Dairy Council DIGEST®

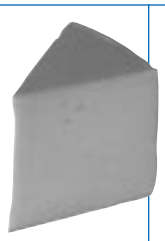
July | August 1999

Volume 70
Number 4

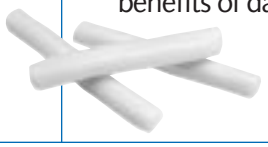
COMMON MISPERCEPTIONS ABOUT DAIRY FOODS

SUMMARY

Myths regarding the health effects of specific foods are neither new nor uncommon. Dairy foods are no exception. Misperceptions about dairy foods periodically arise despite their recognized nutritional and health benefits. This *Digest* identifies some of the myths surrounding dairy foods and reviews the scientific evidence to help dispel these myths.



A common myth is that individuals who have difficulty digesting lactose should avoid milk and other dairy foods. New research indicates that individuals with lactase non-persistence (i.e., low levels of the enzyme, lactase) or lactose intolerance (i.e., symptoms following intake of lactose) can consume the recommended number of servings of milk and other dairy foods. A recent study demonstrated that lactose maldigesters could consume the amount of lactose in 2 cups of milk, one at breakfast and another at dinner, without developing symptoms. In another study, a diet providing 1500 mg calcium/day primarily from dairy foods (i.e., 2 cups of milk, 1 cup of yogurt, and 2 ounces of cheese) was tolerated by lactose maldigesters. Individuals with lactase non-persistence or intolerance can enjoy and obtain the health benefits of dairy foods. In fact, gradually increasing intake of lactose-containing dairy foods may improve tolerance to lactose.



Milk was once thought to contribute to kidney stones in individuals at risk of this disease. On the contrary, research demonstrates that intake of calcium-rich foods such as milk and other dairy foods protects against kidney stones. When milk is consumed at the same time as oxalate-containing foods, dairy food calcium binds food oxalate, keeping it from being absorbed. The result is reduced risk of calcium oxalate kidney stones.

Although milk proteins, particularly bovine serum albumin, have been suspected of contributing to Type I or insulin-dependent diabetes mellitus, scientific evidence indicates that it is unlikely that milk proteins are involved in this disease. Also, the myth that calcium-fortified foods or calcium supplements are a good substitute for milk is not supported by scientific fact. Food is considered to be the best source of nutrients such as calcium for health. Intake of milk and other dairy foods improves the overall nutritional adequacy of the diet.

A coalition of food and nutrition professionals and scientists has provided tools to help improve understanding of nutrition science and dispel food-related myths. This coalition has identified 10 red flags that should raise suspicion regarding the accuracy of nutrition statements about foods. Dispelling myths regarding dairy foods is especially important at this time when accumulating scientific research strongly supports the nutritional and health benefits of dairy foods in the diet. D

July | August 1999

INTRODUCTION

Dairy foods are nutrient dense foods providing many essential nutrients in high amounts relative to their energy content (1,2). As estimated for 1994, dairy foods (excluding butter) contributed only 9% of the total calories available (1). Yet, these foods provided 73% of the calcium, 31% of the riboflavin, 33% of the phosphorus, 19% of the protein, 16% of the magnesium, 21% of the vitamin B_{12}, 17% of the vitamin A, 10% of the vitamin B_6, and 6% of the thiamin (1). Although optional, nearly all milk sold in the United States today is fortified with vitamin D to obtain standardized amounts of 400 I.U. or 10 µg/quart (3). Dairy foods also contain several other components (e.g., conjugated linoleic acid) which may confer health benefits (4,5).

The importance of dairy foods in the diet is supported by their position as a separate group in basic food guides and their inclusion in federally supported child nutrition programs (6–10). In 1997, an estimated 4.9 billion half pints of fluid milk were served in child nutrition programs in schools (10). In addition to milk, other dairy foods such as cheese and yogurt are consumed as part of child nutrition programs.

Scientific findings demonstrate that a dietary pattern including dairy foods helps to reduce the risk of chronic diseases such as osteoporosis, hypertension, and colon cancer (11–16). For example, the Dietary Approaches to Stop Hypertension (DASH) study found that a diet high in lowfat dairy foods, fruits and vegetables with reduced total and saturated fat significantly and quickly (within two weeks) lowered blood pressure in individuals with high normal blood pressure (15). Increasing intake of lowfat dairy foods to reach 1500 mg calcium/day was recently demonstrated to reduce colon cell proliferation and other indicators of colon cancer risk in older men with a history of colon cancer (16).

