

DAIRY PIPELINE

Latest artisan course displays distinctive cheeses from the Eastern Mediterranean region

by Karen Paulus, Wisconsin Center for Dairy Research

In the past, CDR's artisan cheese short course series has focused on cheese from the United Kingdom, Italy, France, Spain and Portugal as well as Hispanic cheeses. This year we journeyed farther abroad to learn about cheese produced in the eastern Mediterranean region of the world.

Although this area includes many cultures and countries, from Greece to Armenia, the entire eastern Mediterranean region is knit together by a shared legacy from the Ottoman Empire. Historians trace the name of the Empire to Osman I, leader of the Islamic Ottoman Turks and founder of the dynasty that established and ruled it. From 1299 to 1923, the Ottoman Empire, with Constantinople as its capital, was the center of interactions between eastern and western worlds. The Empire evolved over centuries, as the conquering Turks absorbed Armenians, Greeks, Persians, and Jews. Thus, Ottoman architecture, music, art, and cuisine all display the influence of cultures from the entire region.

Sirana Gligora of Croatia, won the Barber's trophy for Best New Cheese at the 2010 World Cheese Awards in Birmingham, England. The winning cheese, Paski Sir, is pictured below.



Cheeses of this region are also influenced by culture and history, as well as geography. In the Balkan region, most cheese is made from cows'

milk while cheese in Greece is more varied, 39% from cows' milk, 36% from sheep's milk, and 25% from goats' milk. Turkey has the largest dairy industry in the Middle East, with 44% of milk made into cheese. Cheese consumption varies too, ranging from 2.3 lbs per person per year in Albania, to Cyprus, with 36 lbs per person, and topped by Greece, by far the country consuming the most cheese at 82.2 lbs per person per year.

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Eastern Mediterranean immigration

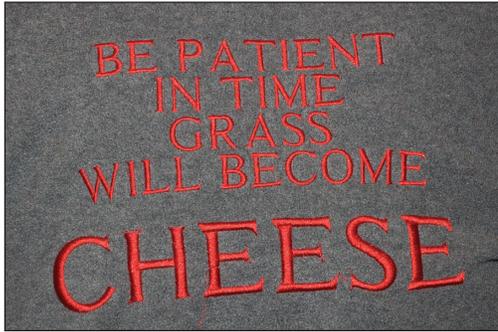
Mozzarella, pasta filata, string cheese, or pizza cheese, it doesn't matter what you call it, most Americans know it and many eat it and cook with it often. Why do cheeses like kashkaval, rumi, and kasseri, all similar pasta filata types, sound so foreign to us? A review of our own

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Research Update

Grass-based dairy products and the latest buzz around butter

by Karen Paulus
Wisconsin Center for Dairy Research



Edelweiss Graziers Cooperative, partners in the project

The SARE grant project partners also include owners of five farms in the Edelweiss Graziers Cooperative. According to Paine, Wisconsin has led the country in the adoption of managed grazing on dairy farms over the past 20 years. As of 2003, nearly 25% of our dairy farmers used grazing as a primary source of forage. (Taylor and Foltz 2006)

First came rumors about a whey cream butter entered in the 2010 American Cheese Society annual contest. It won first place in its category but some judges thought it was good enough to take Best of Show. Butter ... Best of Show?

Then, Al Bekkum, a Wisconsin artisanal buttermaker, told a reporter at the Wisconsin State Journal reporter that he has no trouble selling his grass-based butter at Farmers Markets in Chicago and Madison and he also gets orders from New York city chefs. What's going on?

Artisanal butter

Butter is simply following the model of artisanal cheeses and yogurts; unique value-added products that are made on a small scale, sometimes on the farm. For example, Mike Gingrich and his business partner Dan Patenaude knew that their cows, grazing on lush Wisconsin pastures, produce exceptional, high quality milk. He learned how to make cheese so that he could turn his exceptional milk into an exceptional, award winning cheese—Pleasant Ridge Reserve.

