

## A LOOK AT THE FACTORS IMPACTING CHEESE BROWNING AND BLISTERING

In the previous issue of the Dairy Pipeline (Volume 33, Number 3), we covered “How the Cheesemaking Process Influences Melt and Stretch.” In this issue, we’re following up with a related topic: cheese browning and blistering.

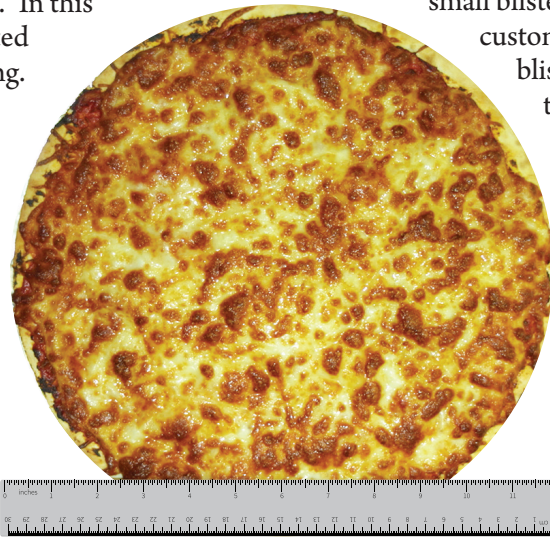
Cheese browning and blistering is very important for cheeses that are used in applications where the cheese is baked or subjected to direct heat. The most common application is pizza. Too much or, in some cases, too little browning and blistering can ruin a pizza in the eyes of your customer.

### What is Browning and Blistering?

This topic is somewhat complicated and comes down to different factors that will be addressed in this article, including protein structure, cheese composition, cheese age and more.

When talking about browning and blistering, we’re looking at the number and size of the blisters and the color of the browning. There is a whole range of blistering and browning. Some pizzas with pronounced

blistering look as if the entire surface is one large blister. More commonly, pizzas will have several dozen small blisters with a dark brown color. Most customers prefer some browning and blistering on their pizzas. However, there’s no right amount – it comes down to personal preference of your customer.



Dean Sommer, CDR Cheese and Food Technologist, said, “When I teach short courses, I will point at a picture of a pizza with a little more browning and blistering and I’ll ask, ‘How many people like your pizza to look like this?’ And half the hands in the room will go up. Then I’ll point to a picture of a pizza

with less browning and blistering and I’ll ask, ‘How many people like your pizza to look like this?’ And the other half of the hands in the room go up. So, there’s no right or wrong amount.”

Dialing in the desired browning and blistering is about working with your customer to determine the optimum amount of browning and blistering and making a consistent cheese that meets those parameters. This article will examine some of the factors and methods to control cheese browning and blistering.

### Protein Structure

One of the biggest factors in controlling browning and blistering is the ability of the protein structure of the cheese to form either a thick layer (more rigid) or a thin layer (weak) during blister formation. Blister formation is due in part to the stretchability of the cheese and the speed of drying of the blister during baking. ➡



#### What's Inside:

- ◆ Curd Clinic – Cryoscope Test, page 4
- ◆ CDR's New Specialty Cheese Caves, page 5
- ◆ CDR Sensory Services, page 6
- ◆ DBIA News, page 8
- ◆ CDR Welcomes New Staff, page 9
- ◆ Building Project Update, page 10
- ◆ Congrats to CDR Retirees, page 11
- ◆ Upcoming Trainings and Events, page 12

However, a cheese with a long stretch will not necessarily result in more numerous and larger blisters. The ability of a cheese to stretch is based on the casein network and the three factors that influence the chemistry of the casein network: pH, loss of calcium, and proteolysis. A cheese with a long stretch and that forms thick strands when pulled will more likely form few if any blisters but a cheese with shorter stretch and that forms thin strands when pulled is more likely to form more and larger blisters. A cheese with little to no stretch may form many small blisters or the cheese shreds will burn in place and form no blisters if the cheese does not melt.

So, why is this the case? Let's explain using examples. Mozzarella made by the direct acidification process (Fresh Mozzarella) typically has the longest stretch of any Mozzarella but does not form blisters nor does the cheese flow when heated. The cheese remains white and fat is not released (cheese does not flow). Why are blisters not formed? Fresh Mozzarella is not shredded but cut into circles and placed on the pizza, i.e. the layer of cheese is relatively thick. Fresh Mozzarella also contains much free or expressible moisture that will evaporate rapidly as the cheese is baked. The cheese surface cools as moisture evaporates and in part prevents steam being produced within the cheese, at least temporarily. The cheese surface slightly dries and becomes firm. Steam formed within the cheese will push on this tough layer of cheese but the pressure is insufficient to allow blisters to form. The pH of Fresh Mozzarella is approximately 5.7-5.8, which is key to the long stretch.

Low Moisture Part Skim (LMPS) Mozzarella made by traditional acidification with thermophilic strains of bacteria has a pH of approximately 5.1-5.3. This is key for its enhanced melting properties and lower stretch length when compared to Fresh Mozzarella. Young LMPS Mozzarella typically forms many small blisters on a pizza but as the cheese ages and some proteolysis takes place, the blisters may become larger.

