



## WHEN LESS IS MORE:

Reducing sugar and salt  
in baked goods and snacks

We've all heard the saying, "Everything in moderation." When it comes to sugar and salt, it's guidance that bakery and snack makers are increasingly taking to heart.

A convergence of forces is affecting food manufacturers, stemming from a growing body of research that suggests too much sugar and excessive salt from our foods are wreaking havoc with our health. Regulatory agencies, medical providers and the media provide consumers with regular reminders to watch their intake – but replacing these two ingredient staples is often easier said than done.

## Sweet demands

On the sugar side of the equation, there's clearly room for downsizing. After all, Americans consume more sugar per capita than any other nation.<sup>1</sup> Still, while consumers may say they want less sugar (and surveys often rank sugar reduction as a top desire), those same consumers have unyielding expectations for taste and texture.

According to Cargill's Bill Gilbert, a certified master baker and principal food technologist, the first step is defining objectives. Is the goal to make a specific sugar-reduction claim, or to achieve a set amount of sugar per serving? Are you only trying to reduce sugar levels, or is calorie reduction a concern as well? (Not all sugar-reducing ingredients also reduce calories.) Are there other considerations, too? Once those questions are answered, the formulation work can begin.



"When we start reducing sugar, it's not just the sweet taste we have to replicate," Gilbert says. "Sugar impacts how much cookies spread when baked, how ingredients bind in granola bars, aeration and tenderness in cakes, browning, bulk, texture, shelf life and more. To achieve sugar-reduction goals, we have to recreate all this functionality with other ingredients."

Mimicking sugar's sweet flavor is often one of the easiest tasks. To replace the taste of sugar, next-generation stevia sweeteners are a great choice. Options like Cargill's ViaTech® stevia sweeteners offer improved sweetness and flavor dynamics compared to earlier Reb A stevia options, enabling greater sugar reductions in a wide array of bakery applications. Equally important, according to Cargill's proprietary research, consumers view stevia as a healthful ingredient that positively impacts purchase intent.<sup>2</sup>

While stevia does a great job replacing the sweetness of sugar, it won't make up for the loss of bulk or functionality. For those properties, Gilbert often turns to Zerose® erythritol and Oliggo-Fiber® chicory root fiber, which help deliver the tenderness and mouthfeel consumers expect. In many bakery applications, this trio of ingredients can successfully replace the functionality of sugar, keep cost-of-use in check and deliver on consumer preferences. Still, he admits there's no "one-fix" solution or single drop-in ingredient to replace sugar.

"Finding the right ingredient combination can take time," Gilbert says, "but that's one of the advantages to working with Cargill. We have so many different sweeteners and texturizers in our portfolio, we can help customers find the best ingredient blend to achieve their unique product development goals."



Snack bars are another good candidate for sugar reduction. Here, too, stevia combined with label-friendly favorites, such as tapioca syrup, enable formulators to deliver sugar reduction without sacrificing taste or function.

As with baked goods, replacing sweetness with ViaTech® stevia products is relatively easy. However, replicating sugar's functionality requires a bit more work. Cargill's Versyra® reduced-sugar syrup is one option – delivering a pleasant flavor and optimal viscosity. VerSyra® contains 25 percent less sugar than typical corn or tapioca syrups and can contribute to 20 to 90 percent sugar reduction on a per-serving basis, depending on formulation goals. The reduced-sugar syrup serves as an adhesive, binding all the bits of grains, fruit and nuts together in a way that isn't overly sticky. Chicory root fiber and even polyols can also play a role, helping to replace sugar's bulk.

Still, texture can be a challenge. Snack bars may become harder in texture as sugar is reduced, requiring additional formula modifications. Options include adjusting the fat, adding glycerin, experimenting with different combinations of syrups, using a small amount of honey, or even making changes to processing. Deciding which approach achieves the right texture often hinges on shelf life, water activity and the processing requirements of potential ingredient options.

## Salt check

Sugar is not the only ingredient on consumers' "watch lists;" excessive salt intake has been linked with its share of health concerns, too. While baked goods might not seem like a big source of sodium, according to the U.S. Department of Agriculture's "What We Eat in America" and the Centers for Disease Control and Prevention (CDC), bread and rolls are the largest source of sodium intake in American diets,<sup>3,4</sup> primarily due to how much of this food category is consumed by the population.

For bakers aiming for lower sodium levels, straightforward reduction of a sodium-containing ingredient like salt is often the first step.

"It's pretty basic, but that's where we start," says Janice Johnson, PhD, technical service and applications lead for Cargill's salt group.



We can often reduce sodium levels by as much as 10 percent without impacting taste or texture.



She notes that as part of the initial evaluation, it's important to identify all the sources of sodium in a formulation. Leavening agents, such as baking powder and baking soda, for example, often contain sodium, but there are alternatives. Adding flavors can help attain deeper sodium reductions, but Johnson says given the substantial contributions of salt to baked goods and snacks, there comes a point when salt substitutes like potassium chloride enter the equation.

"With sodium reduction, it's not just taste; you also have to think about how salt functions in the food," she emphasizes. "In baked goods, salt contributes to texture, aiding in gluten development and controlling the rate of yeast fermentation. It also plays a role in food safety and shelf life." Fortunately, these are all functions that salt substitutes such as potassium chloride can do as well, usually replacing sodium chloride in a one-to-one ratio.

Recent improvements in potassium chloride production give bakers and snack makers even more options. At Cargill's new potassium chloride facility, researchers have modified the physical shape of the ingredient to achieve different functionality. "We can granulate potassium chloride much like table salt or adjust it to a smaller particle size for faster dissolution," Johnson explains. "We can even take the cube and flatten it out."

In similar fashion, manipulating the shape of sodium chloride can deliver salt reduction, an approach especially useful in topical applications for salty snacks. For example, Cargill's Alberger® salt boasts a unique, inverted hollow pyramid shape, which allows it to dissolve faster than traditional salt crystals. "That means you get a faster initial salty taste, so less salt is needed to achieve the same taste impact," Johnson explains. "As an added benefit, no changes are required to the ingredient declaration."

## Experience edge

While successful salt and sugar reductions are clearly possible, it takes plenty of testing to land on the right combination of ingredients. That's where Cargill's Food Innovation Center shines, allowing ingredient specialists, application experts and customer product development teams to work side-by-side helping to refine formulas.

"At the Innovation Center, we have state-of-the-art analysis equipment that lets us see what happens to the physical characteristics of a product as we refine formulas and processing techniques," Johnson explains. "Then we can work together to build those characteristics back."

The Cargill in-house sensory lab takes the analysis full circle, helping product developers understand how the formulation changes impact consumers' experiences.

**"Baked goods and snacks are first-and-foremost indulgences," Gilbert emphasizes. "They have to taste great, look right and have the right texture and mouthfeel. At Cargill, we always keep the end consumer top-of-mind, whether we're tackling sugar reduction, cutting sodium levels or addressing some other formulation challenge."**

#### SOURCES

<sup>1</sup> Statista.com. "The Average Per-Capita Consumption of Sugar as of 2016, by Country." <https://www.statista.com/statistics/535219/global-sugar-per-capita-consumption-by-country>

<sup>2</sup> Cargill IngredienTracker consumer research, conducted December 2016.

<sup>3</sup> U.S. Department of Health and Human Services, U.S. Department of Agriculture. "What We Eat in America." NHANES 2013-2014. Agricultural Research Service Website.

<sup>4</sup> Centers for Disease Control and Prevention (CDC). "Top 10 Sources of Sodium." <https://www.cdc.gov/salt/sources.htm>

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