# CENTER FOR DAIRY RESEARCH DAIRY PIPELINE A TECHNICAL RESOURCE FOR DAIRY MANUFACTURERS FALL 2023 VOL. 35, No. 2

# COLD PACK CHEESE: A WISCONSIN ORIGINAL

Consumers in Wisconsin and the upper Midwest have long enjoyed cold pack cheese. This cheese is also known as club cheese and is often sold in retail as a spreadable product usually labeled cold pack cheese food. Although these products are not as well known in markets outside the Midwest, cold pack cheese is highly utilized by the food industry as an ingredient in applications such as crackers and other products.

Cold pack cheese originated in Wisconsin in the 1920s by Hubert Fassbender. According to the Kaukauna Cheese website, "After years of experimenting, Hubert pioneered a method of creating spreadable cheese without heat, known as the cold-pack method. Hubert's method included grinding the natural cheeses into a fine texture. He would then combine it with dairy ingredients as well as other flavorful ingredients like wine and spices." Fassbender distributed his spreadable cheeses in ceramic crocks to clubs and hotels around northeastern Wisconsin and the cheese became known as club cheese.

To this day, the upper Midwest accounts for about two-thirds of retail cold pack cheese sales. However, as mentioned earlier, cold pack cheese is utilized by food service and government estimates that cold pack



#### What's Inside:

CDR Course for Spanish speakers, page 4

Dairy Food Safety Emerging Trends, page 6

◆ Making Caciocavallo-Style Cheese, page 7

- Yogurt Monograph Series, page 8
- DBIA Awards \$2.3 Million, page 9

cheese production for food services ranges from 42-90 million pounds annually. Cold pack cheese can also be used as a cheese base for food blends. To

hit desired flavor profiles, cheese cracker manufacturers sometimes use cheese that is essentially a cold pack cheese. In addition, cold pack cheese is used in double milled cheese (particularly in England) where it's mixed with ingredients like dried fruits.

"There are many different opportunities for cold pack beyond just the retail shelf," said John Jaeggi, Coordinator of the Cheese Applications & Industry group at the Center for Dairy Research (CDR). "There's a lot of cold pack that goes into product that's not accounted for in the sales numbers."

### **Cold Pack Cheese Defined**

So, what exactly is it? Cold pack cheese has a standard of identity. According to the Code of Federal Regulations (CFR), "Cold pack cheese, club cheese, is the food prepared by comminuting, without the aid of heat, one or more cheese of the same or two or more varieties ... into a homogeneous plastic mass."

"So, in other words, I'm taking cheese and grinding it," Jaeggi said.

How is cold pack cheese different than process cheese? As the name implies, the main difference between cold pack cheese and process cheese is that no heat and no emulsifiers are used in manufacturing cold pack cheese.

"Basically, I'm making an aged cheese that's ground up, but it still going to age like a natural cheese," Jaeggi said. "So, it has its benefits and it has its detriments."

With no heat or kill step during processing, cold pack cheese will age and have proteolytic and lipolytic  $\Rightarrow$ 

Number Stress Markov College of Agricultural and Life Sciences 🖉

breakdown like natural cheeses. It will have a short shelf life, compared to process cheese. The advantages are that cold pack cheese has more flavor.

#### Cold Pack Cheese Versus Cold Pack Cheese Food

Cold pack cheese and cold pack cheese food have different compositions. Cold pack cheese's moisture target is the same as base cheese that is used (i.e. Cheddar 39%), the minimum fat is not less than the base cheese (i.e. Cheddar 30 % fat on a wet basis) and allowed ingredients include cheese, water, acidifying agent, salt, flavor/spices, mold inhibitors. Manufacturers need to be aware that the moisture and fat percentages for cold pack cheese change based on the type of base cheese used. These targets also change and get more complicated when blending different cheeses.

Cold pack cheese food's maximum moisture is 44%, the minimum fat is 23%, it must contain at least 51% cheese and there are more allowed ingredients like whey



spreadable. While these products don't adhere to CFR standards, they meet a niche for consumer standards and are popular in retail.

The minimum fat content of the solids for cold pack is the same as the base cheese, and in no case is less than 47% (except Swiss is not less than 43%). Note that for cold pack cheese, the regulations state fat as a percent of the solids, but for cold pack cheese food they express fat as simply percent fat, meaning as is including moisture.

As far as what varieties of cheese are utilized in cold pack, Cheddar is by far the cheese used most often in cold pack but other varieties, like Feta, Swiss, Brick and Blue Cheese are also in cold pack cheese.