Certainly anecdotal information has always supported the notion that feed influences the flavor of milk, anyone who has sampled milk from cows grazing on wild onions or garlic could attest to that. (And nursing mothers!) Preliminary research also suggested that different feeding regimens, grain vs. pasture, influenced not only the flavor of milk, but also cheese, butter and yogurt made from that milk. Sensory analysis suggests the grassy flavor notes in dairy products from pastured cows doesn't appeal to everyone.

Researchers Scott Rankin and David Combs of the UW—Madison set up a project to compare grass fed dairy products. In a 2005

One poetic individual commented that the grass based butter cream frosting, "Twinkled on my tongue."

Butter cream frosting on chocolate cupcakes, the grass based butter is on the right.



study funded by WMMB, USDA, and the Center for Integrated Agricultural Systems, they compared cheese made from grass-based milk, grain-based Total Mixed Ration (TMR) milk, and a milk mixture of both. (See Dairy Pipeline, Volume 17, No. 2, 2005) They found that a consumer panel preferred the cheese made from the mixed milk, many noticed the grassy flavor note which was only found in cheese from the mixed milk and the cheese made from grass-based milk. In addition, the cheese made from grass-based milk was consistently softer than the other cheeses, perhaps because of an increase in unsaturated fatty acids.

It turns out that butter made from the milk of grass fed cows, or grass-based butter, has some similar characteristics. According to Rankin, depending on the time of year, grass-based butter has more unsaturated fatty acids than conventional butter. (See Table 1.) Grass-based butter exhibits a corresponding soft texture and has a deeper yellow color from the carotene in green grasses.

Is there a market?

Who will appreciate these unique grass-based dairy products? Is there a market for them? Laura Paine, Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) thinks there is, and she would like to encourage its growth by getting these niche products into more stores and restaurants. A three year project, funded by the North Central Region Sustainable Agriculture Research and Education (SARE) grant, aims to learn more about grass-fed milk, managing seasonal changes in it and increasing awareness of how it works in food, or its functionality. From there, Paine would like to help establish a market for this premium product.

SARE grant collaborators recently organized the second annual Grass-Fed Dairy Tasting, held on October 28th at the University of Wisconsin Arlington Research Station. The daylong session featured discussions of feed and forage, terroir and a comparative tasting of foods made with grass based dairy products. Jack Kaestner, executive chef at the Oconomowoc Lake Club, and Leah Caplan, of Field to Fork Culinary Consulting and Metcalfe’s

Market, led the tasting and shared their observations on the culinary characteristics of grass based dairy products. The menu included two portions of each dish, one made with conventional butter and one made with the grass-fed version. Attendees feasted on brioche, croissants, salad with buttermilk dressing, fish prepared with a sage and garlic browned butter sauce, cupcakes with butter cream frosting and an assortment of cheeses.

Both chefs noted that grass based butter seems to enhance other flavors, for example, enhancing the flavor of herbs in browned butter allows flavor to linger. Attendees noticed a big difference in the butter cream frostings (see photo on the the left), commenting on the broader range of sweetness in the grass based butter cream frosting. “It is like two different recipes,” noted one taster. Others thought that the conventional butter tasted like shortening in comparison, while one poetic individual commented that the grass based butter cream frosting, “Twinkled on my tongue.”

Chefs like the texture

Chefs also appreciated the texture of the grass based butter; it was softer; just like the cheese made from grass based milk. This texture difference allows pastry chefs to pull it out of a refrigerator and skip the wait to room temperature before use.

This is a timely topic for Wisconsin cheesemakers, who need a buttermakers license before they start production. Recent changes proposed by DATCP would allow licensed cheesemakers to earn a buttermakers license by

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Table 1.

