

Nutrition Reports

The Goodness of Dairy: Health Highlights

Dairy Foods Help Boost Diet Quality

New studies support dairy foods as a leading source of essential nutrients for U.S. children and adults. Using data from the National Health and Nutrition Examination Survey (NHANES) 2003-2006, researchers examined food sources of calories and nutrients consumed by more than 7,000 children 2 to 18 years of age and more than 9,000 adults 19+ years of age.

The study in children showed that milk was the top source of calcium, potassium, vitamin D, protein, vitamin A, riboflavin, vitamin B₁₂, phosphorus, and magnesium, yet contributed only 7% of total calories. Milk and cheese together accounted for more than half (52.6%) of children's dietary calcium intake, followed by yeast breads and rolls, which contributed only 6% of calcium. Adequate calcium intake is critical for children's and adolescents' bone health.

Dairy foods provide a unique package of essential nutrients difficult to obtain from other foods.

For adults, milk was the top source of calcium, vitamin D, potassium, vitamin A, riboflavin, and phosphorus, and contributed only 3.8% of calories. Milk and cheese together accounted for nearly half (44.1%) of the calcium and nearly one-fourth (23.6%) of the phosphorus. Cheese and milk ranked third and fourth, respectively, as a source of protein, together contributing 15.4% of the protein

in the diets consumed by adults.

These findings showed that consumption of milk and dairy products can help children and adults meet "nutrients of concern" - calcium, vitamin D, and potassium - identified by the 2010 Dietary Guidelines for Americans. Further, the results reinforce the importance of consuming nutrient-rich foods, such as low-fat and fat-free dairy foods, to help meet nutrient recommendations within calorie needs.

Because of dairy foods' substantial contribution to nutrient intakes, it is not surprising that diets deficient in dairy are often low in several nutrients. According to a study published in *Nutrition Research*, replacing dairy foods in the diet with calcium-equivalent nondairy foods could result in decreased intake of several nutrients including protein, vitamins A, D, B₁₂ and riboflavin, potassium, magnesium, and phosphorus.

The 2010 Dietary Guidelines for Americans and MyPlate (www.choosemyplate.gov), an education tool to help consumers make healthy food choices consistent with the Dietary Guidelines, recommend 3 cups of low-fat or fat-free milk and milk products every day for persons 9 years and older, 2 ½ cups for children 4 to 8 years, and 2 cups for children ages 2 to 3 years. A recent review of the scientific literature published in *Nutrition Reviews* highlights the nutritional and health benefits of consuming more than three



recommended servings of low-fat and fat-free dairy foods a day. The authors conclude that consuming three servings of dairy a day for those 9 years and older "helps close gaps between current nutrient intakes and recommendations." Further, they state "consuming more than three servings of dairy per day leads to better nutrient status and improved bone health and is associated with lower blood pressure and reduced risk of cardiovascular disease and type 2 diabetes." ■

Keast, D.R., et al. Food sources of energy and nutrients among children in the United States: National Health and Nutrition Examination Survey 2003-2006. *Nutrients* 5: 283-301, 2013.

O'Neil, C.E., et al. Food sources of energy and nutrients among adults in the US: NHANES 2003-2006. *Nutrients* 4: 2097-2120, 2012.

Fulgoni, V.L., III et al. Nutrients from dairy foods are difficult to replace in diets of Americans: food pattern modeling and an analysis of the National Health and Nutrition Examination Survey 2003-2006. *Nutr. Res.* 31: 759-765, 2011.

Rice, B.H., et al. Meeting and exceeding dairy recommendations: effects of dairy consumption on nutrient intakes and risk of chronic disease. *Nutr. Rev.* 71: 209-223, 2013.

Dairy Research Institute, National Dairy Council. Scientific Status Report: Nutrient Contribution of Dairy Foods. 2012. www.nationaldairy-council.org/Research/Pages/Scientific-Status-Reports.aspx.