### **Cold Pack Cheese Food Composition**

The cheese utilized for cold pack cheese food is typically made from pasteurized milk (if using raw milk cheese, it must be held >60 days and >35°F). As mentioned

previously, cold pack cheese food cannot exceed a maximum moisture of 44% or be below a minimum fat of 23%. Cheese must make up not less than 51% of the finished cold pack cheese food product. If two varieties are being blended, each variety's minimum is 25% (if using three varieties, the blended minimum is 15%).

Optional dairy ingredients for cold pack cheese food include plastic cream, cream, milk, skim milk, buttermilk, cheese whey (or albumin), anhydrous milkfat, dehydrated cream (all ingredients must be made from pasteurized product).

Cold Pack Cheese versus Cold Pack Cheese Food			
Cold Pack			
Moisture target same as base cheese (e.g. Cheddar - 39%)			
Minimum fat – 30 % fat on a wet basis			
Allowed ingredients: cheese, water, acidifying agent, salt, flavor/spices, mold inhibitor			
Typically used as a food ingredient			
Cold Pack Cheese Food			
Maximum moisture – 44%	Minimum fat – 23%		
Cheese minimum – 51%			
Allowed optional ingredients: whey powders, dehydrated milk powders, etc.			
See this product more in retail but can also be used as a food ingredient			

Approved acidifying agents for cold pack cheese food include vinegar, lactic acid, citric acid, acetic acid, and phosphoric acid. Approved sweetening agents include sugar, dextrose, corn syrup, glucose syrup, maltose, and hydrolyzed lactose. Other additives include water, salt, and flavorings like nuts, meats, vegetables, spices (remember to keep track of allergens).

Approved mold inhibiting agents are sorbic acid, potassium sorbate, and sodium sorbate. These can used alone or in combination (not to exceed 0.3% / wt. total).

"I always tell people that it is best to try and find cause of mold and eliminate it," Jaeggi said. "If you really have an issue with mold, you need to identify that source and not rely on antimycotics as a band aid." This is important, because, again, no heat step is used in cold pack cheese food/cold pack cheese production. Mold control in the incoming cheese used to make these products, as well as mold control in the environment in the facility where cold pack cheese is made is crucial.

Finally, approved hydrocolloid agents for cold pack cheese food are guar gum and xanthan gum (not to →

exceed 0.3% / wt. total). These help the product by thickening, gelling, emulsifying, stabilization and controlling ice and sugar crystal growth.

### **Prepping/Selecting the Cheese**

The manufacture of high-quality cold pack cheese/cold pack cheese food starts with the cheese. This is where a skilled evaluator or grader is helpful to examine the cheese and determine if the cheese is ready. The cheese can age anywhere from 1 to 9 months and when the cheese is ready depends on the target flavor profile and texture, etc.

"Again, it's important to know your flavor profile because cold pack cheese is going to age like a natural cheese," Jaeggi said.

Before you begin processing the cheese, it is important to run a micro/composition analysis of the cheese. Unpack and prep the cheese in a separate room from where it will be processed and finally, weigh it.

Another option is that chopping the natural cheese in a blending cutter may be acceptable. This is a nice option since it eliminates the need for a secondary piece of equipment like a grinder. One more important aspect is that metal detection is extremely important with cold pack cheese/cold pack cheese food. With the equipment that is used to chop, grind, or chunk the cheese, there is a risk of foreign material issues in the product.

Cheese tempering is also something to consider. The best option might be to pull the pallet of cheese out of the cooler the night before and allow it to temper. The colder the cheese, the more force that is needed to grind or chop it up, which adds stress to the equipment.

### Handling/Prepping Ingredients

Once the cheese is reduced in size (chopped, chunked, shredded), the next step is blending the cheese and the ingredients in equipment like a bowl cutter.

Before getting into details about blending, it's important that all ingredients are properly handled. You should have certificates of analysis (COAs) for ingredients and/ or a micro/composition analysis. In addition, if any ingredients need to be prepped, for example cutting up peppers, that should all be done in a separate room. When possible, use ingredients that have been sterilized. This is important because there is no heating step in cold pack cheese/cold pack cheese food.

For dried ingredients, it's important to unpack them in a different room. If sifting and aerating powders, make sure

to do that in a dry room/environment otherwise powders will begin sticking and clumping.

In addition, to avoid contamination of ingredients, it's also recommended that there are segregated areas for different ingredients like meats and vegetables.

"I want to be doing this in a compartmentalized situation," Jaeggi said. "I don't want to be dragging a lot of ingredients in that can be causing issues. I don't want to be dragging in pallets and cardboard and packaging materials. I want to do these in separate areas."

### Blending

Once all the ingredients are prepped and the cheese has gone through size reduction, you are ready to begin blending. The best option is to first blend the non-cheese ingredients like the dairy powders, shelf life extenders, meats, vegetables, spices, etc. into a slurry. These ingredients are blended into a slurry and then pumped into the bowl cutter with the cheese.

