



Unlocking optimal stevia sweetness

Cargill uses fermentation to create zero-calorie sweetener

Sugar, with its clean, sweet taste, is the undeniable gold standard of sweetness, but its calorie-laden status has many consumers searching for alternatives. It's a quest that has proven difficult, as those same consumers refuse to compromise on taste. Fortunately, a new sweetener from Cargill is poised to bridge the divide, delivering a sugar-like taste in a zero-calorie package.

Nearly a decade in the making, Cargill's EverSweet™ sweetener represents a significant step forward in sugar reduction. To develop the sweetener, the company's food scientists invested more than 150,000 hours studying the stevia leaf. Cargill scientists have mapped many steviol glycosides' unique flavor profiles and studied how different glycosides interact to deliver taste and sweetness. In particular, they honed in on two glycosides — Reb M and Reb D. While these two molecules are only found in trace amounts in the stevia leaf, they offer a heightened sweetness and a taste similar to real sugar.

"These minor glycosides offer a real improvement in sweetness quality, but they are present in such small quantities — less than one percent of the leaf," explains Andy Ohmes, global director of high-intensity sweeteners at Cargill. "The land and water resources required to produce commercially viable quantities of Reb M and Reb D from stevia leaves were staggering. To get at them in a sustainable, affordable way, we wanted to find another approach."

Fermentation Innovation

The age-old process of fermentation, long used to make beer and cheese, provided an ideal method to address these concerns. Cargill scientists partnered with Evolva to develop a specially crafted baker's yeast that, through fermentation, produces the exact same great-tasting Reb M and Reb D glycosides present in tiny amounts in the stevia leaf.

"Fermentation allows us to produce commercially-scalable volumes of these rare glycosides," Ohmes explains. "We get the same great taste, but at a commercially viable scale for our customers and in a method that uses significantly less land and water resources than if the Reb M and Reb D glycosides were extracted from the stevia leaf."

Unlike stevia leaf extracts or stevia sweeteners containing mainly Reb A or stevioside, EverSweet™ provides sweetness without bitterness or a licorice aftertaste, creating a more rounded taste profile with a faster onset of sweetness. It is ideal for manufacturers looking for deep calorie reductions, even enabling up to 100 percent sugar replacement in some applications.

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Formulation Expertise

Cargill's Wade Schmelzer, principal food scientist, is quick to acknowledge there's more to sugar than sweet taste. Depending on the application, sugar plays a critical role in mouthfeel and texture, moisture and microbial control, appearance, freezing-point depression and so much more. Because sugar does so much, it makes sugar reduction all the more complicated. Fortunately, Cargill's expertise extends beyond the stevia plant, with a portfolio that includes traditional corn sweeteners, bulking agents, texturizers and more.

"When we work with our customers, we bring all that expertise to bear," Schmelzer emphasizes. "We are ready to partner with our customers to help them formulate with EverSweet™ sweetener and develop innovative, great-tasting, reduced-sugar products."

That deep knowledge base translates into speed to market. By collaborating with Cargill's ingredient specialists, customers can create new flavors and products in a matter of days, instead of the months it could take to replicate the work alone. Often, companies can build on prototype work Cargill has already completed. For example, Cargill recently developed a zero-calorie cola.

"Using EverSweet™ sweetener, we were able to completely eliminate sugar from the cola formulation, yet still meet consumer taste expectations," explains Schmelzer. "Then we tapped into Cargill's texturizing expertise, to replace the bulking properties of sugar and build back mouthfeel."

Timely Introduction

The end result, a great-tasting, sugar-free cola, demonstrates the promise of EverSweet™ sweetener, and the timing couldn't be better. The pressure to reduce sugars is coming from many sides – from consumers, seeking to adopt healthier lifestyles; from healthcare providers, concerned about links between excessive sugar consumption and obesity; and from regulatory mandates, designed to bring more attention to sugar content levels. Against those market realities, EverSweet™ sweetener offers product developers a new pathway.

"We know consumers want to reduce calorie consumption, but they refuse to compromise on taste," Ohmes said. "With EverSweet™ sweetener, product developers can achieve those seemingly opposing ideas, making dramatic sugar reductions possible while still maintaining a high-quality sweetener profile."