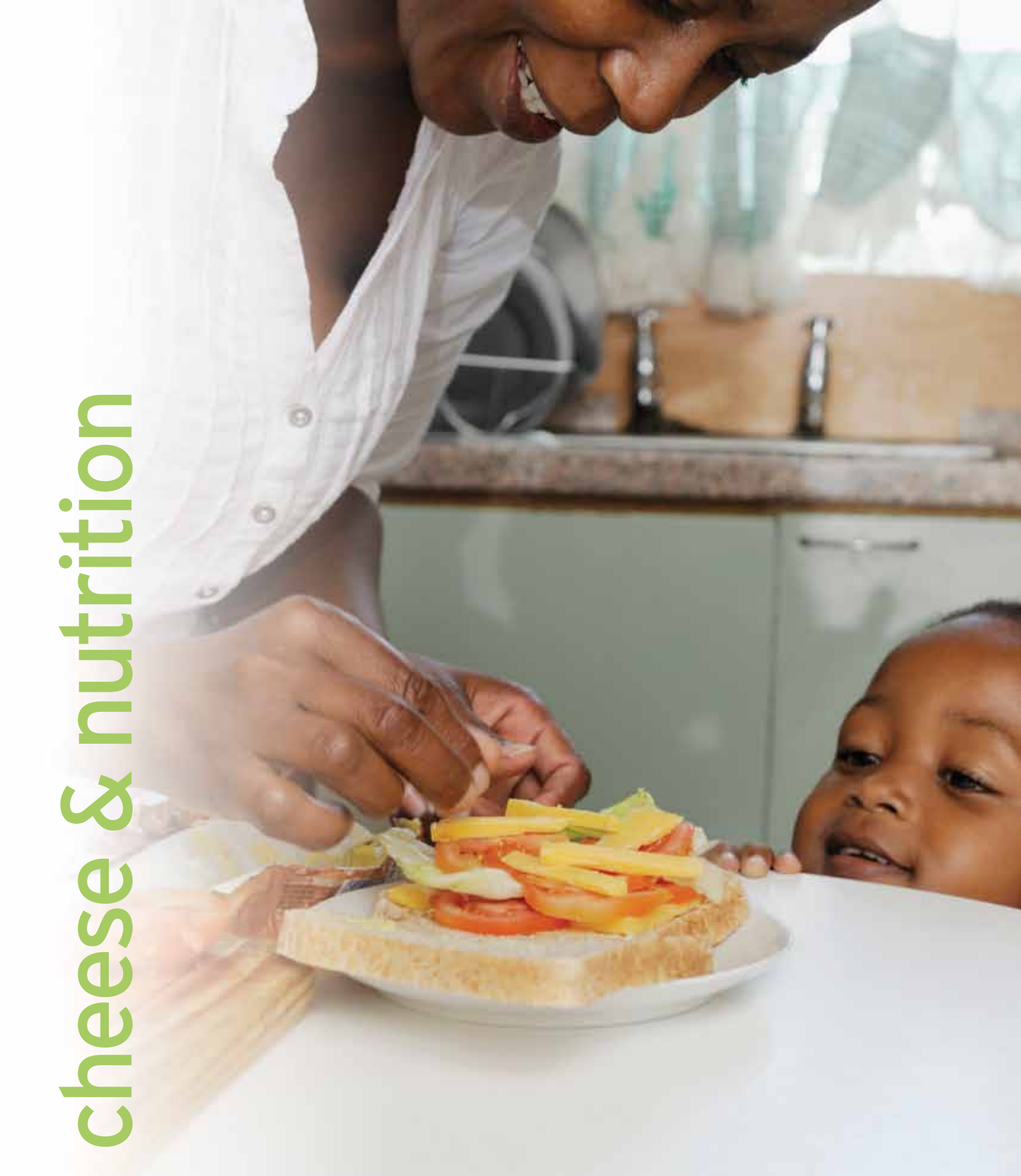


# cheese & nutrition



NATIONAL DAIRY COUNCIL®



HEALTHY PEOPLE • HEALTHY PRODUCTS • HEALTHY PLANET

# What you may not know about cheese

## Did you know?

Cheese can fit into almost any eating plan. This brochure provides statistics, facts, nutrition information and public health considerations related to cheese and how it can help meet health and wellness needs.