"You don't have to do it that way but that might be best to make sure you have everything mixed into a homogenous mass and an even disbursement of ingredients," Jaeggi said. Experienced cold pack cheese manufacturers will also have a sequence when they add ingredients into the slurry. For instance, adding powders and then liquid works best to get a good slurry mix.

If adding ingredients directly to the bowl cutter with the cheese, Jaeggi recommends adding liquid ingredients first to the cheese. Once the liquid ingredients are added to the cheese in the bowl cutter, next add the dry ingredients like dairy powders, mold inhibitors, salt, spices, meats, vegetables.

The mixing blending process in the bowl cutter happens rather quickly. Typically, after about 30 seconds, the mixture will still be rather lumpy but after only about another minute, the mixture should be smooth; microparticulate will still be visible but the mixture should overall be quite homogenous. How long to mix depends on a number of factors including the cheese, ingredients and equipment.

"You have to be careful not to mix too much," Jaeggi said, "This can result in textural and flavor defects."

Overall, with the mechanical action/blending, the goal is to minimize the heating of the product, air incorporation, starter activation and fat disruption. Again, these can lead to textural and flavor defects. Continued on page  $5 \Rightarrow$ 

### **CDR OFFERS** CHEESE MAKING COURSE FOR SPANISH-SPEAKERS

Jori Skalitzky, UW–Madison CALS Office of External Relations

The Center for Dairy Research at the University of Wisconsin–Madison hosts a lot of cheese making short courses — almost twenty per year. But most participants don't get to hear their instructors say: "Tres vueltas, sin romperlo."

#### Three times, without breaking it.

After helping to make vats of cheddar, Colby, gouda and ricotta cheeses, participants in CDR's new "Fundamentos de Elaboración de Queso" (Fundamentals of Cheese Making) short course, spread out in a big circle around the CDR's pilot plant space and started stretching a long rope of freshly extruded mozzarella cheese. The goal was to stretch the cheesy rope three times around the plant — and try to break the cheese-stretching record.



Photo by Michael P. King/UW–Madison CALS

They almost made it. Once the near 100-foot rope started to break, the cheese got rolled up like a ball of yarn — which the instructors noted is a process similar to making queso Oaxaca, a mozzarella-like cheese that originated in Mexico.

The hands that held the mozzarella rope this past spring belonged to participants in the CDR's first in-person Spanish-language short course to be taught in the pilot plant.

"We're excited because we're closing a huge gap in learning and teaching for Hispanic people here in Wisconsin, where the dairy industry is a big part of our economy," says Rodrigo A. Ibáñez, scientist at CDR and one of the course instructors. "There are a lot of native Spanish-speakers who work in our state's dairy processing plants, so we're really glad that we can offer this." Ibáñez hails from Chile, and the three other Spanishspeaking CDR instructors for the course come from Mexico and Chile. Instruction is given exclusively in Spanish, or first given in English and then repeated in Spanish.



Photo by Michael P. King/UW-Madison CALS

The class is a two-day course that covers the fundamentals of cheese making, including delving into the science and theory — explaining the "how" and "why" — behind things. Participants learn about the process that turns milk into cheese, including microbiology, moisture, and pH, plus common government safety regulations for dairy processing in the United States. The course also covers a comprehensive overview of dairy processing equipment and includes a hands-on cheese making lab.

"We know the basics," says short course participant Levi García Sánchez, who works at Blakesville Creamery in Port Washington, Wisconsin. "The basics are good, but it's nice to know more in-depth about [what's going on]. We've never had a class like this."

The process of cheese making is complex. And it can be especially challenging for people to understand advanced techniques when they're being taught in a second or third language. "I have the ability to speak in English, but I find it is always better [to learn things] in your native language because [it's easier to follow along and] you can understand one hundred percent," says Noel Espejo, who works at Eau Galle Cheese in Durand, Wisconsin. "Apart from that, [in a course in your first language], you also feel more confident and comfortable asking questions." →



Steven Martinez, an employee at V&V Supremo in Arena, Wisconsin, was grateful that the CDR offered the course in Spanish. "The community is very rooted in Wisconsin and a lot of the Latino community works in the cheese plants, not just where I work," says Martinez. "The needs of the community are important. I think that this course can help not only me, but all cheese companies, and the more knowledge we have, the better for the industry."

For the spring 2023 course, nearly all the participants had their course fees covered by their employers. And it was well worth it, according to Bob Wills, owner of Clock Shadow Creamery in Milwaukee, Wisconsin and Cedar Grove Cheese in Plain, Wisconsin.