Fatty Acids	Grass butter May 2009	Grass butter July 2009	Grass Butter Oct. 2010	Conventional Butter July 2009
Short chain	5.4	8.0	7.1	7.6
Saturated	65.9	67.6	67.0	67.7
Mono-unsaturated	29.7	28.3	28.8	27.8
Poly-unsaturated	3.7	3.5	3.5	3.9

Depending on the time of year, grass-based butter has more unsaturated fatty acids —which are thought to be healthier— than conventional butter.

From the Archives

The first new cheese in modern times: Nuworld cheese

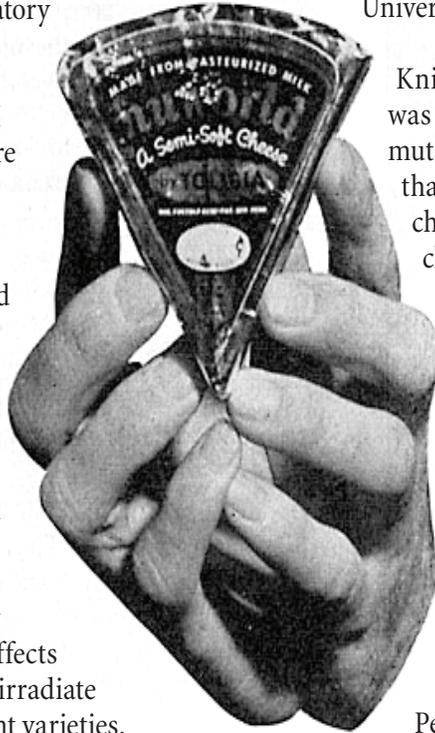
Do you remember Nuworld cheese? Several weeks ago I fielded a call from Dieter Kutscha of Elhurst, Illinois, who asked if anyone here had heard of it. His friend, Diana, who emigrated from England in the mid 50's to work in the Forest Products Laboratory remembered Nuworld cheese fondly and asked him if he could find out if it was still available. So I poked around in our archives before switching to Google, which led me to a digital document at Steenbock Library here on campus. From there I followed the trail of Nuworld cheese.

Around 1947 Professor Stanley Knight, a UW professor in the Microbiology Department, was inspired by the research of Indiana Professor H. J. Muller. This was shortly after the detonation of the atomic bomb over Japan and many scientists were worried about the effects of radiation. Muller used X rays to irradiate fruit flies, producing several mutant varieties. Knight wondered what would happen if he tried a similar experiment with cheese starter cultures. So, according to published accounts from the 50's, he started experiments using ultraviolet light. Here is how he described his efforts:

“The only ultraviolet lights available to me were in a basement animal room under a greenhouse,” he said. “They were used to keep airborne infections from spreading from cage to cage.”

“I simply put my petri dishes containing the cultures of cheese starter on top of the animal cages, let the light shine on them for varying periods of time, and then took them to my laboratory for incubation. Many of them died, when the rays killed part of the organisms necessary for life.”

Apparently Knight had one interesting “culture” that he wanted to try in cheese. But he “ran into a roadblock” when he tried to work with Dr. Walter Price; Babcock Hall hadn't been built yet and the current lab at Hiram Smith Hall had no space for more cheese research. Knight sent his test tubes to a friend at the University of Minnesota.



Knight's discovery, referred to as a culture, was really a mutant mold. Specifically, a white mutant of the *Penicillium roquefortii* family that allowed the University of Minnesota cheesemakers to produce a white colored blue cheese. They named it Nuworld because they believed it was “the first new cheese in 500 years.”

Tolibia Cheese in Fond du Lac, WI made Nuworld cheese, described as a “light cream-colored cheese with little odor.” Tasters described it as “neither sharp nor mild, and not as bland and flat as American cheese.” Nobody seemed to be describing it as anything close to a white colored blue cheese.