**Sixteen percent of teenagers and 26 percent of adults are reducing or not eating meat in their diets and both are looking for additional sources of protein.<sup>1</sup>**

Cheese can help fill the protein gap. Cheese contributes high-quality protein as well as calcium, phosphorus and vitamin A to the American diet.

**U.S. preteen and teenage girls 9 to 18 are at risk for not getting enough calcium according to the Institute of Medicine.<sup>2</sup>**

As part of a healthy, balanced diet, cheese can help fill this gap. Most cheeses are a good to excellent source of calcium.

**Cheese may help children eat more fruits, vegetables and whole grains.**

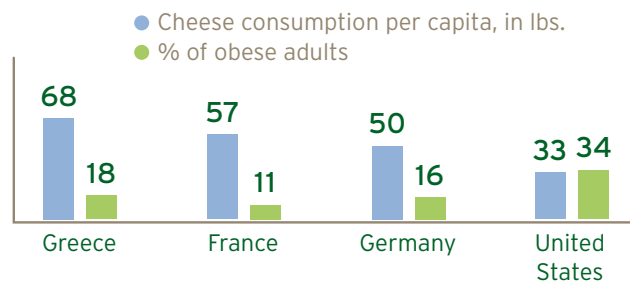
A recent study indicates that the visible addition of cheese to various middle school menu offerings may help increase the consumption of fruits, vegetables and whole grains compared with these items without cheese.<sup>3</sup> Pairing foods with cheese potentially helps to increase total nutrient intake to improve diet quality.

**Most cheeses are gluten-free.**

Most dairy foods are gluten-free. Natural cheeses are gluten-free and in the case of cheeses that have added flavors or are processed, check the food label's ingredient list to make sure ingredients sourced from wheat, barley or rye aren't added.

**Other countries have higher cheese consumption, yet lower incidence of hypertension and obesity.**

Hypertension affects 16.5 percent of French adults compared with 31.3 percent of U.S. adults.<sup>4,5,6,7</sup>



## Fast facts

- It takes 10 pounds of milk to make 1 pound of cheese.
- The dairy food group is the top source of dietary calcium in the American diet.<sup>8</sup>
- Cheese is the No. 2 source of dietary calcium for Americans.<sup>8</sup>
- Cheese is more than just calcium; it also provides high-quality protein needed to help stay healthy.
- For those with lactose intolerance, cheese can be an important source of calcium. Natural cheeses such as Cheddar, Colby, Monterey Jack, mozzarella and Swiss contain minimal amounts of lactose, because most of the lactose is removed when the curds are separated from the whey in the cheese making process.
- According to the Institute of Medicine, those with lactose intolerance can rely on cheese as a source of calcium: "... virtually unrestricted amounts of reduced-fat hard cheeses with very low amounts of lactose may be ingested to ensure adequate intakes of calcium."<sup>9</sup>



# Cheese

## ... a few simple ingredients

Cheese is a complex food made from a few simple ingredients. Cheese makers have developed thousands of varieties of cheese around the world, each with a unique taste, texture and nutritional profile. No cheese is the same — there are many standards of identity for cheese, because there are a number of ways to adjust the basic recipe to get a distinct product (e.g., Cheddar, Swiss, blue, Brie, mozzarella, etc.).