"Two of our employees at Cedar Grove Cheese participated in this program and since they got back, they've been sharing their new knowledge with our other Spanish-speaking employees," says Wills. "It's been beneficial to our workforce. I would absolutely send more employees to future Spanish-language courses at CDR."



Photo by Michael P. King/UW–Madison CALS

When the training is over, participants receive a printed certificate of completion. The document marks their successful completion of the course, and the training qualifies as a prerequisite for the advanced cheese making courses that are offered by CDR and as a first step to taking the Wisconsin Cheesemakers License exam.

Participants were enthusiastic about receiving this intensive training, and they enjoyed the hands-on learning. After the lab session, for instance, they were able to sample many of the cheeses they produced, including cheese curds seasoned with some unusual flavorings. A group favorite was the ancho chili lime cheese curds. ©

### Continued from page 3

When the cold pack cheese come out of the mixer/bowl cutter, it will be flowable but as it cools, it will firm up. The chopping/blending action of the equipment can warm the mixture up to about 80 °F.

### Packaging

Once blending is complete, the cold pack cheese is moved from the bowl cutter into a hopper or surge tank where it's held before packaging.

Again, when looking at a packaging system, it is recommended to talk with an equipment supplier. If selling to retail, you will need a packaging system that has the capacity to apply tamper evident seals. In addition, lids are also important to consider. Opaque lids are recommended because they will help reduce light damage. If the product is exposed to too much light, it can get oxidized or have some pinking (if using a cheese colored with annatto).

Since cold pack cheese is essentially a natural cheese, cooling the product is very important. Many manufacturers use equipment like a spiral cooler or cooling tunnel.

"If I heat that product up, I'm activating starter cultures, coagulating enzymes and any other potential non-starter microbes that are in that cheese," Jaeggi said. "I've got to get it back down to temperature (below 45 °F) as quickly as possible."

In closing, it should be emphasized that the cheeses used to make cold pack cheese/cold pack cheese food must be high quality. Since no heat is used in manufacturing these products, any undesirable spoilage organisms that might be present in the cheese are not killed. In addition, there are no optional ingredients allowed that might help reduce off flavors in the base cheeses. So, only the best quality cheese can be used to make cold pack. This is very different from cheeses used to manufacture process cheese.

This is a look at some of the key steps and recommendations when manufacturing cold pack cheese/cold pack cheese food. It's a product that is very popular in the upper Midwest and has many applications in the food industry as a cheese base for many products. \*

### **DAIRY FOOD SAFETY** EMERGING TRENDS and NEW RESOURCES

### Technical Contributor: Alex O'Brien, CDR

In this article, we examine a couple of emerging trends or potential hazards that dairy foods producers should be aware of. Many plants in the dairy industry are audited by a Global Food Safety Initiative (GFSI) audit scheme. One of the many requirements is to validate your HACCP/Food Safety Plan and evaluate for any new emerging hazards, new scientific discoveries, regulatory recommendations, process authority recommendations or trends in recalls over the past year. It is important for food producers to be aware of emerging hazards and, most importantly, be prepared.

#### **PFAS**

Since 2018, the FDA has had per- and polyfluoroalkyl substances (PFAS) on their radar. These substances have been around since the 1940's and are used in different commercial, consumer and industrial products and are now being found to accumulate in the environment. Also known as "forever chemicals," the EPA reports that there are thousands of PFAS chemicals. There have been PFAS testing campaigns as late as 2018 in the dairy industry that have not shown any issues. However, the amounts of chemicals able to be detected and quantified has increased in the past 5 years. With this increased capability and finding more classes of these compounds, the more we may find issues that we will have to navigate. The FDA issued a letter to food industry on the use of fluorinated polyethylene food contact containers. At this point, there is no data that would indicate that the dairy industry has any issues with PFAS, but these are chemicals we will unfortunately be more acquainted with.

#### **PFAS Resources**

FDA Issues Letter to Industry on Fluorinated Polyethylene Food Contact Containers - <u>https://go.wisc.edu/9pg812</u> Federal Register article on Fluorinated Polyethylene Containers for Food Contact Use - <u>https://go.wisc.edu/91g4h4</u> Proposed rule by the EPA to have set limits for PFAS in drinking water - <u>https://go.wisc.edu/5yxx70</u>

The FDA does not have a PFAs limit on foods yet, but there may be concerns with non-targeted testing from consumers and other groups finding this substance. This concern may apply to other persistent organic pollutants in the future. This is something to keep an eye on in the coming years.