Perhaps inspired by the success of Nuworld cheese, Professor Price and Don Irvine worked together to develop another new cheese: Dariworld. According



to an account from the Wisconsin State Journal in 1956, Irvine was actually trying to push the limits of making cheddar cheese. Instead, to his surprise, he made a cheese that ripened rapidly and held its flavor “for long periods.” Once started, innovation must have been hard to stop because the next advance was yet another cheese; Spreez. Manufactured



by Lever Brothers, this product was advertised as “the first easy spreading cheese with real Wisconsin flavor!” In fact, it was a mix of Dariworld and Nuworld cheese.

I think Spreez had a short life but I can tell you where you can buy Nuworld cheese (try the dairy story at the University of Minnesota) and I also have a 1970 brochure that describes how to make Dariworld cheese. After that you are on your own.

References

Morris, H.A., Jezeski, J. J., Combs, W. B., The Use of White Mutants of *Penicillium roqueforti* in Cheese Making. Journal of Dairy Science, Vol. 37, No. 6, June 1954

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Grass-based butter

working 40 hours under the supervision of a licensed buttermaker and completing a DATCP approved course. CDR offered the first buttermakers short course in September, with another to follow in early March. Contact Marianne Smukowski if you have questions, msmuk@cdr.wisc.edu or 608.254.6469.

References

Grass-based dairy products: challenges and opportunities
 Laura Paine, DATCP
www.cias.wisc.edu

Taylor, J. and Foltz, J. 2006. Grazing in the dairy state: Pasture use in the Wisconsin dairy industry, 1993-2003. University of Wisconsin—Madison Center for Integrated Ag Systems.
www.cias.wisc.edu/wp-content/uploads/2008/07/statusgrz.pdf



Salad with buttermilk dressing and fish prepared with a sage and garlic browned butter sauce

What’s next?

Despite multiple attempts to indentify them, the chemical compounds that deliver that grassy flavor note to dairy products made from grass-based milk remain a mystery. The next step for researchers will be taking a closer look at the grass-based milk over the season, how does it vary from early summer to fall? The scientists will also look at the influence of different types of forage on the flavor of grass-based milk. Maybe they will even have another tasting!



Nutrient dense cultured milk products like Greek yogurt and kefir are popular throughout the Eastern Mediterranean region and they are gaining ground here in the United States.

history offers some clues. Back in the early 1900's the population of the United States increased by millions when immigrants, fleeing poverty and unemployment, poured into east coast cities. Between 1880 and 1920, an estimated four million people left Italy for America. By 1920, around 900,000 Greeks immigrated to the US, however the majority of them were men and half returned to Greece. A history of Syrians in America notes almost 90,000 people from greater Syria arrived in the United States between 1899 and 1919. By 1920, nearly 100,000 Armenians fled Turkey to settle in the United States. Detroit became home to Palestinians and Arabs although Muslim Arab immigration was rare before 1920. And then the welcome mat was yanked when Congress passed the Johnson-Reed Quota Act in 1924, greatly reducing immigration from the eastern Mediterranean region. Although the US absorbed millions of people from this region in the early 20th century most of them came from Italy, explaining why mozzarella is a household word and kashkaval might show up in a trivia contest.

Cheese ripened in a sack

Kalit Samir, Professor in the Dairy Science Department at the University of Zagreb, in Croatia told us about one of the most unique cheeses of the region: cheese ripened in a sack. This cheese is called Tulum in Turkey, Mjeh in Bosnia and Herzegovina and Misina in Croatia. For centuries nomadic sheep breeders used lambskins to store and transport food. In ancient times, perhaps 10,000 years ago during the period of Illyrians and Tracians, they began to ripen cheese in the skin of a whole lamb or goat. The skin is prepared by removing the wool and tallow, washing it several times followed by drying in the sun and the wind.

