

THE SECRET IS OUT:

Dairy Flavors Improve Mouthfeel & Provide Masking



The Better for You (BFY) category is expected to grow by 24.6% to over US\$199.8 billion by 2015 (Source: 2011 Euromonitor Statistics). Various federal and state legislative initiatives require product developers to have tools on hand to meet this acceleration in demand for new, healthier product reformulations.

This trend impacts both processed food for retail outlets and prepared food served at restaurants and dining institutions. New FDA regulations will require restaurants with more than 20 locations to list calorie content information for standard items on their menus and drive-through order boards. And, healthier menu options provide alternatives for those times when consumers choose to “behave” when dining out.

Whether in a restaurant or at home, eating still revolves around a sensory experience. While improved nutrition might be the hook that draws a consumer in, it's taste and flavor that drives all-important repeat purchases. Dairy flavor systems provide tools which formulators can use to develop healthier foods that consumers find pleasing. “Using dairy flavors helps product developers take the guilt out of guilty pleasures while maintaining the rich, creamy profiles that entice us to indulge in the first place,” explains Edlong’s Corporate Chef Anne Druschitz.

Dairy flavors provide two key functional properties necessary when developing appealing healthy foods—masking and mouthfeel. “Very few ingredients can supply masking, mouthfeel and great taste all in one delivery system, which is why dairy

flavors make so much sense for healthy foods,” says Rick Schultz, Vice President of Strategic Product Development. “As formulators, we can offer ways to make food in either retail or restaurant settings meet these healthy food guidelines and still be flavorful and enticing.”

Peeking Behind the Mask

For years food formulators have added nutrients and vitamins to foods, ‘fortifying’ them to make them more nutrient-dense and thus healthier. And for just as long, companies have struggled with the off-flavors that accompany many vitamins and nutritive ingredients.

Dairy flavors help mask the off-taste of ingredients containing those desirable nutrients. Whole wheat bread, for example, contains more protein and fiber than bread made with white flour but is more bitter. A traditional solution to this problem is to add sugar to the whole wheat bread. However, with the growing concern of sugar intake, formulators seek new solutions that solve the bitterness issue without modifying the nutritional content. In this scenario, milk or butter flavors with sweet profiles effectively mask bitter off-notes from the whole wheat flour and can also enhance the sweet notes of other ingredients, enabling the formulator to reduce the amount of sugar or sweetener. The end product is whole grain bread with reduced sugar and reduced calories.

Often, trends popular on the west coast spread across the US. Stevia is one such ingredient trend. “It’s a plant-based, natural ingredient so it’s a great option for market segments that want clean labels,” says Lori Macpherson, Senior Food Scientist

at Edlong Dairy Flavors. “Stevia is sweet on the front but ends with a bitter taste, which is very apparent in foods. Edlong has flavors that help mask that bitterness and create a more balanced profile.”

The application of Stevia is broad, from beverages and snacks to baked goods and confectionery. For example, cereals targeting the children’s market are usually highly fortified to ensure a complete complement of vitamins and minerals. The push in the last few years has been to reduce the amount of sugar in those cereals or to replace the high-fructose corn syrup in formulations with another type of sweetener. Dairy flavors mask the fortification and help compensate for reduced sugar levels.

After-school snacks or lunchbox treats, such as cereal bars or individual pudding packs, can also be vehicles for fortification. According to Macpherson, their team fortified a pudding with 20% of children’s RDA for vitamins and minerals

and was able to mask that high level using a few selected dairy flavors for greatly improved taste. In this application, a natural cream flavor with vanilla notes covered the metallic aftertaste of the minerals and added to the perception of sweetness.

Protein: Yin and Yang

This single nutrient, protein, carries the banner simultaneously of hero and flavor challenge. Protein-fortified foods are well recognized for satiety and improved health yet contribute distinct off-notes. “Protein is a flavor challenge

whether it comes in the form of a whole wheat bread or Greek yogurt,” says Macpherson.

While the concept of flavor layering is new as a potential strategy for masking proteins, the concept of flavor layering dates back as far as the first chef, looking to add complexity, depth and richness to a dish. Modern science enables flavorists to drill down to the molecular level, as different flavors hit the taste buds first and flash off, linger, or mix with or mask other flavors. One flavor might simply not do the job, but two or three in the right combination will perform different roles at different points between the nose detecting the aroma, the first bite, the chew and the lingering aftertaste.

