

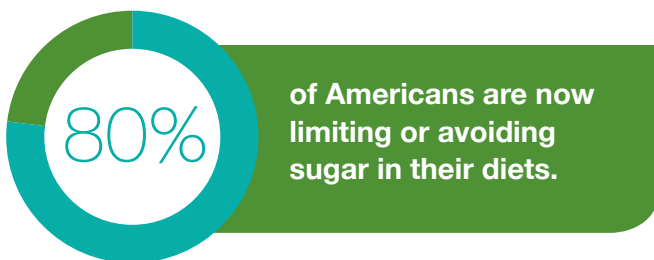


SWEET SOLUTIONS:

Formulating low sugar products for competitive advantage

These days, consumers are just not that sweet on sugar. There is growing realization that sugar consumption in the typical Western diet is well beyond the recommended levels of 10 percent of daily calories, as recommended by the World Health Organization.¹ Coupled with the growing realization that too much sugar and excess calories beyond the diet's energy needs can have potential health consequences, CPG manufacturers are waking up to a groundbreaking shift in consumer attitudes about this very key ingredient in their products.

Add to that the recent FDA-mandated changes to the Nutrition Facts panel, which take effect in January 2020. The new label will feature Added Sugars and a corresponding daily value, as well as realistic portion sizes, which will also impact consumer perceptions. As serving sizes are adjusted, the added sugar content may appear to be two to three times higher than what consumers may expect. These changes are likely to bring sugar-watching to a fever pitch.²



A surprising 80% of Americans are now limiting or avoiding sugar in their diets, according to the 2019 Food and Health Survey from the International Food Information Council Foundation (IFIC). To do so, according to the annual report, they are taking a number of actions, including drinking water instead of caloric beverages (62%), eliminating certain foods and beverages from their diets (49%), and using the Nutrition Facts label to choose foods and beverages with less sugar (32%).³

None of this is particularly good news for product formulators who have long depended on sugar for a variety of functions, from flavor and mouthfeel to product texture. Further complicating the issue is the fact that consumer expectations regarding these attributes have not changed all that much, even though they don't want the added sugar. So companies have the difficult task of

formulating or reformulating products with lower or no sugar, while also maintaining product taste and texture expectations.

It is a narrow line to walk, but there are increasingly great ingredient options – from alternative sweeteners and specialty carbohydrates, to texturizing solutions that can help manufacturers stay on top of these competitive demands in a cost-effective way without compromising taste.

Here is a look at some of the toughest formulation challenges and the ways in which these alternative sugar solutions can do the job:

Frozen fortunes

Whatever they may think about sugar, Americans love their frozen treats. The average American consumes more than 23 pounds of ice cream alone per year,⁴ and overall new product launches in the frozen dessert category grew at a CAGR of 2.4%, according to data from Innova Market Insights. But frozen desserts with low sugar are now increasingly important to the category (for example, Halo Top has now become a household name) and Innova reported that products with a low-sugar or sugar-free claim made up close to 11% of the new product offerings between 2013 and 2017.

But reducing or leaving sugar out of the mix in frozen treats is a big deal. First, sweetness expectations have established sugar as the gold standard, and taking it out of the formula changes how sweetness is interpreted. Furthermore, it impacts texture, ice crystal formation, freezing point depression and how a dessert melts on the tongue.

Frozen desserts are especially complex food systems. They contain solid, liquid and gas, which creates a challenge when it comes to managing ingredients like sugar and fat. The trick is to understand how all these components interact, and then find alternatives that can mimic their functions.

In frozen desserts, stevia-based sweeteners have proven to be both versatile and functional, meeting growing consumer demand for comparable-tasting, reduced-sugar products that have familiar ingredients and are label friendly. Suppliers have learned how to combine the various steviol glycosides (the sweet components in stevia), including the original Rebaudioside (Reb) A with other stevia components, such as Reb M and Reb D, to meet various sugar reduction targets and produce a sugar-like taste.

Sugar alcohols, like erythritol, are often combined with the stevia-based components in these frozen treats to round out the flavor profile and create a great-tasting low-sugar dessert. Being 65 to 70 percent as sweet as sugar, erythritol contributes sweetness and bulk solids. Erythritol is low in molecular weight, hence has greater influence in depressing freezing point, which is an essential functionality for frozen desserts.

