolved to allow manufacturers to use this standardized method to measure the environmental impact of everything from apricots to zippers. Over the past decade experts have developed sophisticated computer programs that can handle analyzing detailed inputs for every product made. You may have seen carbon calculator applications on some websites.

The dairy industry now has the data to start answering questions about the environmental impact of producing cheese and whey. A recent report titled, Comprehensive Life Cycle Assessment for Cheese and Whey Products, sponsored by the Innovation Center for U.S. Dairy's Dairy Research Institute (DRI), describes a LCA for mozzarella, cheddar, and whey, both wet and dry. A typical LCA starts at the very beginning of the raw material, in this case feed production for the cows. A dairy LCA continues through milk production, transport, processing, distribution, retail, consumption, and disposal; in the lingo of LCA, "from cradle to grave."

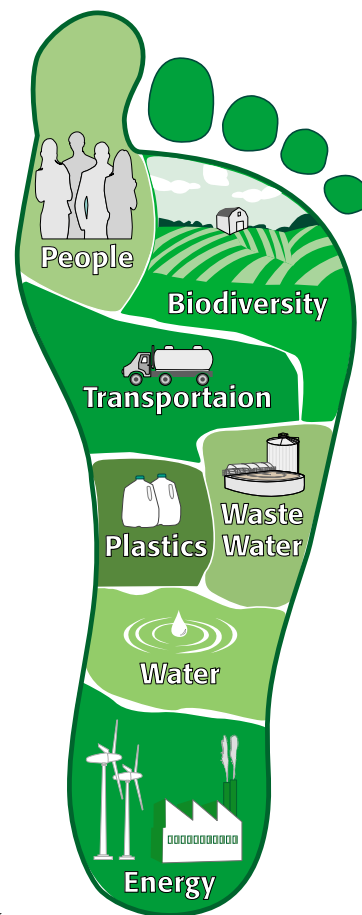
This report is comprehensive. The author's note, "We have accounted for the entire supply chain of cheese consumption in the United States." They began by building a Life Cycle Inventory, gathering input and output data for each element of the system and for each process and product option. For example, they collected information detailing the percent of milk solids, the amount of cheddar, mozzarella, and other products produced as well

as the input of rennet, sodium chloride and the amount of energy used each year. The primary focus of the current study was on the processes controlled by cheese manufacturing plants. The cheese companies volunteered to complete a spreadsheet-based survey to incorporate data directly into a digital platform for the LCA. During 2010, data was collected on a total of seventeen processing plants, including ten cheddar plants, six mozzarella plants, and one whey processing plant. Based on total U.S. cheese production estimates of just over 10 billion pounds per year, the study surveyed 1.2 billion pounds of cheddar and .77 billion pounds of mozzarella, which represents 36 percent and 24 percent of the category production of each of those cheeses, respectively. A wide variety of plant sizes are represented with production ranging as small as 30 million pounds per year to around 300 million pounds per year. The average cheddar and mozzarella plant produced 120 and 130 million pounds per year of cheese, respectively.

Life cycle assessments need to include multiple dimensions, or indicators, of environmental impact and for this study the following nine were included: climate change, cumulative energy demand, freshwater depletion, marine eutrophication, photochemical oxidant formation like smog and ozone, freshwater eutrophication (mostly phosphorus), ecosystems (biodiversity), human toxicity and environmental toxicity (poisons).

The report, over 77 pages, is loaded with detail. The fact that cheese and whey are co-products but produced by different processes, complicates the LCA of dairy products. Thus, the authors developed an allocation procedure that fairly assigns the environmental impact of both cheese and whey. This was done by tracking the mass balance flow of milk solids through the plant, using the van Slyke cheese yield equation for cheese and compositional nutrition information for whey. From the LCA, the calculated carbon footprint of cheddar and mozzarella cheese is approximately 8.3 and 7.4 pounds of CO<sub>2</sub> per pound of cheese consumed, respectively.

