

CALIFORNIA Dairy Dispatch

RESEARCH, EDUCATION AND SERVICE TO SUPPORT THE DAIRY INDUSTRY

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Cal Poly DPTC concocts “recipe for success” for frozen foods industry

By Pat Ketchum

A high-tech laboratory nestled in the pastures of the Cal Poly campus has evolved into a major solutions center for cheese and yogurt producers throughout California.

A team of Dairy Products Technology Center (DPTC) students and scientists recently concocted a recipe for success for an up-and-coming player in the huge frozen foods industry.

Pinkberry, a frozen-treat chain so popular in Southern California that the *Los Angeles Times* called it “the taste that launched 1,000 parking tickets,” contacted the DPTC to help ease their growing pains, after their solo shop multiplied to more than 30 stores in less than two years.

Although the DPTC team’s collective lips are sealed to protect the secret formula for the signature “pouty peaks” of Pinkberry creations, Director Phil Tong did reveal that they helped the company determine how to make their product in larger quantities, while insuring compliance with California law and retaining

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New Zealand’s Harjinder Singh receives William C. Haines Dairy Science Award

Professor Harjinder Singh, co-director of the Riddet Institute at New Zealand’s Massey University, was presented by the California Dairy Research Foundation (CDRF) with the William C. Haines Dairy Science Award in recognition of his contribution to the field of dairy science. The award was given to Singh on March 18 at the 10th Cal Poly Dairy Ingredients Symposium in San Francisco where he gave a presentation on the use of milk proteins as potential nano-encapsulation and nutrient delivery systems.

“Dr. Singh is an excellent candidate for this award,” said Joseph O’Donnell, executive director of the CDRF. “He is an authority on

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milk proteins and their relationship to dairy technology and processing. His research has contributed to the fundamental understanding and functionality of milk proteins and hydrocolloids in food systems, knowledge that has formed the solid basis of the development of new dairy products with improved nutrition, functionality and shelf-life.”

“It is a great honor for me to receive this award recognizing excellence in dairy research and development,” said Singh. “Many graduate students, postdoctoral scientists and collabora-

tors at Massey University deserve to share the recognition this award presents. The continued support of the New Zealand dairy industry for multidisciplinary, fundamental work on milk protein structure and functionality at Massey University is greatly appreciated. The ability of the dairy industry worldwide to innovate by developing new products with leading edge functionality depends on how well the fundamental knowledge about dairy ingredients can be translated into product development ideas and concepts. Close interactions between industry and academic researchers are essential to make academic research more relevant and to facilitate uptake of knowledge by the dairy industry.”


Holder of an endowed Chair in Dairy Science at Massey University in New Zealand, Professor Singh serves as director of the Riddet Institute, which was recently established as a National Centre of Research Excellence in Food Innovation, one of seven such centers sponsored by the New Zealand government and part of a partnership between Massey University, University of Auckland and University of Otago and the Crop and Food Research and AgResearch organizations. He has published 200 peer-reviewed papers, 15 book chapters and holds four patents. His research program is directed at generating fundamental knowledge on structures, interactions and functions of dairy components, such as milk proteins and the effects of different environments and novel processing technologies. His recent work explores the use of milk proteins and phospholipids in designing nano-encapsulation and delivery systems for bioactive compounds.

Professor Singh has a long-standing relationship to the California dairy industry, participating in a regular exchange of ideas and collaboration

over the last six years. In 2002, a CDRF-funded project allowed Cal Poly student Annie Bienvenue (now on the staff of the U.S. Dairy Export Council) to conduct milk protein research at Massey University. A subsequent project brought Professor Singh to work at the Cal Poly Dairy Products Technology Center for six months where he continued his work on the influence of minerals in milk proteins as they become concentrated to produce NFDMP (known internationally as SMP). An additional project that grew out of this collaboration was the study of heat interactions of beta-lactoglobulin alone and with kappa-casein.

Established in 2004, the William C. Haines Dairy Science Award was created to recognize individuals who, through their accomplishments in research and development in the field of chemistry, biochemistry, microbiology, technology, nutrition, and/or engineering, have made a significant contribution to dairy science and the betterment of the dairy industry and consumers of dairy products. Past award winners include David Barbano of Cornell University, Todd Klaenhammer of North Carolina State University and Paul Ross of the Teagasc Moorepark Food Research Centre.

