



**Do consumers really perceive a difference between natural and artificial flavors? Technical experts weigh in on formulation issues, taste, trends and the value proposition. Pat Fernberg reports.**

## Natural Flavors: Delivering Sales, Value

AMONG HEALTH-CONSCIOUS CONSUMERS and in a food-obsessed culture, “natural” sells. In the U.S. and Europe, the number of food products claiming to contain natural flavors rose 150 percent between 2009 and 2013, according to market research firm Mintel Group, Ltd.

Further, Barbara Pugesek, market manager at FONA International Inc., says natural claims are growing in the food industry, and the use of natural flavors in the U.S. has increased steadily since 2005: In 2012, 7.6 percent of all products claimed to contain natural flavors. To put the market into perspective, Leatherhead Food Research estimates global sales of all flavor compounds at \$10 billion.

Mintel reports more than 45 percent of consumers say “all natural” is an important attribute in products — although their definition of “natural” ranges from “better for me” and “contains no artificial ingredients” to “grown without pesticides and synthetic fertilizers.”

“People believe ‘natural’ is better for them, but natural flavors per se are not necessarily what they’re looking for,” Pugesek observes. “They’re really looking for natural products.”

Although the FDA does not regulate the use of the term “natural,” its policy is that it does not object to the term’s use on products that don’t contain added color, artificial flavors or synthetic substances. In a bulletin on food ingredients and colors, the FDA and the International Food Information Council (IFIC) conclude: “Natural ingredients are derived from natural sources . . . Also, some ingredients found in nature can be manufactured artificially and produced more economically — nature-identical compounds — with greater purity and more consistent quality than their natural counterparts.” (See sidebar, *Defining Flavoring Pedigrees*)

More important, adds Nicole Staniec, business development director, confectionery, at Firmenich, Inc., is that no actual difference exists between the natural and artificial versions of a flavor and most consumers are unable to taste one. The difference, she says, is primarily

one of expectation. Thus, Gary Augustine, executive director of market development for Kalsec, Inc., points out, the key difference between natural and artificial flavors is the effect of having products with a “clean” label.

According to Donald Wilkes, CEO of Blue Pacific Flavors, Inc.: “The main advantage for confectionery companies to consider using natural flavors is the opportunity to grow their brands in the natural food channel and differentiate their products in conventional food, c-store and value retail channels. ‘Natural’ consumers tend to pay more for natural food and confectionery products, and natural-flavored confections provide a higher value proposition for the product and brand.”

Institute of Food Technologists spokesperson and Professor of Food Science and Human Nutrition at the University of Maine Mary Ellen Camare, PhD, adds: “People are interested in the health benefits of various herbs and spices, such as antioxidant properties. Adults tend to strategize how they want to spend their money and calories and what tradeoffs they are willing to make.” The steady growth in products touting natural attributes suggests many adults have made that choice.

### MANY FACTORS CONTRIBUTE TO FLAVOR EXPERIENCE

Perception of flavor — why the green apple flavor one consumer relishes tastes brackish to another — is both psychological and physical. Augustine points to an IFIC study that found more than 85 percent of consumers purchase food on the basis of their sensory attributes, and Paulette Lanzoff, technical director at Synergy Flavors, Inc., explains: “When you bite into an apple, the taste, texture, crunch, tartness, aroma, juiciness — all of those things going on at once are what drive the flavor expectation.”

Sources agree that technical and manufacturing advances have minimized differences between natural and synthetic flavors. “Chemicals are chemicals,” Camare says, and explains every flavor has a distinctive

chemical “fingerprint.” Although it is unclear whether the body can recognize the specific fingerprint of a flavor, the brain searches previous sensory experiences to help it identify an aroma.

“Smell is evocative of memory,” she adds. “Basic flavors are innate, and we learn them over time. Much of the perception of flavors comes from smell and expectation. We expect an orange-flavored product to taste like an orange, but medication and age, among other factors, can affect the way we experience flavor.”

Marlene Smothers, associate director of sweet applications at Wild Flavors, GmbH/A.M. Todd, agrees: “It’s what’s in your head, not what’s on your tongue. A lot of what makes a particular flavor acceptable is your prior experience with something. Preferences can vary by region and by cultural heritage, even within a country.”

