

Inside this Issue

Nutrition Research	p. 2
Product Research	p. 4
Regulatory Affairs	p. 5
Contact Info.	p. 5

NR

Nutrition Research

High Impact Papers * - Published

- **Diets with high-fat cheese, high-fat meat, or carbohydrate on cardiovascular risk markers in overweight postmenopausal women.** Thorning TK, Raziani F, Bendtsen NT, Astrup A, Tholstrup T, Raben A. *Am J Clin Nutr.* 2015 Jul 15. pii: ajcn10911
- **Consuming the daily recommended amounts of dairy products would reduce the prevalence of inadequate micronutrient intakes in the United States: diet modeling study based on NHANES 2007-2010.** Quann EE, Fulgoni VL 3rd, Auestad N. *Nutr J.* 2015; 14(1):90. doi: 10.1186/s12937-015-0057-5.

PR

Product Research

High Impact Papers – Submitted

- **Pulsed-light inactivation of pathogenic and spoilage bacteria on cheese surface.** Proulx J, Hsu LC, Miller BM, Sullivan G, Paradis K, and Moraru CI. *J Dairy Sci.* 2015; 98(9):5890-5898. doi:10.3168/jds.2015-9410

RA

Regulatory Affairs

Updates:

- **FDA Proposed Rule: Revision of the Nutrition Facts Labels, Additional Provisions**

Pipeline Statistics

January – September
2015

Nutrition

Papers:	12
Abstracts:	12

Product

Papers:	35
Abstracts:	24

Sustainability

Papers:	1
---------	---

Total Published: 83

* **The High Impact Papers** in this Research Pipeline Quarterly were selected to present new or novel findings that enhance what we know about a particular area of dairy related research, or reflect new large scale studies that support previous evidence that was once only considered emerging.

Diets with high-fat cheese, high-fat meat, or carbohydrate on cardiovascular risk markers in overweight postmenopausal women: a randomized crossover trial

Thorning TK, Raziani F, Bendtsen NT, Astrup A, Tholstrup T, Raben A. *Am J Clin Nutr.* 2015 Jul 15. pii: [ajcn109116](#)

Status: **Published**

Communication Ready: **YES**

DGA Relevant: **YES**

Key Words: Full-fat cheese, meat, high carbohydrate diets, saturated fat, lipid biomarkers and CVD risk

Type of Research: Clinical

Funding Source: Supported 50% by the Danish Dairy Research Foundation and the Danish Agriculture and Food Council (Denmark) and 50% by the Dairy Research Consortium: National Dairy Council (United States), the Dairy Farmers of Canada (Canada), the Centre National Interprofessionel de l'Economie Laitie`re (France), Dairy Australia (Australia), and the Nederlandse Zuivel Organisatie (Netherlands)

Headline: Full-fat cheese appears to have unexpected effects on blood cholesterol.