Natural cheese is made from four basic ingredients: milk, salt, starter culture or “good bacteria” and an enzyme called rennet. The nutrients found in cheese (e.g., calcium, protein, phosphorus) are there because milk is the main ingredient in cheese.<sup>10</sup> Salt is needed to finish the transformation of liquid milk into enjoyable cheese. Salt also acts as a natural preservative.<sup>11</sup>

Process cheese is made from high-quality natural cheese so it also provides important nutrients such as calcium, phosphorus and protein. And it can be made to have more calcium. Historically, process cheese was used to provide shelf-stable cheese for wartime and for shipping to warmer climates.<sup>12,13,14</sup>

The processing halts the aging process so the cheese maintains its flavor, texture and smoothness. Process cheese is customizable for flavor and qualities such as a smooth melt that make it a versatile, tasty and easy-to-use food. The amount of salt used impacts firmness, flavor, safety and preservation.<sup>11</sup>



## Cheese has been around for centuries and is rich in culture

- Its origins date back to ancient times when travelers from Asia are believed to have brought the art of cheese making to Europe. According to an ancient legend, the first cheese was accidentally made by an Arabian merchant who carried his milk in a pouch made from an animal's stomach. The rennet in the lining of the pouch combined with the heat of the sun and caused the milk to separate into curd and whey. That night he found that the whey satisfied his thirst, and the cheese (curd) satisfied his hunger.<sup>15</sup>
- Cheese making was common in the Roman Empire and the Romans passed on their knowledge to the rest of Europe. The art of cheese making flourished. The Pilgrims included cheese in the Mayflower's supplies for their voyage to America in 1620. Once in the New World, the craft of cheese making spread quickly.<sup>15</sup>
- The cheese making process is an art with roots going back to Biblical times, and is a sustainable and natural food that helps keep cultures, communities and families vibrant and healthy today.<sup>15</sup>



# Cheese can fit into almost any eating plan

Because there are so many different types of cheese, it's a nutritious choice that easily fits into most eating plans — the Dietary Guidelines for Americans (DGA) general population recommendations and many of its meal plans; the Dietary Approaches to Stop Hypertension (DASH) diet, diabetic, Mediterranean, plant-based, vegetarian, gluten-free and low-lactose, among others.

## What about fat?

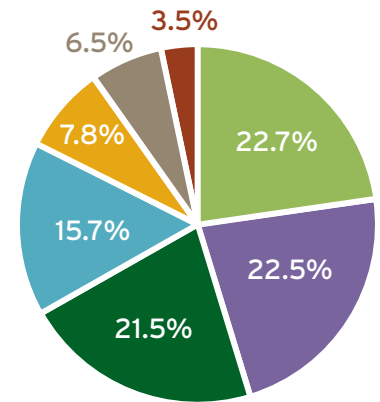
Cheese accounts for only 9 percent of the total fat and 16 percent of the saturated fat in the U.S. diet.<sup>16</sup> Emerging research has shown simply reducing saturated fat in the diet is not associated with a decreased risk of heart disease or cardiovascular disease.<sup>17</sup> And scientists from Harvard have identified a component in dairy fat that may reduce the risk of type 2 diabetes.<sup>18</sup>

## What about sodium?

Salt/sodium plays an important role in cheese making. The majority of the sodium in the U.S. diet (92 percent) comes from sources other than cheese (see chart on this page).<sup>19</sup> Cheese contributes only 8 percent of the sodium.<sup>19</sup> Salt is a vital part of the cheese making process, as it controls moisture, texture, taste, functionality and food safety. So, salt cannot be completely eliminated; however, some cheeses require less than others.

Sources of sodium in the diet by food groups<sup>19</sup>

- Salt as Ingredient
- Other Foods
- Grain Products
- Meat, Fish, Poultry
- Cheese
- Vegetables
- Dairy, Other



More than 300 different cheeses in the U.S. and 2,000<sup>20</sup> in the world can be classified into eight categories:<sup>21</sup>