The United Dairy Industry of Michigan is the umbrella organization for Dairy Council of Michigan and the American Dairy Association of Michigan. These non-profit organizations provide nutrition education services and dairy product promotion.

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New Research Supports the Goodness of Flavored Milk

The goodness of flavored milk, a popular beverage choice among the nation's school children, is supported by findings from recent studies. These studies sought to answer the following questions: What's the impact on milk consumption and nutrient intake from eliminating flavored milk in schools? Do school children accept lower-calorie flavored milk? What's the nutritional role of flavored milk and white milk in children's diets?

• **Removing flavored milk from schools can have unintended consequences.** Some schools have removed or eliminated flavored milk at school without consideration of the consequences. A new observational study published in *Nutrition Today* examined the impact of removing flavored milk on school children's total milk consumption and nutrient intakes. Daily milk sales and the amount of milk discarded on an average of 12 days were determined in 49 elementary schools where changes in flavored milk availability had occurred over the past two years. "When flavored milk was removed on 1 to all days of the week, there was a 26.0% reduction in milk sales and an 11.4% increase in the percentage of milk discarded, resulting in a 37.4% decrease in milk consumption," reported the researchers. This unintended consequence could adversely affect children's nutrient intake.

In addition, it was difficult and expensive to replace the nutrient deficit from this decline in milk consumption.

It took three to four additional foods, resulting in more calories and fat, and was estimated to cost up to \$4,600 more per 100 students per year, according to a separate evaluation in one of the tested school districts.

• **Students accept lower-calorie flavored milk.** The dairy industry, in response to concerns over children's total intake of added sugars, has reduced added sugars and calories in flavored milk in schools. Added sugars in flavored milks in schools have decreased by an estimated 38%, and most contain an average of 134 calories per 8 ounce serving – only 31 more calories than white milk. In accordance with the new Nutrition Standards for School Meals, flavored milk now offered must be fat-free. An important question is whether or not school children will drink the lower calorie flavored milks. According to a recent plate waste study, elementary school children drinking lower calorie flavored milk were just as likely to drink most of their milk as students offered flavored milk with slightly more calories and sugar.

• **Flavored and white milk contribute to children's nutrient intake.** The important nutritional role of milk, both flavored and white, in children's diets is supported by a recent study published in the *Journal of School Health*. Using dietary intake data from more than 7,000 children aged 2 to 18 years participating in NHANES 2003-2006, the researchers found that consumption



of white or flavored milk contributed to shortfall nutrients or nutrients of concern (e.g., calcium, vitamin D), yet very little to total calorie intake and nutrients to limit (i.e., saturated fat, sodium, or added sugars). The researchers suggest that "making small changes in milk choices (e.g., switching from whole milk to nonfat chocolate milk) can help children to meet current recommendations for dairy foods, thus decreasing the percentage with inadequate intakes of essential milk nutrients." ■

Quann, E.E., and D. Adams. Impact on milk consumption and nutrient intakes from eliminating flavored milk in elementary schools. *Nutrition Today* 48: 127-134, 2013.

Yon, B.A., et al. School children's consumption of lower-calorie flavored milk: a plate-waste study. *J. Acad. Nutr. Diet.* 112:132-136, 2012.

Nicklas, T., et al. The nutritional role of flavored and plain milk in the diets of children and adolescents. *J. School Health* 83: 728-733, 2013.

For additional information about flavored milk, check out:

National Dairy Council. Flavored Milk Education Kit.

www.nationaldairyCouncil.org/ChildNutrition/Pages/FlavoredMilkEducationKit.aspx

Dairy Research Institute, National Dairy Council. Scientific Status Report: Flavored Milk. 2011.

www.nationaldairyCouncil.org/Research/Pages/Scientific-Status-Reports.aspx

United Dairy Industry of Michigan. Rethink Chocolate Milk. Nutrition Reports No. 2, 2012.

www.udim.org/nutrition/health-professionals/nutrition-reports



Cheese May Help Prevent Tooth Decay, Study Suggests

Consuming cheese and other dairy products may be a good strategy to help protect teeth against tooth decay (dental caries), according to a new study published in the peer-reviewed journal, *General Dentistry*.