Chicory root fiber ingredients are also finding a role to play in frozen desserts. These ingredients can offer different degrees of solubility, sweetness, fiber content and polymerization, as well as some useful fat mimetics.

Revamping snack bars

Sugar content in the ever-popular snack bar category is also attracting attention, as savvy consumers look at the new Nutrition Facts panel for more detailed information about sugars and added sugars in these products. Sugar and other conventional sweeteners have played an important role in these bars, whether they are nutrition bars, fruit bars, granola bars or energy boost bars. Sugar and conventional sweeteners provide the texture and flavor that consumers have come to expect, while syrups



serve as a binding agent holding the fruit, nuts and crispy parts together while also helping to keep bars moist over their shelf life.

Taking out the sugar means both sweetness and functionality must be replaced. Once again, high-intensity sweeteners like stevia can provide the sweet taste, but, in this case, will need some help to rebuild sugar's full functionality. Manufacturers are turning to bulking agents such as chicory root fiber, polyols like erythritol, and even next-generation corn syrups that are lower in sugar with a clean flavor and optimal viscosity.

However, these changes can also affect a bar's all-important texture. So formulators may need to experiment and manipulate ingredients in order to keep the texture soft, for example. Different combinations of syrup, a small amount of honey, or even keeping some sugar in the formula may help. Finding a strategy that works may take some trial-and-error and will also depend on desired shelf life, processing requirements and water activity.

Beverage busters

Sugar-based beverages have been on the front lines of the low-sugar revolution more than any other product. And this is where product formulators have faced some of the greatest challenges, as well as made some of the most important strides. Taking sugar out of a beverage impacts its mouthfeel, flavor and sweetness – which is pretty much everything for a beverage.

Product manufacturers in the beverage segment have had to be at the cutting edge of sweetener alternatives and definitely pioneered the use of stevia leaf extract. It has been an evolving story, but new innovations with stevia sweeteners (including insights on different combinations of steviol glycosides) have taken low-sugar beverages to a new level. Next-generation stevia sweeteners like Cargill's proprietary ViaTech® portfolio can now take beverages to a 50% sugar reduction target in a tea, which consumers could not distinguish from the full-sugar version. These products also make it possible to formulate chocolate milk products with no added sugar to meet the demands of both moms and kids.

The newest iteration of stevia sweeteners, EverSweet™, made with the sweetest steviol glycosides Reb M and Reb D, can now achieve up to 100% sugar reduction in a variety of beverage applications. Cargill creates these components using the age-old technique of fermentation and a specially crafted yeast. Because Reb M and Reb D are only found in 1% of the stevia leaf, it would take huge quantities to generate enough from the plant alone. Instead, the specially crafted yeast and simple sugars are transformed through fermentation into steviol glycosides that are identical to those found in the plant.



Keeping options open

Beyond finding the right systems that match both taste and functional attributes for your product, it is also important to understand your consumers' demands. What are the lines that cannot be crossed? Does a product have to be label-friendly or gluten-free? Will they accept some sugar or corn syrup? Is non-GMO* important? The best approach is to work with a supplier that has a broad portfolio of sugar-reduction ingredients, with strong insights into their functionality and versatility. Such expertise will help to meet these goals while maintaining quality, functionality and cost-competitiveness.

Sources:

¹ World Health Organization. "WHO Calls on Countries to Reduce Sugars Intake for Adults and Children." March 4, 2015. <https://www.who.int/mediacentre/news/releases/2015/sugar-guideline/en/>

² U.S. Food and Drug Administration. New and Improved Nutrition Facts Label – Key Changes. FDA.gov. <https://www.fda.gov/downloads/food/labelingnutrition/ucm511646.pdf>

³ International Food Information Council Foundation. 2019 Food and Health Survey. <https://www.foodinsight.org/2019-food-and-health-survey>

⁴ International Dairy Foods Association. "Ice Cream Sales and Trends." <https://www.idfa.org/news-views/media-kits/ice-cream/ice-cream-sales-trends>

* There is no single definition of "non-GMO" in the USA. Contact Cargill for source and processing information.

Claims: The labeling, substantiation and decision making of all claims for your products is your responsibility. We recommend you consult regulatory and legal advisors familiar with all applicable laws, rules and regulations prior to making labeling and claims decisions.