BioNeutra®

IMO: A SUGAR SUBSTITUTE THAT GIVES CONSUMERS THE EXPERIENCE THEY MISS

Nearly half (46%) of consumers worldwide are avoiding high sugar products, according to a 2019 report, and 70% are interested in applications that contribute to healthy blood sugar levels. Both locally and nationally, governments around the world are placing taxes on sugary products both as public health policy and as sources of revenue.

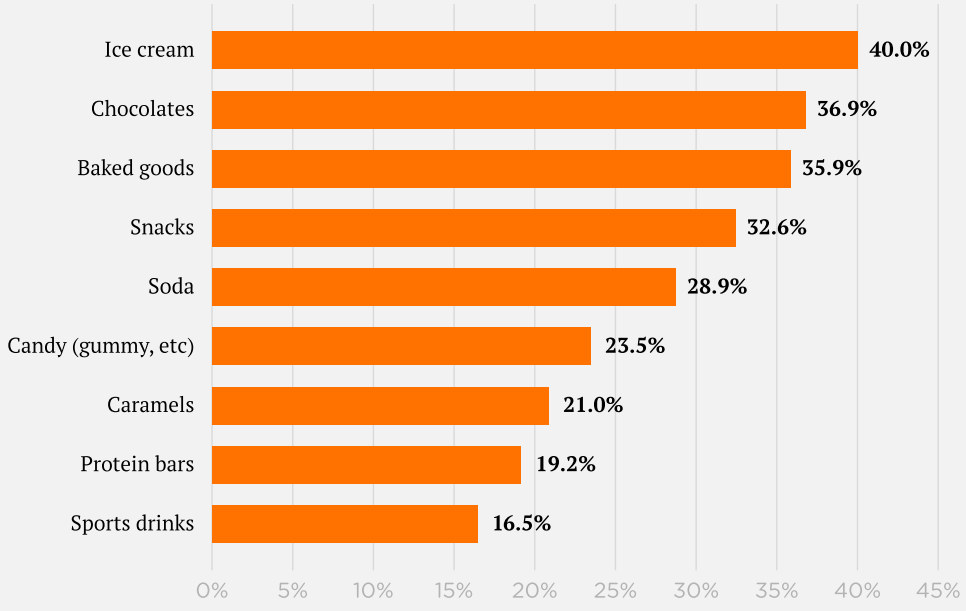
Given these trends, **brands that innovate reduced-sugar, low-calorie applications today** will be well-positioned for the market landscape of tomorrow.

Preference for lower-calorie applications is now widespread, according to a new consumer survey from BioNeutra North America, a leading producer of food ingredients with a focus on oligosaccharides. In September 2020, BioNeutra surveyed 529 US consumers about their attitudes and experiences with reduced-calorie foods and beverages. **Nearly half (49.2%) agreed that they prefer to buy low-calorie or no-calorie products.** Over half agreed that low-calorie sweeteners are effective in replacing sugar in food (51.0%) and beverages (57.3%).

And when it comes to specific applications, many of the consumers surveyed said they would **eat more ice cream (40.0%), chocolates (36.9%), baked goods (35.9%), and candy (23.5%)** if there were lower-calorie versions that had a similar taste and texture. To meet demand for calorie reduction, the right alternative sweetener creates new possibilities, such as creamy butter Georgia pecan ice cream sandwiches, sticky toffee pudding cupcakes with buttercream frosting and toffee drizzle, Meyer lemon bars with decadent lemon custard and buttery shortbread crust, and delightfully chewy strawberry sherbet gummy rings. These are just a few examples of how normally high-sugar applications can be transformed into lower-calorie versions with consumers' favorite flavors.

Low-Calorie Application Demand

"Which of the following would you eat more of if there were lower calorie versions that had a similar taste and texture?"



General consumers, n=515

Because low-calorie, high-intensity sweeteners often lack a sugar-like flavor and texture, many low-sugar applications do not deliver on consumers' desired sensory experience.

Additionally, the sugar alternatives that require flavor masking and bulking agents to counteract a lingering aftertaste or lack of mouthfeel do not often align with consumers' desire for natural and plant-based ingredients.

Isomaltooligosaccharide (IMO) is a mixture of short-chain carbohydrates with naturally digestion-resistant properties and a sensory profile similar to sugar.

This versatile alternative sweetener offers natural possibilities for reducing sugar in confectionery, frozen desserts, snacks, beverages, baked goods, condiments, and many other applications.

Consumers Are Dissatisfied with the Sensory Experience of Sugar Substitutes

While consumers seek health benefits from low-calorie sweeteners, they are dissatisfied with the taste and texture of them.

