



## BEHIND THE MASK:

# Managing off-flavors in foods & beverages

Some of the hottest products in the market today cater to consumer desires for food and beverages that support healthier lifestyles. But while fortified, functional, plant-based and reduced-sugar options are trending, the ingredients central to these in-demand formulations sometimes come with undesirable effects.

“Functional ingredients like vitamins, minerals and antioxidants may deliver physical benefits; adaptogens like caffeine, L-theanine or botanicals like chamomile and ashwagandha may address mental well-being, but for a flavorist, they also create plenty of headaches,” explains Smaro Kokkinidou, Principal Food Scientist for Cargill. “Bitterness, astringency, metallic notes, chalkiness and earthy undertones are just a few of the unwanted elements that may need to be addressed.”

## Flavor masking 101

To compensate, brands often turn to a class of ingredients known as flavor maskers. Some use substances that influence how flavors are perceived and recognized in the brain. Others change how ingredients interact with odor or taste receptors.

“Ingredients with a psychological mode of action don’t remove sensory signals or change how undesirable compounds interact with taste or odor receptors,” Kokkinidou explains. “Instead, they provide an additional sensory attribute that covers the off-flavor signal.”

To achieve the best effect, this sensory input needs to be perceived by the brain at a similar time as the negative attribute. For example, sweeteners are often used to mask bitterness. This requires finding a sweetener with a temporal profile similar to the bitterant.

“The sweetener doesn’t change how the bitterant interacts with taste receptors, but by adding a sweet sensory input that is expressed at the same time, we influence the brain’s overall perception of the product,” Kokkinidou explains.

Physical maskers or blockers are another approach to flavor masking, interfering with how the troublesome ingredient interacts with taste receptors. Blockers either change how fast the compound is extracted from the food

matrix, or they bind with taste receptors to alter how the compound interacts with the receptor. In both cases, the aim is to help reduce the impact of a negative flavor. Still, for all their benefits, flavor maskers can bring their own set of challenges.

“Introducing a flavor modifier with masking properties often impacts a multitude of sensory properties,” Kokkinidou acknowledges. “While they may mute off-notes, flavor maskers also dull the system’s characterizing flavors and may even introduce additional notes that are incongruent with the desired flavor profile of the finished product.”

The key, she says, is finding masking solutions that provide a neutral profile and work in harmony with – or even enhance – the finished product’s planned flavor profile. Enter Cargill’s newest sweetening system: EverSweet® stevia sweetener + ClearFlo™ natural flavor.



## Revealing sweetness

“We set out to create a better zero-calorie sweetener – but in the end, we developed a solution that goes beyond sweetness to address a much broader range of flavor considerations,” Kokkinidou explains. “The resulting system is unlike anything on the market, with far-reaching benefits that extend well beyond what we imagined was possible.”

Cargill’s best-tasting stevia, EverSweet,<sup>®</sup> serves as the foundation. Then ClearFlo,<sup>™</sup> a natural flavor, is added to address sweetness, flavor and taste modification, as well as functionality considerations, such as solubility and dissolution. As a sweetener, it delivers a more sugar-like experience – especially at higher concentrations – with a sweetness profile that is even closer to sucrose.

That accomplishment alone would be cause for celebration, but EverSweet + ClearFlo goes a step further. Its unique mode of action helps manage off-flavors from other ingredients used in formulation, including earthy and beany notes from plant-based proteins, bitterness from caffeine or vitamins, or metallic tastes from potassium chloride or other minerals. At the same time, it enhances many characterizing flavor profiles, including light, fruity notes and rich, chocolatey tones.

“Typically, when we use flavor modifiers to manage off-notes, we’re also forced to bump up expensive characterizing flavor loads because everything gets muted,” Kokkinidou points out.

“EverSweet + ClearFlo has the opposite effect, resulting in a better-tasting finished product and potential cost savings.”

The advanced sweetener system brings one additional sensory benefit: enhanced mouthfeel perceptions, especially in no-sugar-added formulations. For example, when used in a non-fat yogurt, EverSweet + ClearFlo delivers noticeable improvements in mouthfeel, resulting in an indulgent, creamy product that’s a far cry from most non-fat options on the market today.

**“For reduced-sugar systems with complex flavor challenges, EverSweet + ClearFlo addresses many of the biggest hurdles,” Kokkinidou emphasizes. “From a sweetener perspective, it delivers the right sweetness profile, with up-front sweetness and reduced linger. But on top of those benefits, it also offers significant flavor-modifying benefits, delivering a total package that lets all kinds of reduced- and no-sugar-added products shine.”**

Learn how to maximize both flavor and function with Cargill.