### Cybersecurity

Cybersecurity has also been an emerging food defense risk. Within the last couple of years, there have been two major cybersecurity attacks in the dairy industry. In the fall of 2021, Schreiber Foods suffered a ransomware attack that comprised the company's plants and distribution centers. The ransom was \$2.5 million. The incident happened on a Friday and operations were back online Monday evening. Then, in the spring of 2022, HP Hood was also hit with a ransomware attack that caused 13 of the company's dairy plants to be down for an entire week. Ransomware was the biggest threat in cybersecurity in 2022. Multifactor authentication is one of the greatest reducers of risk in this area. Having a back-up plan to run product without computerized systems and data as well as working with IT professionals to assess gaps in your IT systems will go a long way in strengthening cybersecurity.

Cybersecurity ResourcesCDR Cybersecurity webinar - <a href="https://go.wisc.edu/y61t8b">https://go.wisc.edu/y61t8b</a>Dairy Foods article "Mitigate your cybersecurity risk" - <a href="https://go.wisc.edu/g3m9yn">https://go.wisc.edu/g3m9yn</a>Food Protection and Defense Institute cybersecurity white paper - <a href="https://go.wisc.edu/ftrf9f">https://go.wisc.edu/ftrf9f</a>Food and Ag Cybersecurity: A Guide for Small & Medium Enterprises - <a href="https://go.wisc.edu/ptuuyb">https://go.wisc.edu/ptuuyb</a>

### **FRI Cheese Thermization App**

Developed by the University of Wisconsin-Madison's Food Research Institute, the Cheese Thermization App allows the user to determine the milk hold time and temperature necessary for log-reductions of foodborne pathogens (listeria monocytogenes and E. coli) pertinent to cheeses made with unpasteurized bovine milk. FRI Cheese Thermization App - <u>https://go.wisc.edu/v7txut</u>

These are just a couple of emerging hazards to keep an eye on. We encourage you to access the resources listed above and take action to protect your workplace and/or business against these risks. \*



### MAKING CACIOCAVALLO-STYLE CHEESE AT CDR

Caciocavallo is an Italian-style aged pasta-filata cheese. Pasta-filata means that it is stretched and molded into its final shape in hot water, similar to Mozzarella or Provolone.

Caciocavallo is close to a Provolone, as it is lower in moisture and aged. A lot of the aged Italian pasta-filata cheeses are similar in theory and make procedure, and what differentiates them officially is the milk used (often raw milk from a specific breed of animal, adhering to certain diets, and raised in certain geographical areas), and the final shape.

In Italy, these cheese names are often regulated by a Denominazione d' Origine Protetta (Protected Designation of Origin). When these cheese-styles are made in America, they are usually made with pasteurized milk, and they are not always aged in "caves" or ripening rooms before being sealed in plastic. However, with our new ripening rooms, we now have the ability to age this style of cheese in the traditional manner. By modifying the humidity and the temperature of the room, we can manipulate how the cheese develops both internally, and on the rind of the cheese. For example, we wanted a clean, mold-free rind for this cheese, so we chose a lower humidity to allow the cheese to develop a protective shell of dried cheese around itself. However, if we desired some limited mold growth (as you often see on traditional Caciocavallo), we could have increased the humidity to accomplish that.

This cheese was made with pasteurized Wisconsin milk, as opposed to raw Italian milk, so it will never taste the exact same as traditional Caciocavallo cheese. However, perfectly replicating another cheese is not our goal. Rather, the goal is that through experimenting with, practicing, and iterating upon the distinct traditions and methodologies from Italy (or from anywhere), that we are able to utilize that knowledge to make and help others make something that is a distinctly American – distinctly Wisconsin – cheese that is delicious and valuable on its own merits.  $\circledast$ 

Ben Ullerup Mathers, Lead for Specialty Cheese, CDR



Ben Ullerup Mathers putting the curd into the stretcher/cooker.



Gina Mode, Assistant Coordinator Cheese & Industry Applications, removing cheese from stretcher/cooker.



Mathers presents one of the distinct Caciocavallo shapes.



Here the Caciocavallo-style cheese is aging in one of CDR's 10 environmentally controlled ripening rooms. Caciocavallo means "cheese on horseback" and gets its name from the way it is tied and hung to age.



Mode and a student worker shape the warm cheese from cooker/stretcher into one of the traditional Caciocavallo shapes.



The finished cheese after about 3 months of aging.

7

# **YOGURT** MONOGRAPH SERIES: SENSORY PROPERTIES

Technical Contributor: Daniel Wilbanks, CDR

This is part of a CDR Monograph Series focused on yogurt production. Watch for further installments of this series in the Dairy Pipeline.