The award, named for William C. Haines, former vice president of product innovation for Dairy Management Inc., includes an engraved plaque, \$1,000 in cash and travel expenses to an annual dairy industry event co-sponsored by the CDRF. A committee of dairy personnel representing producers, processors, manufacturers and researchers make the final award selection. Nomination forms for the 2009 award are available online at www.cdrf.org under “Awards & Giving.” The deadline to submit 2009 nomination forms and supporting materials is Sept. 22, 2008. *CDD*



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ORGANIZATION SPOTLIGHT

CDRF's Dutch Counterpart – The Dutch Dairy Association

While CDRF's mission is to support the implementation of effective regional and national initiatives designed to increase consumer and customer demand for California and U.S. produced milk and dairy products, it is still in our best interest to form bonds with other dairy research organizations outside of the United States. CDRF works to find common ground with these organizations to continue to better understand the health benefits of milk above and beyond what consumers could obtain through alternative products such as soy or health supplements.

One of these affiliations is with the Dutch Dairy Association. Innovation has always played an important part in Dutch dairy farming. Despite being one of the smallest and most densely populated countries in the world, The Netherlands is one of the largest exporters of agricultural products. The country has always been a frontrunner in the development and application of new techniques and has made optimal use of its resources. Quality and the safety of humans, animals and the environment are an essential element of its production methods.

In 1989, just a year after the California Dairy Research Foundation (CDRF) was founded, The Dutch Dairy Foundation for Nutrition and Health was established to exchange information, ideas and results of dairy education programs, mainly directed at opinion formers and leaders. The concept was to provide international coordination of issues and developments in the field of nutrition related to milk and dairy products or their components. In building international networks with scientists from many



countries, the group began inviting researchers to closed workshops in order to exchange and discuss the latest developments in their research areas.

In 2003, the Dutch Dairy Foundation for Nutrition and Health merged with the Dutch Dairy Bureau and the Dutch Dairy Association and created a new Dutch Dairy Association. The association holds seminars and publishes a bimonthly magazine, which is distributed to dietitians, doctors, pharmacists and teachers. The English translation of this magazine can be found at www.nutritionmagazine.nl on the Web.

In support of dairy research, the Dutch Dairy Association sponsors endowed chairs at several universities and maintains international contacts with major dairy processing countries in the field of nutrition through the Utrecht Group. The group meets yearly in the city of Utrecht in The Netherlands to present and discuss the latest research with a new theme for each year. Some of the Utrecht Group workshop themes have included: "Dairy Products, Weight Management and Satiety; Determinants of total/HDL cholesterol concentration and its health conse-

quences; and Metabolic Syndrome: Prevention and Treatment."

Representatives from CDRF not only attend the Utrecht Group workshops, but also invite an American expert in a particular topic to attend and participate in the research workshop discussions. At the end of each workshop, each member is encouraged to discuss specific successful or unsuccessful educational programs in dairy nutrition. Each year, the members come away with the latest updates on nutrition research as well as tactics to consider or avoid in the area of dairy nutrition education. Dr. Joe O'Donnell, Executive Director of CDRF stated, "Attendance at the annual Utrecht Group meeting always provides me with the most recent information on the cutting edge of dairy nutrition research, while the face-to-face workshops allow investigators to complement each other's work and prevent overlap of research efforts."

The topic for the 2008 Utrecht workshop in May is "Dairy Products and Cancer Risk Reduction." Dr. Carlito Lebrilla of UC Davis will be speaking at this workshop.

CDR

DPTC *from page 1*

the singular taste its avid followers clamor for.

As a result, more Pinkberry shops could be just around the corner, serving up their soft swirls of chilly bliss in the form of frozen yogurt, smoothies and shaved ice – with toppings that range from Coco Pebbles® to coconut.

“We worked with other consultants and universities previously with little success,” Pinkberry President Shelly Hwang wrote in a thank-you letter to Tong last summer. “The advice you gave and the test trials you performed enabled us to continue with our development of the Pinkberry business and is positioning us for larger-scale production.”

In fact, venture capital firm Maveron, co-founded by Howard D. Schultz of Starbucks fame, has announced it will infuse \$27.5 million into the budding business.

In another project, a DPTC team, guided by Cal Poly Professors Rafael Jimenez and Nana Farkye, is working to improve products for a California-cheese giant. Hilmar Cheese Co., which produces more than 1.3 million pounds each day, not only seeks the services and expertise of DPTC scientists, it also hires dozens of industry-ready graduates from the College of Agriculture, Food and Environmental Sciences.

“It’s great to work with our recent graduates at Hilmar and solve real-world problems together,” says Jimenez.

“With Hilmar’s cooperation,” said Farkye, “we were able to effectively test and show that the DPTC approaches to improving the quality and taste of low-fat cheese actually work in the industrial situation.”