Despite dairy foods' long history of being highly nutritious foods that contribute to health, myths or false notions regarding these foods periodically arise (17). These myths center on dairy foods' alleged role in the development of kidney stones and diabetes mellitus.

Milk and other dairy foods provide many essential nutrients and health-promoting components, are the richest source of calcium in the American diet, and are a crucial part of a healthful diet.

Other common myths are that individuals who have difficulty digesting lactose cannot comfortably consume milk and other dairy foods, and that calcium supplements or calcium-fortified foods are good substitutes for milk. This *Digest* presents scientific evidence to help dispel these myths and provides recommendations to reduce food-related myths.

MYTH. *Individuals who have difficulty digesting lactose should avoid milk and other dairy foods.*

FACT. Research indicates that individuals with low levels of lactase, the enzyme necessary to digest lactose, can consume the recommended number of servings of milk and other dairy foods (18–20). Moreover, consuming lactose-containing foods such as milk may improve tolerance to lactose (21,22).

Lactose is the main carbohydrate in milk and other dairy foods. In many population groups, lactase begins to decrease sometime during childhood and early adulthood (18). This normal, genetically-controlled physiological decline in intestinal lactase activity is called lactase non-persistence (lactose maldigestion) (18). An objective test for lactase non-persistence, such as the breath hydrogen test, is essential to diagnose this condition.

Lactase non-persistence is not necessarily synonymous with lactose intolerance. Many people with lactase non-persistence (i.e., low levels of the intestinal enzyme, lactase) are not lactose intolerant (i.e., develop abdominal symptoms following intake of lactose) (18). Lactose intolerance can only be confirmed by well-controlled, double-blind studies. Under these conditions, lactose intolerance is less prevalent than commonly believed (19,23,24). Among 30 individuals who described themselves as intolerant to very small amounts of lactose, 30% were lactose digesters based on a breath hydrogen test (23). In another investigation designed to test tolerance to 2 cups of milk, 31% of subjects who claimed to be severely lactose intolerant were able to digest lactose as measured by the breath hydrogen test (19). Researchers in Massachusetts found that

43% of self-reported lactose maldigesters were not lactase non-persistent as determined by the breath hydrogen test (24).

Individuals with lactase non-persistence, whether real or perceived, may limit their intake of dairy foods unnecessarily, thereby reducing their intake of calcium and other essential nutrients. However, findings of recent double-blind, randomized, cross-over trials indicate that individuals with lactase non-persistence can meet their calcium needs with milk and milk products (19,20).

Researchers in Minnesota found that lactose maldigesters could consume the amount of lactose in 2 cups of milk, one cup at breakfast and another at dinner, without developing symptoms (19). In another double-blind, cross-over study, individuals with lactase non-persistence tolerated a diet providing 1500 mg calcium/day, the amount recommended by an Expert Panel of the National Institutes of Health (NIH) to prevent osteoporosis (25). The calcium in this study was provided primarily from dairy products (i.e., 2 cups of milk, 1 cup of yogurt, and 2 ounces of cheese) (20). Interestingly, 66% of the study participants with lactase non-persistence reported that their symptoms during milk intake were less than anticipated (20).

Lactose maldigesters can consume about 1500 mg calcium/day primarily from dairy foods (i.e., 2 cups of milk, 1 cup of yogurt, and 2 ounces of cheese), according to a new study.

Several dietary strategies are available to help lactase non-persistent individuals enjoy and obtain the health benefits of dairy foods (5,18). These include the following:

- Adjust the amount of lactose consumed. Start by frequently consuming small portions of lactose-containing foods such as milk and gradually increase the serving size. As discussed above, many lactose maldigesters can consume the amount of lactose in 2 cups of milk/day in divided doses with breakfast and dinner without developing symptoms (19). Even mild symptoms do not prohibit intake of four servings of dairy foods (i.e., milk, yogurt, cheese) throughout the day (20).
- Consume lactose with a meal or solid foods (e.g., milk with cereal). This slows gastric emptying and/or delivery of lactose to the colon which improves tolerance to lactose (18,19).
- Adjust the type of dairy food consumed. Many cheeses (e.g. Cheddar, Swiss, Parmesan) contain considerably less lactose than milk. Aged cheeses in particular generally have negligible amounts of lactose. Also, many cultured dairy foods such as yogurt which contain "live, active" bacteria are generally well tolerated. The consistency of yogurt (i.e., a semisolid state) which slows gastric emptying, its reduced lactose content, and the presence of lactase in the bacteria used to make yogurt all contribute to the improved tolerance to yogurt by individuals with lactase non-persistence (26). Tolerance to other cultured dairy foods such as sweet acidophilus milk depends on the strain of bacteria used, among other factors (18).
- Gradually increase intake of lactose-containing dairy foods. This may improve tolerance to lactose by encouraging the growth of bacteria which break down lactose (21,22).
- For the few individuals who cannot tolerate usual quantities of milk, lactose-hydrolyzed milk, and other dairy foods, as well as commercial lactase preparations (capsules, chewable tablets, solutions) may be beneficial.