Desirable sensory properties for yogurt varies between styles of yogurt and with the preference of consumers. For instance, additional sugar is often - though not always - included with stirred style yogurts, while skyr is known more for its thick texture and sour taste and so contains little or no added sugar. Additionally, consumer preferences change over time, which makes universal rules for proper yogurt sensory properties impossible to codify. Instead, we will turn our focus here to the factors that produce the unique flavors and textures one may find in various yogurt varieties.

Perhaps the most defining characteristic of yogurt is its acid flavor. The most common end point for fermentation is pH ~4.6, which provides a pleasant acid flavor and helps to preserve the food from most microorganism-based spoilage. While cooling yogurt to refrigeration temperature slows the fermentation process, it does not stop it completely and acidification continues after packaging (post-acidification) unless the yogurt is heated to inactive the microbes. Post-acidification is typically considered to be a defect as it leads to additional sour flavor and more importantly can lead to syneresis. Many modern cultures are selected for their poor growth beyond a particular acid level to limit post-acidification.

Additional flavor compounds may be produced by yogurt starter cultures (L. bulgaricus and S. thermophilus) but adjunct cultures are often used to impart additional flavors (Table 1). For instance, acetaldehyde, a major flavor compound produced by lactic acid bacteria in yogurt, is described as having a green apple flavor and odor. Many

Table 1 – Primary flavor and odor compounds found in yogurt		
Compound	Flavor/Odor	Source
Lactic Acid	Sour, Tart	Starter Cultures
Acetaldehyde	Green Apple	Starter and Adjunct Cultures
Acetone	Solvent	Mostly Starter Cultures
Acetoin	Cream, Butter	Mostly Starter Cultures
Diacetyl	Butter	Mostly Adjunct Cultures

flavor compounds are volatile and degrade over time or may be converted by microbes to other end products. Sweetness is an attribute in yogurt that is important but not always desirable. US consumers generally prefer moderate-to-high sweetness scores in their

yogurt but are increasingly wary about high levels of added sugar. Recent changes to FDA nutritional labeling requirements now require added sugar to be listed separately under total carbohydrates to draw attention to products with added sugar. Artificial sweeteners, such as acesulfame K and saccharin, have been used in the past to supplement or replace sugar but are becoming rare in low calorie yogurt options, mostly due to widespread consumer acceptance of stevia, a natural sugar substitute.

The primary sugar in milk, lactose, is a disaccharide comprised of 2 sugar monomers (saccharides) - glucose and galactose. As sweetness is concerned, lactose is an example of a sugar that is not the sum of its parts; that is, glucose and galactose are individually sweeter than they are when bonded together to form lactose (Table 2). By hydrolyzing the glycosidic bond in lactose with enzymes, it is possible for yogurt manufacturers to

Table 2 – Sweetness of sugars*		
	Sweetness	
Carbohydrate	Index*	
Lactose	0.2	
Galactose	0.6	
Glucose	0.5-0.8	
Sucrose	1.0	
Stevia	30	
Acesulfame K	200	
Saccharin	300-400	
*Fennema's Food Chemistry, 4ed.		

break lactose apart into glucose and galactose monomers prior to, or during, fermentation which increases the sweetness of the finished product without the addition of sweeteners. The complete hydrolysis of lactose also allows manufacturers to label yogurt as lactose free.

Flavor additives are common in yogurts and may be added as fruit chunks, fruit puree, and/or flavor extracts before or after fermentation. Care must be taken when incorporating fruit after heat treatment of the milk as it has the potential to introduce yeast and mold contamination, which are the primary microorganisms responsible for spoilage in yogurt.

Continued on page 10 →

## **DBIA** AWARDS \$2.3 MILLION TO 26 DAIRY BUSINESSES

The Dairy Business Innovation Alliance (DBIA), a partnership between the Wisconsin Cheese Makers Association (WCMA) and the Center for Dairy Research (CDR) announced the 26 companies and cooperatives that have been selected to receive Dairy Business Builder grants totaling \$2.3 million. This year's awardees hail from all 11 states served by DBIA. Eighteen of the 26 businesses are receiving a DBIA grant for the first time, and 12 are farmsteads.

DBIA's Dairy Business Builder grant program aims to encourage small- to medium-sized dairy farmers, entrepreneurs, and processors to pursue innovative projects such as dairy farm diversification, on-farm processing, value-added product creation,

and efforts to market dairy products for export. Reimbursement grants of up to \$100,000 each are awarded following a competitive review process.



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"These grants have become an important factor in helping support the growth of our dairy businesses in our region as they continue to innovate by creating new products or expanding their markets," said CDR Director John Lucey.

> "This group of projects showcases the innovative spirit and drive of our dairy industry. We're pleased to help these businesses, and the industry as a whole, continue to grow and thrive," said WCMA Executive Director John Umhoefer.