|                |  |
|----------------|--|
| Blue           | A characteristic of varieties that develop blue or green streaks of harmless, flavor-producing mold throughout the interior. Generally, veining gives cheese an assertive and piquant flavor. Examples: Roquefort, Gorgonzola and Danish blue. |
| Hard           | Well-aged, easily grated and primarily used in cooking. Examples: Parmesan, Romano and Asiago.   |
| Pasta Filata   | Curds are heated and stretched or kneaded before being molded into shape. Stretches when melted. Examples: mozzarella, string and provolone.   |
| Processed      | A blend of fresh and aged natural cheeses that have been shredded, mixed and heated with an addition of an emulsifier salt, after which no further ripening occurs. Examples: American cheese and process cheese spreads.                      |
| Semi-hard      | A classification of cheese based upon texture. Examples: Colby, Cheddar, Edam and Gouda.   |
| Semi-soft      | A wide variety of cheeses made with whole milk that melt well when cooked. Examples: Monterey Jack, brick, Fontina, Havarti and Muenster.  |
| Soft and Fresh | Have high moisture content, typically made with the addition of lactic acid cultures. Examples: cottage cheese, cream cheese, Feta, Mascarpone, ricotta and queso blanco.  |
| Soft-ripened   | Classification of cheese based upon texture. Examples: Brie and Camembert.   |



## What's your type?<sup>22</sup>

### Looking to lower the sodium in your diet?

Try: Swiss, Monterey Jack, ricotta, Port de Salut or Parmesan (1 Tbsp). Also try lower sodium varieties of Colby-Jack, provolone, Muenster, mozzarella or Cheddar.

### Watching the fat in your diet?

Try: Parmesan, Romano (grated) or part-skim mozzarella. Also try lower fat options of cottage, ricotta, Cheddar, Swiss, Parmesan, Colby, Muenster, provolone, Mexican blend\* or American (process).

### Need more calcium in your diet?

Try: Swiss, Cheddar, ricotta, mozzarella, Monterey Jack, Gouda, queso blanco, Mexican blend\* or Colby.

### Looking for more protein options for your diet?

Try: Swiss, cottage, ricotta, mozzarella, Monterey Jack, Cheddar, Gouda, Colby, Port de Salut, provolone, Mexican blend\* or Muenster.

### Watching lactose in your diet?

Try: Cheddar, Swiss, Monterey Jack or mozzarella.

\*A blend of cheeses

## Did you know?

If you are looking to lower the sodium in your diet, one tip is to choose a cheese based on firmness and age. In general, softer, less-aged cheeses require less salt than harder, aged varieties. Lower sodium and lower-fat cheeses also are available. Get more help on a cheese to meet your individual needs in the chart below.<sup>22</sup>

| Per 1 oz. (unless noted) | Swiss  | Monterey Jack | Ricotta, part-skim (1/2 cup) | Cheddar | Mozzarella, part-skim | Brie   | Process American (1 slice/21 g) | Blue   |
|--------------------------|--------|---------------|------------------------------|---------|-----------------------|--------|---------------------------------|--------|
| Calories                 | 106    | 104           | 171                          | 114     | 72                    | 95     | 79                              | 100    |
| Protein                  | 8 g    | 7 g           | 14 g                         | 7 g     | 7 g                   | 6 g    | 5 g                             | 6 g    |
| Calcium                  | 224 mg | 209 mg        | 337 mg                       | 204 mg  | 222 mg                | 52 mg  | 116 mg                          | 150 mg |
| Phosphorus               | 161 mg | 124 mg        | 227 mg                       | 145 mg  | 131 mg                | 53 mg  | 108 mg                          | 110 mg |
| Fat                      | 8 g    | 8 g           | 10 g                         | 9 g     | 4.5 g                 | 8 g    | 7 g                             | 8 g    |
| Sodium                   | 54 mg  | 150 mg        | 155 mg                       | 176 mg  | 175 mg                | 178 mg | 263 mg                          | 395 mg |
| Lactose                  | 0.02 g | 0.14 g        | 0.38 g                       | 0.07 g  | 0.32 g                | 0.13 g | 0.11 g                          | 0.14 g |

# There's a place for cheese in a healthy eating plan

The **2010 Dietary Guidelines** for Americans recommends three servings of low-fat or fat-free milk and milk products each day and states: "Moderate evidence shows that intake of milk and milk products is linked to improved bone health, especially in children and adolescents and is associated with a reduced risk of cardiovascular disease and type 2 diabetes and with lower blood pressure in adults."<sup>23</sup>

The Guidelines and other health authorities encourage sodium reduction. As part of sodium reduction, it is important not to lose sight of the fact that overall diet quality and lifestyle behaviors can positively affect blood pressure and related risks. The Guidelines recognizes that diet and lifestyle changes may help lower blood pressure.<sup>23</sup>