Among consumers who buy reduced-calorie sweeteners, over half agree that **low-calorie sweeteners, in general, do not have a texture like sugar (53.9%)** and nearly half agree that they **do not taste like sugar (47.2%).**

A significant proportion of these consumers also indicated that low-calorie sweeteners, in general, have an **unnatural flavor (43.3%), an unpleasant aftertaste (41.8%), or do not have the right level of sweetness (39.4%).** The data also suggests that general consumers have concerns about the taste and texture of low-calorie versions of specific applications, such as ice cream and candy.

If considering an ice cream made with low-calorie sweeteners, over half of surveyed consumers said they would be concerned it would have an unpleasant aftertaste (60.5%), would not have the right level of sweetness (57.7%), or would not have the right texture (51.8%). Similarly, if considering a candy made with low-calorie sweeteners, general consumers said they would be concerned it would have an unpleasant aftertaste (59.3%), would not have the right level of sweetness (55.5%), or would not have the right texture (44.1%). Since consumers want reduced-sugar options but have reservations about taste and texture in low-calorie sweeteners, formulators can look to sweeteners with bulk, flavor, and viscosity similar to sugar.

VitaFiber® IMO provides **mild sweetness with no bitter aftertaste** and **creates sugar-like textures.**

Furthermore, VitaFiber IMO can be used as a 1-to-1 sugar replacement in chocolate formulations. This makes it useful for chocolate coating and panning of bars, balls, and other snacks and confections. Its viscosity and clean taste also reduce the need for bulking agents and flavor masking when replacing sugar in candies, ice cream, soft drinks, and other applications with upfront sweetness.

Opportunities in Prebiotics and Fiber

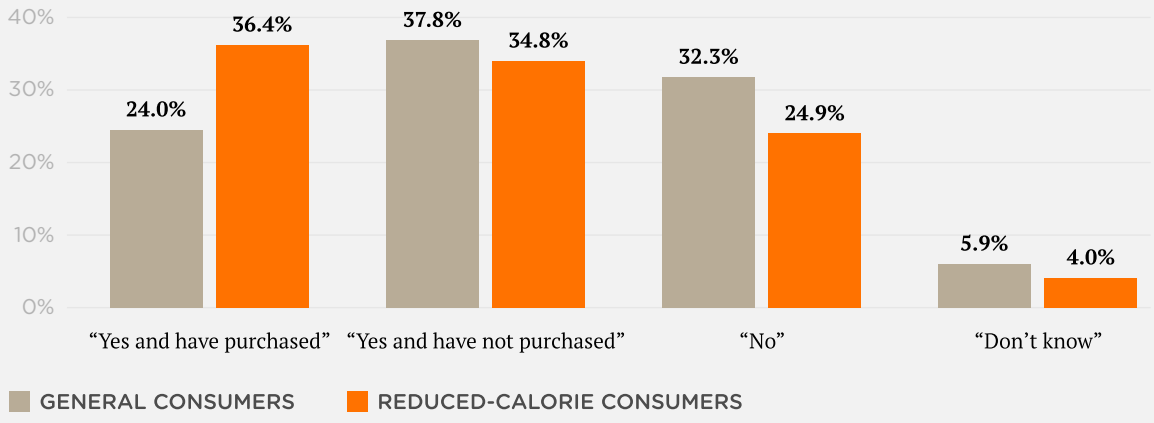
A large percentage of general consumers (38.8%) expressed interest in trying a low-calorie sweetener that adds prebiotics to food and beverages. In addition to replacing the taste and texture of sugar, **VitaFiber IMO is a source of prebiotics and creates opportunities for brands to increase the health appeal** of applications like fruit-flavored gummy supplements and mocha-flavored protein shakes for meal replacement and **sports nutrition**.

Increasing fiber content is another way to give applications more health appeal. **Over half (52.1%) of surveyed consumers said they would be interested in trying a low-calorie sweetener that adds dietary fiber to food and beverages.** Additionally, more than half said they try to buy high fiber products when possible (55.3%) or that they have tried to include more fiber in their diet in the past six months (52.7%). However, 30.1% said that they do not currently get enough fiber daily.

Interest in prebiotics and fiber is even more pronounced with **consumers who purchase reduced-calorie sweeteners.**

They are more likely than the average consumer to report having heard of (71.2%) or purchased (36.4%) prebiotics. Consumers of reduced-calorie sweeteners are also much more likely than the average consumer to have expressed interest in trying a low-calorie sweetener that adds prebiotics to food and beverages (56.1%). Moreover, a strong majority of consumers of reduced-calorie sweeteners report trying to get more dietary fiber in the past six months (66.8%) and, when possible, trying to buy high fiber products (64.1%).