Abstract

Background: Heart associations recommend limited intake of saturated fat. However, effects of saturated fat on low-density lipoprotein (LDL)-cholesterol concentrations and cardiovascular disease risk might depend on nutrients and specific saturated fatty acids (SFAs) in food. **Objective:** We explored the effects of cheese and meat as sources of SFAs or isocaloric replacement with carbohydrates on blood lipids, lipoproteins, and fecal excretion of fat and bile acids. **Design:** The study was a randomized, crossover, open-label intervention in 14 overweight postmenopausal women. Three full-diet periods of 2-wk duration were provided separated by 2-wk washout periods. The isocaloric diets were as follows: 1) a high-cheese (96-120-g) intervention [i.e., intervention containing cheese (CHEESE)], 2) a macronutrient-matched nondairy, high-meat control [i.e., nondairy control with a high content of high-fat processed and unprocessed meat in amounts matching the saturated fat content from cheese in the intervention containing cheese (MEAT)], and 3) a nondairy, low-fat, high-carbohydrate control (i.e., nondairy low-fat control in which the energy from cheese fat and protein was isocalorically replaced by carbohydrates and lean meat (CARB)). **Results:** The CHEESE diet caused a 5% higher high-density lipoprotein (HDL)-cholesterol concentration ($P = 0.012$), an 8% higher apo A-I concentration ($P < 0.001$), and a 5% lower apoB:apo A-I ratio ($P = 0.008$) than with the CARB diet. Also, the MEAT diet caused an 8% higher HDL-cholesterol concentration ($P < 0.001$) and a 4% higher apo A-I concentration ($P = 0.033$) than with the CARB diet. Total cholesterol, LDL cholesterol, apoB, and triacylglycerol were similar with the 3 diets. Fecal fat excretion was 1.8 and 0.9 g higher with the CHEESE diet than with CARB and MEAT diets ($P < 0.001$ and $P = 0.004$, respectively) and 0.9 g higher with the MEAT diet than with the CARB diet ($P = 0.005$). CHEESE and MEAT diets caused higher fecal bile acid excretion than did the CARB diet ($P < 0.05$ and $P = 0.006$, respectively). The dominant type of bile acids excreted differed between CHEESE and MEAT diets. **Conclusions:** Diets with cheese and meat as primary sources of SFAs cause higher HDL cholesterol and apo A-I and, therefore, appear to be less atherogenic than is a low-fat, high-carbohydrate diet. Also, our findings confirm that cheese increases fecal fat excretion. This trial was registered at [clinicaltrials.gov](#) as NCT01739153.

Contribution to the State of Science

Current dietary guidelines recommend the intake of low-fat or fat-free dairy. The rationale behind the current recommendation relies on the fact that saturated fat (SFA) increases LDL-cholesterol levels, frequently thought to be associated with increased risk of CVD. But studies examining cheese consumption, specifically, have found cheese to be associated with lower risk, or not associated with CVD ([Warenjo et al., Am J Clin Nutr 2010;92:194-202](#); [Qin et al. Asia Pac J Clin Nutr 2015;24\(1\):90-100](#)). Furthermore, cheese has been shown to not increase LDL-C when compared with other food sources with similar SFA content ([Tholstrup et al. 2004. J Am Coll Nutr 23:169-176](#); [Biong et al. 2004. Br J Nutr 92:791-797](#); [Nestel et al. 2005. Eur J Clin Nutr 59:1059-1063](#); [Hjerpsted et al. 2011. Am J Clin Nutr 94:1479-84](#)). For this study, researchers conducted a dietary intervention in post-menopausal women—a population and found frequently to be at higher risk of CVD. The study compared the effects of a full-fat cheese, meat, or carbohydrate intervention on cardiovascular risk markers. The main findings of the study were that plasma lipid markers, e.g., total cholesterol (TC), LDL-C and HDL-C, decreased similarly in the 3 treatments. However, the HDL-C levels were higher after cheese and meat intake compared to carbohydrates. In a similar fashion, Apo A-I was higher and Apo B:Apo A-I ratio was lower after cheese consumption. These results suggest that food sources of SFA, cheese and meat, appear to have a more favorable impact on CVD risk markers than a low-fat, high carbohydrate diet.

Importance to Industry

For Thought Leaders/Health Professionals: Saturated fat sources, such as cheese, may not have a negative impact on CVD risk. Thus, full-fat cheese within a well-balanced diet, may offer health benefits.



Subject Matter Expert Comment – Moises Torres-Gonzales, Ph.D.

By focusing on the effects of food sources of SFA, such as cheese and meat, this study shows that both do not have a negative impact on the levels of TC, LDL-C and HDL-C in post-menopausal women. Compared to a high-carbohydrate low-fat diet, cheese intake actually improved the HDL-C (good cholesterol) levels and two other lipid markers associated with reduced risk of CVD. Furthermore, beyond its SFA content, cheese is also a source of diverse nutrients such as, unsaturated fat, protein and calcium.