Now that we know the carbon footprint of cheese, what can we do with it? Cheese manufacturers can benchmark their performances against this 2009 industry average calculated in the report. Then, they can verify and track changes and improvements. For example, carbon footprint has a companion; it is energy consumption. The fossil fuels, coal and gas, both huge carbon dioxide emitters, make up the vast majority of energy used around the world. Tracking your carbon footprint also



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# Round Table Discussion-Reduced Sodium Cheese

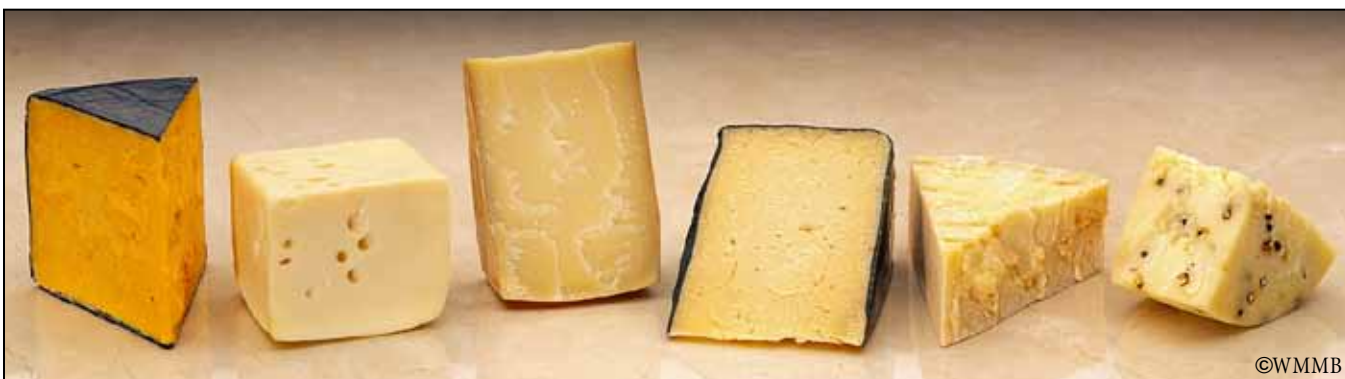
On December 1, 2011, the Wisconsin Center for Dairy Research (CDR), held its annual CDR Industry Team Research Forum in Madison, Wisconsin. Over 80 members of the dairy industry and CDR staff attended.

During the forum, attendees were asked to join in a round table discussion moderated by CDR Director John Lucey, focusing on the concerns, obstacles and future potential of lower or “reduced” sodium cheese. Mark Johnson Ph.D., Assistant Director and Senior Scientist at CDR, Kevin Sweeney, Corporate Vice President R&D and Technical Services at Saputo Cheese, USA and David McCoy Ph.D., Vice President, Product Research, Dairy Research Institute (DRI) led the round table discussion.

While many thoughts and opinions were expressed during the discussion, it became clear that industry and researchers have a similar set of concerns when it comes to the production and sale of low sodium cheese. Below, is a summary of the main points discussed during the round table. For a full review of the discussion, see the January 13 issue of Cheese Reporter.

Concerns Regarding Low Sodium Cheese:
<b>Concern: Growth of pathogens</b>
It is important to recognize that cheese is essentially a preserved product that has evolved over hundreds, if not thousands, of years to result in a product that can be consumed without making people sick and without rapidly spoiling. By modifying the salt content, we change the environment of the cheese, and now other microorganisms may grow which would not grow under normal salt conditions. This poses a potential safety risk for consumers and potential brand issues for the manufacturers.
<b>Concern: Altered Flavor and Quality variation</b>
Salt plays an important role in the flavor and texture of cheese. Over many years, specific salt conditions in moisture levels have been established for each cheese, which helps the cheese product to remain consistent in taste, texture and safety. When the salt content is altered, the manufacturer may lose his or her ability to maintain a consistent product.
<b>Concern: Loss of consumer confidence</b>
As one panelist said: Some consumers may try their first purchase of lower sodium cheese, but if you want that second sale, it comes down to taste and what the consumer wants. Cheese characteristically has a salty taste and salt is what the consumer expects. If you change the salt levels, then you change what consumers expect and that can change sales. The panel agreed, concluding that when it comes to consumers, “there is no such thing as better or worse, only different.”
Functional Aspects of Salt in Cheese:
<b>Function: Cooling for brine salted cheese</b>
Consider this: If cheesemakers simply reduce the time cheese is left in brine in order to reduce its sodium level, then it would also result in cheese of a higher temperature which provides greater opportunity for undesirable bacteria to grow (compounded by the lower salt content).
<b>Function: Controls Moisture</b>
Consider this: Salt addition helps to expel moisture from curd. Unless counteracting measures are taken, a reduction in salt may result in higher moisture cheese that may have softer texture and reduced shelf-life.

