

Food & Beverage Insider

Vol. 2, No. 7 September 2021

foodbeverageinsider.com

US\$20.75

The real deal:
Natural color
and flavor solutions





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Winning in the natural colors and flavors space

How food looks can be a major deciding factor in whether a consumer will try the product. To increase the visual appeal, product developers rely on color additives—synthetic, natural or nature-identical—to offset possible color loss, enhance naturally occurring colors or give bland-looking foods an attractive hue.

In fact, adding color to food products also has been found to impact the chemosensory perception of foods and beverages; evidence suggests that color exerts these effects through a link with emotion, according to a 2016 study published in the journal [Food Quality and Preference](#). The same holds true for flavors. The study's authors found strong evidence that consumers have pre-existing expectations regarding the appropriate color for specific flavors and types of beverages.

The study reinforces how colors and flavors contribute to overall product success. What's more, there's been a monumental shift in how consumers view ingredient decks. Health-conscious consumers want natural and easily identifiable ingredients, but they can be more challenging (and sometimes costlier) to work with than their synthetic counterparts.

Fortunately, ingredient suppliers are turning to Mother Nature to provide brands with natural color and flavor solutions that not only deliver on taste and appearance, but also satisfy consumer demand for clean label. But swapping out artificial ingredients for natural ones isn't as easy as it

sounds because colors and flavors are influenced by pH, temperature, light, moisture, packaging, processing and more. Natural ingredients also can be more expensive, more volatile, and have a shorter shelf life than artificial counterparts. With these considerations, natural flavors and colors can require longer research and development (R&D) timelines and investment to validate the formula and meet consumer and retail needs.

This digital magazine examines options and technologies for natural colors and flavors as well as formulation solutions and supply chain considerations for brands to succeed in the natural space.

Cheers and good health,

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Colors, flavors and food choices: The drive toward natural

by Jan Nash



Dating back to the first century, Roman gourmand Apicius is credited with coining the phrase, “We eat first with our eyes.”

Presentation continues to play a large part in people’s dining habits, whether they are eating out or preparing meals at home. Today’s consumers demand quality natural ingredients be used in dishes that look enticing while delivering on flavor. If a dish doesn’t look appetizing, convincing someone to try it will not be easy.

Colors and flavors of foods and beverages play a large part in choosing ingredients to purchase and prepare. With more people preparing meals at home due to COVID-19, consumers are looking to buy the best fresh and natural foods and beverages for their money. For well over a decade (since 2009), consumers have increasingly looked to their stores to carry foods that are natural, organic and preservative-free (see Figure 1), with the desire for organically grown foods exhibiting the most growth (49%). Consumers have been increasing their clean eating practices for some time, seeking foods that are unadulterated and free from artificial colors, flavors and preservatives (up from 54% in 2009 to 69% in 2020), which in turn drives natural color and flavor innovation within the supply chain.

% general population who completely/somewhat agree “it’s important for my store to have ...”

	2009	2020
Foods that are natural	61%	73%
Foods that are free from artificial colors, flavors and preservatives	54%	69%
Foods grown on farms that practice sustainable agriculture	55%	67%
Organically grown foods	39%	58%

Source: NMI’s 2020 Health and Wellness Trends Database



Non-GMO status is generally labeled on packaging, but for genetically modified foods and beverages, GMO content remains somewhat of a mystery. While consumers often waver on whether GMOs would influence their purchase decision, reluctance to purchase GMO products is declining.

In 2013, 69% of respondents surveyed stated they would be less likely to purchase a product labeled that it contained GMOs. In 2020, fewer than half of consumers (45%) reported they would be less likely to purchase GMO-labeled products. With only 1 in 6 consumers checking their food and beverage labels specifically for genetically modified content, perhaps consumers are more concerned with other issues surrounding food and beverage ingredients, such as those that can be seen and tasted. Decline in GMO opposition may be a boon for formulators challenged with meeting non-GMO labeling requirements, but will not affect brands working toward organic certification.

The rise of plant-based

Given the increased focus on clean, “free-from” foods and beverages, consumers are turning more to plant-based alternatives which carry a healthy halo versus synthetic counterparts. Plant-based foods and beverages demonstrated steady growth over the past five years, with nearly one-third (29%) of the general population using plant-based products in the past year, up from 22% in 2016. In fact, 17% of consumers stated that in the past year, they had increased their use of plant-based dairy, and similarly 16% increased their plant-based meat consumption. The appeal is such that 1 in 10 shoppers reported now checking the label of packaged foods and beverages to see if plant-based is listed.

The rise of plant-based foods is fueled by younger consumers—76% of consumers under age 40 indicated they have used plant-based protein in the past year, compared to 56% of those 40 or older, so attracting this younger segment is key to continued category growth.

Taste and health

Over half of consumers (59%) indicated they believe healthy food should taste good and they are not willing to sacrifice taste to that end (see Figure 2). On the list of top five attributes rated as very/somewhat important to their food/beverage purchase decisions are taste, value for the money, nutritious, simple-to-understand labeling, and fresh and less processed. Clearly consumers are looking for nutritious ingredients that give them the most bang for their buck.

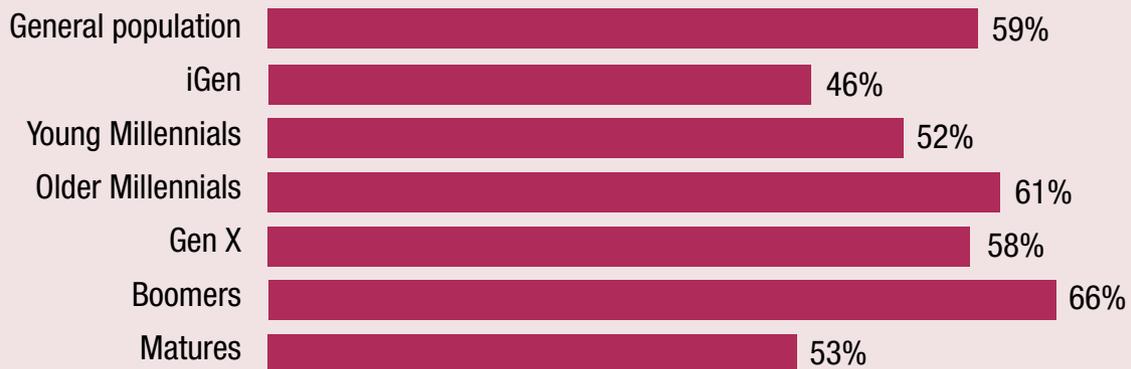


Consumers are looking for nutritious ingredients that give them the most bang for their buck.