In addition, the moisture in LMPS Mozzarella is held within the casein network although not as readily

released as in Fresh Mozzarella but will form steam as the cheese is heated. The protein layer or skin is somewhat giving so as steam pushes up on the cheese, a blister can form. If the pressure of the steam is released before the skin dries, no blister forms. In young cheese there is more of a tendency for the pressure of the cheese to be released than in older cheeses. However, if the pressure is not released the uplifted surface will dry (burn) and a blister will form. The thinner the skin, the greater the chance for it to dry (burn) before pressure is released and more and larger blisters can result. Proteolysis can result in a thinner skin and this is why older cheeses tend to form larger blisters.

### Blister Color

"I know people put a lot of emphasis on the sugar content on the cheese and the Maillard browning process in describing blister color, but it's more complicated," said Mark Johnson, CDR Distinguished Scientist.

The color of the blister is a result of drying and the sugar (mainly galactose) content of the cheese. Both of these factors (drying and sugars) are needed to produce browning. For instance, cheese that does not dry even

though it contains a lot of galactose does not brown. Check the cheese underneath a dark brown blister, it is white because it hasn't dried out.

### Cheese Age

The age of the cheese also impacts the cheese protein structure, which in turn, will influence the amount of

browning and blistering. "Cheese is dynamic and changing as it ages," said Sommer.

As cheese ages, it undergoes proteolysis or the breakdown of its protein structure. For instance, Mozzarella that is older (over 60 days) will have a weakened protein structure due to proteolysis. If proteolysis is not too extensive and the cheese still has the ability to stretch albeit not long it will have a tendency to form larger blisters that burn more readily and be more susceptible to browning. If the cheese can still stretch, although the stretch will be shorter, the skin on the uplifted cheese will be thinner. The thin skin will dry faster and will dry ➡

### Blister Quantity Examples



A number of factors impact blister quantity, including protein structure of the cheese, cheese composition, and cheese age. From left: Pizza with no blister quantity, slight blister quantity and pronounced blister quantity.

or burn before pressure can be released. Together with enhanced potential to burn and with galactose present, the blisters will be darker.

### Fat/Cheese Composition

Fat also plays an important role in determining the amount of browning and blistering that will occur. “Lower fat cheeses can be more challenging to work with on pizzas because those cheeses are more likely to blister,” Johnson said. “Fat content is very important in restricting moisture loss that precludes burning but there is more to it.” Even though lower fat cheeses are higher in moisture they are also higher in protein. The protein network is denser, contains more bound calcium and this can lead to more blister formation.

When cheese is baked and the cheese flows or melts some of the fat within the cheese will be released and coat the surface of the cheese. This thin layer of released fat on the surface of the pizza helps protect the cheese from drying out. Once cheese dries out while baking, it will quickly, brown and blister. If the fat content of the cheese is higher, fat can provide some protection to avoid excessive browning and blistering. If a variety of cheeses are blended on a pizza, released fat can help to form weak spots in the cheese layer and this will aid in the release of steam and reduce blister formation.

Cheese blends can be an effective strategy to avoid too much browning and blistering. To illustrate this point, Johnson shared a previous research project. CDR was tasked with developing a cheese for pizza that would meet the lower fat requirements of the school lunch program. Schools were finding that their pizzas were browning and blistering too much and students weren’t eating them. CDR staff developed a cheese blend, consisting of a low fat cheese blended with a higher fat cheese (Muenster). The blend still met the low fat requirements of the school lunch program and the pizzas had much less browning and blistering and, most importantly, the students liked the pizzas much better. In effect, the small amount of full fat Muenster in the cheese blend protected the low fat Mozzarella from over blistering.

### Other Factors

The use of thermophilic cultures in the manufacture of Mozzarella can result in galactose accumulation in the cheese. As mentioned earlier, galactose participates in the Maillard reaction, which is heat induced reactions between proteins and sugars. Cheese with galactose is more likely to caramelize and form brown blisters when cheese dries during baking. This is why it is important to choose thermophilic cultures carefully to find strains that better ferment the galactose and/or modify the make procedure to force the cultures to ferment the galactose. Or the lactose/galactose can be removed by other means such as water dilution, water rinses, or using diafiltered UF milk.

**One final point:** cheese pizza is probably the most demanding regarding cheese browning and blistering. Toppings like pepperoni, mushrooms and onions are going to help protect the cheese because they add a fat or moisture to the surface of the pizza and can inhibit blister formation. Plain cheese pizzas are the toughest ask of cheese when it comes to browning and blistering. 🌞

### Blister Color Examples



The color of the blister is a result of the drying of the cheese and the sugar (mainly galactose) content of the cheese. Both of these factors (drying and sugars) are needed to produce browning. From left: Pizza with definite blister color and pizza with pronounced blister color.