Consuming the daily recommended amounts of dairy products would reduce the prevalence of inadequate micronutrient intakes in the United States: diet modeling study based on NHANES 2007-2010

Quann EE, Fulgoni VL 3rd, Auestad N. *Nutr J.* 2015; 14(1):90. doi: 10.1186/s12937-015-0057-5.

Status: Published

Communication Ready: YES

DGA Relevant: YES

Key Words: dairy, dietary guidelines; NHANES; micronutrients;

Type of Research: Epidemiological

Funding Source: National Dairy Council

Headline: Increasing dairy intake to the amounts recommended by the 2010 Dietary Guidelines for Americans is one practical dietary changes that could significantly improve the adequacy for certain vitamins and minerals that are currently under-consumed.

Abstract

Background: A large portion of Americans are not meeting the Dietary Reference Intakes (DRI) for several essential vitamins and minerals due to poor dietary choices. Dairy products are a key source of many of the nutrients that are under consumed, but children and adults do not consume the recommended amounts from this food group. This study modeled the impact of meeting daily recommended amounts of dairy products on population-based nutrient intakes. **Methods:** Two-day 24-h dietary recalls collected from participants ≥2 years (n = 8944) from the 2007-2010 What We Eat in America, National Health and Nutrition Examination Survey (NHANES) were analyzed. Databases available from the WWEIA/NHANES and the United States Department of Agriculture (USDA) were used to determine nutrient, food group, and dietary supplement intakes. Modeling was performed by adding the necessary number of dairy servings, using the dairy composite designed by USDA, to each participant's diet to meet the dairy recommendations outlined by the 2010 Dietary Guidelines for Americans. All analyses included sample weights to account for the NHANES survey design. **Results:** The majority of children 4 years and older (67.4-88.8 %) and nearly all adults (99.0-99.6 %) fall below the recommended 2.5-3 daily servings of dairy products. Increasing dairy consumption to recommended amounts would result in a significant reduction in the percent of adults with calcium, magnesium, and vitamin A intakes below the Estimated Average Requirement (EAR) when considering food intake alone (0-2.0 vs. 9.9-91.1 %; 17.3-75.0 vs. 44.7-88.5 %; 0.1-15.1 vs. 15.3-48.0 %, respectively), as well as food and dietary supplement intake. Minimal, but significant, improvements were observed for the percent of people below the EAR for vitamin D (91.7-99.9 vs. 91.8-99.9 %), and little change was achieved for the large percentage of people below the Adequate Intake for potassium. **Conclusions:** Increasing dairy food consumption to recommended amounts is one practical dietary change that could significantly improve the population's adequacy for certain vitamins and minerals that are currently under-consumed, and thus improve overall health.

Contribution to the State of Science

The 2010 Dietary Guidelines for Americans recommend 3 servings of dairy per day for children and adults 9 years and older (<http://www.cnpp.usda.gov/dietary-guidelines-2010>). This recommendation is intended to help individual's meet nutrient needs as well as improve overall health. Previous work using NHANES 1999 – 2004 showed that the prevalence of inadequate calcium, potassium, and magnesium across different age groups could be reduced if additional servings of dairy foods were consumed (<http://www.ncbi.nlm.nih.gov/pubmed/?term=The+role+of+dairy+in+meeting+the+recommendations+for+shortfall+nutrients>). This study updated and expanded those findings by showing that increasing dairy intake to the recommended amounts could significantly improve the adequacy for certain vitamins and minerals that are currently under-consumed in both children and adults.

Importance to Industry

Dairy products are a major contributor to the intakes of certain essential vitamins and minerals, including calcium, vitamin A, magnesium, and phosphorus. The results of this modeling study show that meeting dairy recommendations would improve the adequacy for certain vitamins and minerals that are currently under-consumed. These results support the current recommendations set forth by the 2010 DGA and highlight the importance of dairy for optimal nutrition.



Subject Matter Expert comment – Chris Cifelli, Ph.D.

