

Scientists study how to reduce salt, but not flavor, in cheese

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From soup to nuts, supermarket shelves teem with products trumpeting their reduced-salt status. Not in the cheese cooler, though.

University of Minnesota Assistant Prof. Tonya Schoenfuss is hoping to change that. Significantly reducing sodium in cheese - without ruining its taste and texture - has been particularly vexing for food scientists like Schoenfuss.

She hasn't found the cure, but she's making progress. Using a potassium-based substitute, Schoenfuss and her lab team successfully cut [sodium levels](#) by 53 percent in cheddar cheese, publishing their results this year in a prominent [dairy](#) science journal.

Schoenfuss is an assistant professor in UM's Department of Food Science and Nutrition, and her specialty is dairy, particularly cheese. "I'm a real cheese nerd and I love dairy products."

Her dairy roots are deep. Schoenfuss grew up in a rural part of Southern California where her parents ran a nursery. Agriculture was a hobby. She raised four or five dairy goats and joined 4-H and Future Farmers of America.

California is the nation's largest milk producer, and Schoenfuss got her bachelor's degree in dairy science in her home state at California Polytechnic State University. After her graduate work, including a Ph.D. from Louisiana State University, she landed a job in Minnesota at

General Mills.

The Golden Valley, Minn.-based food products giant makes Yoplait, one of the nation's top yogurts, and Schoenfuss went to work in product development. She helped create two drinkable yogurt items there.

In 2008, when a food sciences post came up at UM's St. Paul campus, she jumped at it. She teaches courses in product development and other food science issues, and devotes lab time to cheese, particularly the salt conundrum.

Low-sodium cheddar cheeses have been marketed for decades. But they "account for only a trivial percentage of total retail sales of cheddar cheese," the National Dairy Council said in comments earlier this year to the U.S. Department of Agriculture, which is seeking to reduce Americans' salt consumption.

"The lack of consumer acceptance is indicated by the lack of market growth of the low-sodium cheese category," the dairy council wrote.

But it's not for a lack of trying by cheesemakers. "Low is hard," Schoenfuss said.

Salt acts not only to flavor cheese, but to preserve and give structure to it. "Cheese is basically this biochemistry thing going on, and salt helps control that," Schoenfuss said.

Under federal rules, to qualify for a "reduced sodium" claim, a cheesemaker must cut [sodium chloride](#) by 25 percent. A "low-sodium" claim, rare commercially, often entails a significantly greater reduction, 55 percent in cheddar cheese.

Schoenfuss' lab reduced sodium chloride in cheddar cheese by 53

percent, replacing the mineral in different trials with calcium chloride, magnesium chloride and potassium chloride. The first two were losers, leading to cheddar that was metallic-tasting and soapy.

Potassium chloride, a sodium chloride replacement, can also impart a metallic or bitter flavor. But with the cheese cultures and production process Schoenfuss used - combined with the right amount of potassium chloride - the metallic flavor wasn't there.

An independent taste panel found the potassium chloride cheddar not appreciably more bitter than a control cheddar made the conventional way, Schoenfuss' lab concluded.

"Potassium chloride can be used successfully to achieve large reductions in sodium when replacing a portion of the (sodium chloride) in cheddar [cheese](#)," said a study published in the Journal of Dairy Science by Schoenfuss and four UM colleagues.

She and her lab team are working on another cheddar study to advance the previous one. They've come across nothing patentable yet. But as Schoenfuss said, "We will be able to help the dairy industry make better tasting (low-sodium) stuff."

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