### Resources

Dairy Pipeline. 2021. Volume 33, Number 3. How the Cheesemaking Process Influences Melt and Stretch. Accessed at [www.cdr.wisc.edu/assets/pipeline-pdfs/Dairy-Pipeline-Vol33-No3\\_2.pdf](http://www.cdr.wisc.edu/assets/pipeline-pdfs/Dairy-Pipeline-Vol33-No3_2.pdf)

FRCFT Group (National University of Ireland). 2003. Assessment of cheese browning affected by baking conditions using computer vision. *Journal of Food Engineering*. 56, 339-345.

Xixiu Ma, B. James, M. Balaban, L. Zhang, E. Emanuelsson-Patterson. 2013. Quantifying blistering and browning properties of Mozzarella cheese. *Food Research International*. 54, 917-921.

## CURD CLINIC – CRYOSCOPE TEST AND THE FREEZING POINT OF MILK

*Curd Clinic Doctor: Dean Sommer, CDR*

**Question:** I was reading about the cryoscope test, which tests for water in milk by looking at the freezing point of the milk. Several of our farmers' milk is higher than the standard ( $-0.540^{\circ}\text{H}$ ). How can that be? Can I assume there are more solids or is there something else that is causing the freezing point to rise?

**Answer:** Cryoscope is an interesting topic and one that causes a lot of confusion. I'll try and explain.

The Cryoscope test measures the freezing point of milk.

You are correct in saying that it is used to assess whether water was accidentally or intentionally added to the milk at the farm. The freezing point of milk is a function of how many low molecular weight solids, typically salts and sugars, are present in the milk. It is not appreciably affected by high molecular weight solids, like fats and proteins. So, it's the Other Solids in milk – lactose and minerals – that determine the freezing point. The more lactose and minerals in the milk, the lower (colder) the freezing point. But remember, we are talking a negative number here:  $-0.540^{\circ}\text{H}$ . The degree units are not  $^{\circ}\text{F}$  (Fahrenheit) or even  $^{\circ}\text{C}$  (Celsius) but rather  $^{\circ}\text{H}$  (Horvet).

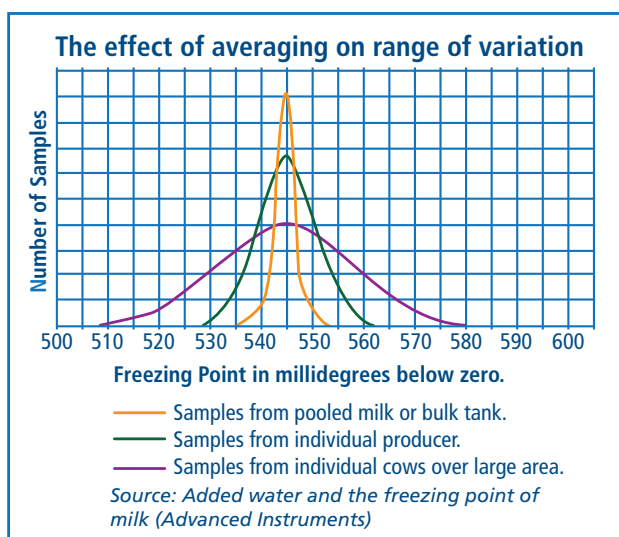
Because the freezing point of milk is a negative number (meaning colder than the freezing point of pure water) the larger, the number the colder it is and the lower the freezing point. Just like a  $-20^{\circ}\text{F}$  day is colder than a  $-10^{\circ}\text{F}$  winter day. So, a  $-0.540^{\circ}\text{H}$  is a colder number than a  $-0.515^{\circ}\text{H}$ . I think it's helpful and less confusing when talking about cryoscope readings to talk in terms of warmer or colder with regard to the number rather than a 'higher' or 'lower' number.

As you know the composition of cow milk varies in fat and protein, but it also varies to a much lesser extent, in the other solids, namely minerals and lactose. The reason the mineral content of milk varies very little is that it is linked to the mineral content of the blood system of the

cow, which is tightly controlled physiologically in the cow's body. That's why all cow milk doesn't freeze at exactly  $-0.540^{\circ}\text{H}$ . Some cow milk has slightly more or less lactose and minerals than other cows. So, the  $-0.540^{\circ}\text{H}$  cryoscope freezing point is an average freezing point determined over time. Some cows and herds will freeze at a slightly warmer temperature (for example at  $-0.535^{\circ}\text{H}$ ) due to slightly less minerals and/or lactose in their milk; some will freeze at a slightly colder temperature due to slightly more minerals and/or lactose in their milk (for example at a temp of  $-0.550^{\circ}\text{H}$ ).

Since  $-0.540^{\circ}\text{H}$  is an average freezing point number, every cheese plant has to choose for themselves what their 'actionable' number is for a farmer's milk freezing point. At what temperature is it worthwhile to do some

checking to see if there is added water in the farmer's milk? I don't recommend investigating every farm with a number slightly warmer than  $-0.540^{\circ}\text{H}$  (for example  $-0.536^{\circ}\text{H}$ ) because, in most cases, there is no added water; it's just normal cow to cow and herd to herd variation. Also, since the  $-0.540^{\circ}\text{H}$  freezing point is an average; the more cows in a herd, the more the individual cow variation will average out. Therefore, large herds will tend to be closer to the  $-0.540^{\circ}\text{H}$  number than smaller herds.