Regarding labeling, consumers are checking the Nutrition Facts panel, checking the ingredient list on the package and checking claims on the front of the package. They are also checking labels for undesirable ingredients, artificial colors/flavors, natural ingredients, organic ingredients and preservatives.

Not surprisingly, during 2020, the health issue the adult U.S. population was most concerned about preventing was the COVID-19 virus. The heightened concern about lowered immunity, flu and viruses may have motivated consumers to demand more natural foods without artificial preservatives and ingredients, as they recognized the need for whole, real foods for proper nutrition for the body, while at the same time not wanting to sacrifice taste.

Consumers who agree completely/somewhat that “healthy food should taste good and I am not willing to give up taste for health”



Source: NMI's 2020 Health and Wellness Trends Database

The pandemic changed a lot of how consumers live, including shopping and eating. It made many Americans think about foods and beverages in ways they never had before, and with the increased focus on natural versions as a way to be healthier, natural ingredients including colors and flavors are a must for brands to stay competitive. ♦



Jan Nash is senior director of research at the [Natural Marketing Institute](https://www.nmisolutions.com) (NMI), a strategic consulting, market research and business development firm specializing in the health, wellness and sustainability marketplace. For more information on the Institute's services or proprietary research tools, contact jan.nash@nmisolutions.com.



COLOR HARVESTED FROM NATURE

GET A SAMPLE!

Next-generation colors and flavors offer natural brands the best of both worlds

by **Melissa Kvidahl Reilly**



Before organic certification, non-GMO verification and the ensuing flood of health-signaling seals now available to better-for-you brands, there was one thing marketers could use to differentiate themselves from the chemical-laden competition on the market: the claim that they were free of artificial colorings and flavorings.

It's a claim that's still going strong as a cornerstone of the clean label food and beverage category.

"These days, natural flavors can barely be considered a desired attribute in products; rather, not having natural flavors is a barrier to entry for new products," said Philip Caputo, marketing and consumer insights manager at Virginia Dare. "Other attributes that consumers find appealing, like organic, recognizable ingredients, sustainability and more are all rooted in the ingredients and flavors themselves being natural."

According to proprietary research from Sensient Flavors & Extracts, the inclusion of natural colors and flavors still tops consumers' most-wanted attributes, coming in at No. 2 behind an easy-to-understand ingredients list. DSM internal research backs this up, finding that the absence of artificial colors ranks higher than organic certification in terms of importance for purchase.

George Gonzalez, carotenoids product manager at DSM, suggested, "The trend away from artificial colors overlaps with so many clean label trends, including more recognizable ingredients, plant-based and more." He practically rendered it mandatory for any brands falling under the clean label umbrella—regardless of what other claims they hold.

Formulators will be happy to know, however, that utilizing natural colors and flavors is a clean label trend that's fairly affordable. Perrin Gerber, head of product development at Sensapure Flavors, said "Natural is economical and sustainable," although it's still "easier to get something natural than it is to get it organic."

And while some consumers may prioritize certifications like USDA Organic or Non-GMO Project Verified, "the majority just want to better understand what is going into their food and why," stated Megan Jacobs,



senior global marketing manager at DDW, The Color House. “Since natural colors generally come from recognizable sources and are typically labeled as color (for example, vegetable juice for color), this satisfies both the recognizable and understandable attributes that many consumers are looking for.”

This trend is also applicable to any food and beverage category, though it seems to matter more for some than others. According to proprietary SPINS data, the largest categories (in terms of sales) that feature natural flavors and colors include bread and baked goods, frozen entrées, soda and carbonated beverages, and chips, pretzels and snacks. But brands would be wise to keep their eyes on the categories featuring natural colors and flavors that are growing the most, which include performance nutrition (up 34% in the past year), refrigerated ready-to-drink (RTD) tea and coffee (up 20%), shelf-stable functional beverages (up 18%) and refrigerated entrées (up 17%).

That said, it’s not always as easy as swapping an artificial red dye for beetroot or adding real Cheddar where an artificial cheese flavor was once used. Brian Zapp, marketing director at Applied Food Sciences (AFS), maintained natural colors and flavors are perpetually works in progress, requiring brands to consider the product’s appearance, smell, texture, shelf life, stability and more. “Tack on the fact that much of the botanical world consists of perishable, insoluble plant parts, formulating with natural colors and flavors can be challenging to say the least,” he added.

Most-favored flavors

Health-and-wellness-inspired flavors are piquing consumers’ interest as a result of the pandemic, Caputo asserted, putting antioxidant-rich dark berries like acai, elderberry and goji, as well as ginger and mushrooms, in the spotlight. “By integrating wellness flavors into their applications, brands can underscore their focus on targeted nutrition categories such as immunity, brain health, aging and digestion,” he said. “If a protein bar is flavored with wellness-centric flavors like elderberry, turmeric, ginger and tart cherry, that can connote that the product has certain health benefits.”

At ADM, citrus flavors can signal that a product is a rich source of vitamin C. Similarly, berry flavors like acai, acerola, blackcurrant, cranberry, elderberry and maqui berry communicate a superfruit quality. And, they’re flexible enough for most applications. “These delicious flavorings can be used in any food and beverage category, from baked goods to frozen treats and sparkling water to energy drinks,” said Marie Wright, president of creation, design and development and chief global flavorist at ADM.

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Health-and-wellness-inspired flavors are piquing consumers' interest as a result of the pandemic.

In beverages, specifically, a [survey from Mintel](#) found berry and citrus flavors tied for first place among consumers when asked which flavors they'd include in their ideal nonalcoholic beverage, each garnering over half of consumer favor. These topped the desire for tropical (coconut, mango, etc.), sweet (chocolate, vanilla, etc.), herbal (basil, mint, etc.), and spiced (chai, cinnamon, etc.) flavors. But there's still room for creativity.

On the one hand, sweet and indulgent natural flavors appeal in certain segments of the market. "Being in the nutrition and sports nutrition space, we currently see a lot of demand for candy, dessert, exotic and alcohol themed flavors," Gerber shared. "Basically, our consumers want to feel like they're having a healthy treat." This is supported by [Mintel research](#) showing that, at least when it comes to beverages, the largest proportion of consumers choose a flavored beverage to treat themselves (44%) and over one-quarter are interested in beverages inspired by cocktail flavors like mojito and margarita.

Grapefruit, specifically, is one natural, cocktail-inspired flavor on the rise in the beverage space. Not surprising, considering palomas increased 32% as an offering on U.S. beverage menus between 2018 and 2021, and 20% of Millennials and Gen Zers reported grapefruit is their go-to cocktail flavor, according to Mintel's "US Menus: Growing Flavors and Ingredients." So when it comes to nonalcoholic drinks, 43% of consumers have already tried and are enjoying grapefruit flavors.