Richard Gallian, director of product development at Jel Sert Co., adds: “Five or 10 years ago, the trend was for exotic flavors. Now companies seem reluctant to put out something unique, maybe because consumers need to recognize a flavor as something they like before they’ll spend money for it.”

Color also strongly influences consumers’ perception of the way foods taste, according to Gallian. “People use color as a reference point. If it is absent, they depend on smell and taste to identify the flavor. In the U.S., consumers tend to rely less on smell when choosing products, although coffee and cocoa are exceptions.”

Gallian adds that sensory disconnects between color and flavor — if a green gumdrop tastes like anise instead the anticipated apple or lime — can turn off consumers.

Balancing the psychological aspect of taste is the physical interrelationship of flavor agents with ingredients during processing. Pugesek explains that the challenge of using natural ingredients is identifying those that will survive the cooking process and maintain their integrity.

For example, artificial flavors don’t work well with the fats, protein, sodium and complex carbohydrates in snack foods, Augustine says, and adds that natural spices and extracts can offset deficiencies in taste, texture, moisture level and shelf stability of items, particularly those formulated to be low in sodium and fat.

Candy is a different matter, says Tim Parker, CEO of Parker Flavors. “There’s not that same expectation of the flavor being natural in candy that there is in bakery and snacks. Flavor is about one percent of the product, and in some cases, artificial might be the better choice, based on the quality, consistency and formulation of the product.”

Lanzoff notes some natural flavors, such as

citrus and mint, are sufficiently intense to maintain their integrity in the manufacturing process. Others, such as tropical and red fruits and sweet, brown flavors such as root beer and brown sugar s’mores, are difficult to work with in a natural formulation.

## USING FORMULATIONS, PROCESSING TO INNOVATE

“With natural strawberry juice, for example, the amount of juice you’d need to produce a real strawberry flavor would destroy the sugar-to-water ratio and ruin the finished product,” Lanzoff says.

According to candy manufacturer Torie Burke, CEO of Torie & Howard, LLC, natural flavors are compatible with most finished product formulations, but can be sensitive to certain levels of citric acid and fortifying components, such as B vitamins. Burke explains: “Because they’re derived from plant material rather than highly refined petroleum compounds, natural flavor compounds containing lower vapor and boiling point components — such as pineapple and strawberry — aren’t as heat-tolerant as those containing more stable oils.”

Staniec adds that because many natural flavors are water soluble, they don’t work well in applications such as chocolate or gum that require oil-soluble compounds to maintain structural integrity and texture and deliver flavor through the confection base. “It’s more difficult to get the same impact with some natural flavors as with artificial flavors in a way that’s cost-effective,” she says.

When non-heat-stable compounds are overheated, flavor components break down, destroying the top notes. “Even extremely stable compounds such as orange or lemon can

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Blue Pacific Flavors, Inc.

## DEFINING FLAVORING PEDIGREES

THE FDA HAS ISSUED precise designations about natural flavors; however, the term “natural” spans a broad range of products. Although the label on the back of the package reads “natural flavor,” the front of the package reveals the true nature of the contents:

“Natural” means that all flavor components come from natural sources — the named source, such as mint. Pictorials can be used on the front label along with the words “natural mint flavoring” or “naturally flavored.”

“Natural, with other natural flavors (WONF)” indicates that all flavor components come from natural sources, but only some come from the named source. The label on the front can show a picture, but the descriptor must read: “natural mint flavoring with other natural flavoring” or “naturally flavored.”

In products with all flavor components derived from natural sources but that contain no flavor components from the named source, the front label must include the words “naturally flavored,” but cannot include a pictorial. **CST**

SOURCE: U.S. FOOD & DRUG ADMINISTRATION AND FONA INTERNATIONAL, INC

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develop furniture polish notes," Gallian says. Further, high levels of acidity can affect sugar crystal structure, which can be problematic in hard candy.

Consequently, flavor agents are normally added at the end of the manufacturing process. Bell Flavors & Fragrances, Inc. Senior Flavorist Cindy Cosmos explains: "You would need to use a larger amount of natural flavors in hard candy, and that can become expensive. However, a smaller amount of a synthetic flavor would work as well, and it costs less. In addition, artificial flavors have more components, so we can make more variations with them than with natural." For example, lemon can be reformulated to take on the unique qualities of Meyer or Ponderosa varieties; apple can be tweaked into apple pie.