We recommend that each cheese plant set their own cut off number where they want to investigate if there is a possible added water issue. If I remember correctly, when I worked in industry, we set the cut off number at  $-0.532^{\circ}\text{H}$ . Meaning that at numbers warmer than this, ( $-0.531^{\circ}\text{H}$ ,  $-0.530^{\circ}\text{H}$ ,  $-0.529^{\circ}\text{H}$ , etc.) our field representative would go to the farm and investigate. Admittedly  $-0.532^{\circ}\text{H}$  is cutting it pretty fine. Regulatory officials wouldn't investigate until the number was  $-0.525^{\circ}\text{H}$  or warmer.

From a practical perspective, it was always the really warm freezing point numbers, like  $-0.510^{\circ}\text{H}$  or warmer, where I would really get concerned because of the financial implications of high amounts of added water.

What I advise cheese plants today is to consider using your Other Solids test results on individual farms as a rough screen for added water issues. Meaning if you look at your farmers' milk composition tests, and you see ➡

any with low Other Solids numbers, that's a rough screen for potential added water. Then you can follow that up and use the Cryoscope test on those farmers' milk supply, which is a more definitive test of added water, to see if something is going on or not. That will at least catch any really serious water addition cases.

Finally, don't forget to check samples from your incoming bulk loads of milk for added water. There have been cases of unscrupulous haulers adding water to the milk in their truck tanks after the farm samples have been taken. In this case the individual farm samples will all be in the acceptable range, but a sample taken from the entire bulk truck tank will be bad, because the water was added after individual farm samples were taken. If this is not caught it

can lead to dairy plant losses of tens or even hundreds of thousands of dollars over time. All bulk truck deliveries should be routinely sampled for added water, either by screening by looking at other solids milk composition of the truck tank sample, or by testing the bulk truck tank sample with a cryoscope.

### Resource

Added Water and the Freezing Point of Milk. 1995.

Advanced Instruments. Accessed online: \_

<https://portal.aicompanies.com/assets/2015/12/AddWaterMilk.pdf> 🌟

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## TAKE A TOUR OF CDR'S NEW SPECIALTY CHEESE CAVES

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The Center for Dairy Research is currently moving into its new three-story addition to Babcock Hall on the University of Wisconsin-Madison campus and the Center's staff are excited to share some of the equipment and capabilities available in this new facility. CDR is rolling out a series of short videos highlighting some of the new areas and features.

The first video is with Andy Johnson, who is an Assistant Coordinator for the Cheese Industry and Applications group, giving a tour of the specialty aging rooms or cheese caves. CDR is very excited about this feature of the new CDR addition. CDR Director John Lucey has called the state-of-the-art aging rooms the "crown jewel" of the new facility. It is believed that the aging rooms are the only facility of their kind in the United States in an academic or research setting.



The aging rooms are made up of 10 different aging or ripening rooms that each have their own individually controlled environment. When aging cheese, it is very important to have the correct environment and many factors like temperature and humidity need to be taken into consideration and controlled.

The aging rooms are fitted with advanced air handling systems that allow users to maintain very tight control over the environment to maximize and target very specific parameters based on the cheese requirements. The operator will manage the room environments through modern touchscreen interface systems allowing for tight control and monitoring. Our capabilities will also allow all room environmental data to be recorded for later examination and use.

Using these new aging rooms, CDR will have the capability to develop and research all types of specialty cheese including white molded cheeses, blue mold cheeses, bandaged Cheddars, washed and smear ripened cheeses, eyed cheeses like Gouda and Swiss and dry room capabilities for cheese like Parmesan.

To view the video featuring the CDR aging rooms, visit [www.cdr.wisc.edu/building-project](http://www.cdr.wisc.edu/building-project) 🌟

## WHAT CAN CDR SENSORY SERVICES DO FOR YOU?

Want to get a better understanding of how consumers perceive your product? Interested in how your product stacks up against the competition? Or maybe you just want to learn more about how sensory science can help you? The Center for Dairy Research's Sensory Services can help you with all of the above and much more.

Located on the University of Wisconsin-Madison campus, CDR's Sensory Services offers a variety of panels and services that can provide you with truly objective data. Gain a better understanding of the sensory attributes of your product and identify key appearance, texture, and flavor attributes that drive consumer preferences. CDR's Sensory Services can help add value and awareness to products.

Sensory science/evaluation is defined as a "scientific method used to evoke, measure, analyze and interpret those responses to products as perceived through the senses of sight, smell, touch, taste and hearing."<sup>1</sup> Sensory evaluation controls different variables to create an environment in which trained panelists or testers can objectively evaluate the sensory aspects (sight, smell, touch, taste and hearing) of a food/beverage. By scientifically evaluating a food/beverage, data or results can be produced that can give important feedback to food/beverage producers as to how their product is received and/or perceived.