Many Americans are not consuming adequate amounts of several essential vitamins and minerals due to poor dietary choices. Dairy is a good source of many nutrients; however, most children and adults do not consume the recommended amount of dairy each day. The objective of this observational study was to model the impact of meeting daily recommended amounts of dairy products on population-based nutrient intakes. The results showed that increasing dairy intake to recommended amounts would result in a significant reduction in the percent of children and adults with calcium, magnesium, phosphorus, and vitamin A intakes below the Estimated Average Requirements. These findings illustrate that meeting dairy recommendations is one practical dietary change that could significantly improve adequacy for certain vitamins and minerals that are currently under-consumed.

Pulsed-light inactivation of pathogenic and spoilage bacteria on cheese surface

Proulx J, Hsu LC, Miller BM, Sullivan G, Paradis K, and Moraru CI. *J Dairy Sci.* 2015; **98(9):5890-5898**. doi:10.3168/jds.2015-9410

Headline: Light pulses can reduce cross contamination of cheese surfaces even after packaging.

Abstract

Cheese products are susceptible to post-processing cross-contamination by bacterial surface contamination during slicing, handling, or packaging, which can lead to food safety issues and significant losses due to spoilage. This study examined the effectiveness of pulsed-light (PL) treatment on the inactivation of the spoilage microorganism *Pseudomonas fluorescens*, the nonenterohemorrhagic *Escherichia coli* ATCC 25922 (nonpathogenic surrogate of *Escherichia coli* O157:H7), and *Listeria innocua* (nonpathogenic surrogate of *Listeria monocytogenes*) on cheese surface. The effects of inoculum level and cheese surface topography and the presence of clear polyethylene packaging were evaluated in a full factorial experimental design. The challenge microorganisms were grown to early stationary phase and subsequently diluted to reach initial inoculum levels of either 5 or 7 log cfu/slice. White Cheddar and process cheeses were cut into 2.5 × 5 cm slices, which were spot-inoculated with 100 µL of bacterial suspension. Inoculated cheese samples were exposed to PL doses of 1.02 to 12.29 J/cm². Recovered survivors were enumerated by standard plate counting or the most probable number technique, as appropriate. The PL treatments were performed in triplicate and data were analyzed using a general linear model. *Listeria innocua* was the least sensitive to PL treatment, with a maximum inactivation level of 3.37 ± 0.2 log, followed by *P. fluorescens*, with a maximum inactivation of 3.74 ± 0.8 log. *Escherichia coli* was the most sensitive to PL, with a maximum reduction of 5.41 ± 0.1 log. All PL inactivation curves were nonlinear, and inactivation reached a plateau after 3 pulses (3.07 J/cm²). The PL treatments through UV-transparent packaging and without packaging consistently resulted in similar inactivation levels. This study demonstrates that PL has strong potential for decontamination of the cheese surface.

Contribution to the State of Science

This study documents the use of pulses of high energy light to reduce surface contamination of cheese. Cheese slicers inherently are potential sources of transference of microbes from one cheese to another. No matter whether the organisms transferred are spoilage organisms or pathogens, undesirable consequences can occur. Cross-contamination occurs when multiple lots of cheese are sliced without significant sanitizing between blocks. This is especially a concern in retail delis when many types of cheese as well as meats, may be sold. But it also is a concern in cut-and-wrap operations servicing many manufacturers. Historically, it has been difficult to trace pathogens back to smaller operations but this is changing as DNA fingerprinting becomes more common in incident investigations. A one second pulse of light results in at least a 99.9% reduction of surface microbes potentially reducing the chances that either a pathogen or a spoilage organism will survive on the new cheese surface. That this pulse can be administered through polyethylene packaging reduces the chances that further contamination will happen.

Importance to Industry

Industry: This paper describes a relatively easy process can be used to control possible cross-contamination of cheeses in cut-and-wrap operations, on final cheese/ process cheese slices, and at retail delis to enhance quality and safety. **Farmers:** Insuring food safety and enhancing shelf-life of cheeses improves consumer confidence in the industry. This is a relatively straight forward way that small manufacturers and retailers can control and improve their distribution systems and improve consumer satisfaction. **Consumers:** Reduction in possible cross-contamination can improve shelf-life and safety of various cheeses especially those obtained from retail delis where other products may be sliced on the same equipment as the cheese.