Like many of the companies it assists, the DPTC started as a small venture and has grown beyond expecta-



From left, Cal Poly Professors Rafael Jimenez, Nana Farkye and Phil Tong

tations into a world-class education and research center. Tong says the center will mark its 20th anniversary in 2008 with plenty to celebrate and plans for the next 20 years.

“The DPTC is committed to helping California’s booming dairy

industry by providing graduates and technology innovations for the next decade and beyond,” said Tong.

This article first appeared in the Winter 2007 issue of *Cal Poly Magazine Online* at www.calpolynews.calpoly.edu/magazine *CDD*

5th International Symposium on Milk Genomics & Human Health to be held ‘down under’

International experts in nutrition, genomics, bioinformatics and milk research will gather in Sydney, Australia, October 14-16 for the 5th International Symposium on Milk Genomics and Human Health.

Organized by the California Dairy Research Foundation (CDRF), the three-day event will focus on topics such as the bovine genome, evolution across genomes, lipids as the next beneficiary of genomics, milk research down under

as well as updates from the International Milk Genomics Consortium (IMGC). A complete speaker program will be announced in June. Proposals for poster sessions will be accepted through July 15. See www.milkgenomics.org for details.

Symposium registration is \$450 through Aug. 15, 2008, and \$500 thereafter, and includes all program materials

See **Milk Genomics** at right

Dairy Ingredients Symposium unveils research to help food and beverage makers capitalize on health and wellness boom

Research and industry insights uncover new market opportunities, technologies for value-added dairy ingredients

As consumer interest in health and wellness continues to soar, so does the growth potential for dairy ingredients in food and beverage products. New research is exploring ways to harness the health benefits of dairy ingredients to maximize the nutritional content of foods. In addition, dairy ingredients can be used to facilitate the introduction of other popular nutrients – such as omega-3 fatty acids, probiotics, calcium and vitamin D – into food formulations.

Highlights of these scientific approaches to dairy ingredients were unveiled in San Francisco, March 18-19, during the 10th Annual Dairy Ingredients Symposium, co-sponsored

by Dairy Management, Inc. (DMI) and the Dairy Products Technology Center at California Polytechnic State University with support from the California Dairy Research Foundation and USDEC. More than 175 leaders in the dairy, food and beverage industries gathered to learn about the latest trends in the marketing, science, manufacturing technology and food applications of value-added dairy ingredients.

“If you think you know dairy ingredients, think again,” said Alan Reed, senior vice president, U.S. manufacturing and ingredient marketing, Dairy Management, Inc. “As the latest research results become available, food and beverage manufacturers will discover even more ways to use dairy ingredients to create innovative, nutrient-packed products that give them a competitive advantage.”

According to a study conducted by The NPD Group, Inc. and re-



leased at the symposium, Americans are looking to improve their health by “adding” to their diets. Approximately 53 percent of adults are trying to get more protein in their diets versus a year ago. Whey proteins and milk protein concentrates are just a few of the many domestic dairy ingredients that can be leveraged to answer this need.

The symposium also featured sessions on the topic of dairy ingredient functionality. Presenters spoke on current research related to the solubility and flavor optimization of dairy ingredients.

“New processing techniques are helping to make dairy ingredients even easier to use in food and beverage formulations,” said Phillip S. Tong, Ph.D., director, Cal Poly Dairy Products Technology Center. “These techniques, uncovered by DMI-supported research, will continue to catalyze numerous market opportunities for manufacturers and suppliers in the years ahead.”

Dairy ingredient prices also are projected to drop in 2008, compared to 2007, making them even more affordable to use. At the symposium, Robert Cropp, professor emeritus at the University of Wisconsin-Madison, presented a market outlook for lower dairy ingredient prices in 2008, spurred by higher U.S. milk production.

To obtain abstracts and/or copies of the 22 presentations given at the 10th Annual Dairy Ingredients Symposium, call the Dairy Technical Support Hotline at 1-800-248-8829. For more information on formulating and innovating with dairy ingredients, go to www.innovatewithdairy.com.

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Milk Genomics *continued*

and daytime meals as well as a Tuesday evening reception. Discount rates are available for students and sponsoring members of the International Milk Genomics Consortium. For registration information, visit www.milkgenomics.org or register online at www.acteva.com/go/cdrf.

Event sponsors include the International Dairy Federation, U.S. Dairy Export Council as well as IMGC sponsoring members: CDRF, CNIEL, DairyAustralia, Dairy Farmers of Canada, Dutch Dairy Association, Mead Johnson Nutritionals and Teagasc. Information about the IMGC is available at www.imgconsortium.org.