When it comes to cheese, focus is sometimes misplaced on sodium content. Cheese contributes many essential nutrients to Americans' diets — it's the No. 2 source of calcium and a valuable source of protein, phosphorus, vitamin A and zinc.<sup>8,16</sup> Cheese contributes only 8 percent of the sodium, 9 percent of total fat and 5 percent of total calories to the U.S. diet.<sup>16,19</sup>

**Diet quality and lifestyle changes, not just less sodium**  
Consuming recommended amounts of potassium, losing

excess weight, increasing physical activity and eating a healthful diet, in addition to meeting recommended sodium intakes, may help lower risk for high blood pressure.<sup>23</sup>

## Often overlooked: potassium and blood pressure management

High intake of sodium can be linked to increased prevalence of high blood pressure in the United States, but dietary potassium can lower blood pressure by blunting the adverse effects of sodium.<sup>23,24</sup> Potassium found in fruits, vegetables and milk products (i.e., milk and yogurt) can contribute to blood pressure control. Few Americans, including all age and gender groups, consume potassium in amounts recommended.<sup>23</sup>

## DASH delivers low sodium, high potassium and balanced approach

Americans can achieve sodium and potassium recommendations by following the Dietary Approaches to Stop Hypertension (DASH) eating plan. Within the context of a reduced-fat diet, a DASH diet — rich in fruits, vegetables and predominantly low-fat dairy products (including an average of 1 ounce of regular cheese each day) — was found to lower blood pressure to a greater extent than a diet rich in fruits and vegetables, but devoid of dairy.<sup>25,26</sup>

## A closer look at cheese makers' efforts to decrease sodium

- Quality and food safety are primary concerns for cheese makers.
- A natural preservative, salt plays a vital role in the safe manufacturing of cheese and its post-production integrity. Control of factors that affect salt content in cheese are a critical part of the cheese making process to ensure quality.
- Cheese makers are working to control variability to better control sodium levels. Variability can result from processing conditions, cheese type, form (e.g., string, shreds, slices, bricks) and, in the case of process cheese, different standards of identity.
- A recent study confirmed that actual sodium levels can be lower than reported on labels, indicating an opportunity to control variability for consistently lower sodium and better quality cheeses.<sup>27</sup>



# Public health FAQs

## What is the National Salt Reduction Initiative?<sup>28</sup>

- The National Salt Reduction Initiative (NSRI) is a New York City-led partnership of cities, states and 19 national health organizations designed to help companies voluntarily reduce the salt levels in 62 categories of packaged food and 25 classes of restaurant food. The intent of the initiative is to reduce the salt in packaged and restaurant foods by 25 percent over five years, which is expected to reduce the nation's sodium intake by 20 percent.

The following chart demonstrates analytical sodium levels determined in a recent largest-of-its-kind, blinded study compared with NSRI target levels for 2012 and 2014.

| Type of Cheese  | Sodium Study Average <sup>27</sup><br>(mg of Na/100 g) | NSRI 2012 Target<br>(mg of Na/100 g) | NSRI 2014 Target<br>(mg of Na/100 g) |
|-----------------|--|--------------------------------------|--------------------------------------|
| Cheddar         | 615  | 630                                  | 600                                  |
| Mozzarella*     | 666  | 630                                  | 600                                  |
| Process singles | 1,242  | 1,250                                | 1,040                                |

\*Low-moisture part-skim mozzarella

## Is the cheese industry willing to adopt a targeted approach to sodium reduction?

While a variety of individual cheese manufacturers or food companies that make cheese may commit to a “targeted approach” to sodium reduction for their products, the industry at large is not adopting a targeted approach, and here’s why:

Cheese is not one single food — in the U.S., there are many standards of identity for cheese. Cheeses differ by type, form and variety in their sodium levels and other properties (fat level, moisture level, etc.), so you can’t put a blanket sodium reduction on cheese, since cheese is not one single food. For example, Swiss cheese naturally has a low level of sodium and is considered a low-sodium food. A blanket reduction of 25 percent would potentially risk taste/texture changes and food spoilage.