The DBIA is supported by funding from the U.S. Department of Agriculture. Since its inception, the DBIA has now administered over \$9.4 million in grants to 103 dairy businesses in Illinois, Iowa, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin. The program also offers technical assistance and education to dairy farmers and processors in the region. The next grant application period will opened in August. For more information, visit www.cdr.wisc.edu/dbia \*



### Companies and cooperatives receiving Dairy Business Builder Grants are:

Beauty View Dairy Products – Wahoo, Nebraska Berning Acres – East Dubuque, Illinois BoBell Cheese Company – Burbank, Ohio Brunkow Cheese of Wisconsin – Darlington, Wisconsin Concept Processing – Melrose, Minnesota Dairy Distillery Alliance – Novi, Michigan DARI – Clinton, Wisconsin Eau Galle Cheese Factory – Durand, Wisconsin Farm Life Creamery – Ethan, South Dakota Farm Stapels – Cedar Grove, Wisconsin Hastings Creamery – Hastings, Minnesota Hildebrand Farms Dairy – Junction City, Kansas Hill Valley Dairy – East Troy, Wisconsin Landmark Creamery – Belleville, Wisconsin Marieke Gouda – Thorp, Wisconsin Rolling Hills Dairy Producers Co-op – Monroe, Wisconsin Rosewood Dairy – Sturgeon Bay, Wisconsin Royal Guernsey Creamery – Columbus, Wisconsin Sartori Cheese – Plymouth, Wisconsin Schulte Dairy – Norway, Iowa SCREAM – Fairfield, Iowa Terrell Creek Farm – Fordland, Missouri Tulip Tree Creamery – Indianapolis, Indiana Two Cows Creamery – Hot Springs, South Dakota Uplands Cheese – Dodgeville, Wisconsin Widmer's Cheese Cellars – Theresa, Wisconsin

## **DBIA** GRANT PROGRAMS NOW OPEN

The Dairy Business Innovation Alliance (DBIA), a partnership between the Wisconsin Cheese Makers Association (WCMA) and the Center for Dairy Research (CDR) is accepting applications for two grant opportunities: the Dairy Business Builder Grant Program and the Dairy Industry Impact Grant Program.

The Dairy Business Builder Grant Program aims to encourage small- to medium-sized dairy farmers, entrepreneurs, and processors in the Midwest to pursue innovative projects such as dairy farm diversification,

on-farm processing, valueadded product creation, and efforts to market dairy products for export. Reimbursement grants of up to \$100,000 each will be awarded following a competitive review process.



The Dairy Industry Impact Grant Program will welcome applications in targeted topic areas that have the potential to positively impact the dairy industry. In the upcoming grant cycle, applications will be accepted for projects related to new or expanded dairy export endeavors. Just as with its companion program, the Dairy Industry Impact Grant Program offers reimbursable grants of up to \$100,000 each, to be awarded following a competitive review of all applications.

Applicants may apply for both the Dairy Business Builder Grant and the Dairy Industry Impact Grant, if they have two separate projects related to DBIA goals. Companies are eligible to receive awards from both offerings in the same grant cycle. Online application forms are available on <u>www.cdr.wisc.edu/dbia</u> and the deadline for submissions is October 18, 2023 at 5 p.m. Central Time. Applicants will be notified of results in early December.  $\circledast$ 

### Continued from page 8

Texture is a critical sensory attribute that can affect the overall acceptance of yogurt. Smooth texture is desired for yogurt, with minimal lumps or grains present. Generally, higher protein levels lead to thicker yogurt and higher fat levels lead to a creamier yogurt. Thick and creamy texture are often conflated, but they are in fact separate properties that are largely independent of each other. Texture is covered in greater detail in its own Primer Article (Part 2).

### MAGGIE BECHER AWARDED JOHN BRANDT MEMORIAL SCHOLARSHIP

Maggie Becher, a Ph.D. student in John Lucey's Lab at the University of Wisconsin-Madison Department of Food Science, has been selected to receive the John Brandt Memorial Scholarship from the Land O' Lakes Foundation. The scholarship is in recognition of Maggie's research and will award her a \$25,000 scholarship. Her mentor is Rani Govindasamy-Lucey

Maggie's research is focused on extending the performance and shelf life of string cheese and fresh cheese curds. She received an undergraduate degree in Dairy Microbiology at South Dakota State University where she helped expand the Food Science club and also worked in the Davis Dairy Plant making cheese and ice cream. Maggie has had internships at Schreiber Foods in Green Bay, WI and the Valley Queen Cheese Factory in Milbank, SD.