The rough cheese curd is shaped by hand and in wrapped in a cloth to drain. Then, it is cut into chunks, salted with sea salt and wrapped in the skin, or sack, to ripen between 64 and 68° from 2 to 3 months. During the aging process, the sack is turned and washed to remove mold. When finished the cheese is white to yellowish in color with a hard, crumbly texture and a strong, piquant flavor. Today, in Croatia, Misina is made on small family farms with full fat, raw milk from sheep, cow, goat, buffalo or a mix.

Samir also told us about Paski sir cheese (see photo on page 1), a hard, distinctively flavored sheep milk cheese that we were able to see, smell and sample. Paski cheese is made on the Croatian island of Pag, a stony landscape with limited vegetation. Paski sheep are well adapted for island life and grazing on aromatic wild herbs, like sage, sprayed by the sea probably influences the flavor of the cheese. Paski sir is a farmstead cheese, relying on natural lactic acid bacteria from woody tools rather than starter culture.

Fermented milk and yogurt

Nutrient dense cultured milk products like Greek yogurt and kefir are popular throughout the Eastern Mediterranean region and they are gaining ground here in the United States. Greek style yogurt was traditionally made by straining whole milk yogurt with cheesecloth to remove whey, but manufacturers can use



Kalit Samir, Professor in the Dairy Science Department at the University of Zagreb, Croatia



a contemporary method employing ultrafiltration. (See Dairy Pipeline Vol. 20, No. 4, 2008)

Kefir is a liquid, with both protein and fat contents similar to the starting milk. Kefir grains, a unique symbiotic matrix of bacteria and yeasts combined with proteins, lipids, and sugars is the traditional culture for making kefir, which has a refreshing, “sparkling” acidic flavor. The kefir you find in grocery stores here is less likely to offer the sparkling note, which is produced by yeast in the kefir grain; commercial kefir here is made with defined cultures.

Marketing opportunities

As mentioned earlier, the Eastern Mediterranean population in the United States is not large. According to Dave Leonhardi of the Wisconsin Milk Marketing Board, nearly 2.5 million US residents claim at least partial ancestry from the Eastern Mediterranean region. At least half of them have Grecian roots. Although the market for cheese from this region is small, it is growing, particularly kefir and feta cheese. Eastern Mediterranean cheeses are sold in all U.S. markets, but certainly you will find stronger markets in areas of the west coast, Chicago, Denver and Detroit.

Is there an Eastern Mediterranean cheese that will follow the lead of mozzarella, topping millions of pizzas? Probably not. However, we have more adventurous palates these days and more Americans have heard of the health benefits of the Mediterranean diet. I do not doubt that research on probiotics will continue to show positive effects, and that might influence demand for kefir which is packed with potentially advantageous bacteria.



“We treat cheesemaking as a heritage,” Samir told me.

I had a chance to talk with Samir about the structure of the dairy industry in Croatia and I was struck by the similarities to the industry here in Wisconsin. Under Communist rule very large Croatian dairy plants were run by the state. After the fall of Communism multinational companies bought a few, but others just ceased to exist. Some smaller plants started up to make local cheese. Farmstead operations, some on them on Croatian islands like Pag, sell directly to consumers, including tourists. Cheesemakers milk during the spring and ripen cheese for the summer tourists. Samir noted that the tourists enjoy farmstead operations because, “They can see where the cheese is produced and the animals that produce the milk.”

And, like here, “Farmers can earn more money by producing cheese instead of selling the milk.”

“We treat cheesemaking as a heritage,” Samir told me.

“We do too,” I answered.

Under the direction of Chef Sabi, the class got a chance to make Cigarro Burek, or feta cheese phyllo rolls, left and below.