## One Stop Shop

In addition to the CDR Sensory Service's panels and tests, clients can be provided with further analysis and troubleshooting assistance through collaboration with the other CDR program areas.

CDR has more than 30 researchers with over 300 years of combined experience in food and dairy manufacturing. Areas of expertise include cheese, beverages, dairy ingredients, cultured products, dairy processing, butter, product development and more. CDR is world leading in product development, contract research, troubleshooting for product and process manufacturing, and training services.

When working with CDR's Sensory Services, these other services and areas of expertise are available to clients. Perhaps a cheese has unwanted crystals? That client can be connected with CDR's Cheese Group and Analytical Lab, which can provide the analysis and technical assistance to identify and remedy the issue.

Not only can flavor or functionality defects be identified and quantified through sensory analysis, CDR's extensive industry experience can be leveraged to help diagnose what in manufacturing, processing, or the supply chain might be contributing to that issue. Whether a cheese unexpectedly develops gas, becomes overly pasty, or just doesn't develop the desired flavor profile, CDR has the tools to pinpoint the source. ➡

### CDR Sensory Tests

**Expert Screenings** - CDR dairy product experts, many of whom have judged at national and international competitions, can evaluate your product to generate key insights. Thanks to their advanced expertise and years of experience in judging, they can also help in troubleshooting, identifying defects and suggesting areas of improvement for various products.

▶ Expert Opinion

▶ Qualitative feedback

**Descriptive Panels** - Descriptive sensory analysis offers a statistically robust method of identifying key attributes of a product or monitoring their changes over time. This is done using panelists who have been extensively trained to detect and quantify appearance, flavor and texture attributes in a repeatable manner.

▶ Quantitative descriptive analysis

▶ Qualitative descriptive profiling

▶ Product comparison

▶ Product mapping

▶ Changes during shelf life/ripening

**Consumer Panels** - Consumer panels are conducted in our consumer-lab located in Babcock Hall. Data is collected with the end goal of measuring preferences, degree of liking (hedonics) or consumer differentiation.

▶ Preference testing

▶ Differentiation

▶ Acceptance testing

▶ Ranking

▶ Product comparison

**Functionality Testing** - Our expert judges or trained panelists are also able to test cheese performance including shredding, melting, slicing and cooking applications. Both trained panelists (descriptive) and expert panels (screening) are available to evaluate products, depending on the outcome and feedback you desire.

▶ Descriptive functionality

▶ Screening functionality

**Discrimination Testing** ▶ Triangle testing

▶ Tetrad testing

## Enhanced Data Analysis

With a Master's Degree in Business with a focus in Data Analysis from Missouri State, CDR Sensory Coordinator Brandon Prochaska can provide clients with detailed data visualization of the data collected by CDR Sensory Services. This service allows for a deeper understanding and analysis of the data collected by CDR Sensory Services on your product.

Data visualization (see example below) can help tell the data's story by breaking down information into easily understandable and infinitely customizable graphical representations. A well-designed visual can more succinctly summarize what the data is saying, quickly transforming bits of information into actionable knowledge. This allows for more effective communication to stakeholders and more informed decision making, empowering your organization. It can even allow for stakeholders to do their own ad-hoc analysis with included filters to query the data. This transforms a typical static report, into something much more dynamic. For instance, perhaps you want to see how your product was perceived by different age groups, you can easily bring that factor into the visual.

## Here to Help

CDR's Sensory Services are here to help you develop high quality, successful dairy products that meet consumer expectations. Maybe you aren't sure where to start? CDR's experts can help you determine how sensory services can best help you. Don't hesitate to contact CDR to learn more.

In addition, CDR's Sensory Services is actively recruiting consumer panelists to expand and improve upon its services and capabilities in running consumer panels. CDR is also working on adding other new services to its list of sensory tests such as focus groups, difference testing and others.



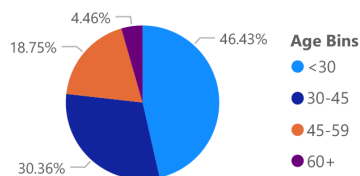
CDR's Brandon Prochaska

For more information or to access Sensory Services, contact Program Coordinator Brandon Prochaska at [bprochaska@cdr.wisc.edu](mailto:bprochaska@cdr.wisc.edu) or visit the CDR Sensory Services webpage: [www.cdr.wisc.edu/sensory](http://www.cdr.wisc.edu/sensory) 🌻