That flavor layering or building is important because “there is no single drop-in solution,” says Karen Grenus PhD., Senior Food Scientist at Edlong Dairy Flavors. “Masking solutions are based on the specific application parameters for each individual food. While certain flavors act as a great starting point, we often work with flavor combinations, such as pairing a cream flavor with milk flavor.”

Being high in protein, Greek yogurt, a product category that has had a meteoric rise in sales, presents the challenge of creating favorable dairy flavor profiles while

masking added milk protein. Greek-style yogurts are strained up to three times to remove whey and water, creating a product with thicker texture and higher protein levels, whereas in traditional yogurts heat-treated milk protein is added to fortify it. Edlong works with a combination of flavors for both masking and mouthfeel to achieve optimum taste and performance in Greek yogurts. “One recent flavor solution, says Macpherson, “started with a natural caramel flavor and developed from there.”

To Bean or Not to Bean

Soy and other non-dairy based foods and beverages present a unique challenge to mimic the fresh dairy flavor customers anticipate. Without masking, these non-dairy milks, cheeses, ice creams, coffee creamers and yogurts all present a beany aftertaste at the end, not the real dairy equivalents. Fortunately, dairy flavors can offer not just authentic dairy profiles but a dairy-free formulation as well. Renata Rojek, Food Scientist at Edlong Dairy Flavors, was given the challenge of masking the off-notes of soy in a high protein nutrition bar. Using kosher pareve dairy flavors, the soy bar had a more rounded profile without any beany spikes. In comparison, the unflavored soy bar had strong beany notes and was not preferred by sensory tasters.

“When the key ingredient, in this case dairy, is missing because it is being replaced by something else (e.g., a more cost effective commodity or a non-dairy ingredient), dairy-type flavors can go a long way towards making a product taste more like the real thing and increasing consumer acceptance,” says Macpherson. Dairy-free cheese, milk, cream and butter flavors are available, making them ideal ingredients for formulating these products.

Safe but Sour

For cost and convenience, sauces and dressings are developed to be shelf stable, which requires adding acid to lower the pH of the product to below 4.6.

“The acid helps keep the product shelf stable, says Grenus “but the product loses its creamy characteristics. We use dairy flavors to help customers recreate the rich and creamy profile of the refrigerated or retorted gold standard. Examples of shelf stable products include cream-based pasta sauces and dairy-based dressings.

Reduce or Replace

A frequent approach for developing BFY foods is to reduce everything considered negative—fat, sugar, sodium and calories—and then add additional vitamins and nutrients. Total replacement or elimination of ingredients poses an even greater formulation challenge than simply reducing ingredients.

“All of those ingredients—the fat, the sugar, the sodium—help overcome the off-notes of a fortified system. When they’re absent or reduced it is a different issue than simply masking, because you’re also concerned with achieving balanced flavor and addressing mouthfeel. Milk and cream flavors, along with butters, are the most versatile in improving the overall eating quality of foods. These flavors fit into so many applications, flying just ‘below the radar’ so the customer can tell the product tastes better but can’t quite detect why,” says Grenus.

In any formulation situation, Schultz states, the earlier the flavor house is pulled into the process, the better it is for the customer. “A lot of companies think of flavor as the finishing touch, the final ingredient to consider; however, we have a much greater

probability of achieving the best flavor for a customer when collaborating in the process of ingredient selection at the start of development.” Dairy flavors traditionally are used at low levels, 1% or less, and are often combined with other formulating tools to aid product development. Schultz says when a customer removes 10% of the fat in formulation, replicating that taste and mouthfeel is a tricky process especially if it is left to the end of the formulating procedure.

Involving Edlong earlier in the process doesn’t mean slowing down application development. Edlong has complete testing facilities, including a Microthermics® unit to determine how the flavors will react in a UHT product to help counteract that slight ‘cooked’ note that can deter some consumers.