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## Labeling Concerns And Definitions Regarding Sodium:

### Concern: Sodium content must be listed on a label

While one method of sodium reduction is to use a reduced amount in production, other methods include using potassium chloride in place of sodium chloride or using another chemical to reduce sodium levels. The compounds must be listed on the label. In addition, it is important to consider that sodium replacements such as potassium can only replace about 20% of sodium before most consumers notice a distinctive unpleasant taste. In any case, labeling any additives becomes a necessary part of the sodium replacement process, which may be costly.

### Definition of Low vs. Reduced Sodium Cheese:

The Food and Drug Administration (FDA) sets strict rules regarding the labeling of products containing additives and sets limits for products looking to be labeled as “low-sodium.” Technically low sodium cheese must be 280 mg sodium / 100 grams or less.

The term lower sodium has no legal definition; it just means lower than the typical sodium content in that type of cheese, but there is considerable commercial variation in the sodium levels for cheeses such as Cheddar and processed cheese.

### Is There A Future For Low Sodium Cheese?

- The Asian market provides a great opportunity for the export of lower sodium cheeses as they demand cheese containing less than one percent salt.
- It is also important to emphasize to consumers that Swiss and Fresh mozzarella are two existing low sodium options that are already on the market.
- Also, sodium reductions of up to 25% have already been successfully achieved in Cheddar.

In the end, it is important to remember that cheese is a living product; one which comes in many varieties and one which, even after thousands of years, we are still working to perfect and understand. In keeping with our goal to keep consumers safe and educated, it is time to take a step back and carefully look at the risk/benefit of low sodium cheese before moving forward and potentially damaging the good name of the industry and harming consumers in the process.

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*It is important to recognize that cheese is essentially a preserved product that has evolved over hundreds, if not thousands, of years to result in a product that can be consumed without making people sick and without rapidly spoiling.*

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### Research Update Continued from page 5

allows you to track your energy consumption. Since the study contains stratified and detailed information throughout many of the processes in the dairy manufacturing plant and associated food chain, plant operators can use this information to reduce energy consumption, which can shrink a carbon footprint and save money. Likewise, a review of water usage and wastewater streams can reduce your water footprint and may also save you money.

For a complete copy of the report go to:

<http://www.usdairy.com/Pages/Home.aspx>

For more information about the dairy industry and green house gases, see the Dairy Pipeline, Vol. 22, No. 2

*F.X. Milani, Assistant Professor at UW–Madison, collected data at cheese plants, analyzed surveys and is one of the authors of Comprehensive Life Cycle Assessment for Cheese and Whey Products. Contact F.X. Milani at (608) 890-2640 or [milani@wisc.edu](mailto:milani@wisc.edu) for more information.*

# Curd Clinic

Clinic Doctors: Mark Johnson Ph.D, Dean Sommer and Bill Wendorff Ph.D

**Question:** How can I limit yeast and mold surface contamination of cheese?

**Answer:** Yeast and mold contamination is a common problem in cheeses, especially those that are not immediately vacuum packaged the day of manufacture. While the simple solution to controlling surface contamination is to maintain a sanitary working environment, there are often other factors to consider. In dealing with surface contamination of cheese there are two important things to remember. First, yeast and mold are two different microbes and must, therefore, be dealt with differently. Secondly, controlling surface contamination of a brined cheese that is then vacuum packaged like mozzarella, Muenster or perhaps Feta differs greatly from controlling surface contamination on smear ripened (Limburger; Gruyere, smeared Brick), bloomy rinded (Brie; Blue), or cave aged cheeses.

## Understanding Yeast:

Yeasts are single-celled organisms that reproduce asexually by budding. They generally grow best between 25 and 30 degrees Fahrenheit but can also grow at or below 32 degrees Celsius. Unlike mold, which absolutely needs the presence of oxygen to grow, yeast can tolerate and grow in very low oxygen concentration conditions, including in modified atmosphere packaging (MAP) found with shredded cheese, or even 20 pound slabs of vacuum packaged mozzarella. Halophilic yeasts are of most concern in the case of cheese, as they grow well even in high concentrations of salt found in brines. Yeasts also thrive in acid conditions especially those containing high levels of sugar (lactose). Therefore, they can present a major problem wherever whey is found. While some yeasts are important in the ripening of certain cheeses, yeast contamination in other cheeses can cause many negative effects including the production of gas and off-flavor in cheeses.