News from CDR

In the marketplace, customers, suppliers and buyers can understand and verify food safety capabilities of manufacturers by using a third party audit. However, depending on the size of the plant, some Wisconsin cheese plants are audited up to 50 times a year. The Committee for the Assurance of Wisconsin Dairy Product Safety was formed to address this issue by developing a comprehensive and standardized dairy specific food safety program. Could this program help to cut back on multiple audits without affecting safety and quality? It turns out that it may indeed be possible. Whole Foods Market, a prominent customer of many Wisconsin manufacturers, will now accept the Wisconsin Dairy Product Safety audit in lieu of an additional third party audit. Marianne Smukowski, CDR's safety and quality expert and a member of the Wisconsin committee noted that they hope other Wisconsin cheese buyers, like Kroger, Walmart and Costco will follow suit.



short course on Feb. 1-2, 2011. Sponsored by CDR and the Department of Food Science with support from Wisconsin Laboratory Association, this class will cover basic dairy microbiological methods as well as analytical tests that measure fat, moisture, pH, salt and crude protein of dairy products. For more information about the curriculum, contact Kristen Houck at (608) 265-6346 or houck@cdr.wisc.edu

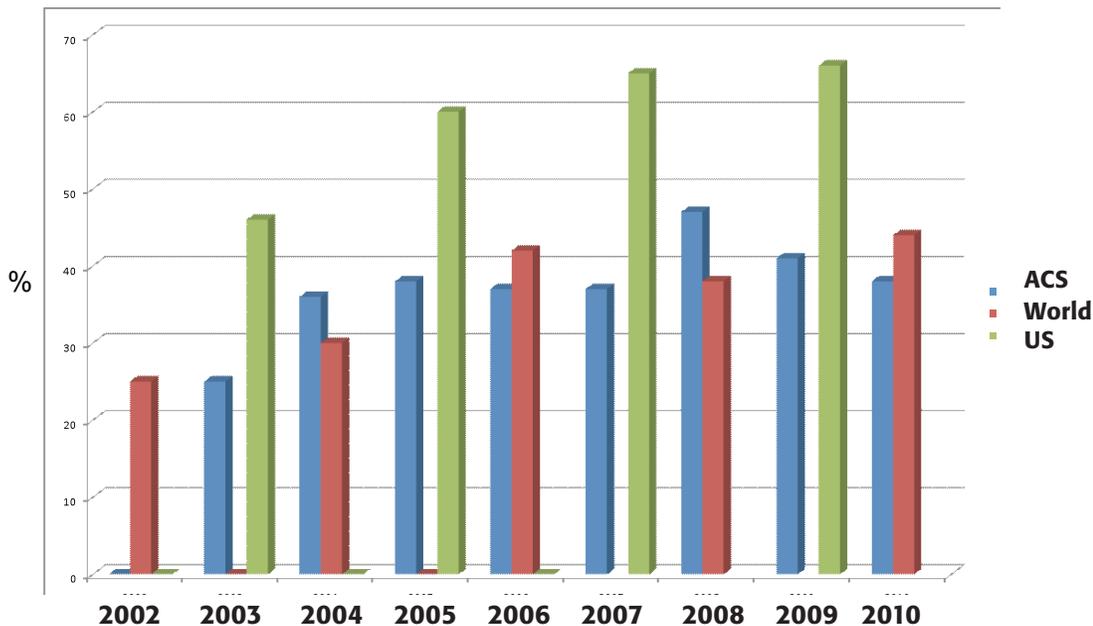
Basic Dairy Laboratory Techniques Workshop

Do you have someone at your plant who wants to learn more about basic laboratory tests? Consider our new one and a half day

Wondering if education pays off? Bill Wendorff compiled this graph to indicate that graduates of UW Dairy short courses are big winners at cheese contests, including the American Cheese Society (ACS), and the Wisconsin Cheesemakers US and World contests.