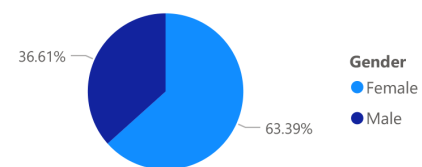
Source

1. Stone, H. and Sidel, J. 1993. *Sensory Evaluation Practices*. Academic Press.

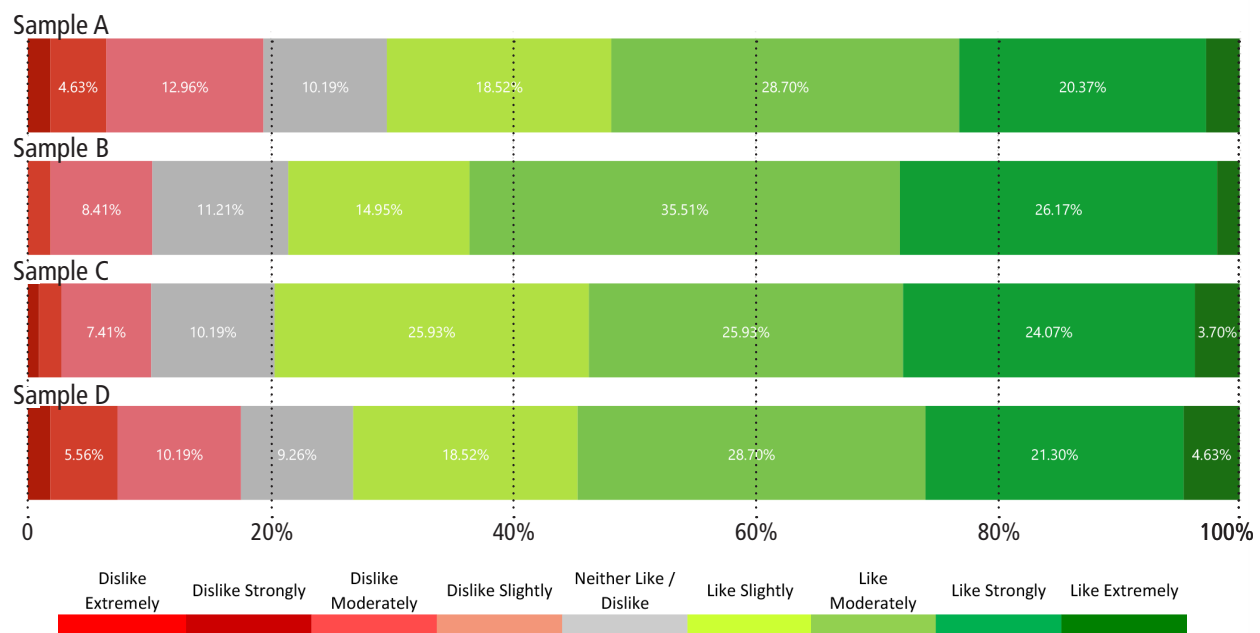
Age Breakdown Of Respondents



Gender Breakdown of Respondents



## Overall Liking



## DBIA NEWS: DAIRY INDUSTRY IMPACT GRANTS AWARDED, DAIRY BUSINESS BUILDER GRANT PROGRAM OPENS IN FEBRUARY, USDA FUNDING ANNOUNCED

The Dairy Business Innovation Alliance (DBIA), a partnership between the Center for Dairy Research (CDR) and Wisconsin Cheese Makers Association (WCMA), announced the four companies and cooperatives which, via a competitive review process, have been selected to receive Dairy Industry Impact grants totaling more than \$600,000.

The Dairy Industry Impact grant was designed to attract medium to large dairy companies to develop an innovative idea or tackle a challenge with the potential to advance the dairy industry. The Industry Impact program awards reimbursable grants ranging from \$50,000 to \$250,000 for USDA-eligible expenses related to a company's proposed project. This is the first cycle for the Dairy Industry Impact grant and the four companies listed below have committed to sharing their knowledge gained with the wider dairy industry.

### 2021 Dairy Industry Impact grant recipients:

**Cedar Grove Cheese - Plain, WI** - Cedar Grove Cheese will scale up a model, liquid waste-to-fertilizer system for small dairy processors. This solution will convert wash water into marketable fertilizer, which is expected to be relatively affordable for small and medium size dairy plants. The project will result in recovery and marketing of nutrients from the bio-solids remaining after treatment of cheese plant wash waste. The common elements of technology and results will be shared with other food processors.

**GoodSport Nutrition - Evanston, IL** - GoodSport Nutrition will raise consumer awareness regarding the ability of dairy products to deliver effective hydration before, during and after exercise, opening the door for dairy products to access the \$8.3 billion plus sports beverage market. GoodSport Nutrition's international renowned experts will attend select sports health professional tradeshows to present scientific research behind dairy's hydration properties and target decision-makers and influencers such as registered dietitians, strength & conditioning coaches, and sports medicine doctors. Extensive sampling onsite aims to accelerate acceptance of dairy-based drinks as an excellent choice for sports beverages. This project will pave the way for further product development and entry of other dairy-based sports nutrition products and has the added benefit of creating value for a dairy by-product previously considered a commodity.

**Milk Specialties Global - Eden Prairie, MN** - Milk Specialties Global will evaluate the potential nutritional benefits of a low-value dairy by-product in animal feed. If successful, the expected nutritional benefits will create both a new market and higher price for commodity items. This will also incentivize the development of additional premium feed products to justify a value-added price for what is currently a processing by-product. Milk Specialties Global will make the results of their research publicly available.