"I am truly honored and grateful to join the legacy of John Brandt's contribution to the dairy industry," Becher said. "I applied for the John Brandt Memorial Scholarship because I am excited about the vision that Land O'Lakes has for supporting dairy-focused graduate students."

The John Brandt Memorial Scholarship Program was



created in 1953 by the namesake's family and friends to honor his memory and assist aspiring graduate students ensure a bright future for the dairy industry. John Brandt was an organizer and president of Land O'Lakes from 1923 until his death in 1953.

"Graduate school has been incredibly formational for me in terms of gaining confidence, knowledge, and skills that will aid my future career, but it can also come with many challenges and obstacles," Becher said. "This funding will help me to stay focused on my goals and career aspirations while continuing to stay passionate about my research.

"Maggie is a talented student who will have a bright future in our dairy industry, I am very pleased that she has been recognized with this scholarship," Lucey said. \*

## **CDR** WELCOMES NEW EMPLOYEES

### **Catalina Barrientos, Research Intern**

Catalina Barrientos has joined the staff at CDR for a year as



a Research Intern, working with the dairy processing and cheese industry and applications groups. A native of Costa Rica, she earned a degree in Electronic Engineering at Tecnologico de Costa Rica. She completed an internship with Coca-Cola Industrias LTDA in Costa Rica and learned cheesemaking at Valley

Shepherd Creamery in New Jersey.

### Niels Hansen, Maintenance Technician

As CDR's Maintenance Technician, Niels helps maintain and



repair the many building systems, machinery and equipment. Niels brings a lot of valuable experience to his position. He's worked at Central Storage Warehouse, where he oversaw refrigeration and maintenance operations, and he previously worked at the Memorial Union on the UW-Madison campus.

### Sumeyra Karaca, Administrative Assistant



Sumeyra Karaca has joined CDR as an Administrative Assistant and assists with purchasing and other administrative tasks and responsibilities. Sumeyra is originally from Turkey, where she worked for UNICEF and served as a teacher. She also has worked as an early childhood educator.

### Derek Morrick, Research Cheesemaker

Derek Morrick comes to CDR with a wide variety of experience. He worked as a professional chef, baker and worked as an old-world style Charcuterie and Salumi



producer. For three years, he worked for Dean Foods doing milk receiving, processing and batching. As a research cheesemaker at CDR, Derek assists with milk receiving and processing and is involved in cheese trials and troubleshooting. Derek enjoys working at CDR with the experienced and knowledgeable staff.

### Srirupa Sen, Researcher

As a CDR Researcher, Srirupa works with the analytical and cheese research group on numerous projects. Srirupa previously worked at CDR as



a Research Intern. She received her undergraduate degree in Chemistry with a minor in Biotechnology from Shiv Nadar University, India. Srirupa also worked closely with CDR when she earned a Master's degree in Food Science from the University of Wisconsin-

Madison. Her research focused on modifications to milk powder processing for manufacturing wheyless Panela cheese.

### Nick Terebayza, Analytical Research Specialist

As an Analytical Research Specialist, Nick works with CDR's analytical team providing accurate and timely data for CDR clients and research projects.



Nick graduated from the University of Wisconsin-Madison with undergraduate degrees in microbiology and biology. As a student, Nick also worked in the CDR analytical lab. Nick enjoys working at CDR with its large outreach and vast number of connections

within the dairy industry as well as working with state-of-the-art equipment to further his education and experience in the field.

## Pratishtha Verma, Dairy Ingredients & Applications Specialist

Pratishtha has a master's degree in Dairy Manufacturing from South Dakota State University.



She also has 3 years of professional experience working in the dairy industry on ingredient applications aimed at increasing the protein load and developing new application areas for milk ingredients. As a dairy ingredients & applications

specialist at CDR, Pratishtha works with clients on various projects and supports short courses.

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### New CDR Training Webpage Design

CDR has updated its training webpage to include a page for each CDR short course. When you click on the training page you'll find an image grid. You'll be able to read about all of our courses at any time. Visit <u>https://www.cdr.wisc.edu/education</u>

### **Upcoming CDR Trainings**

The Center for Dairy Research is here to help with dairy processing training. Below is a listing of upcoming CDR short courses and other training opportunities.

- \* Cheese Grading & Evaluation (in-person) October 17-19
- \* Dairy Beverage Application (in-person) October 24- 25
- \* Advanced Sanitation Training (in-person) November 2
- \* Cheesemaking Fundamentals (online, self-study) Opens December 6

For the latest information or to register visit

https://www.cdr.wisc.edu/education





Sign up for the electronic version of the Dairy Pipeline at <u>https://explore.wisc.edu/LP=1231</u> The Dairy Pipeline is published by the Center for Dairy Research and funded by the Dairy Farmers of Wisconsin.