## Why not eliminate sodium completely?

- Substituting sodium chloride (salt) with salt substitutes is not a fail-safe solution to reduce sodium in cheese. Salt influences the activity of enzymes and microorganisms; therefore, it affects critical aspects of the cheese, including taste, consumer acceptance, food safety, shelf life, body and texture.
- Use of potassium chloride is an option; however, it is known to add bitter flavors to foods, so its potential use is limited. Other replacement options also are being explored. More work is needed for widespread use of potassium and other alternatives to sodium.

## Dairy industry working voluntarily to address sodium in cheese

Despite the fact that cheese contributes only 8 percent of sodium to the U.S. diet, cheese makers are working together to proactively address public health as well as meet people’s needs and lifestyles. Cheese makers continue to lead process control and product innovations as part of the solution to help lower sodium — all while maintaining strict expectations for food safety and taste.

### What are examples of industry actions?

Collectively, the industry has:

- Spearheaded an independent, blinded study to determine benchmark analytic sodium levels in commonly consumed cheeses to establish industry best practices to improve process controls and thus reduce sodium
- Reduced commodity mozzarella salt content from 2.0 percent to 1.6 percent to meet USDA specifications
- Formulated reduced-fat and reduced-sodium process cheese and blended cheese for commodity purchase by schools, containing 200 to 300 mg of sodium per 28-gram serving
- Innovated cheese packaging to help people with portion control and calorie intake
- Introduced more than 200 new cheese products since 2007 that are reduced-fat, low-fat or fat-free