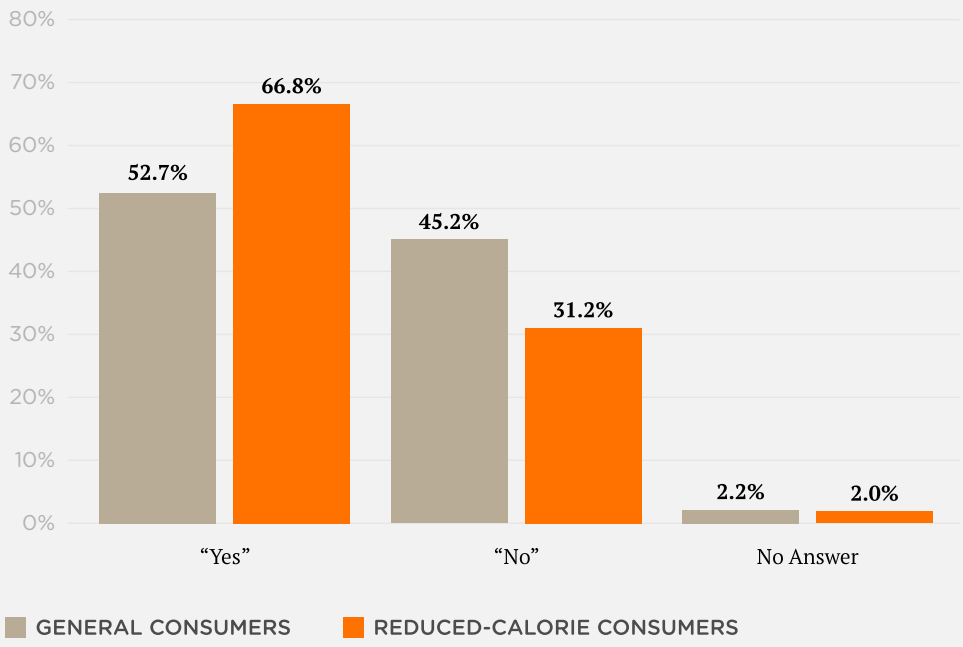
Awareness of Prebiotics "Have you heard of prebiotics?"



General consumers, n=505 *Reduced-calorie consumers, n=253*

Fiber Consumption

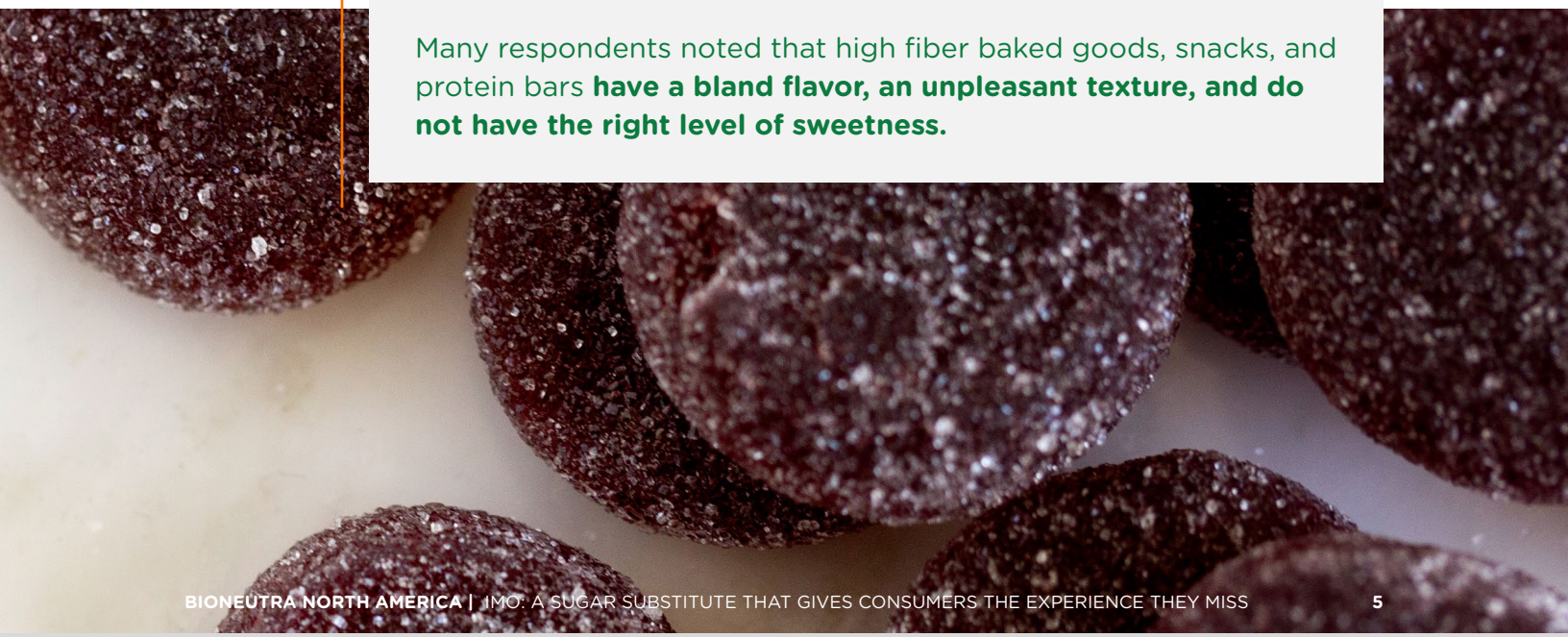
"In the past six months, have you tried to include more fiber in your diet?"