On the savory side, formulators are seeing increased demand for global flavors. According to Kevin Barasa, global extracts product manager at Sensient Flavors & Extracts, "Taste bud travel is a response to consumers not traveling for myriad reasons." He noted a rise in rooibos, cassia, clove and mint flavors, to name a few. ADM's Wright has also seen travel-inspired flavors rise in popularity, including spicy flavors like harissa and chile de arbol, as well as amba, baharat and garam masala.

Doug Ressh, director of commercial marketing at T. Hasegawa USA, backed up the movement: "Globally, indigenous flavors like sweet chili, curry chipotle or even ingredients like peanut have universal application and strong ties to popular sauces in international cuisine."

But flavors don't have to be international to be inspiring. Barasa has also noticed that products with provenance such as hops from the Pacific Northwest or chili extracts from New Mexico can help connect consumers to the location where the food originates.

Mushroom flavors are also on the rise, with Mintel's "US Menus" data reporting a 57% menu increase for truffles between 2018 and 2021, and 68% of consumers saying they've tried and enjoy mushroom as a flavor at restaurants. The result? Increased demand for more pungent and bitter earthy flavors; in fact, Mintel reported 24% of consumers are eating more earthy flavors as compared to a year ago. To help formulators work with these rich flavors and deliver a consistent profile, T. Hasegawa USA recently introduced Bootstract, a natural flavor modifier that adds or enhances kokumi, increasing richness of taste while maintaining flavor balance.

Going forward, Wright predicts top natural flavor trends will merge to yield combinations of adventurous spices with more familiar fruit flavors, “such as pear and cardamom quick bread, bittersweet dark chocolate and heat-inducing cayenne pepper, or a tropical smoothie with pineapple, mango, turmeric and coconut milk,” she offered. “Consumers are hungry for new flavors and taste combinations that encourage their sense of adventure. Formulators continue to innovate by activating multiple taste receptors in one sip or bite.”

Flavor challenges

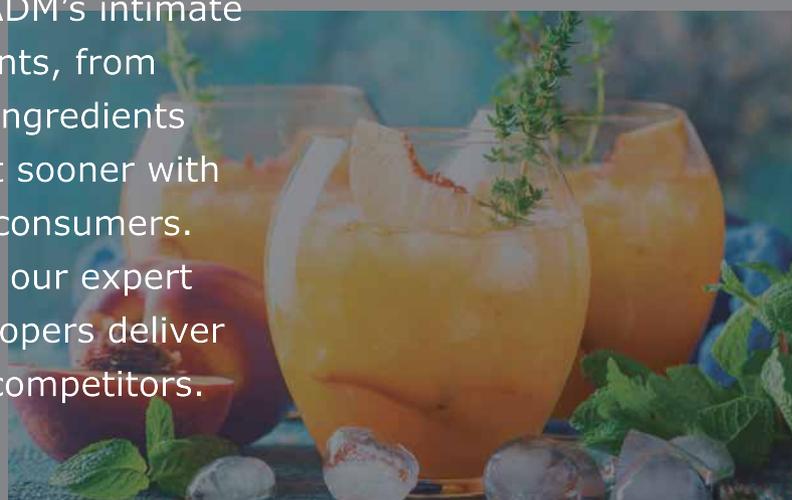
Working with natural flavors isn’t as easy as adding a dash of turmeric or a squeeze of citrus. First, unlike artificial flavors, natural flavors “can be impacted by weather patterns, soil quality, climate change and natural disasters,” stated Nora Yang, director of taste and sensory innovation at Kalsec. “These impacts can result in flavor variation from year to year or, in a worst-case scenario, can lead to crop shortages.” At Kalsec, natural ingredients are standardized to minimize crop-to-crop variation and allow for consistency on the shelf.

Michael Crain, director of flavor creation at Comax Flavors, said natural flavor supply chains can also be disrupted by political unrest, material demand and shipping woes. Gerber added that finding sustainable sources—especially during the COVID era—is also challenging, and recommended diversifying supply chains just in case a shortage presents itself.

Even if formulators and brands are able to source their natural flavorings affordably, reliably and sustainably, they face additional challenges. Zapp offered an example: “How attractive is that brilliantly golden-orange turmeric latte? Served hot and fresh, it is Instagram-worthy,” he said. “But, give it an hour on the shelf, and you will likely see material separation, sediment settling to the bottom of the glass, and a far less appetizing product.” Indeed, spices like turmeric can impart vibrant colors, but they are a fickle friend in the packaged food and beverage world.

According to Zapp, consumers tend to perceive sediment or separation as diluted or bland tasting. This challenge is huge for natural and organic products that usually carry a higher price tag than their conventional competition, and can doom even the best-tasting products. “When a food or beverage has an off-color, appears to be grainy, contains sediment, cloudiness or separation, consumers are positively or negatively judging how it will taste based on past experiences,” Zapp suggested. Flavors, therefore, must not interfere with a good-looking product, and brands would be wise to partner with ingredient suppliers that prioritize texture, shelf life and solubility.





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Colors of the rainbow

Most experts in the food and beverage industry know that consumers eat with their eyes first; in other words, flavor is just one part of the eating experience, and how a product looks is equally, if not more, important. The good news is natural colors have come a long way. “There is a misconception that natural colors can’t be vibrant or stable,” Jacobs affirmed. “With just a few exceptions, there is generally a natural color or color blend that can be used in just about any application. It’s all a matter of knowing which colors to use in your application and how to apply them during processing.”

As is the case with flavors, “vibrant, citrus colors are incredibly popular right now, with reds, oranges and yellows leading the way,” stated Caroline Schroeder, food division marketing communications manager for Lycored. “We have seen citrus flavors gain popularity due to the increased desire for healthy and good-for-you products in response to the pandemic, which has driven the natural colors that lend themselves to these flavors to the forefront.” In addition, she said, these bright and cheery colors create “a sense of happiness and excitement” that’s much needed right now in the grocery aisle and during eating occasions.

According to DSM’s Gonzalez, of these citrus colors, orange is rising to the top thanks to its association with immunity benefits. Fermented beta-carotene is his orange color of choice, which can often be used to impart not just the bright immune-signaling color, but also nutritional benefits like vitamin A, which can enhance the healthy positioning of the products. DSM’s B-Carotene Crystal Clear 2.5% has been designed to compete with azo dyes and offers a clearer solution for applications that need it, like beverages.

Reds, yellows and oranges also benefit from growing plant-based trends. Specifically, frying- and cooking-friendly reds for meat-alternative vegetable patties, and yellows and oranges for cheese and egg alternatives are in demand, maintained Bertrand Martzel, Kalsec’s commercial director of colors. At California Natural Color, the company’s Pure Brown Carrot is popular for applications that require grill marks or where a cooked meat look is desired.