% of Contest Winners that are UW Dairy Mfg. Short Course Graduates



Skimming the Shelf—

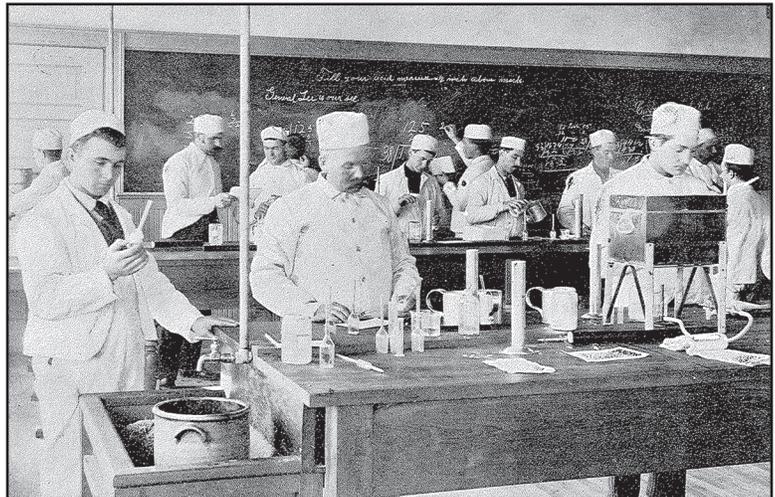


What's New in Print?

“Decker on Cheese & Dairying” by John Wright Decker is the third in a book of heritage volumes published by the Robert Mondavi Institute at UC- Davis. The new publication combines into one volume two of Decker’s books: “Cheddar Cheese Making” and “The Elements of Dairying,” both published more than a century ago.

Author John Wright Decker was born in Wisconsin and, after graduating from high school, built and operated his own cheese factory near Fond du Lac, Wis. In 1886, he sold the factory and entered the University of Wisconsin to study agriculture. Five years later he became one of the first instructors at the Wisconsin Dairy School.

Convinced that students needed more than “lectures and quizzes” to truly understand the science and nuances of cheese making, Decker was frustrated to find that all available texts on the subject were either outdated or unsuitable for college students. Undaunted, he set out to write his own book. The result was “Cheddar Cheese Making,” which he self-published in 1893 and sold for just \$1 per copy. A second edition was published in 1895.



A photo of the Wisconsin Dairy School from Deckers original 1895 book.

Decker went on to write and publish “The Elements of Dairying” in 1903, while on the faculty at The Ohio State University.

More than a century later, the modern compilation of his works from the Robert Mondavi Institute includes pictures and illustrations from the original texts, as well as newly discovered photographs and biographical information about the author. The new book’s foreword was written by Mark Johnson, senior scientist at the Wisconsin Center for Dairy Research at the University of Wisconsin, Madison.

The new book’s foreword was written by Mark Johnson senior scientist at the Wisconsin Center for Dairy Research at the University of Wisconsin, Madison.

The new book can be purchased for \$60 each at the UC Davis Bookstore, through the Robert Mondavi Institute website at : <http://rmi.ucdavis.edu> or by contacting Kim Bannister at the Mondavi Institute at (530) 754-6349 or kbannister@ucdavis.edu.



Curd Clinic

Curd clinic doctor for this issue is Dr. Bob Bradley, professor emeritus Dept. of Food Science

Q. I am a cheesemaker but I am also thinking about making butter in the future. Right now I am doing some research on packaging. I plan to make and sell a quality product, what do I need to consider when choosing a wrapper for my butter?

A. I remember childhood trips to Kennedy’s Butter and Egg market, tagging along when my mother took her ration coupons to buy some butter. A knife was used to cut a block of butter from a big wooden tub, a firkin, and the butter was wrapped in parchment and weighed for sale. Packaging has changed.

Fats absorb odors because they absorb the gases comprising the odor. This characteristic is behind the most common butter defect, referred to as “storage flavor.” Frozen butter can absorb flavors from the freezer and refrigerated butter can pick up unwanted flavors from anything nearby. And, of course, any cook who has made the mistake of cutting butter on a board previously used to cut onions knows that room temperature butter does a good job of hijacking flavor too.

