

Sodium Reduction Strategies

■ **Donna Berry** *Product Development Editor*

The single most dangerous ingredient in the food supply is salt, according to the Center for Science in the Public Interest (CSPI), the Washington, D.C.-based consumer advocacy group often referred to as the “food police.” Despite differing opinions among some medical and nutritional authorities regarding the correlation of salt intake with human health and wellness, numerous health organizations support CSPI’s opinion and are putting pressure on the food industry to lower the sodium content of foods.

Understanding salt and sodium

In order to lower sodium contents, one must understand salt’s chemistry, and the functionalities sodium brings to many food formulations, in particular cheese. For starters, sodium and salt are not the same. The chemical name for salt is sodium chloride, indicating that sodium is a component of salt. Because sodium is a smaller molecule than chloride, sodium chloride is 39.34% sodium and 60.66% chloride on a molecular weight basis. FDA standards also allow table salt to contain up to 2% additives, such as anti-caking agents and processing aids.

Compared to other minerals, the human body needs sodium in relatively large amounts, but many believe not as much as currently consumed. Federal guidelines say the average American should consume about 2,300 milligrams of sodium daily, while some population segments should consume closer to 1,500 milligrams. According to the American Medical Association, Chicago, most Americans consume more than 4,000 milligrams each day. Studies suggest that this excessive consumption is a contributing factor to hypertension, heart disease and even certain cancers.

Even though not all scientists believe universal sodium restriction is the answer to improved health, CSPI does, and in January, New York City showed it does, too. Through its National Salt Reduction Initiative, New York City health officials asked food manufacturers to reduce salt levels in packaged foods and restaurant meals by 25% during the next five years. This is serious — as you may recall, New York City was the first to take on trans-fatty acids in foodservice, forever changing the fats and oils industry.

Now the Big Apple wants to change the way Americans consume sodium. “Consumers can always add salt to food, but they can’t take it out,” says New York City Health Commissioner Thomas Farley. Many national and international health organizations have reviewed the proposed targets and are now voicing support for the initiative (see sidebar on p. 58).

Photo courtesy of Dairy Management Inc.



“Reducing sodium levels in packaged and restaurant foods could save thousands of lives a year in New York City alone,” says CSPI Executive Director Michael Jacobson. “Food companies should cooperate with New York City authorities and set achievable targets to reduce salt nationwide. If companies don’t cooperate, they can certainly expect other state and local governments, and perhaps at long last, FDA, to begin regulating in this area.”

More than a salty taste

What CSPI and New York City officials do not realize is that in many applications, sodium chloride is a functional ingredient, and careless reduction can have a deleterious effect on quality and safety. For example, in natural cheesemaking, highly ionic sodium chloride functions to pull whey (moisture) out of the curd. This, in turn, gives cheese a firm texture and reduces its water activity, which contributes to quality, safety and shelf life. Because of this functional aspect of sodium chloride, it is challenging to replace salt in natural cheese.

“Sodium reduction in traditional cheese requires creativity, as its contribution goes well beyond providing a ‘salty taste,’” says John Faragher, national accounts manager, DSM Food Specialties, Parsippany, N.J. “A familiar formula may have good taste, texture, stability and characteristic cheese flavor, which could all change when you reduce sodium.

“We suggest offsetting the perceived losses in flavor in traditional cheese through the addition of the umami taste from yeast extract at low levels (0.05% to 0.1%),” says Faragher. “We offer

Photo courtesy of Dairy Management Inc.



Another supplier includes a third mineral — magnesium — in its sodium reduction ingredient blend. “Our new, unique mineral salt is based on magnesium,” says Deborah Rolf, executive vice president, Americas, Smart Salt Inc., La Jolla, Calif. “The patented process, which involves co-crystallization, eliminates any negative taste or handling issues while creating positive taste-enhancement properties.”

The patented component is a combination of magnesium ammonium and potassium chloride hexahydrate. Blended with sodium chloride, manufacturers can obtain a 30% to 60% sodium reduction

in natural cheese, without compromising taste, texture or preservation,” says Rolf. “Custom blends allow for a one-to-one replacement for sodium chloride in dairy products such as cheese, dips and spreads.”

“Similar approaches can be used in dairy-based dips and spreads with even greater ease as you typically have more ingredient choices and less dependence on desirable microbial growth for characteristic flavor development,” Faragher adds.

Linda Kragt, technical services manager, Morton Salt, Chicago, says, “We offer potassium chloride for sodium reduction. Potassium chloride is the best salt alternative in the marketplace and can be used with other ingredients as part of a sodium-reduction toolbox.

“Potassium chloride imparts saltiness and also helps enhance ionic strength in dairy foods. However, because of its characteristic taste, we recommend a partial substitution approach where potassium chloride is used in combination with sodium chloride,” she says. “A recommended starting level with potassium chloride is 25% to 30% substitution for salt.”

Scientists at Nu-Tek, Minnetonka, Minn., also believe in the power of potassium chloride when it comes to reducing sodium levels in natural cheese. “It is very similar in ionic strength as sodium chloride. The down side of straight potassium chloride is its metallic flavor,” says Teresa Isakson, sales and marketing director. “We have developed a patent-pending technology that minimizes the metallic note of potassium chloride so it is more similar to sodium chloride in salty perception.

“We have trialed our modified potassium chloride in Cheddar cheese and found that the salty perception and flavor is similar to that of the control cheese made using regular salt. Further, the texture and shelf life of the cheese were similar,” Isakson says.