In addition to citrus colors, formulators are getting innovative with vibrant sources like ube (mashed purple yam) and turmeric. “Instagram-worthy offerings like black ice cream and rainbow cakes require rich and bright stable colors to catch eyes and earn likes,” assured Emina Goodman, senior director of commercial color development at ADM. “This in turn captures Millennials’ and Gen Zers’ interest in purchasing these offerings to then share across social channels.”



ADM helps brands achieve a spectrum of colors with its Colors from Nature portfolio, derived from natural sources like botanicals, fruits and vegetables. “We proudly offer the industry’s only patented acid-, light- and heat-stable blue, created with juice from the Amazonian huito fruit,” Goodman claimed. “Huito fruit juice also contributes to stable shade expansions of various green, purple and brown.”

Also new to the scene are red shades from GNT USA with unique warm hues and vibrancy. The EXBERRY shade Rubescent Red is “dynamically bright” and Ruby Red has “a hint of yellow that gives it an intriguing glow,” offered company vice president Jeannette O’Brien. She added these colors are the closest shades possible to Red Dye 40 and are available in liquid, powder and micronized forms for a wide variety of applications like confectionery products, cereal, baked goods, frostings, meat analogues and dairy items, with examples spanning syrup, yogurt and low-pH beverages. “Sourced from red potatoes, they are particularly significant for beverage applications because they are rich in the naturally occurring, water-soluble pigment anthocyanin, renowned for its antioxidant benefits and discovered in intensely colored ingredients such as blackberries, elderberries and radishes,” she stated, contending they’re also free from the off-taste imparted by other natural reds.

GNT USA also recently launched EXBERRY bright green shades made from spirulina and turmeric, including Lime Green (a vibrant yellowish green) and Jade Green (a vivid blueish green). All of GNT’s shades are vertically integrated and made from non-GMO fruits, vegetables and plants, processed via a water-based method free from chemical solvents.

Natural color considerations

As with natural flavors, natural colors come with their own sourcing challenges. Zapp expounded, “I don’t think we pay enough attention to how few botanicals grow in the U.S. for commercial consumption. Typically, this is not a problem, as the world can provide an abundance of herbs—that is, until it can’t.”

In recent years, foreign regulation changes, port delays, transportation issues, forest fires, drought and more have compromised the supply chain for natural colors and other ingredients. Zapp recommended “manufacturers looking to add novel botanicals to their products should be aware of the potential risks and limitations in doing so.”

These risks can run the gamut from availability to price changes. Jacobs concurred, “Natural colors are like any other agricultural product; the cost and availability can vary from year to year based on the country of origin, certifications and growing conditions.”

DSM is stepping up to address at least one part of this challenge by offering fermented products like CaroCare, which is less vulnerable to climate-related issues.

Natural colors also present unique challenges during formulation. “Natural colors, in particular, can be sensitive to high temperatures, certain pH ranges and storage conditions,” shared Christopher Naese, vice president of business development at Florida Food Products.

To address this, California Natural Color senior account sales manager Kimberly Luis recommended adding color at the latest point in the manufacturing process and limiting exposure to oxygen. “You can also increase the dosage to account for the loss that occurs in manufacturing,” she said. “When designing packaging, consider designs that will protect the product from light exposure. Always maintain fresh inventory on store shelves and manage the supply chain so that old product is not being placed next to new product.”

Another color-related challenge is flashing, or when different colors streak within a mixture like powdered beverage packs, seasonings or mixes. At ADM, a few different precautions are taken to avoid this. “We create naturally sourced color with plating characteristics to provide uniform powders,” Goodman shared. “Plus, our proprietary and patented emulsion technology is key for beverages. It eliminates color staining on product containers like beverage bottle caps, helps mitigate precipitation, and works well with other emulsion systems such as cloudifiers and flavor emulsions.”

ADM can also alter natural colorants that may impart a taste that clashes with a particular format, for example, paprika. “Our proprietary extraction technology removes the earthy notes from paprika while maintaining its original color properties to achieve a bright orange pigment for beverages and sweet and savory dishes alike,” she added.

The future is now

Experts anticipate the future of natural colors and flavors to dovetail even more closely with other perceived better-for-you trends, such as the use of plant proteins. Yang said the onus is still on flavor formulators to mitigate unpleasant tastes—like earthy and bean-forward notes in plant proteins—in favor of desirable flavors, like meat and umami.

Goodman noted some of the category developments in vibrant natural colors could lead to exciting consumer experiences, such as color-changing beverages.

But overall, Gonzalez maintained advances in simplification will be key. “Consumers are looking more toward naturality and, therefore, there will be increasing interest in products that use fewer artificial colorants and flavors.” He continued, “The U.S. market is so dynamic and rapidly changing that there will be a lot more innovation to come.” ♦



[Melissa Kvidahl Reilly](#) is a freelance writer and editor with 10 years of experience covering news and trends in the natural, organic and supplement markets. She lives and works in New Jersey.





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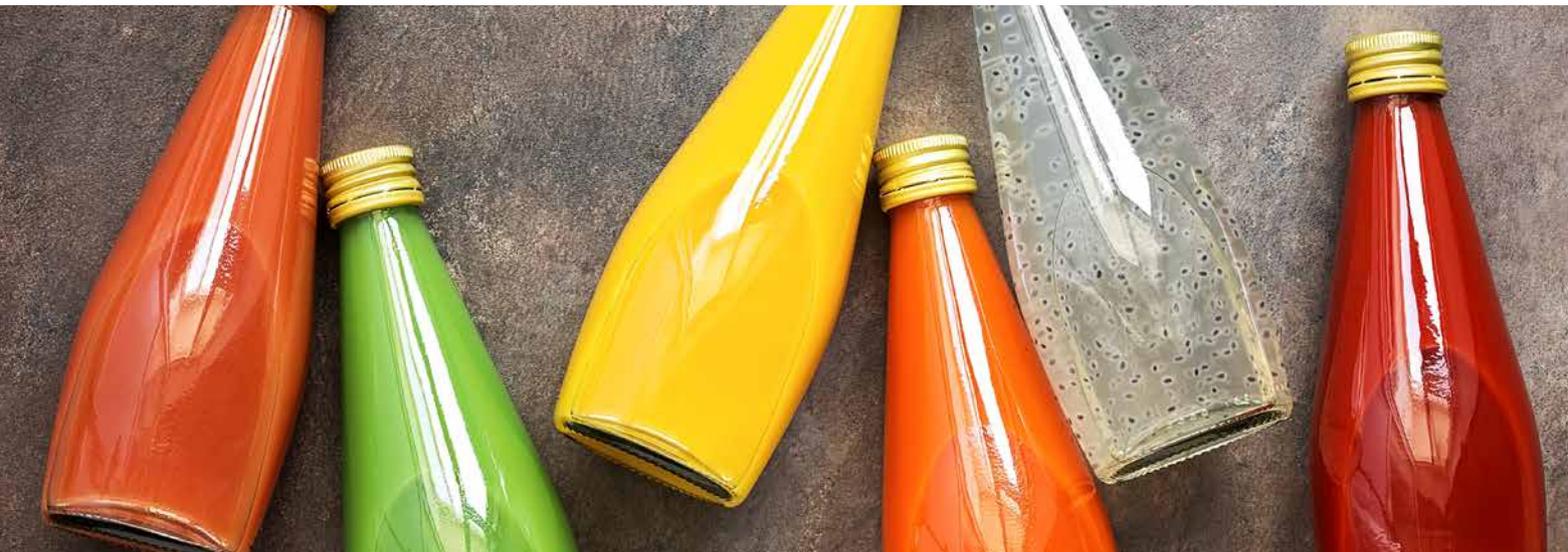