Skimmed milk better than isotonic for post-sport rehydration

Drinking skimmed milk after exercise may promote recovery and rehydration better than water or an isotonic sports drink, suggests a new study from the UK.

Writing in the *British Journal of Nutrition*, researchers from Loughborough University's School of Sports and Exercise Sciences report that volunteers in their trial remained hydrated after drinking milk, but remained dehydrated after drinking the other drinks.

"The results of the study are really exciting as they show skimmed milk to produce a significant improvement in re-hydration compared to the other drinks evaluated in the study. As dehydration can have an impact on performance, it is essential to re-hydrate in preparation for subsequent exercise in order to help maximize one's abilities," said lead author Susan Shirreffs from Loughborough University.



The researchers recruited 11 healthy volunteers (average age 24) for the randomized crossover trial. Lactose-intolerant people were excluded from participating. The participants performed exercise to lose 1.8 percent of their body weight and then consumed one of the beverages – the volume consumed was equivalent to 150 percent of the sweat lost. Drinks included skimmed milk (0.2 percent), skimmed milk with added sodium chloride, water or Powerade. Urine samples were taken five hours after exercise.

The researchers report that urine excretion over the recovery period was unchanged as a result of drinking the milk, while excretion increased between one and two hours after drinking the water and sports drink.

"The results suggest that milk is more effective at replacing sweat losses and maintaining hydration than plain water or a commercially available sports drink following exercise-induced dehydration by approximately 2 percent of initial body mass," said the researchers.

"Given that hypohydration results in an increase in cardiovascular and thermoregulatory strain, and a reduction in exercise capacity in the heat, it is important to ensure that fluid losses accrued during exercise are replaced prior to the performance of a subsequent exercise bout," they concluded.

Source: *British Journal of Nutrition*, Volume 98, Pages 173-180, "Milk as an effective post-exercise rehydration drink," S.M. Shirreffs, P. Watson, R.J. Maughan.

Fuel from cheese? Whey cool: research may save state plants

Filling your car's gas tank with fuel made from cheddar might sound cheesy, but it could happen soon. Scientists and a former cheese plant manager from Stratford, Wis., are studying the feasibility of making ethanol from whey left over from cheese-making. When mixed with gasoline, ethanol is a popular biofuel.

The research could help save dozens of small cheese plants struggling with high operating costs. Whey, once regarded as a waste product from cheese plants, has become a popular ingredient in packaged foods such as cake mixes, candy and nutrition bars.

Finding another use for whey could help the plants make ends meet, said Joe Van Groll, owner of Grand Meadow Energy, a Stratford firm that's experimented with making ethanol from cheese waste.

Van Groll bought the former Grand Meadow Co-op cheese plant after it closed three years ago and converted the facility into a biofuels research and development laboratory. Now, he's ready to sell licenses to use the yeast-based technology developed with the help of a \$29,000 state grant.

Van Groll said his process focuses on making ethanol from sugar water extracted from whey. He believes the same method could be used to make ethanol from other organic waste. His next step is to acquire another former cheese plant and use it to produce up to 6 million gallons of ethanol a year.

Making ethanol from cheese whey has been done be-

fore, but the technology is not widely used in the United States. Most ethanol here is made from corn.

There are advantages to making ethanol from whey, including lower energy costs. About 50 percent of the ethanol in New Zealand, a dairy-rich country, is made from whey, said John Fieschko, executive director of the Central New York Biotechnology Research Center in Syracuse, N.Y. A German dairy products company recently invested \$27 million into a plant to make ethanol from cheese waste. A California start-up company, called Earthanol, raised about \$7 million in venture capital for similar work.

Whey is a viable but less grandiose alternative to corn for making ethanol, said Fieschko, whose laboratory recently received a \$400,000 government grant to design an energy-efficient bioreactor for the whey process.

"I am not going to compete, volume-wise, with corn. But I can make ethanol for about 80 cents a gallon, compared with \$1.50 per gallon from corn," Van Groll said.

But rising whey prices could dampen some of the enthusiasm. The value of Wisconsin whey exports nearly tripled in the first half of the year to \$37 million. Wisconsin whey exports to China grew from \$2.7 million in the first half of 2006 to \$10.8 million in the same period this year.

"It all comes down to economics," said John Umhoefer, executive director of the Wisconsin Cheesemakers Association. "The trick is to anticipate market prices, which is a very difficult thing to do," he said. "You can definitely make ethanol out of whey . . . but it comes down to the price. Markets dictate the best use of products."

