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Cheese Makers Urged To Reduce Variability Of Sodium So Labels Are More Accurate

Sodium Content Varies Within Cheese Varieties; Manufacturers Tend To Be Conservative When Reporting Salt On Labels

Rosemont, IL—Cheese manufacturers need to reduce the variability of sodium in their products to better target desired sodium levels, which will enable them to label sodium more accurately.

That's one of the conclusions of an independent retail analysis of the sodium content of cheese. The research was spearheaded by the Dairy Research Institute and published online in the March issue of the *Journal of Dairy Science*.

Typical sodium content of the most popular cheeses consumed in the US — Cheddar, Mozzarella and process cheese — vary widely based upon label claims, the study noted. Cheddar cheese averages 620 milligrams per 100 grams; low moisture part skim (LMPS) Mozzarella aver-

aged 512 milligrams per 100 grams; and process cheese averages 1,488 milligrams per 100 grams of cheese.

For the dairy industry to respond to the demands to deliver reduced- and low-sodium cheeses to the market, many challenges must be overcome related to manufacturing processes, flavor and texture acceptability, shelf life, and safety of the products, the study noted.

To proceed appropriately, the industry must first know where cheese products stand in regard to sodium levels. This research was conducted to determine sodium levels in major cheese types; report variability in sodium levels across brands, private labels and regions; and report deviations between analytical sodium and Nutrition Facts label sodium.

Retail samples of Cheddar cheese (specifically 650 from chunk and shred varieties), LMPS Mozzarella

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Sodium Variability

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(specifically 746 from shred, chunk and string varieties) and process cheese singles (269 individually wrapped slices of pasteurized process cheese food, pasteurized process cheese spread, pasteurized process cheese product, or pasteurized prepared cheese product) were collected for analysis.

'Great Deal' Of Variability

Overall, process cheese contained the highest mean level of sodium (1,242 milligrams per 100 grams) among all cheese tested. A "great deal" of variability was seen in sodium content between cheese types and within cheese types, the study said.

Across Cheddar forms and brands, the mean analytical sodium was 615 milligrams per 100 grams. Analytical sodium ranged from 250 to 982 milligrams per 100 grams, with 95 percent between 474 and 731 milligrams per 100 grams.

However, label sodium ranged from 600 to 800 milligrams per 100 grams (mean 648 milligrams); differences ranged from 67 milligrams of sodium below label declaration to 50 milligrams of sodium above declaration.

Across all LMPS Mozzarella forms and brands, the mean analytical sodium was 666 milligrams per 100 grams. Sodium in samples ranged from 350 to 1,010 milligrams per 100

grams, with 95 percent between 452 and 876 milligrams per 100 grams.

By contrast, label sodium ranged from 526 to 893 milligrams per 100 grams (mean 685 milligrams); mean differences ranged from 117 milligrams of sodium below label declaration to 71 milligrams of sodium above declaration. String cheese tended to have higher sodium than chunk or shred.

Across all process cheese forms and brands, the mean analytical sodium was 1,242 milligrams per 100 grams. Analytical sodium ranged from 750 to 1,520 milligrams per 100 grams, with 95 percent between 936 and 1,590 milligrams per 100 grams.

By comparison, label sodium ranged from 1,185 to 1,740 milligrams per 100 grams (mean 1,313 milligrams); mean differences in analytical sodium ranged from 107 to 115 below label declaration.

These findings demonstrate that manufacturers tended to be conservative with their reporting of sodium on labels; about 10 percent of products contained 20 percent less sodium than the label declaration, the study noted.

Also, within a brand of the same type and form, variability was found in sodium. The coefficient of variance ranged from 12 to 19 percent for chunk, 13 to 20 percent for shred, and 8 to 18 percent for string cheese brands. On the other hand, no significant differences between brands or private labels were found for any cheese forms.

Differences in the sodium content were not due to moisture differences, because no significant or meaningful correlation was found between sodium content and moisture for sharp Cheddar chunks and LMPS chunk and string cheeses, the study noted.