“The technology for process cheese involves removing sufficient calcium during manufacture of the cheese base and replacing melting salts normally used in the cheesemaking process with emulsifiers such as mono- and diglycerides,” says John Lucey, professor of food science at the University of Wisconsin-Madison.

More mineral manipulation

Amr Shaheed, technical service for Innophos, Cranbury, N.J., says, “The phosphate salts that are typically used in dairy applications are of a sodium origin and are well known for their essential contribution to the functionality of the end products. For example, tetra sodium pyrophosphate (TSPP) plays an essential role in the foam stability of whipped toppings and in maintaining fat dispersion in ice cream mixes. To lower sodium, TSPP can be replaced with tetra potassium pyrophosphate without affecting the functionality of the final products and with very minimal taste differences.

“In processed cheese products, reducing sodium with functional phosphates is one of the newest solutions being researched by our scientists,” says Shaheed. “Internal lab work

Hold the Presses: IOM Recommends National Sodium Reduction Initiative

On April 19, the Institute of Medicine (IOM) issued strategies to reduce sodium intake, including a recommendation that FDA set mandatory national standards for the sodium content in foods. The IOM did not call for the outright elimination of adding salt to foods, but did recommend that companies and restaurants begin the process of reducing sodium in processed foods and menu items.

"It is important that the reduction in sodium content of foods be carried out gradually, with small reductions instituted regularly as part of a carefully monitored process," the IOM said in its report "Strategies to Reduce Sodium Intake in the United States." "Evidence shows that a decrease in sodium can be accomplished successfully without affecting consumer enjoyment of food products if it is done in a stepwise process that

systematically and gradually lowers sodium levels across the food supply."

The IOM also recommended FDA to modify the generally recognized as safe (GRAS) status of compounds such as sodium that are added to processed foods. By changing the level to which the use of such compounds is considered safe, the expectation would be that sodium content in the food supply would gradually slow in a way that should avoid making food unpalatable to consumers. Currently, companies may use as much salt as they like because of its GRAS status.

The *Washington Post* reported on April 20 that FDA, along with USDA, is set to implement a 10-year program that would lead to the first legal limits on the amount of salt allowed in food products. In re-

sponse, FDA issued this statement: "A story in today's *Washington Post* leaves a mistaken impression that the FDA has begun the process of regulating the amount of sodium in foods. The FDA is not currently working on regulations nor have they made a decision to regulate sodium content in foods at this time. Over the coming weeks, the FDA will more thoroughly review the recommendations of the IOM report and build plans for how the FDA can continue to work with other federal agencies, public health and consumer groups, and the food industry to support the reduction of sodium levels in the food supply. The Department of Health and Human Services will be establishing an interagency working group on sodium at the Department that will review options and next steps."

has demonstrated that a 25% sodium reduction or more is possible with blends that incorporate a variety of phosphates. The low-sodium phosphate blends provide good emulsification, desirable melt characteristics and extended shelf life, while also enhancing color, texture and flavor."

It must taste good

Maintaining quality and safety are critical hurdles when reducing sodium contents, but formulators must always remember, if the product does not deliver on taste, it is doomed for failure.

Land O'Lakes Inc., St. Paul, Minn., just debuted an American deli cheese with 30% less sodium than its regular American deli cheese, but with full-flavor thanks to the addition of sea salt, according to the company. "We strive to offer a product that has both great taste and is better for you," says Erin Gislason, brand manager. "It's a delicate balance to manage, but with the addition of sea salt to this product, Land O Lakes 30% Less Sodium American Deli Cheese Product really does deliver on both promises."

Suppliers offer an array of solutions to maintain flavor in all types of lower-sodium dairy foods. "We have a patent-pending solution that delivers the sensory attributes of salt without sacrificing the flavor of dairy products," says John Wassergord, senior application technologist, Danisco USA, New Century, Kan. "Targeted dairy products include natural cheese, process cheese, cottage cheese and dips. Studies indicate that our ingredient is effective in reducing sodium 25% to 40%, depending on the formulation. It also provides a combination of functionality and manufacturer convenience."

Alexandra Rice, manager, marketing communications, Kerry Ingredients & Flavours, Americas Region, Beloit, Wis., says, "We have a large portfolio of clean-label sodium-reduction systems that allow processors to reduce sodium up to 50%, depending upon application. Our modulators have been tested in a wide variety of applications and are able to reduce sodium



■ Land O'Lakes uses sea salt to reduce the sodium content of its deli-counter American cheese.

levels while still achieving consumer-accepted flavor with no metallic notes or off flavors.

"Specifically for cheese and dairy-based dips, our sodium modulators are applied at 0.05% to 0.25% and can achieve a reduction of up to 50%," says Rice. "For dairy-based dressings, our modulators are applied at 0.1% to 0.3% and can achieve a reduction level between 35% and 50%."

Emil Shemer, director, food solutions, Sensient Flavors LLC, Indianapolis, says, "We offer natural flavors systems for sodium reduction, which allow for a reduction of 25% to 35% or more per serving. Our solutions take a whole system approach to taste and functionality, and are suitable for a variety of applications."

Kragt cautions product developers to check standards of identities to make sure sodium reduction ingredients are allowed in specific dairy applications. "According to 21CFR130.10, some deviations may be made in standardized products if approved nutrient content claims are made," she says. "With dairy products that have a standard of identity, consult with your regulatory or legal department to determine if there are any restrictions on the use of salt alternatives."

In summary, reducing the sodium content in dairy products, in particular cheese systems, is challenging, but today there are many solutions. Let's keep cheese on burgers in the Big Apple! ■