Subject Matter Expert Comment – David McCoy, Ph.D.

A number of food poisoning incidences in the last few years have occurred as a result of the transference of microorganisms from contaminated cheese to cheeses that should have been safe. Since we know that this can and does occur on occasion, it may be prudent to consider processes that reduce the chance of this occurring. The pulsed light technology would add a one second protective light treatment to the retail transaction which could be an option for many delis and cut-and-wrap operations.

Status: Published

Communication Ready: YES

Key Words: Listeria, E. coli, Pseudomonas, cross-contamination, food safety, Cornell, Northeast Dairy Foods Research Center, pulsed-light, cheese

Type of Research: Application study

Funding Source: National Dairy Council



By Kristin Harris, Ph.D.

FDA Proposed Rule: Revision of the Nutrition Facts Labels, Additional Provisions

On July 27, 2015, the Department of Health and Human Services at the FDA released a supplemental notice of proposed rulemaking for additional revisions to the Nutrition Facts label. This supplemental notice proposes additional revisions to the Nutrition Facts label (in addition to the revisions proposed in March 2014) and requests comment from the public on the proposed changes. The proposed rule includes three major proposed revisions of interest to the dairy industry:

Establish a Daily Reference Value (DRV) at 10% of total energy intake for Added Sugars. Dairy products with added sugars (e.g. ice cream, flavored milk, and flavored yogurts) would be required to label added sugars in both grams and percent Daily Value. For example, an 8oz serving of flavored milk with 9 grams of added sugars, the Daily Value would be 18%. According to the information published by FDA, the establishment of the DV for added sugar is based on new information contained in the 2015 Dietary Guidelines Advisory Report, which links diets higher in added sugars to CVD risk. This conclusion does not align with the scientific evidence that dairy products, even those with added sugar (e.g. yogurt), are linked to a reduced risk of CVD. In addition, it overlooks the nutrient contribution of nutrient dense foods with added sugars (e.g. flavored milk) to the American diet.

Finalize the use of the term "Total Sugars" on the label based on consumer research. In this proposed rule, the FDA presents previously unreleased consumer research conducted by the agency to address consumer understanding of added sugars labeling. This research indicates that there is significant consumer confusion around added sugars labeling. In some cases, consumers added the total and added sugars lines together to arrive at a higher level. Consumers also tended to consider those products with higher levels of added sugars as less nutritious regardless of the other nutrients provided by the food.

FDA will not move forward with the previously proposed "alternative format" for the Nutrition Facts label. FDA stated that they will not move forward with the "alternative format" for the revised Nutrition Facts panel. For dairy foods, the alternative format might have placed undue emphasis on saturated fat and specific nutrients, rather than a total-diet approach. The decision to abandon the alternative format is positive development for dairy.

The NDC Regulatory Affairs is discussing the revisions to the proposed rules with relevant internal and external stakeholders and plans to submit comments to FDA, on behalf of NDC, to address the proposed changes for total and added sugars. The deadline for comments is tentatively set for October 13, 2015.

Contact

Questions?

If you have any questions about the content or science behind any of the featured papers, please contact:

Nutrition Research

Mickey Rubin, Ph.D.
Mickey.Rubin@dairy.org
 ☎ 847.627.3330

Product Research

Dave McCoy, Ph.D.
David.McCoy@dairy.org
 ☎ 847.627.3348

Sustainability

Juan Tricarico, Ph.D.
Juan.Tricarico@dairy.org
 ☎ 847.627.3721

Regulatory Affairs

Kristin Harris, Ph.D.
Kristin.Harris@dairy.org
 ☎ 847-627-3246

This report was generated by **Scientific Affairs** and is intended for **internal use only**. Do not reproduce or distribute without the editor's permission.

Editor:

Agnieszka Kuzmicka
agnieszka.kuzmicka@dairy.org
 ☎ 847.627.3254