General consumers, n=505 *Reduced-calorie consumers, n=253*

Although interest in fiber is strong, a **notable number of general consumers have concerns about taste and texture** in particular applications with fiber.

Many respondents noted that high fiber baked goods, snacks, and protein bars **have a bland flavor, an unpleasant texture, and do not have the right level of sweetness.**



Consumer Concerns About High Fiber Applications

	Baked Goods		Snacks		Protein Bars	
In general, high fiber...	General Consumer	Reduced-Calorie Sweetener Consumers	General Consumer	Reduced-Calorie Sweetener Consumers	General Consumer	Reduced-Calorie Sweetener Consumers
Has a bland flavor	35.5%	45.2%	33.9%	39.7%	35.4%	41.3%
Has an unpleasant texture	29.8%	35.3%	31.2%	35.3%	33.0%	38.9%
Does not have the right level of sweetness	37.1%	42.5%	33.9%	38.1%	32.6%	36.9%

VitaFiber PLUS is a blend of IMO and Resistant Dextrin to provide both an alternative sweetener and FDA-approved dietary fiber. VitaFiber PLUS excels as a lower-calorie bulk sweetener and can be used in place of sugar as a binder and filler in many applications, including protein bars, snacks, and baked goods. It can give dark chocolate chunk granola fibers a pleasingly soft, chewy texture while reducing calories and increasing fiber content for the perfect on-the-go snack.

VitaFiber: A Sugar Substitute with the Sensory Experience Consumers Want

These survey results point to the need for sugar replacement ingredients that offer taste and texture similar to sugar, but with fewer calories. IMO-based sugar substitutes give formulators options that have sensory characteristics similar to sugar.

Furthermore, the results suggest that alternative sweetener consumers are more likely than average to be interested in fiber and prebiotics but have concerns about sensory experience in high fiber applications. VitaFiber PLUS is both an alternative sweetener and FDA-approved dietary fiber and has flavor and functionality similar to sugar, making it an excellent substitute without compromising taste and texture.

From BioNeutra North America Inc., **VitaFiber IMO and VitaFiber PLUS are natural, plant-based sweeteners that are low in calories.**

VitaFiber® VitaFiber® PLUS

As an added benefit, VitaFiber sweeteners are easier to digest than many other sugar substitutes and minimize gas and bloating. With proven success in confectionery, frozen dairy, beverages, and more, the functionality of VitaFiber IMO and VitaFiber PLUS makes it simple for formulators to replace sugar in existing recipes. VitaFiber sweeteners have high viscosity and excellent pH and heat tolerance, making them easy to use in chocolate confections, coatings, and dessert applications. Both sweeteners mitigate off-flavors from high intensity sweeteners, are 100% water soluble, and are effective as binders, humectants, and bulking agents.

VitaFiber IMO and VitaFiber PLUS are also ideal for gummy applications, such as nutritional supplements. According to the survey, a large majority of general consumers said that, if considering a gummy nutritional supplement, it would matter that it tastes good (73.5%). VitaFiber sweeteners can be used as a mildly sweet filler in gummies with no bitter aftertaste and reduced sugar.

BioNeutra is an industry leader in the research, development, production, and commercialization of food ingredients, with a focus on oligosaccharides. **Visit our website** or **contact us** to find out more about the versatility of IMO and how VitaFiber sweeteners can help you deliver the sensory experience and health benefits that consumers seek in reduced-calorie foods and beverages.

Facts about VitaFiber Sweeteners

	VitaFiber IMO	VitaFiber PLUS
Digestive tolerance	30 g/day	80 g/day
Viscosity	3000-7000 cps @ 20°C	3,000-7,000 cps @ 20°C
pH Tolerance	pH 2.0-9.0	pH 3.5-6
Heat tolerance	160°C	160°C
100% soluble in water	Yes	Yes
US FDA GRAS-Approved	Yes	Yes
Plant-based	Yes	Yes
Vegan	Yes	Yes
Gluten-free	Yes	Yes
Standard formats	Syrup, powder	Syrup, powder (coming in Nov. 2020)
Organic formats	Syrup, powder	Syrup (coming 2021)