MYTH. *Drinking milk contributes to kidney stones in individuals at risk of this condition.*

FACT. On the contrary, drinking milk may help to reduce the risk of kidney stones. Specifically, the calcium in milk may be protective (27–30). A four-year prospective study involving more than 45,000 male health professionals with no history of kidney stones found that the men who consumed a calcium-rich diet (>1300 mg calcium) experienced a 44% lower risk of symptomatic kidney stones than men who consumed 516 mg calcium/day (27). Similar findings were found in a study that followed more than 91,000 women with no history of kidney stones for 12 years (28). The women who consumed more than 1100 mg calcium a day from foods such as dairy foods were 35% less likely to develop stones than those who consumed 430 mg calcium/day or less. Another prospective study of more than 81,000 women with no history of kidney stones associated intake of nonfat milk with decreased risk of kidney stones (30).

In contrast to calcium-rich foods, research indicates that calcium supplements do not protect against kidney stones (27,28). Researchers speculate that a diet high in calcium may reduce the risk of kidney stones by decreasing the intestinal absorption and urinary excretion of oxalate, a substance found in whole grains, legumes, fruits, and vegetables. The fact that calcium supplements are often consumed between meals when there is no oxalate to bind with calcium may contribute to the absence of an effect of calcium supplements on kidney stone risk.

Both urinary calcium and oxalate concentrations influence risk of calcium oxalate crystallization in stone formers (29,31–33). When 21 adults with a history of calcium oxalate kidney stones and normal urine calcium levels substituted 12 ounces of nonfat milk for 16 ounces of apple juice in a diet of moderate oxalate content, urinary calcium levels increased by 17% and oxalate levels decreased by 18% (29). The increase in urinary calcium excretion was offset by the decrease in oxalate excretion resulting in no overall difference in risk of calcium oxalate kidney stones. The researchers recommend that milk be consumed simultaneously with oxalate-containing foods to bind the oxalate in the diet and reduce the risk of calcium oxalate kidney stones (29).

MYTH. *Early milk drinking causes Type I diabetes mellitus.*

FACT. Milk proteins, particularly bovine serum albumin, have been speculated to trigger an autoimmune response that destroys pancreas beta cells in genetically susceptible children, thereby resulting in Type I or insulin-dependent diabetes (IDDM) (34–36). However, scientific evidence fails to support a causal association between cow's milk proteins and IDDM (37–43). A comparison of 184 children who developed IDDM under the age of 15 and 184 nondiabetic children found no differences in infant feeding practices (39). This study demonstrated that early introduction of cow's milk did not predispose to childhood-onset diabetes (39).

Calcium-rich foods such as milk may help to reduce the risk of kidney stones.

In another investigation involving 253 children aged 9 months to 7 years from 171 families of persons with IDDM, children who developed B-cell autoimmunity (i.e., an early predictor of IDDM) were no more likely to have been exposed to cow's milk protein than children without this condition (40). Additional research indicates that blood levels of antibodies to bovine serum albumin are not a good predictor of IDDM (37,41).

An American Academy of Pediatrics (AAP) Work Group on Cow's Milk Protein and Diabetes Mellitus (44) encourages breast feeding during the lfirst year of life for all infants and, in particular, those born into families with a strong history of IDDM (44). For infants at high risk of IDDM, the Work Group also discourages the use of commercially available cow's milk and products containing intact cow's milk protein during the first year of life (44). However, for children with diabetes, the AAP recommends that dairy products not be restricted (45). Based on the weight of scientific evidence to date, it is very unlikely that cow's milk proteins are involved in the development of IDDM in genetically susceptible infants.