**Specialty Cheese Company - Reeseville, WI** - A consortium, headed by Specialty Cheese Company, will provide market access services for a group of small cheese producers to increase export opportunities via consolidated shipments to the Middle East and Japan. This will increase the competitiveness of small Wisconsin cheese producers by reducing shipping costs and providing export expertise. The funds provided will enable the consortium to validate a model pilot program that can be replicated in other domestic geographic areas as well as being capable of expansion to other international markets. The consortium will present their model and findings to the wider industry so that other small producers can replicate the model.

### Dairy Business Builder Grant Program Opens in February

In addition to the Dairy Industry Impact Grant Program, which is aimed at medium to large dairy companies, the DBIA supports small dairy companies through its Dairy Business Builder Grant Program.



The program provides reimbursement grants of up to \$50,000 each to dairy farms or dairy manufacturing or processing facilities in Illinois, Iowa, Minnesota, South Dakota, or Wisconsin. Eligible projects include:

1. dairy farm diversification through dairy product development, specialization, packaging and/or marketing strategies;
2. creation of value-added dairy products;
3. enhance the value of a dairy commodity or by-product through product development or alternate use; and/or
4. creation or expansion of a program for exporting dairy products. ➡

In 2021, DBIA awarded Dairy Business Builder grants totaling more than \$1 million to 25 dairy companies and cooperatives. In 2020, DBIA awarded Dairy Business Builder grants totaling \$230,000 to 13 dairy companies and cooperatives.

DBIA staff encourage interested applicants to join DBIA on January 27 for a Dairy Business Builder “Helpful Hints” Webinar. The webinar will answer questions applicants might have about the program and application process. The webinar will also be recorded and posted on the DBIA website to view on-demand.

In addition, DBIA staff recommend that all applicants view “Let’s Keep Your Business Going” Webinar series in advance of preparing their application. For more information, visit the DBIA webpage [www.cdr.widc.edu/dbia](http://www.cdr.widc.edu/dbia)

Dairy Business Builder Application and Funding Timetable
Application materials available February 1, 2022
Applications due March 31, 2022 (5PM CT)
Proposals scored and selected on or before May 2, 2022
Applicants notified on or before May 12, 2022

**USDA Announces \$6.13 Million Investment in DBIA**  
The U.S. Department of Agriculture (USDA) announced an investment of \$20.2 million in the Dairy Business Innovation (DBI) Initiatives, which includes the Dairy Business Innovation Alliance. In total, USDA awarded \$18.4 million to three current DBI Initiatives at University of Tennessee, Vermont Agency for Food and

Marketing and University of Wisconsin (DBIA), and \$1.8 million to the California State University Fresno. Specifically, DBIA will receive \$6.13 million, which will allow DBIA staff to continue to offer direct-to-business grants, free workshops, consultations, and industry research for dairy farmers and processors in Illinois, Iowa, Minnesota, South Dakota, and Wisconsin.

“The strength of our agricultural economy, including the dairy industry, depends on strategic investments that help fund innovative projects and tailored technical assistance for producers and processors alike. We thank USDA Secretary Vilsack and U.S. Senator Tammy Baldwin for delivering this continued investment in the important work of the Dairy Business Innovation Alliance,” said John Umhoefer, WCMA Executive Director.

“This program will allow us to continue to strengthen innovation in dairy businesses within the five Midwest states that make up the Dairy Business Innovation Alliance by providing expert training, technical assistance, and grants to support diversification and creation of value-added products,” added Dr. John Lucey, CDR Director.

The Dairy Business Innovation Alliance is supported by funding from the U.S. Department of Agriculture and was created in the 2018 federal Farm Bill. In addition to its grant programs, the DBIA provides extensive resources to support dairy businesses through webinars, technical assistance and product development. 🌻

## CDR WELCOMES NEW STAFF

### Andrea Miller, Outreach Program Manager

Classically educated and trained as a registered dietician, Andrea has worked in the retail setting where she has organized extensive engagement opportunities with food industry and commodity organizations as well as community outreach work including programming,



service promotion, food marketing and customer relations. She has a varied background in both the communication of food science as well as the development and execution of communications and outreach strategies. In her role at CDR, Andrea manages

industry relation activities, plans technical events, coordinates communication work projects and company

trainings, and oversees all CDR communication outreach efforts. Andrea brings a dedication and burning desire to promote and generate excitement around all things dairy in Wisconsin.

### David Niemiec, DBIA Cheesemaker

David is an experienced cheesemaker and cheese monger with nearly two decades of industry experience. In addition to working at several dairy plants around Wisconsin, David ran a small creamery in Iceland. He is knowledgeable on more than a dozen different cheeses of various milks. With David’s knowledge of cheesemaking and his experience with various processes, techniques and equipment, he provides guidance to CDR and DBIA clients and assists them in developing high quality dairy products. 🌻



## CDR BUILDING PROJECT UPDATE

CDR staff have begun the process of moving into the new three-story CDR addition and bringing equipment online.



**First Load of Milk** – Jeremy Johnson oversees the first load of milk coming into the new CDR dairy plant. The drive through milk receiving bay will allow for easier and more efficient milk delivery in the new plant.



