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BEVERAGE R&D: SWEETENERS

THE SWEET STUFF

Today's beverage formulators have myriad sweetener options for low- and no-calorie beverages.

BY HEATHER LANDI

With consumers increasingly concerned about their health and their waists, every segment of the beverage market is looking to introduce zero-calorie or low-calorie products. This is good news for the alternative sweetener market. In fact, global demand for alternative sweeteners is expected to grow 8.3 percent year on year until 2008, according to market analysis firm Freedonia. And Mintel's global new products database reports that 3,920 new products containing sweeteners launched between 2000 and 2005.

In the US, there are five artificial sugar substitutes currently approved by the Food and Drug Administration for use in food and beverages: acesulfame-K, aspartame, neotame, saccharin and sucralose. However, outside the US, there are other sweetener options, including alitame and cyclamate, both of which are pending approval by the FDA (cyclamate was banned by the FDA in 1969, but is used in more than 50 other countries). And, in both the US and international markets the alternative sweetener market is

growing to include sugar alcohols and natural sweeteners.

High-intensity sweeteners are the most commonly used sugar alternatives when formulating zero- or low-calorie beverages. Formulators often have to find the right sweetener to use in a beverage application, as each one has its own sweetness intensity, taste and formulation potential. Recently, the trend of blending together several high-intensity sweeteners has opened up endless possibilities for sweetener solutions. Blends, such as Ace-K and sucralose, offer formulators the opportunity to take advantage of synergies between sweeteners and create a more sugar-like taste while reducing bitter off-notes.

"Blending is going to continue to be key for tuning sweetness systems to a particular beverage application because the onset of sweetness and the length or tail of sweetness is different with each sweetener and by blending you tend to round that off," explains Ron Perko, director of sales for Cargill Sweetness Solutions (Minneapolis, MN, USA).

Often, high-intensity sweeteners can be blended with nutritive sweeteners to create reduced-calorie products with the right functionality and taste profile.

"If you wanted to make a product that's more friendly for people who are trying to control blood sugar, perhaps a mid-calorie product, you could create a sweetener system using a nutritive sweetener with a sugar alcohol like ery-



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thritol," Perko says. "I think that's an area we're going to see more of in the future. A growing number of consumers also are concerned about the possible health risks of artificial sweeteners and actively are seeking out natural ingredients. Cargill offers beverage formulators the option of erythritol, a natural non-caloric polyol bulk sweetener. According to Perko, erythritol is naturally present in grapes, plums and watermelons and in fermented products like wines and soy sauces. Seventy percent as sweet as sugar, erythritol does not contribute to an increase in blood sugar levels when consumed.

"It's often used in beverages with other sweeteners, typically to improve the sweetness profile of intense sweeteners whether it's a synthetic or natural intense sweetener," he says. "Erythritol is not designed for use as the sole sweetener in a beverage, but it's very functional in helping to cover up some of the aftertaste of natural sweeteners that are available today without contributing any calories."

Perko believes natural sweeteners will become a major trend in the beverage industry as interest in natural and organic products grows. "Everybody in the beverage industry is interested in the search for the ideal natural sweetener combination that tastes like sugar and has no calories," he notes.

Some of the fastest-growing tabletop sweeteners are those that are natural or perceived to be natural, including Splenda-brand sucralose and stevia, Perko points out. However, many of these sweeteners don't have full regulatory approval for mainstream beverage usage, which makes it difficult to formulate an all-naturally sweetened, non-caloric beverage, he notes. For instance, Stevia has been approved by the FDA as a dietary supplement, but not as a sweetener.

To satisfy the demand for natural products, DöhlerGroup has introduced Multisweet fruit, a sweetener option derived from the natural sweetness of grape, pear or apple juice, which can be used on products labeled "contains no crystal sugar" or "contains no sweeteners." The sweetener concept goes hand-in-hand with the company's Multisweet Plus concept which enhances sweetness to mimic the taste profile of sugar-sweetened beverages with a significant reduction in calories.

Taking advantage of both the "natural" sweetener trend and the blending trend, Health Sciences Group, Inc. offers Shugr, a natural, zero-calorie sweetener made by combining erythritol, tagatose, maltodextrin and a trace amount of sucralose. Shugr has the same sweetness level of cane sugar per serving, but it's also available as Shugr 5X (five times the sweetness of sugar) and Shugr 10X (ten times as sweet).

SWEET PERKS

There are sweeteners and sugar replacers available that provide additional benefits beyond sweetness and these ingredients can add a functional edge to beverage products.

Cargill offers Xtend sucromalt, an all-natural sweetener derived from sucrose and maltose. According to Perko, Xtend sucromalt is 60 to 70 percent as sweet as sugar and

delivers the full energy of sugar but is digested more slowly.

"Slowly digested sweeteners provide sustained energy, so you don't get the blood glucose spike that you would get with a fully nutritive sweetener. It also provides appetite suppression for a longer period of time," he notes.

Although energy drinks typically have been marketed to younger consumers, consumer groups across all demographics and age ranges increasingly are looking for healthy sources of energy in their beverages. To fulfill this need, beverage marketers will begin to seek out sweeteners that provide longer-lasting energy, Perko asserts.

Palatinose is a sweet carbohydrate derived from beet sugar that's very low glycemic and provides energy over a prolonged period of time. Produced by Mannheim, Germany-based Palatinit, Palatinose is suitable for sport, functional and wellness beverages and provides the same caloric value as sugars like sucrose or glucose, according to the company.

Capitalizing on the increasing interest in the glycemic index (GI) and its effect on blood sugar levels, many sweetener manufacturers are promoting their ingredients' health benefits, such as claiming added fiber or a low GI response. For instance, tagatose is a low-calorie and low-glycemic sweetener occurring naturally in dairy products that also acts as a prebiotic by promoting the production of lactic acid bacteria, or "good" bacteria. According to SweetGredients KG, the producers of Gaio Tagatose, the sweetener has synergistic effects with other sweeteners and can be used with low-calorie sweeteners to improve texture and mouthfeel. SweetGredients KG is a joint venture between Nordzucker AG and Arla Food Ingredients.

Formulators also can use functional ingredients that work synergistically with sweeteners for added health benefits.

Danisco Sweeteners (Ardsley, NY, USA) markets Litesse polydextrose, a sugar-free ingredient for use in beverages that adds prebiotic fiber. Litesse can be used in noncarbonated juice and water drinks and ready-to-drink nutritional drinks, says Donna Brooks, product manager for Danisco.

"Litesse can be used successfully in combination with all types of high-intensity sweeteners/non-nutritive sweeteners and can even help to enhance sweetness in some cases with other HIS, although Litesse does not provide sweetness on its own," she says. With a neutral taste, Litesse does not provide off-tastes or colors.

Orafti's Beneo oligofructose ingredient can eliminate the aftertaste of high-intensity sweeteners and enhance certain fruit flavors, the company says. In studies, Orafti's Beneo Synergyl ingredient, which is a unique composition of oligofructose and inulin, also can enhance calcium absorption and bone health, the company says. **BW**

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