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Organic glycerine: An ingredient of all trades

by Mike Effing



For anyone in the food and beverage world, organic glycerine should be familiar due to its countless applications. Sometimes spelled glycerin and referred to as glycerol, it is a simple polyol and sugar alcohol that functions well as a flavor carrier.

The ingredient helps prevent sugar crystallization and adds smoothness and sweetness to many food and beverage products. It also serves as a humectant, solvent and preservative.

Its technical versatility is a unique combination of physical and chemical properties. Glycerine readily dissolves in water, making it ideal for water-based formulations. Represented by the chemical formula $C_3H_8O_3$, its molecular structure is composed of three carbon atoms, eight hydrogen atoms and three oxygen atoms, which allows it to retain moisture well. It is also odorless, colorless and has a high viscosity and boiling point (290 degrees Celsius).

Food and beverage applications

Glycerine has seemingly endless applications in numerous industries—primarily in the food and beverage industry. A quality organic version should easily absorb concentrated flavorings and distribute them evenly, providing consistent taste in product formulations.

The ingredient is used to create and preserve botanical extracts, such as lavender and rosemary. However, it should be noted that while glycerine and other glycols can render some organic molecules inert, they do not provide broad-spectrum protection against mold, bacteria, fungi, etc.

The ingredient acts as a solvent for flavors and food colors in soft drinks and confections, and as a humectant—a substance used to reduce the loss of moisture—in dried fruits, nutrition and energy bars, candy, cakes and casings for meats and cheese. A [reference document](#) compiled by The Glycerine Producers' Association noted cakes baked with glycerinated eggs have a larger volume and better texture than cakes made with non-glycerinated eggs.

Glycerine has seemingly endless applications in numerous industries—primarily in the food and beverage industry.

Occurring naturally in fermented foods and beverages, such as beer, honey, vinegar and wine, glycerine contains slightly more calories per gram than sugar and is 60-75% as sweet. Title 21 of the Code of Federal Regulations (CFR), Part 182, Section 1320 states [glycerine is GRAS](#) (generally recognized as safe) when used in accordance with GMPs (good manufacturing practices).

The substance is a major player when it comes to the world of beverages—alcoholic and otherwise. When conducting his famous studies on fermentation in 1885, Louis Pasteur found that 3.5% of the sugars in alcoholic fermentation are converted to glycerine.

Since the 19th century, the sugar alcohol has been used to form base flavors of liquors and liqueurs and as a vehicle in making flavors for stronger drinks such as gin, essence of cognac, essence of rock and rye whiskey and artificial Scotch flavors. It also shows up during the preparation of the base extract of soft drinks as well as fountain syrups.

Glycerine's flavor-carrying abilities are most clearly displayed in vanilla and citrus flavors, coffee, fruit and spice extracts, and chocolate syrups, where they help improve the body and smoothness. Flavor pastes and powders often contain the simple polyol compound, as it is an excellent solvent for flavor and taste materials present in natural products, like coffee beans. And glycerine is used all the way down (or up) to the corks in wine bottles, as it helps maintain the flexibility of the cork, ensuring a solid seal.

One indirect use of glycerine in food processing is centered around monoglycerides, the glycerol esters of fatty acids. Used as emulsifiers and stabilizers for many products, edible monoglycerides help maintain moisture balance and permit richer formulations with a longer shelf life. For instance, glycerine is added to margarine to increase plasticity and to dough mixes to promote the dispersion of fat. Monoglycerides are also used in salad dressings, frozen desserts, candy and food coatings. Although allergies to organic glycerine are possible, they are rare.

The history

The most crucial attribute of glycerine is that it is hygroscopic, meaning that it tends to absorb moisture from the air. The technical book "[Glycerine](#)" described the ingredient as having a "high affinity for moisture." [Encyclopedia Britannica](#) noted Carl Wilhelm Scheele, a Swedish chemist, accidentally discovered the versatile ingredient in 1779, while heating a mixture of olive oil and lead monoxide. Scheele called glycerine the "sweet principle of fat." Then in 1813, Michel Eugene Chevreul, a French lipid chemist, proved that fats are glycerine esters of fatty acids and gave glycerine its name, "γλυκός" the Greek word for sweet.

Manufacturing

Organic glycerine is formed one of three ways:

- 1 Through the alcoholic fermentation of sugars.
- 2 From the hydrolysis of fats and oils (namely palm, coconut or soybean oil).
- 3 Via fermentation of yeast, sugar or starch.



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The substance can be made synthetically from propylene, but it must be produced naturally for it to be organic. Producers of glycerine, whether organic or synthetic, must strictly monitor each stage of processing, from pre-treatment of crude materials to finished products. This assures high purity and uniform quality.

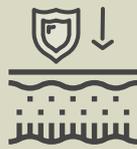
Other applications

Due to its virtually nontoxic nature, glycerine is also common in personal care products, including—but not limited to—face washes, skin creams, lotions, serums, toners, shampoos, lip balms, mouthwashes and massage oils.

A research article published in the *British Journal of Dermatology* (2008;159[1]:23-34) pointed out potential benefits of glycerine include:



Boosting skin hydration.



Enhancing skin barrier function.



Demonstrating an antimicrobial effect.



Protecting skin from irritants.



Accelerating wound-healing processes.

It can help prevent toothpaste from drying and enhances its flavor in the same way it does in food and beverages. It can even help preserve beauty products for increased longevity. In 2019, the Cosmetic Ingredient Review Expert Panel concluded glycerine is safe as a cosmetic ingredient based on the present practices of use and concentration described within its assessment review (*Int J Toxicol.* 2019;38[3 Suppl]:6S-22S).