MYTH. *Calcium supplements or calcium-fortified foods are good substitutes for milk.*

FACT. Food is considered to be the best source of nutrients for health (9,46–49). Both an expert panel on "Optimal Calcium Intake" convened by the National Institutes of Health (46) and the American Medical Association (47) have recognized milk and other dairy foods as an important source of calcium for Americans. Without consuming dairy foods, it is difficult to meet recommended intakes of calcium and vitamin D (17,46,47,50). In fact, low intake of dairy foods contributes to low calcium intake (50,51). In one study, women whose diets met their recommendations for calcium consumed more than three times as much low fat milk as other women and more than six

times as much nonfat or fat-free milk (50). Other foods such as certain green leafy vegetables (broccoli, kale, turnip greens) contain calcium. However, the calcium is present in lower amounts than in dairy foods and may be less available to the body because of the presence of phytates (e.g., in whole grains) and oxalates (e.g., in spinach) (52).

Consuming milk and milk products improves the overall nutritional adequacy of the diets of children (53,54) and adults (48,55,56). Moreover, increasing intake of dairy foods does not necessarily increase total calorie or fat intake, body weight, or percent body fat (48,53,54, 56). Several dairy food components such as conjugated linoleic acid, sphingomyelin, and butyric acid have recently been demonstrated to potentially protect against chronic diseases such as certain cancers (4). Identification of these promising health-promoting components in dairy foods is another reason to meet nutrient needs through foods.

In recent years calcium has been added to numerous products including pastas, rice, cereals, orange juice, yogurt, chocolate milk, and other dairy foods (57,58). In addition to these calcium-fortified foods, a variety of calcium supplements is available. Many calcium-fortified foods and calcium supplements do not provide the same nutritional profile as dairy foods (48). Calcium supplements may correct a calcium deficiency, but they cannot correct multiple nutrient inadequacies resulting from poor dietary choices. Also, a few calcium supplements may contain contaminants such as lead (59). However, most commercial calcium preparations are tested for heavy-metal contamination (59). In addition, inappropriate consumption of calcium-fortified foods and calcium supplements could lead to excessive intakes of calcium (60). To meet calcium needs, a change in dietary habits that focuses on increased intake of calcium-rich foods such as milk and milk products is needed (49).

Calcium supplements or calcium-fortified foods are a supplement to, not a substitute for, foods naturally containing calcium such as dairy foods.

CONCLUSION

Myths regarding foods, including dairy foods, stem from non-scientific opinions, exaggerated attention to a single study's findings, and misinterpretation of nutrition science. The Food and Nutrition Science Alliance (FANSA) has provided tools to help Americans gain a better understanding of the science and help them evaluate reports before jumping to premature conclusions (61). FANSA is a partnership of four professional scientific societies representing more than 100,000 food, nutrition, and medical practitioners and scientists. This coalition identified 10 red flags that should raise suspicion about the accuracy of nutritional information:

- Recommendations that promise a quick fix.
- Dire warnings of danger from a single product or regimen.
- Claims that sound too good to be true.
- Simplistic conclusions drawn from a complex study.
- Recommendations based on a single study.
- Dramatic statements that are refuted by reputable scientific organizations.
- Lists of "good" and "bad" foods.
- Recommenations made to help sell a product.
- Recommendations based on studies published without peer review.
- Recommendations from studies that ignore differences among individuals or groups (61).

Other reports from FANSA such as "Making Sense of Scientific Research about Diet and Health" (62) and "Making Sense of Risks Associated with Diet" (63) are available. In addition, the International Food Information Council Foundation has published reports to help improve understanding of nutrition science (64,65). These resources can help health professionals and other communicators dispel food-related myths and provide scientifically grounded facts and positive messages about the importance of foods such as dairy foods for health. D

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ACKNOWLEDGMENTS

National Dairy Council® assumes the responsibility for this publication. However, we would like to acknowledge the help and suggestions of the following reviewers in its preparation:

- M.D. Levitt, M.D.
  Associate Chief of Staff for Research
  Veterans Affairs Medical Center
  Minneapolis VA Medical Center
  Minneapolis, MN
- L.K. Massey, Ph.D., R.D.
  Professor, Food Science and Human Nutrition
  Washington State University
  Department of Human Nutrition and Dietetics
  Spokane, WA

The *Dairy Council Digest*® is written and edited by Lois D. McBean, M.S., R.D.

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ISSN 0011-5568