## Locating And Controlling Yeast Contamination:

If your plant is experiencing yeast problems, the first place to look is your brine. Yeasts thrive under salty conditions, making brine a potential breeding ground. To keep yeast contamination at bay, monitor your brine for yeast counts on a regular basis. Ultrafiltration (UF) membrane systems easily remove yeast from the brine, but care must be taken to keep the brine tank sides, frames and general brine areas clean as well. Also, clean up any spills and regularly check underneath raised tanks for organic matter.

Other ways to control yeast counts include adding the correct concentration of natamycin to the brine, regular pasteurization of brine, and adding chlorine to brine. It is important to note that while the addition of chlorine is

effective, is not recommended as it can lead to serious off flavors in the cheese and is questionable from a regulatory approval standpoint.

Keeping your manufacturing environment as clean as possible is also critical to yeast control. Supply air into the plant should be filtered if possible; either a 95% efficient filtering system or even a hepa filter system should be used. Good flow of filtered, low humidity air through the plant will keep the environment dry and less prone to yeast growth and contamination. A dry floor program is an effective way to limit yeast and mold contamination in a plant (as well as limiting pathogenic bacteria and bacteriophage). Keeping the plant floor free of cardboard, wood pallets and other harborage will also help control yeast counts. Proper handling of cheese is important as well. Fines from the fines saver should not be incorporated into the regular cheese production. If it is necessary to use the fines in production, they should be routinely monitored for yeast counts. Use of rework is discouraged as this is a notorious source of yeast contamination.



Cleaning and sanitation practices of equipment and the plant environment are critical in controlling counts. When cleaning, be sure to use the proper products. Quaternary ammonium is excellent for sanitizing floors, drains, sinks and walls and other non-product contact surfaces. These cleaners, however, should never be used on product contact surfaces since their residual long lasting killing power will kill starter organisms and inhibit cheese fermentation. Chlorine based products work well for product contact surfaces. Extra diligence is required for non stainless product contact surfaces such as rubber or plastic belts as these surfaces often develop tiny cracks that harbor yeast cells. Keep in mind that acid based sanitizers do not work well as mold and yeast thrive in acidic conditions.

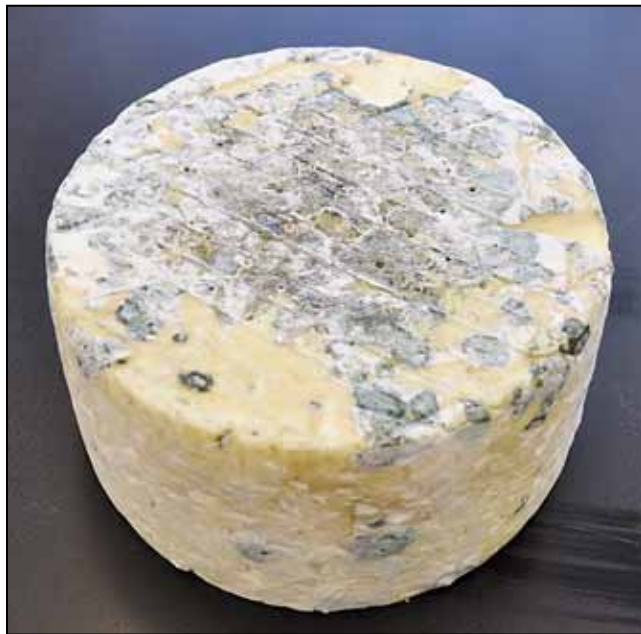
## Understanding Mold:

Molds are aerobic many-celled filamentous fungi, which tend to have a fuzzy appearance and come in many color varieties. It is important to mention that black mold is particularly dangerous as they may produce aflatoxin which are toxic and carcinogenic. Molds can grow easily in both

very acidic and very basic conditions, but often favor acidic conditions. Molds reproduce through spores, which become airborne and quickly spread throughout the plant.