The pharmaceutical world needs glycerine in its arsenal as well. One of the most widely used ingredients in drugs and pharmaceuticals, it functions as a solvent, moistener, humectant and bodying agent in tinctures, elixirs, ointments and syrups—cough syrup, for instance. Even capsules for medicinal use are often plasticized with it.

Other places glycerine shows up are in electronic (e)-cigarette liquid, dynamite, as a preservative for organic matter like flowers and as an intermediary in creating different chemicals. Glycerine is also a vital byproduct in biodiesel production. As early as the 1920s, it was used as an ingredient in antifreeze for car engines.

If not already present in a brand's repertoire of product offerings, organic glycerine may be the missing flavor carrier to amp up food and beverage product formulations. ♦



Mike Efting has been a senior executive in the chemical distribution industry for more than 35 years and an entrepreneur for well over a decade. He is the current president, CEO and founder of [Viachem](#), a specialty chemical food additive and ingredient distributor, and American Pure Products, a wholly owned subsidiary of Viachem that includes premium personal care brands spanning hand sanitizer to CBD.



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Next-level vanilla manufacturers think globally, act locally

by Philip Caputo



Natural vanilla is one of the most recognizable and sought-after foundational flavors in the world. The trend toward clean label ingredients has only intensified demand for its distinctive, classic taste in its natural form rather than as an artificial or synthetic flavor.

In fact, according to research from the International Food Information Council (IFIC), nearly 6 in 10 consumers check product labels before making a first-time purchase. As food and beverage brands shift away from chemically produced imitations, the sourcing of real, natural vanilla is increasingly a concern for manufacturers.

The supply chain for the best natural vanilla is as complex and intricate as its deep, richly nuanced aromatic profile. Key to this endeavor, and to ensuring the highest quality, is having boots on the ground in the growing regions where the agricultural conditions and curing processes can be carefully observed and guided. To achieve this, suppliers need extensive local relationships and a strong understanding of cultivation and production practices.

Cultivation and curing

The most critical components of successful production of natural vanilla are the local partnerships in the various growing regions. Cultivating vanilla is one of the most intricate agricultural processes of any spice or flavor in the world. To produce vanilla pods of exceptional quality, particular cultivars must be grown, and each orchid's flower must be pollinated by the hand of an experienced grower. These pods must be meticulously tended to under specific conditions and must be harvested at peak maturity (harvesting pods too early greatly diminishes quality).

The geographies in which vanilla can be grown are very limited. Therefore, suppliers need to be able to lean into longstanding, embedded relationships and deep knowledge at the local level in Madagascar—where 80% of the world's vanilla is sourced—as well as places as diverse as Uganda, Papua New

Guinea and Indonesia. Having close, working relationships with local cultivators and processors is necessary to make sure each step in the process is done with care and attention to detail. And there is, perhaps, no step more important in this process than curing.

It takes eight months to cure vanilla beans. Cutting corners and rushing the process severely risks degrading the quality (and quantity) of the vanillin produced. Suppliers of natural vanilla must carefully control each step and should employ specialists who can train local employees on how to optimize the curing process. A high level of control over curing enables suppliers to apply the highest standards in production.

Vanilla is the only flavoring ingredient subject to a [federal standard of identity](#), per Title 21 of the Code of Federal Regulations (CFR), Part 169, Section 175. Moreover, the bakers and manufacturers who use vanilla extracts have their own exacting standards of quality because their customers expect natural vanilla to have complexity and depth of character, especially when it comes to premium goods. This can be achieved only through local presence and close-knit relationships in vanilla-growing regions.



Organic and sustainable vanilla

Consumers are increasingly attuned to the ecological and social impact of the products they use and are often willing to pay more for foods they know are produced in a sustainable, ethical fashion. Food and beverage brands are, in turn, paying more attention to traceability and ethical practices in the production of the ingredients they use. Local partnerships can help ensure vanilla is cultivated in a manner that is environmentally friendly, ethical and sustainable.

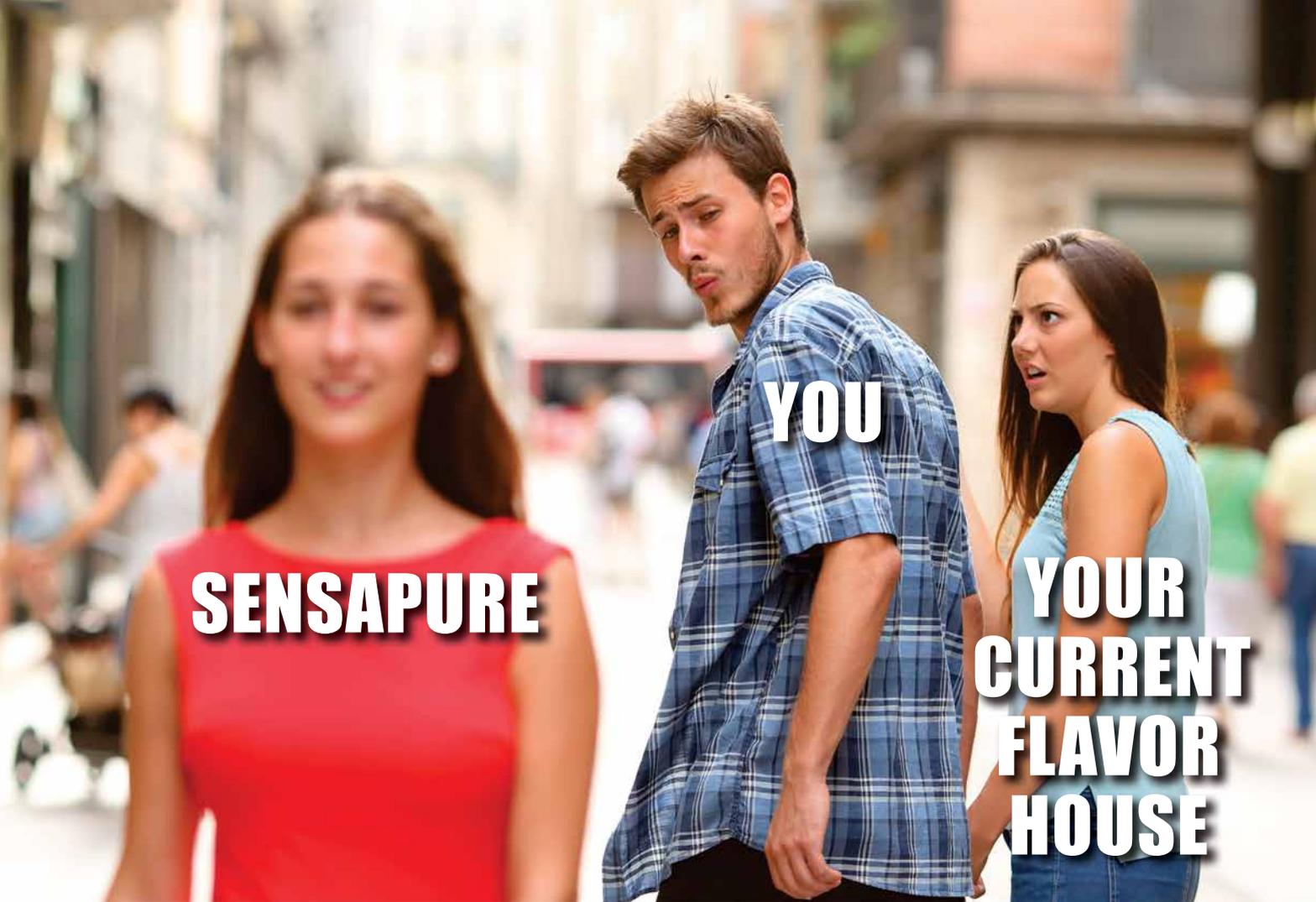
Organic certification for vanilla requires that chemical fertilizers and pesticides not be used in cultivation, nor can it be produced from genetically modified crops. One result of the boom in demand for natural vanilla is the increased use of GMO vanilla orchids. Industrial-scale suppliers with a strong local presence have an advantage in their ability to guarantee production is done in accordance with organic labeling requirements. Having these established relationships allows these companies to observe agricultural practices and educate farmers on the standards for growing certifiably organic vanilla beans.