## FACTORS AFFECTING FLAVORS

Much also depends on the ingredients to which the flavors are added. Smothers points out the amount of sugar in a mass affects mouth feel, while the type of acid used determines texture and flavor release. For example, natural extracts that degrade in hard candy remain stable in chewy or fruit gels, while some starch-based formulations distort flavors. She explains: "The matrix makes a huge difference in gum in terms of flavor released and how long it will last."

Virginia Dare Extract Co., Inc. Group Vice-President of Marketing Anton Angelich explains that if herbs, botanicals or nutritional ingredients such as vitamins or minerals are incorporated into snack products, masking agents might be needed to suppress off-notes. He adds that although there is consumer demand for natural and organic products, the price might not match what a majority of consumers are willing to pay because raw materials that are used in natural and organic flavors can often be inconsistent and present supply challenges.

Not surprisingly, cost also affects the choice of whether natural or artificial flavoring is used. For example, Smothers notes the chemical compound that gives a cherry its distinctive taste — benzaldehyde — is the same, whether the essence is natural or synthetic. However, she points out, naturally derived cherry flavoring is 20 times more expensive to produce than its synthetic twin — costs many manufacturers are loath to pass on to consumers or absorb.

One solution is to blend a small amount of the natural characterizing flavor with other natural compounds to ensure



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FONA International Inc.

consistent taste and stability. When supplies of natural ingredients are limited, natural alternatives enable manufacturers to cost-effectively meet commitments without compromising quality. FONA's Pugesek points out the flavor chemist's toolbox is fairly limited by the availability, cost and market volatility of natural materials; however, it expands dramatically as the available options increase.

Candymakers who want to convert to natural flavors need to consider not only the availability and cost, but whether the desired flavor will withstand the rigors of processing, as well as the costs related to product reformulation and the ability to match consumers' expectations. "A flavor profile is one thing; flavor impact — all those things flavor is supposed to do — is another," Pugesek says.

In addition, Angelich cautions that even when a combination of natural and artificial flavors produces a satisfactory taste and cost solution, it can backfire because to many consumers, "if it's artificial anywhere, it's artificial everywhere."

## MANAGING COMMODITY ISSUES

Maintaining a steady supply of consistently high-quality natural raw materials can be a challenge, flavor suppliers tell **Candy & Snack TODAY**, because orders are placed well in advance of delivery and agricultural products are susceptible to the vicissitudes of the environment, sustainability, political unrest and economic forces, putting at risk the ability to fulfill supply commitments.

Manufacturers such as Torie & Howard and Jel Sert have plans in place for weathering fluctuations in quality and supply; however, Burke adds: "Once a product formulation has proven successful, there can be no compromise on individual ingredients, especially natural flavors that

contribute so much to the identity and success of the product."

To fulfill obligations to their clients, suppliers develop demand and yield projections and set priorities and a strategic plan for emergencies, Augustine says.

Virginia Dare continually checks stocks of raw materials from its 2,000 suppliers and inventory reserves for quality throughout its shelf life, Angelich says. The key, he advises, is to work with good buyers, but adds the company has staff on site in Madagascar to oversee its vanilla interests.



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Parker Flavors

Parker recalls the years between 2000 and 2005 when wholesale market prices for vanilla expanded tenfold after suppliers in Madagascar were hit by a series of cyclones, post-storm speculation, a disputed election and a civil war. "It was a perfect storm, year after year," he says.

Noting vanilla has its own standard of identity and is regulated by law, Parker's strategy for meeting demand during this period included developing a line of alternate all-natural vanilla flavoring.

Although weather is a major issue, Parker cites a bigger consideration: sustainability. "We must provide market incentives for farmers," he says. "Vanilla is the number-one flavor, as long as we can keep it sustainable."

Flavor suppliers continue to grapple with supply and formulation issues as the demand for natural flavors grows. The bottom line, Angelich says, is: "They're what the consumer is asking for, and they are doable." **CST**