Sixty-eight subjects aged 12 to 15 were randomly assigned to consume either Cheddar cheese, or milk, or sugar-free yogurt for three minutes followed by rinsing with water. The researchers measured subjects' dental plaque pH levels before and at 10, 20, and 30 minutes after consuming the dairy products. A plaque pH level of 5.5 or lower (i.e., more acidic) increases the risk for erosion of tooth enamel (protective outside layer), leaving the tooth vulnerable to tooth decay. None of the dairy products in this study lowered plaque pH levels below 5.5.

When measured 30 minutes after consuming milk or sugar-free yogurt,

plaque pH levels did not change, suggesting that these dairy foods are non-cariogenic or do not promote tooth decay. Cheese, however, increased plaque pH levels (i.e., becoming more alkaline), indicating that this food is protective against tooth decay. The researchers suggest that cheese's anti-cariogenic effect could be explained by increased saliva production stimulated by chewing cheese. Saliva helps buffer against high levels of acidity and remove any residue in the mouth that may contribute to cavities. Additionally, components in cheese such as protein, calcium, and phosphorus may



protect teeth. The findings of this study suggesting that milk and sugar-free yogurt do not cause cavities and that cheese may help protect against cavities support earlier investigations demonstrating dairy products' beneficial role in dental health.

Interestingly, consuming milk after intake of sugary foods may help reduce tooth decay, according to a study in adults conducted at the University of Illinois in Chicago. Milk was more effective than fruit juice or water in neutralizing acid in the mouth resulting from sugary foods. Milk also added calcium, which is important for strengthening teeth. The researchers suggest that the order of intake of sugary and non-sugary foods may affect oral health. ■

Telgi, R.L., et al. In vivo dental plaque pH after consumption of dairy products. *General Dentistry* 61: 56-59, 2013.
Naval, S., et al. The effects of beverages on plaque acidogenicity after a sugary challenge. *J. Am. Diet. Assoc.* 144: 815-822, 2013.
Dairy Research Institute, National Dairy Council. Scientific Status Report: Cheese: Benefits and Current Issues. 2011. www.nationaldairycouncil.org/Research/Pages/Scientific-Status-Reports.aspx.

The Goodness of Yogurt: A Focus of Renewed Research

Yogurt has a long history of being a nutritious, healthy dairy product. Some yogurts have been shown to be well-tolerated by lactase-deficient individuals and linked with reduced risk of a variety of diseases (www.aboutyogurt.com). However, the benefits of consuming yogurt specifically have been understudied compared to other dairy products such as milk and cheese. This is changing.

New studies support yogurt's nutritional and health benefits. A recent investigation in over 6,500 adults ages 19 to 89 found that those who consumed more than two servings of yogurt a week had better quality diets with higher intakes of shortfall nutrients and healthier metabolic profiles than those who did not consume yogurt. Compared to yogurt non-consumers, the adults who ate yogurt tended to consume more healthy foods (e.g., fruits, vegetables, whole grains) and fewer less healthy foods (e.g., refined grains, processed meat); have higher intakes of potassium and a

lower prevalence of inadequate intakes of thiamin, vitamin B12, calcium, magnesium, and zinc; and lower levels of blood triglycerides, fasting glucose, and systolic blood pressure, and reduced insulin resistance. "Increasing yogurt intake among Americans may be promising in helping to achieve greater adequacy for some of the shortfall nutrients and maintain metabolic well-being as part of a healthy, energy-balanced dietary pattern," state the researchers.

Yogurt consumption is also associated with nutritional and health benefits for children, according to a study presented at the 2013 Federation of the American Society for Experimental Biology. In this investigation of more than 3,700 U.S. children aged 8 to 18 years, yogurt consumption was associated with higher intakes of protein, calcium, and vitamin D, and lower dietary fat and body fat, with no differences in intake of sugars.