Capitalizing on Success

“There are so many ways to use flavors that don’t involve ingredient replacement,” says Macpherson. “Food manufacturers don’t always think of enhancing as much as replacement, i.e. ‘We want to get rid of the milk and substitute a flavor.’ If you



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Application	Challenge	Solution	Profiles*
reduced sodium sauce	metallic notes,	butter flavor	butter, sweet, benzaldehyde, fatty, melted, creamy,
	unbalanced profile	cheddar flavor	creamy, butter, Cheddar, Processed, mild, Mozzarella, yeasty, cheese
soy beverage	beany notes	milk flavor	sweet, milk, dairy, creamy, cooked, butter
low-fat dairy dip	lack of richness	cream flavor	creamy, fatty, milk, butter, sweet
salty snack	flat flavor profile	butter flavor	butter, dairy, fatty, lipolytic, oily
		sour cream flavor	sour cream, cultured, astringent, fresh, sour curd

*Profiles are shown in ascending order, with strongest notes listed first and subtle notes listed at the end.



enhance what you already have, it can really intensify the flavor of your finished product and differentiate it with consumers by giving a richer taste and creaminess. For example, you can elevate the mouthfeel and acceptance of low fat milk.” (see chart below)

Certain dairy flavors, such as butter, milk or cream flavors will lend the mouthfeel or fat mimetic that enhance the consumer’s eating experience and make a marginal formulation acceptable to the consumer. The realistic model lies somewhere between cardboard vs. calorie-buster as formulators develop products that offer great nutritional benefits and still tantalize the taste buds. According to Schultz, “For superb mouthfeel, there are a number of dairy ingredients we consider due to their composition. Lactones add creaminess and the longer chain fatty acids will add richness and mouth coating.”

When considering use of a butter flavor, it’s good to be knowledgeable of the differences that exist between typical US butter and European style butters. European butters are 3% higher in fat content than American butter. Even this slight difference has an effect on mouthfeel, and Edlong supplies a wide range of butter flavors to enhance mouthfeel as well as to provide masking. Butter flavors are well equipped to mask other ingredients that would otherwise introduce off-flavors into a finished product.

The Keynote: Expertise

The specialized knowledge of flavor systems’ masking and mouthfeel functional properties and the proper selection of the right combination of flavors for each individual application come only with experience.

“I’ve been here for 25 years and have worked with some members of my team for more than 20. When you focus in one arena – in our case, dairy flavors – you get to know what flavors will work best in specific applications. Most of our current flavor systems will successfully mask, add mouthfeel, enhance flavor, or a combination these. In those cases where a customized flavor is needed, we have the right people with the skills to make it happen.”

The quickest turnaround in production time will of course come from using dairy flavors from among the extensive line Edlong markets. Custom flavor systems take more time. However, Edlong is experienced in building flavor systems from the ground up and the team will do what it takes to meet client objectives.

With its focus on dairy flavors, Edlong offers an unmatched depth of knowledge and experience to its customers. Moreover, this focus enables Edlong to develop the right dairy profiles that perform across multiple functional capabilities such as

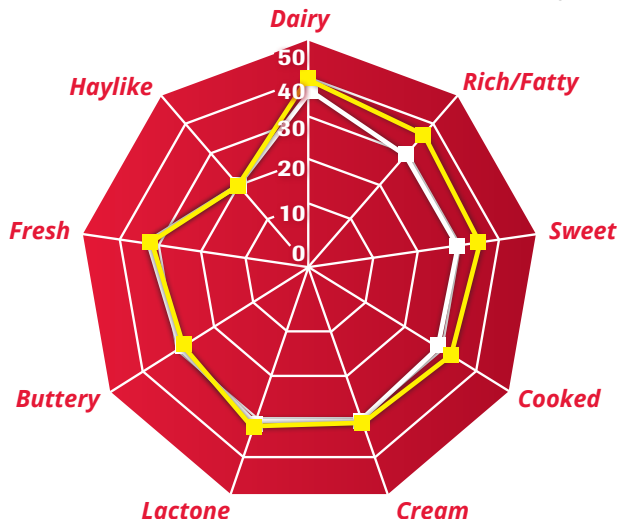
masking, mouthfeel, consistency and the overall sensory experience. Dairy flavors have been categorized into six main dairy groups, including: cheese; milk and cream; butter; cultured, such as sour cream and buttermilk; sweet dairy, such as caramel; and functional dairy, which refers directly to those flavors specifically designed for mouthfeel and masking.

All the statistics and trends point in one solid direction—healthier processed foods are the future. Common sense tells us that no one will eat healthy foods if they don’t taste good. Dairy flavors bridge that gap to creating healthy foods that are successful not only in terms of nutrition and taste, but in terms of sales. >>



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