A former cheese plant manager with a bachelor's degree in food science, Van Groll hopes that his primary revenue will come from selling whey technology licenses that use his trade secrets. He's already sold one license to a group of California investors.

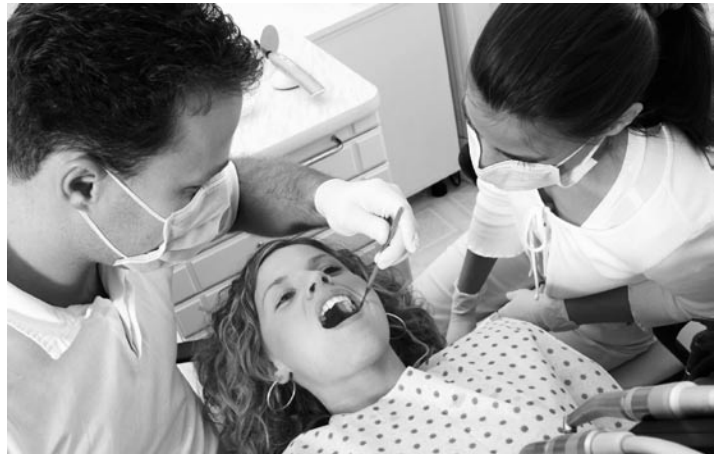
"My plans are to take this global," Van Groll said. "There's more money to be made in Europe and South America than in the United States because their fuel prices are much higher. The Japanese, and people from Brazil, have already looked at this."

Whey could be used to make biodegradable plastics, in addition to ethanol and food ingredients. "There's tremendous potential for replacing fast-food wrappers with something that's biodegradable," Fieschko said.

This article by Rick Barrett was excerpted from an article found in an IDFA Smart Brief posted on Nov. 10, 2007.

Dairy dental benefits played up in industry health drive

A UK-based nutrition group kicked off a new scheme in February designed to promote the consumption of dairy products like cheeses and milk as a key element of good dental health. The Dairy Council says that the Slurp and Chew ad scheme began in early February, and will be played at 160 dental surgeries in the UK. The scheme aims to push the message that cheese and milk consumption can offer consumers an effective means of fighting tooth decay – claims that have been accepted by the British Dental Health Foundation.



The latest Dairy Council campaign is in line with an industry-wide attempt to play up dairy products as a major part of a healthy diet, amidst growing consumer and regulatory concerns over issues like obesity and heart health. Council director, Dr. Judith Bryans, said the Slurp and Chew scheme plays up the importance of components like calcium and phosphorus in developing and protecting teeth.

"With regards to dental health itself, milk is one of the few drinks that is safe to have between meals, and a small piece of hard cheese chewed on its own after meals can actually help reduce the risk of tooth decay," she stated.

Independent charity The British Dental Health Foundation agreed that certain dairy products could indeed be good for teeth. Foundation chief executive Dr. Nigel Carter told DairyReporter.com that the high pH value of cheese and milk helps to neutralize plaque acids from sugars.

"It surprises many people that a small piece of cheese is actually far better for your teeth than an apple, [as] apples are quite acidic and can cause dental erosion," he said.

This article was excerpted from an article by Neil Merrett in the Feb. 13, 2008 issue of Dairy Reporter.com.

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Calendar of **EVENTS**

July 7–11, 2008

ADSA annual meeting. Location: Indianapolis, Ind. For more information, visit www.adsa.org on the Web.

September 9–12, 2008

10th Dairy Science and Technology Basics for the Farmstead/Artisan Cheesemaker

Learn the basics of quality cheese manufacture with emphasis on artisan/farmstead cheese manufacture. Includes one day of hands-on cheese making activities, cheese sensory evaluations, and other considerations in starting a small scale cheese making business. Location: Cal Poly Dairy Products Technology Center, San Luis Obispo, CA.

October 14–15, 2008

Dairy Technology 101. This course emphasizes the basics of milk quality and basic unit operations in milk handling

and processing. Location: TBA. For more information, visit www.dptc.calpoly.edu, or contact Laurie Jacobson at ljacobso@calpoly.edu.

October 14–16, 2008

The 5th International Symposium on Milk Genomics and Human Health. Location: Sydney, Australia. See www.milkgenomics.org for details.

November 18–21, 2008

9th Annual Frozen Dairy Desserts Manufacturing Short Course. Course will emphasize ingredients function and usage, mix formulation, equipment and processes in frozen dessert manufacture. Hands-on sessions for products quality evaluation and product manufacture included. Location: Cal Poly Dairy Products Technology Center, San Luis Obispo, CA

For the latest information, please contact Laurie Jacobson at ljacobso@calpoly.edu.