Nutrition researchers from around the world recently gathered in Boston for the First Global Summit on the Health Effects

of Yogurt. This summit is part of the multi-year *Yogurt in Nutrition Initiative* for a balanced diet, a global collaboration of the American Society for Nutrition, the Danone Institute International, and the UK-based Nutrition Society. The goal of this initiative is to examine the health effects of yogurt, encourage new research, and communicate findings to health care professionals and the public through annual scientific conferences and supporting activities. This first one-day summit reviewed existing and emerging science on the health benefits of yogurt as part of a balanced diet to address current nutrient deficiencies, manage body weight, and reduce chronic health conditions. For more information, including a Yogurt in Nutrition infographic, visit www.nutrition.org/yogurt. ■

Wang, H., et al. Yogurt consumption is associated with better diet quality and metabolic profile in American men and women. *Nutr. Res.* 33: 18-26, 2013.
Keast, D.R., et al. Yogurt consumption by US children is associated with higher protein, calcium and vitamin D intake, lower dietary fat, and lower body fat. Results from the National Health and Nutrition Examination Survey (NHANES 2005-2008). *The FASEB J.* 27: 847.18, 2013.

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Studies Link Dairy Consumption to Reduced Risk of Type 2 Diabetes

Recent systematic reviews and dose-response meta-analyses report that dairy foods may help reduce the risk of type 2 diabetes, a disease affecting millions of Americans. These meta-analyses of prospective studies show that a modest increase in daily intake of total dairy foods, low-fat dairy products, cheese, or yogurt is associated with decreased risk of type 2 diabetes. Potential mechanisms for dairy's beneficial role relate to dairy's content of calcium, vitamin D, magnesium, and protein, which may reduce body fat and insulin resistance. Emerging evidence suggests that dairy fat, specifically *trans*-palmitoleate, may lower risk of diabetes. Blood levels of

trans-palmitoleate are associated with increased intake of dairy fat, lower fasting insulin levels, and less incidence of diabetes, according to a study of a large, multi-ethnic cohort of U.S. adults.

A new study published in the journal *Nutrition* suggests that intake of dairy products is associated with decreased insulin resistance, thus adding to the growing body of research showing that dairy foods may help reduce the risk of type 2 diabetes. Consuming four servings of low-fat milk and yogurt a day under free-living conditions for six months improved an established marker of insulin resistance without adversely affecting body weight or lipids, according to this study in 23

healthy, overweight or obese adults. A 9% reduction in plasma insulin and an 11% reduction in the marker of insulin resistance was observed in those who consumed four servings of low-fat milk and yogurt a day compared to those who consumed no more than two servings a day. ■

Aune, D., et al. Dairy products and the risk of type 2 diabetes: a systematic review and dose-response meta-analysis of cohort studies. *Am. J. Clin. Nutr.* 98: 1066-1083, 2013.

Gao, D., et al. Dairy products consumption and risk of type 2 diabetes: systematic review and dose-response meta-analysis. *PLoS One* 8 (9): e73965 (Sept. 27), 2013.

Mozaffarian, D., et al. *trans*-Palmitoleic acid, other dairy fat biomarkers, and incident diabetes: the Multi-Ethnic Study of Atherosclerosis (MESA). *Am. J. Clin. Nutr.* 97:854-861, 2013.

Rideout, T.C., et al. Consumption of low-fat dairy foods for 6 months improves insulin resistance without adversely affecting lipids or bodyweight in healthy adults: a randomized free-living cross-over study. *Nutrition* 12: 56, 2013.

Do you know that over **50 million Americans suffer from food insecurity** and more than **one in six households** does not have enough money to buy food for their families? To learn more about the goodness of dairy, including its role in addressing domestic hunger, visit **<http://dairygood.org>**.