### **Locating and Controlling Mold Contamination:**

Air quality is one of the most important factors in maintaining a clean and mold free environment. Mold spores can easily enter your plant through windows, doors, on clothing and through unfiltered air vents. Similar to yeast control, ideally a plant should have an air filtering system in place. If this is not possible, it is important to take alternative control measures. This may include, putting up a plastic curtains between doors and the brining room or checking windows and doors or air intake fans to be sure that they are not located near trash dumpsters, dusty areas or other sources of contamination. It is also wise to locate air intakes upwind of spray irrigation fields, treatment plants and dairy processing facilities. Use of slowly dissolving iodine or other sanitizer rings in condenser pans in cooler units is also an important mold control measure. Also, attempt to minimize condensation on ceilings and walls as this moisture can lead to mold growth. Be especially careful to watch cold air vents for contamination.



In the case of mold, it is nearly impossible to keep all varieties off the surface of your cheese. The commonly allowed contaminant level for yeast and mold in a brined cheese such as mozzarella is less than 100 CFU/g while vacuum packed cheeses such as 40 pound blocks of cheddar or Colby often have specifications of less than 10 CFU/g.

Sanitation is again key in limiting mold contamination. Similar to yeast control, use of Quaternary ammonium sanitizers on non product contact environmental surfaces, use of natamycin in correct concentrations in brines or as a surface application on cheeses, and using chlorine based sanitizers on product contact surfaces are among the best for limiting mold contamination.

As an added preventative measure against mold spore contamination in your plant, consider changing clothes before entering the facility. Spores from fields, processing facilities and other locations may be on your clothing so changing before entering the facility or at least putting on a protective coat or other gear can help to limit mold contamination in the facility.

### **Special Cheeses Considerations:**

Smear, bloomy rinded, and cave aged cheeses present special challenges when it comes to yeast and mold control. In all of these cheese varieties the growth of the correct yeast and or mold strains is necessary and desirable for the manufacture of a good quality cheese. The key is to get proper growth of the correct strains of yeast or mold for the variety in question while preventing the growth of undesirable strains. Some general principles will help tip the balance of success in your favor. Again, scrupulous sanitation practices are key, especially keeping undesirable strains of yeast and mold out of your manufacturing and curing rooms. The concept of overwhelming competitive inhibition is also key. Generally, you want the correct strains of yeast and or mold to grow quickly and in overwhelming numbers to preclude the growth of any contaminant strains. If your desirable strains of yeast or mold are slow to grow, they will leave an opportunity for undesirable strains to take over and contaminate the cheese. This method requires an attention to detail in first achieving the correct moisture and pH conditions in your cheese and then maintaining the correct humidity and temperature conditions present in your curing rooms to maximize growth of desirable strains. For smear cheeses, protecting the smear from contamination is most important.

### **Overall Control:**

In all cases, brined or ripened, yeast or mold, it is important to take preventative measures to limit contamination of products. If, however, you are already experiencing yeast and mold issues, know that regardless of the species of contamination, a deep and thorough cleaning of your plant is necessary. Take the time to observe your cheese on a regular basis and take stock when something begins to grow or you notice something odd. Remember, no matter the size of your facility or the variety of cheese you produce, sanitation standards are key to keeping your product safe and saleable.

## News from CDR

**The new Babcock Hall/CDR Dairy Facility project** continues to progress; the UW-Madison Campus Planning Committee (CPC) recently ranked it among the top three projects at the Madison. This means our project will now move up through the University System before reaching the state level for approval. Obtaining this high ranking is good news and we are confident and ready to forge ahead. See Page 3

**Discover Wisconsin** spent a day filming at CDR as part of a story about the “Anatomy of a Pizza.” And what holds the whole pizza together better than cheese! Watch for Dean Sommer and John Jaeggi to appear on your television screen sometime this Spring (March 3).