**First Vat of Cheese** – Andy Johnson and Ben Ullerup Mathers make the first vat of cheese in the plant's new RELCO vats. These vats will allow CDR to program specific recipes and precisely control operations like heating and stirring. The vats are also on load cells to allow for mass balances and cheese yield studies.



**CIP System** – Thanks to David Fabian of Ecolab for installing the dairy plant's CIP system, which will service CDR's 160 circuits in the new dairy plant.



### Air Quality System

Andy Johnson got the Air Quality Process system up and running in the cut and wrap room and the specialty cheese make room.

### Spray Dryer Commissioning

Lars from SiccaDania is pictured here commissioning the new spray dryer, which is a food grade, three stage dryer that has a water evaporation rate of approximately 60 liters of water per hour. It is about 30-feet tall and had to be lifted into the second floor of the new building by crane.



## CONGRATULATIONS TO CDR RETIREES

### **Deb Wendorf Boyke, Senior Management Team, Outreach Program Manager, Communications/ Training Coordinator**

Deb served the dairy industry for more than 35 years. For the past 15 years, she helped lead CDR as coordinator of the Communications/Training group and Outreach Program Manager. In addition, she was a member the CDR Senior Management Team. During Deb's tenure, she helped grow CDR's training program from 3 short courses and only a few company trainings to over 20+ short courses and 15+ company trainings each year. In addition,



Deb led and guided the CDR Communications/Training group during the launch of several iterations of CDR websites, the development of numerous training and promotional videos, and, among other accomplishments, moving short courses to an online format. She also serves as the

Executive Director for the U.S. National Committee to the International Dairy Federation.

Deb, who comes from a family of dairy farmers, is always cognizant of the support that CDR receives from dairy farmers and the work that CDR does on behalf of the industry.

"It's amazing how fast 15 years fly by when you have a job you love and truly believe in the mission of the organization. I'd like to think we make Wisconsin farmers proud of the work we do at CDR to grow the industry and leverage dairy farmer checkoff dollars."

### **Joanne Gauthier, Senior Outreach Specialist, Wisconsin Master Cheesemaker® Program Administrator**

Joanne's long career at CDR started when she was hired as a college student employee. After graduating from the University of Wisconsin-Madison, she joined the CDR Communications/Training group where she was instrumental in supporting CDR's growing short course/training program. In addition, Joanne helped launch and administer the Wisconsin Master Cheesemaker® Program, which was the first of its kind in the U.S. The program is as strong as ever today with more than 90 recognized Wisconsin



Master Cheesemakers. At CDR, Joanne served the dairy industry for 27 years, providing crucial education, training and leadership to Wisconsin's dairy industry.

"It was my honor and pleasure to serve the Wisconsin dairy industry throughout my career. I am extremely proud of my contribution to the Wisconsin Master Cheesemaker® Program and my work with Jim Path to bring specialty cheeses to Wisconsin through the artisan cheese courses held here at the Center for Dairy Research."

### **Tom Szalkucki, Senior Management Team**

Tom was one of the longest-serving CDR employees with an impressive 31 years at the Center. He was



a key member of the administrative staff and worked to keep everything running smoothly at CDR. Tom managed research grants, progress reports, contracts and other business related materials and issues. He also worked to keep everything on

schedule and managed CDR's physical and pilot plant upkeep. In addition, Tom played a key role in guiding the CDR building project which includes a three story addition with new office space, dairy plant, training auditorium and much more. With a M.S. in food science and nutrition and more than three decades of experience at CDR, Tom was an invaluable resource, assisting with everything from administration to the editing of technical documents.

"I have had the opportunity of working for four wonderful directors and many staff that have taken Norm Olson's vision to create an organization within the UW dedicated to dairy research, teaching and outreach and make it a reality." 🌻

## Center for Dairy Research

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## Upcoming CDR Trainings

The Center for Dairy Research is here to help you with dairy product training for your employees. Below is a listing of upcoming CDR short courses, webinars and other training opportunities.

**Cheesemaking Fundamentals (Online) - February 16**

**Processed Cheese Short Course (In-Person) - February 22-24**

**Dairy Ingredients Fundamentals (Online) - February 25**

**Buttermaking Fundamentals (Online) - March 15**

**Cheesemaking Fundamentals (Online) - March 15**

**Cheese Grading (In-Person) - March 22-24**

**Preventive Controls (In-Person) - April 20**

**World of Cheese (In-Person) - April 25-29**

**Food Safety Course (In-Person) - May 4-5**

**Advanced Cheese Technology (In-Person) - May 9-13**

For the latest information or to register visit [www.cdr.wisc.edu/short-courses](http://www.cdr.wisc.edu/short-courses)

## CHEESE EXPO

Global Technology for Dairy Processors

**April 12-14, Milwaukee, Wisconsin | [www.CheeseExpo.org](http://www.CheeseExpo.org)**

**Join the world's largest cheese and whey processing expo!**

A gathering of over 4,000 cheese industry leaders, suppliers, marketers and more will gather to share information about the latest in cheese technology, new products, whey opportunities, product safety, marketing and additional issues affecting our industry.



### DAIRY PIPELINE

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