## References

- 1 DMI Emerging Diets Research, 2010. Available at: <http://www.usdairy.com/Health/ConsumerTrendsProteinLocal/Pages/Market%20Insights.aspx>.
- 2 IOM (Institute of Medicine). *Dietary Reference Intakes for Calcium and Vitamin D*. Washington, D.C.: The National Academies Press; 2011:480.
- 3 Donnelly JE, Sullivan DK, Smith BK, et al. The Effects of Visible Cheese on the Selection and Consumption of Food Groups to Encourage in Middle School Students. *J Child Nutr Manag*. 2010;34(1). Available at: <http://schoolnutrition.org/Content.aspx?id=14040>.
- 4 International Dairy Federation. Bulletin of the International Dairy Federation 446/2010: The World Dairy Situation 2010.
- 5 Tibi-Levy Y, de Pouvourville G, Westerloppe J, Bamberger M. The cost of treating high blood pressure in general practice in France. *Eur J Health Econ*. 2008;9(3):229-236.
- 6 Centers for Disease Control and Prevention. High Blood Pressure Frequently Asked Questions. Available at: <http://www.cdc.gov/bloodpressure/faqs.htm>. Accessed November 18, 2010.
- 7 Organisation for Economic Co-operation and Development (OECD). Available at: [http://www.oecd.org/document/35/0,3343,en\\_21571361\\_44315115\\_46064099\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/35/0,3343,en_21571361_44315115_46064099_1_1_1_1,00.html). Accessed March 8, 2011.
- 8 Fulgoni III VL, Keast DR, Quann EE, Auestad N. Food sources of calcium, phosphorus, vitamin D, and potassium in the U.S. Presented at Experimental Biology, Anaheim, Calif. April 24-29, 2010.
- 9 IOM (Institute of Medicine). *Dietary Reference Intakes for Calcium and Vitamin D*. Washington, D.C.: The National Academies Press; 2011:498.
- 10 Cheesemaking: A Wisconsin Tradition. Available at: [http://trade.eatwisconsincheese.com/wisconsin/how\\_cheese\\_is\\_made.aspx](http://trade.eatwisconsincheese.com/wisconsin/how_cheese_is_made.aspx). Accessed February 15, 2011.
- 11 Guinee TP. Salting and the role of salt in cheese. *International Journal of Dairy Technology*. 2004;57(2-3):99-109.
- 12 Ustunol Z. Processed Cheese: What is that stuff anyway? *Michigan Dairy Review*. Available at: <https://www.msu.edu/~mdr/vol14no2/ustunol.html>. Accessed February 6, 2011.
- 13 What's That Stuff? Chemical & Engineering News. 2000;78(6):51. Available at: <http://pubs.acs.org/cen/whatstuff/stuff/7806sci2.html>. Accessed February 16, 2011.
- 14 Kraft Foods. Kraft History: JL Kraft. Kraft.com. Available at: <http://www.kraft.com.au/products/krafthistory/fredwalkerfounder/jlkraft.aspx>. Accessed May 16, 2011.
- 15 International Dairy Foods Association. Available at: <http://www.idfa.org/resource-center/industry-facts/cheese/>. Accessed February 16, 2011.
- 16 Dairy Research Institute™, NHANES (2003-2006). Ages 2+ years. Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey. Hyattsville, Md.: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. 2003-2004; 2005-2006. Available at: <http://www.cdc.gov/nchs/nhanes.htm>.
- 17 Siri-Tarino PW, Sun Q, Hu FB, Krauss RM. Meta-analysis of prospective cohort studies evaluating the association of saturated fat with cardiovascular disease. *Am J Clin Nutr*. 2010;91(3):535-546.
- 18 Mozaffarian D, Cao H, King IB, et al. *Trans*-Palmitoleic Acid, Metabolic Risk Factors, and New-Onset Diabetes in U.S. Adults: A Cohort Study. *Ann Intern Med*. 2010;153(12):790-799.
- 19 Hentges E. Sources of Sodium in the Food Supply. Paper presented at: Institute of Medicine Committee on Strategies to Reduce Sodium Intake, Information-Gathering Workshop; 2009; Washington, D.C.
- 20 International Dairy Foods Association. Available at: <http://www.idfa.org/news--views/media-kits/cheese/cheese-facts/>. Accessed February 16, 2011.
- 21 Wisconsin Milk Marketing Board. Available at: <http://www.eatwisconsincheese.com/cheese/cheesecyclopedia.aspx>. Accessed March 10, 2011.
- 22 U.S. Department of Agriculture, Agricultural Research Service. 2010. USDA National Nutrient Database for Standard Reference, Release 23. Nutrient Data Laboratory Home Page. Available at: <http://www.ars.usda.gov/ba/bhnrc/ndl>. Accessed March 9, 2011.
- 23 U.S. Department of Health and Human Services and U.S. Department of Agriculture. *Dietary Guidelines for Americans, 2010*. 7th Edition, Washington, D.C.: U.S. Government Printing Office, January 2011.
- 24 Miller GD, Jarvis JK, McBean LD. (2007). *Handbook of Dairy Foods and Nutrition*, Third Edition. In Chapter 1: The Importance of Milk and Milk Products in the Diet (pp. 1-44). Boca Raton, Fla: CRC Press.
- 25 Appel LJ, Moore TJ, Obarzanek E, et al. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med*. 1997;336(16):117.
- 26 Karanja NM, Obarzanek E, Lin P-H, et al. Descriptive Characteristics of the Dietary Patterns Used in the Dietary Approaches to Stop Hypertension Trial. DASH Collaborative Research Group. *J Am Diet Assoc*. 1999;99(8 Suppl):S19-27.
- 27 Agarwal S, McCoy D, Graves W, Gerard PD, Clark S. Sodium content in retail Cheddar, Mozzarella, and process cheeses varies considerably in the United States. *J Dairy Sci*. 2011;94(3):1605-1615.
- 28 National Salt Reduction Initiative, New York City Department of Health and Mental Hygiene. Available at: <http://www.nyc.gov/html/doh/html/cardio/cardio-salt-initiative.shtml>. Accessed February 16, 2011.

Education is the true link between diet and health. Need resources on cheese and nutrition for your patients and clients? Get consumer education resources on cheese, nutrition and health: Visit [NationalDairyCouncil.org](http://NationalDairyCouncil.org) or [USDairy.com/HW](http://USDairy.com/HW).