### 2012 International Cheese Technology Expo



Mark your calendars for April 10-12, 2012 and be sure to visit CDR at the International Cheese Technology Expo (ICTE), to be held at the Frontier Airlines Center in Milwaukee. Co-hosted by CDR and the Wisconsin Cheese Makers Association, cheese manufacturers and suppliers from around the world attend this 2 1/2 day combination of morning seminars, afternoon Technology Expo, and the World Champion Cheese Contest auction and awards banquet. Be sure to attend CDR’s technical session, “Cheese...Today’s Challenges and Tomorrow’s Opportunities” on Wednesday, April 11, when we’ll focus on the challenges of yeasts and molds; how to get back to the basics regarding factors affecting body, texture and flavor of cheese making; and once you’ve made your cheese, how do you capture the value of whey. After the break, we’ll change gears and focus on the opportunities. We’ve partnered with the Innovation Center for US Dairy to share with you the impact of the new school lunch program on cheese, followed by their new report on the Future of Dairy and Cheese Research. And don’t forget to stop by our booth, #729, during the Technology Expo...it’s the perfect place to meet up with CDR staff to ask follow up questions and see what’s new at the Center. ICTE...if you’re in the cheese business, it’s the place to be April 10-12, 2012 in Milwaukee.

### New Editor at CDR

In late November, Rebekah (Bekah) Gillespie joined the CDR staff as a communications specialist/editor. Bekah has a Life Sciences Communication degree from UW-Madison with an emphasis in business. Previously, she worked as a science writer for UW Health Marketing and Public Affairs and she was also the author of the Go Red for Women newsletter and a coordinator for Dottie the Donor Dot. Bekah will be responsible for CDR’s newsletters, technical bulletins, website content, and will assist with presentations and general communications efforts. Tim Hogensen, CDR’s graphic designer will design and layout the Pipeline.



### Farewell

Sometimes you notice that time has passed when you run into a kid you haven’t seen for a while; it seems like they grew up when you had your back turned. For me, the Dairy Pipeline marks the passage of time. When I started working at CDR in 1993, I put together Volume 5, No. 2, highlighting an article written by the “new” director, Rusty Bishop. And, now, this latest newsletter, Volume 23, No. 3 is the last one for me. (I am moving on to pursue other projects.)



Where did the time go! I sure have learned a lot about cheese, yogurt and whey as well as the entire dairy industry. I also met a lot of really nice, hard-working, and fun people. And, so far, I haven’t tasted a cheese that I didn’t like. Thanks for being loyal readers and thanks to everyone at CDR: my co-workers who turned into friends.

*Karen Paulus*

## Jaeggi, Jimenez-Maroto and Bradley to serve as World Cheese Contest Judges

Forty cheese experts from around the world will convene to choose the World Champion Cheese at the 2012 World Championship Cheese Contest to be held March 5 – 7, 2012 at the Monona Terrace Convention Center in Madison, Wisconsin. CDR staff John Jaeggi, coordinator, Cheese Applications Program; and Luis Jimenez-Maroto, sensory coordinator; are both serving as judges along with Dr. Bob Bradley, professor emeritus, UW-Madison Food Science department. This year's international team will hail from 17 nations and 10 U.S. states, including Argentina, Australia, Canada, Croatia, Denmark, France, Germany, Ireland, Italy, New Zealand, Mexico, Portugal, The Netherlands, Russia, South Africa, Switzerland, and the United Kingdom.

“The Contest Judge Selection Committee carefully reviewed many prospective judges to arrive at a well-qualified team. This year's panel represents a wide range of expertise as well as an excellent international presence,” said Chief Judge Robert Aschebrock.

Contest officials anticipate more than 2,500 entries from around the world for this 29th biennial competition.

## Follow us on Twitter

CDR is excited to announce that we have a Twitter account @WICDR. Follow us to learn more about short courses, upcoming milestones and events, research updates and the latest news.

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### The Dairy Pipeline

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**[www.cdr.wisc.edu](http://www.cdr.wisc.edu)**

## **Calendar:**

Short Courses:

Dairy Field Reps- February 7-8

Process Cheese Course- February 21-22

Buttermakers Short Course- February 28- March 1

Cheese Tech Short Course- March 19-23

World of Cheese- April 29-May 3

**For Detailed information on each short course**

**[www.cdr.wisc.edu/shortcourses](http://www.cdr.wisc.edu/shortcourses)**

## **Events:**

International Cheese Technology Exposition (ICTE) April 10-13,  
Milwaukee

International Dairy Federation (IDF) Cheese Ripening & Technology  
Symposium May 21-24, Madison **[www.idfcheeseus2012.com](http://www.idfcheeseus2012.com)**