Furthermore, key players in the vanilla industry are taking initiative to ensure claims about social responsibility and sustainability are trustworthy. The Sustainable Vanilla Initiative—hosted by IDH (the Sustainable Trade Initiative), in collaboration with Sustainable Food Lab—brings together these companies to establish and share best practices for responsible and sustainable sourcing of vanilla. These actions aim to ensure the world's vanilla supply remains stable, has a minimal footprint, and improves the lives of the farmers and workers who grow and cure vanilla.

The importance of direct partnerships in vanilla-producing regions cannot be understated. Having these close relationships is the only avenue to making vanilla flavorings that meet high standards for taste. Additionally, local presence is the only way to achieve certifiably organic and non-GMO vanilla, as well as ensure a highly ethical, traceable and sustainable supply chain. Like the world's best vanilla, cultivating these local relationships takes a significant investment of time and capital, but the results are well worth the effort. ♦



With a decade of flavor and ingredient industry experience, Philip Caputo leads marketing and consumer insight development at [Virginia Dare](#). He and the flavor and extract company help brands turn ideas into innovative products with tasteful formats and flavors. Caputo's previous roles were at Hagelin Flavors and Frutarom USA, and he has a business marketing degree from Manhattan College.



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Clean label ingredients can be functional, fun

by Melissa Kvidahl Reilly



As many consumers continue to table international travel and large gatherings, creativity is helping their attempts to fill the void.

According to [Imbibe](#), food and beverage brands have something to offer here, whether that means providing globally inspired flavors like blood orange, guava and dragonfruit, or fun mocktail flavors like hops, rosé and mimosa. Making these options even more appealing are their Instagrammable bright pink, vivid red and cheery orange colors. But artificial just won't do.

New [research from the International Food Information Council \(IFIC\)](#) shows about half of Americans say they seek out natural flavors at least some of the time, and the same amount also avoid artificial flavors, colors, sweeteners and preservatives when choosing food and beverage at retail.

Where does that leave the state of natural ingredients? Food & Beverage Insider sat down with experts from three brands—Del Monte, LiveKuna and Real Food From The Ground Up—to discuss consumers' most-wanted clean label ingredients, as well as the major trends formulators will need to consider going forward.



Food & Beverage Insider: What are some of the most trending clean label ingredients?

Deb Holt, chief marketing officer (CMO), Real Food From The Ground Up: At Real Food From The Ground Up, we use real veggies like cauliflower, butternut squash and purple carrot to give consumers more of what they love—more flavor, more crunch and more bites per serving.



We have seen a continued shift toward vegan flavors, not only for consumers who follow a vegan diet but also for those who see it as a healthier option. By using natural botanicals, for example, we can mimic some of the more complex cheese notes. Spicy flavors are also hot. Consumers continue to enjoy spicier seasonings, so using natural peppers and spices to add heat and flavor depth is popular.

And finally, color is powerful. Colors from plants have been a staple of the natural foods industry for many years. We see a trend with plant-based colors or flavors now having functional benefits like purple carrots, mushrooms and beets. There is no doubt that the color of food influences consumer taste perception. It is important to work with natural colors that provide appetite appeal to consumers.



Santiago Stacey, CEO and co-founder, LiveKuna: There's a clear shift happening in how we eat. Recent research tells us that consumers are proactively seeking out clean label products and foods that are good for their health and the environment. They also have an interest in understanding where their food comes from. The clean label concept has broadened as consumers look for increased transparency on meeting environmental and ethical demands. The COVID-19 pandemic has also accelerated interest in promoting health through good nutrition. These are weighty subjects that can't be solved overnight. Brands must be authentic and meaningful in their storytelling to have an impact with consumers.

Some examples of trending ingredients are tea infusions, botanical extracts, cereal, nuts and pulses, and fruit powders—ingredients that are naturally beneficial for consumers. LiveKuna products feature chia and quinoa, superfood ingredients that provide great nutritional value.

Food & Beverage Insider: What kinds of artificial ingredients are absolute non-starters for many consumers?



Mario DiFalco, vice president of innovation and insights, Del Monte: Artificial colors and flavors are non-starters for consumers. Also, BPA [bisphenol A] as a packaging component has gained widespread negative scrutiny. In 2016, Del Monte converted 100% of our branded tomato products and nearly 100% of our branded fruit and vegetable products to non-BPA linings.

Holt: Consumers want easily recognizable ingredients. Any ingredient that has a “chemical sounding” name is a non-starter. There are some flavors that are more polarizing than others. As a brand, you need to be careful that you are not formulating a flavor that is too niche.

Food & Beverage Insider: What are some trends that will impact this space going forward?

DiFalco: The past year-plus has influenced a number of consumer trends that we expect to continue well beyond the pandemic. We've seen that consumers have become more focused on health and wellness, grown more confident preparing meals at home, adapted to remote work, increased their appetite for convenience buying, and continued to prioritize buying from brands they trust.