Just like cheese, butter is susceptible to an oxidation defect caused by high intensity light, often while sitting under fluorescent light in a retail display case. Light source, wavelength, and exposure time all influence the degree of oxidation. Certainly yellow light would be a better choice for display cases, but cardboard overwrap and the pigmented plastic tubs can prevent this problem too.

Parchment is very common

Parchment, a very common paper wrap on butter, does allow transmission of light. In addition, parchment is porous, which is another reason unwanted flavors leach into butter from the environment. Looking at it from the other side, moisture also leaks out from the butter, passing through the parchment and drying the surface of the butter. What’s next? Discoloration as well as storage flavor defects. Color can move through the parchment, too, which is something to consider when you choose printing ink and parchment as your only packaging.

So what is the answer? There are several, both are more expensive than parchment but they work. First, you could go the plastic tub route to clean tasting butter. Since the mechanical equipment is costly it might be something for the big companies to consider, but an artisan buttermaker is more likely to go with the second solution: foil wrapping. You can buy laminated foil wrap that is



Fats have three common enemies: air, light and moisture but you can effectively keep them in check with proper packaging.

made with an internal layer of plastic or parchment to protect the butter from the foil. This is necessary because salt and acid in the butter will attack unprotected foil.

If you choose a laminated foil wrap you still need to take it one step farther and make sure you have an effective overlap—at least 2 inches. After that, seal the wrapper with tape to seal the barrier.

Remember, butter and other fats like margarine have three common enemies: air, light and moisture but you can effectively keep them in check with proper packaging. 



Put it on your calendar, the next UW butter short course is March 1 to 3, 2011

Calendar

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March 8-10 US Championship Cheese Contest, Green Bay, WI

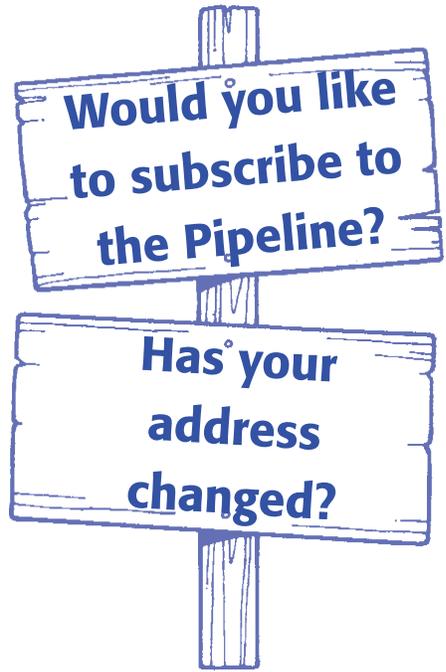
March 15 FRI Better Process Cheese
http://www.fri.wisc.edu/training_workshops.php

April 12 CDR Industry Team Meeting, La Crosse, WI

April 13-14 Wisconsin Cheese Industry Conference, La Crosse, WI
<http://www.cheeseconference.org/>

March 21-25 Cheese Tech Short Course
http://www.cdr.wisc.edu/shortcourses/cheese_tech.html

May 1-5 World of Cheese
http://www.cdr.wisc.edu/shortcourses/world_of_cheese.html



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Calendar

January 4-5 Milk Pasteurization and Process Control School
http://www.cdr.wisc.edu/shortcourses/pdf/milk_past_01_11%20202.pdf

January 14-17 Successful Ice Cream

January 18-20 Batch Freezer Workshop
<http://dairyfoods.wisc.edu/assets/batch11web.pdf>

January 23-26 IDFA Dairy Forum
<http://www.idfa.org/events--trade-show/interactive-event-calendar/>

February 1-2 Lab Techniques Course
http://www.cdr.wisc.edu/shortcourses/lab_workshop.html

February 8-9 Dairy Field Reps

February 22-23 Process Cheese Course
http://www.cdr.wisc.edu/shortcourses/process_cheese.html

March 1-3 Buttermakers Short Course
<http://www.cdr.wisc.edu/shortcourses/buttermakers.html>