However, analytical sodium was “highly correlated” to salt-to-moisture ration (S/M). Of the cheeses analyzed for moisture, sharp Cheddar chunks had the highest mean S/M (4.3 percent), followed by mild Cheddar chunks (4.1 percent) and LMPS Mozzarella string (3.6 percent) and chunk (3.2 percent).

Some Cheeses Need Small Changes

Most samples of Cheddar were close to the 2012 National Salt Reduction Initiative (NSRI) target of 630 milligrams per 100 grams, which suggests that processors will only need to make “small changes” to meet the NSRI 2012 sodium targets, the study noted.

Some Mozzarella samples were close to the 2012 NSRI target of 630 milligrams per 100 grams; however, string cheese processors, in particular, will need to make some manufacturing changes to meet the 2012 target.

Process cheese manufacturers “will need major reformulations” to meet the 2012 NSRI sodium target of 1,250 milligrams per 100 grams, the study continued. Some brands may have “an especially difficult time” meeting targets if they elect to enter the voluntary program.

Reduction of sodium in process cheese will be a greater challenge when compared with Cheddar or Mozzarella, according to the study. Salt is added to Cheddar after milling and to Mozzarella after milling or via brine, whereas for process cheese, sodium may be added in the form of sodium-based emulsifying salts (30 to 48 percent contribution), natural cheese (25 to 37 percent), and added salt (15 to 35 percent).

Options to reduce sodium in process cheese include use of reduced-sodium natural cheese, potassium-based emulsifying salts, other salt replacers, and flavor enhancers.

Regardless of the method used to reduce sodium content in cheeses, for consumers to accurately estimate their sodium intake, cheese makers should more accurately label sodium content, the study advised. Precise control of factors that affect salt uptake and distribution in cheese are a critical part of the cheesemaking process to ensure consistent, high quality cheese.

Manufacturers must reduce variability to better target desired sodium levels, which is an opportunity for better process control, and will enable accurate declaration of sodium content, the study said. Variability in sodium can result from processing conditions, product forms and, in the case of process cheese,

different standards of identity and ingredients.

The difficulty in achieving uniform salt distribution in Cheddar and Mozzarella in commercial settings may stem from variable factors that influence salt uptake by curds and the design of salting equipment, the study noted.

Researcher T. P. Guinee has recommended several approaches to improve salting consistency in cheese, including:

- Standardization of milk protein (casein) and protein-to-fat ratio.
- Greater regulation of cheese-making steps and operations.
- More efficient mechanical devices for mixing and salting.
- Regular maintenance of curd mill and equipment.
- Improved design of equipment for uniform curd distribution and block forming.
- Better control over temperature/humidity during storage and distribution.

Although some advancements have been made, methods to reduce sodium, along with evaluation of the flavor, consumer acceptability, functionality, safety, shelf life, and machinability of reduced-sodium natural cheeses and process cheeses need further investigation, the study concluded.

“To date research does show a number of approaches available to improve consistency, including greater formalization of cheesemaking steps and operations, improved

design of equipment for uniform curd distribution and block forming, and improved quick and easy testing methods to check sodium levels during production,” said Bill Graves, senior vice president of product research, Dairy Research Institute.

“Continued evaluation of best methods to reduce sodium and establish process controls are underway with cooperation among universities and dairy industry partners,” Graves added.

“These research findings already are being used to develop industry-adopted best practices to minimize variability in sodium content, which then needs to be reflected in labeling,” said Nigel Kirtley, vice president cheese research, development and quality for Kraft Foods and member of the health and wellness committee for the Innovation Center for US Dairy.

“The industry will continue to use the findings to develop guidance and support to help manufacturers put this information into action for better process controls that will allow for consistently lower sodium and improved quality,” Kirtley added.

In December 2010, the Innovation Center for US Dairy hosted more than 17 leading cheese companies at a Best Practices Task Force meeting to work on proactively addressing the opportunities and challenges associated with reducing sodium content in cheese. ▀