Consumers now have a stronger desire for more positive nutrition in their snacks and meals. They are looking to eat whole foods and want contemporary benefits to fit today's busy lifestyles. With the added impact of COVID, wellness benefits top that list. The pandemic has made more people interested in boosting their overall health through the products they consume, and [they] are especially interested in the connection between gut health and immunity. With this demand in mind, Del Monte created Fruit Infusions, a new kind of fruit cup infused with antioxidants and added wellness benefits.

Moving forward, we will continue to bring a broad range of benefits to our new product platforms, including a more convenient way to get your macro nutrients in every day with products like Del Monte's Veggiesful Pocket Pies that provide a full serving of veggies, use wholesome ingredients and were a recent Frozen Snack Product of the Year winner for the Mindful Awards 2021.

We are also continuing to reduce our food waste in creative ways like using too small but perfectly good cuts of fruits and veggies in new products and food donations to divert them from the landfill and fight food insecurity with organizations like Upcycled Food Association.

Stacey: We can look forward to innovative products that account for animal welfare, supply chain transparency, nutrition and sustainable sourcing—products that keep up with changing consumer needs. Nutritious products that tell a good story and emphasize consciousness in every part of the process will win in the years to come. LiveKuna works with environmentally friendly family farms and prioritizes a clean label. As we innovate, we'll continue to uphold these pillars and integrate new consumer preferences. ♦



[Melissa Kvidahl Reilly](#) is a freelance writer and editor with 10 years of experience covering news and trends in the natural, organic and supplement markets. She lives and works in New Jersey.



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The Food & Beverage Insider podcast showcases industry leaders and addresses news, events and trends affecting the industry.

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Natural colors, flavors draw in consumers

by Alex Smolokoff



Consumers are increasingly mindful of product labels and ingredient lists when shopping for themselves and their families, with many seeking out products made with few, simple, natural ingredients.

The following sampling of products delivers on the colors and flavors consumers expect, using only the simple, clean and natural ingredients they are seeking:

Purely Inspired Superfood powders

For consumers looking to boost their diets, Purely Inspired's Superfood is a power-packed powder ready-to-mix (RTM) in water, juice and smoothies. It combines fruits, vegetables, a mix of sprouted whole grains, legumes, prebiotics, probiotics, zinc, vitamins C and D and more. Superfood Greens features 13 fruits and vegetables—including spinach, broccoli, carrot and alfalfa—along with spirulina, chlorella, and no artificial flavors or colors. The brand's Reds variety is free of dairy and soy, and lists beetroot, tart cherry and elderberry among its 19 fruits and vegetables.



Serenity Kids Grain Free Puffs

These vegetable puffs for toddlers are savory rather than sweet, containing zero grams of sugar. What they do contain, however, is a multitude of vegetables. Available in Broccoli & Spinach, Carrot & Beet, and Tomato & Mushroom flavors, all three varieties boast real vegetable ingredients in addition to organic olive oil for healthy fat. The Broccoli & Spinach and Tomato & Mushroom flavors also include dehydrated bone broth for added protein. As the name suggests, these puffs utilize no grains, instead using cassava root



Consumers are increasingly mindful of product labels and ingredient lists when shopping for themselves and their families.

flour and tapioca starch, which the brand notes as being for easier digestibility. For added peace of mind, Serenity Kids' products are Certified Pesticide Free by the Clean Label Project, which also gave the brand its Purity Award.

Whole Fruit Organic Frozen Juice

As kids grow up, finding them nutritious snacks—especially of the sweet and frozen variety—can be difficult. Enter Whole Fruit Organic juice pops, which utilize real, organic fruit ingredients over artificial flavorings and contain no artificial sweeteners. Non-GMO Project Verified and Certified USDA Organic, these frozen pops are available in a variety of flavors, including Blueberry, Cherry, Grape, Strawberry and more. Each flavor uses organic fruit juice from concentrate and organic cane sugar while remaining 60-70 calories per pop. Beet juice concentrate gives some varieties an added pop (no pun intended) of color as well.

Truff Spicy Mayonnaise

A spiced-up take on an old standby ingredient, Truff takes a standard sandwich condiment and dials up the heat. With the inclusion of real ingredients like red jalapeño, jicama juice, mustard, cumin, garlic, rosemary and black truffle oil blended with organic eggs, the result is a smooth, rich and spicy sandwich topper or dip. Also available in a non-spicy version sans the jalapeño and cumin, this gourmet condiment is 90 calories per serving and contains no sugar.

Yum Earth Organic Giggles

Everyone loves candy, but not everyone loves what's in candy. Yum Earth's Organic Giggles aims to solve that with its fruity, chewy candies. Organic, non-GMO, gluten-free and vegan, these bite-size chews are free from high-fructose corn syrup (HFCS) and artificial dyes. Instead, ingredients like radish, sweet potato, black current, carrot, spirulina and turmeric provide the product's bright colors, while organic cane sugar and rice syrup add sweetness, all for just 60 calories per serving. The candies are also available in a sour option.



Brave Good Kind Tender Chicken Bites

What's the best way to deliver a chicken-flavored, protein-packed bite? Use real chicken. That's what the folks at Brave Good Kind have done with their chicken jerky bites. Real, antibiotic-free chicken is the first ingredient in these all-natural, gluten-free bites, with brown sugar, honey, soy sauce, celery powder and rosemary extract rounding out the Original flavor; Hot Honey and Teriyaki varieties add habanero powder, paprika, dried pineapple, candied ginger and other natural flavors. All three varieties pack around 10 g of protein and just 80 calories and 5-6 g of sugar per 1-ounce serving.



Olipop Sparkling Tonics

Carbonated soft drinks (CSDs) are a guilty pleasure of many consumers, but often rife with sugar and artificial colors and flavors. Olipop goes in the complete other direction, delivering a soda-like sparkling prebiotic tonic both colored and flavored using only natural ingredients. The product line now includes eight flavors—Root Beer, Vintage Cola, Strawberry Vanilla, Orange Squeeze, Cherry Vanilla, Ginger Lemon, Orange Cream and Classic Grape. Each flavor contains Olipop's OLISMART blend of prebiotic ingredients like cassava root fiber, chicory root inulin and Jerusalem artichoke inulin, with other natural flavors complementing each variety—ginger juice, lemon juice and natural mulling spice for Lemon Ginger, natural dark vanilla and orange for the Orange Cream, etc. The result is an all-natural soft drink consumers can feel good about sipping. ♦



Food & Beverage Insider

Contact us here

Food & Beverage Insider leads CPG brands from ideation through manufacturing, supporting the development of clean label, natural and healthy food and beverage products. FBI provides in-depth data and analysis of the markets and is the source for the latest on ingredients, formulation, supply chain and regulatory issues affecting product innovation. As an official content provider for SupplySide and Food Ingredients North America (FINA), FBI connects ingredient buyers and suppliers with executives across the health and nutrition marketplace.

