(Not) Lost in Translation

Employing raw material knowledge and parsing organoleptic vocabulary to deliver successful flavors

Dianne Sansone and Willy Palmer, Flavor & Fragrance Specialties

During a recent visit to our headquarters, *Perfumer & Flavorist* magazine editor Jeb Gleason-Allured developed a banana flavor. We presented him with a group of ingredients that were preselected and diluted to levels that were relatively equal in strength. Gleason-Allured had 10 colors in his palette, all of which belonged in the picture.

The requisite skill set to develop flavors requires knowledge and memory of the taste and aroma of hundreds of ingredients, their solubility, physical characteristics, and effect in combination. This article explores the technical complexity of developing flavors for companies in the current market. Today's flavorists have thousands of ingredients available for use. Their mastery of the ingredients is the expectation, the rules for entry into the profession, not the measure for their success. As with any learned skill, practice is required for mastery. Our flavor development staff tastes several materials every day. They taste each at different dilutions, smell them on blotters, and then discuss and take notes on their interpretation. The best flavorists we have worked with all have an attribute in common: the uncanny ability to verbalize a description of the ingredients so that others can recognize and remember it.

Developing flavors for incorporation into successful food products is the flavorist's goal, and their sale is the criteria for success. Unlike the perfumers across the hall, flavorists rarely have the opportunity to create fantasy or whim. Their task is usually to recreate nature or a culinary experience, yet ascertaining the consumer's expectation is difficult. Without training, consumers know what they like, but rarely can explain differences.

Converting Language into Organoleptic Targets

Interpreting consumer comments is a special challenge for flavorists. Consumers are not versed in a vocabulary to describe sensory attributes. Recently, we sought to develop a French vanilla flavor for coffee. Our market research determined that the consumer's expectation was not set by other flavored coffees; rather, flavored coffee consumers also are likely to consume milk-based beverages from coffee shops. The new target was a French vanilla latte with rich dairy components and a sweetener that both surrounded and softened a shot of espresso. We challenged our staff to develop flavors for brewed coffee that would meet this expectation. In focus groups, we separated the experience into eight different sections. When we asked if the flavor was creamy enough, the subjects overwhelmingly said yes, yet when we added milk and dairy notes, the product scored one full point higher. The panel wanted the product creamier but did not recognize that attribute.

The marketing expectation through the flavor development route is very complex. When a salesperson requests a creamy beverage flavor, our flavorists ask, "Buttery, dairy, milklike, carmellic, marshmallow?" In their chemist minds, of course, they are thinking "ethyl lactate, butyl butyryl lactate, diacetyl, acetoin, acetyl propionyl, methyl para tertiatry butyl phenyl acetate, dodecalactone delta, etc." While these materials are often lumped under creamy, they have very different attributes.

This communication difficulty in the flavor development process is frequently compounded by short lead times. During Gleason-Allured's visit, we explained that development time is condensed when customers visit with R&D for significant projects. During those meetings, our staff can employ successive iterations to demonstrate the changes achieved by isolating individual flavor notes. This removes a layer of interpretation and possible confusion by promoting direct dialogue.

French Toast: the Challenge of High Recognition Flavors

Developing flavors to match products that have a very strong recognition factor is exceedingly difficult. We use a model to determine consumer concerns and desires, to develop products to meet them, and a mechanism to

Go behind the scenes

To go behind the scenes with Sansone (lab manager and senior flavorist) and her colleagues as they troubleshoot a coffee flavor project, see "An Indulgence in Your Cup," *Perfumer & Flavorist* magazine, October 2008, page 48; or visit *perfumerflavorist.com/articles* and click on the October 2008 issue.

measure the success of the attempt. For example, we recently collected information about consumer expectations of sweet comfort foods. Data was collected from chefs and food industry experts and then confirmed with a broad population in an internet survey. Flavor profiles to match the selections were created and then altered using focus group input. Finally, success was measured by a strong intent-to-purchase response following a home-use product test by typical consumers.

Everybody knows what French toast is supposed to taste like, but the challenge for us was to develop a flavor that, when used in the proper application, would meet the consumer's expectation.

Our survey respondents highly recognized French toast as a comfort food, which we define as a food that imparts strength and hope, inspires a state of ease, and is usually associated with warm feelings. Everybody knows what

The Challenge of Organics and Natural Material Sourcing

The demands of developing markets are not always in sync with technology. Fortunately, in the United States, the Department of Agriculture's National Organic Program (*usda.gov*) defined many ingredient questions that were previously open to semantic interpretation. Unfortunately, the supply of ingredients suitable for natural flavors—and particularly organic flavors—is unstable and at times insufficient. Third-party regulatory agencies validate supply chain and compliance of these ingredients, but many items approved one year are not approved or available the next. Suppliers may choose to drop certification if the economics don't warrant maintenance of the ingredient supply. Others are denied re-approval when requests for substantiation are unfulfilled.

This limited array of ingredients and their questionable supply makes developing flavors suitable for use in organic food products difficult or sometimes impossible. To continue the painting analogy alluded to in this article, flavorists say making natural flavors is like painting a picture with only three colors, while making an organic flavor is like painting with three colors while balancing on one foot with one hand tied behind your back. Still, if the success of a flavor is measured by its use in products that sell, organic flavors are a necessity. Today's flavorists must be well versed in regulatory compliance as well as the aforementioned criteria. They must constantly be on the lookout for and test new products and sources for these specialized ingredients.

The vagaries of the quality and availability of natural ingredients requires the flavor chemist to occasionally replace the impact and characteristic of materials in short supply. Fluctuations in the naturals market—such as with vanilla and, more recently, the supply of grapefruit oil and lemon oil—place demands on flavor companies to maintain the supply of flavors for which ingredients may not be available. The project parameters here are to minimize label and spec change, maintain the profile's perception, and to keep existing products affordable for the customer and profitable for the flavor supplier. As a result flavorists are expected to monitor market supply in addition to their other responsibilities.

French toast is supposed to taste like, but the challenge here was to develop a flavor that, when used in the proper application, would meet the consumer's expectation. The application might not contain eggs, toast or butter. In this case we were after a flavor for a beverage. The flavorist's challenge then was to meet the consumer expectation using aroma chemicals and plant extractives rather than ingredients that were sweet, fatty and had texture.

While everyone believes they know what the expectation is for such a common flavor profile, there are variations shaped by childhood memories: cinnamon sugar or maple syrup; butter; white bread, whole wheat or challah? Mouthfeel is a key component of the flavor of French toast, but that was not available in the beverage application. In this case the flavorists had to work closely with the applications staff to get the aromatics similar to the real thing, build the sweetness level to a similar level of satiation as the target product, and then apply that in a beverage consumers would drink in large volumes without fatigue.

Safety Issues

Amid all of these technical challenges, consumer safety and concerns must be addressed. Adherence to regulatory policy and corporate concern for risk avoidance leads to yet more challenges for flavor chemists. Recently, diacetyl replacement in formulations has occurred at most flavor houses. Developing a drop-in replacement for ingredients which have been deemed unsafe does not always fill the gap. Few ingredients are as characterizing as diacetyl. Rebalancing formulas or substituting ingredients, while still adhering to cost parameters, may be necessary. This work is expected of flavorists, yet budgeting lab time for the work competes with new product development, which can add revenue.

Not long ago, flavorists merely developed new flavors. Today, flavors taste better than ever, are safer than ever, and have more arduous requirements for stability in various bases than ever before. Flavorists still develop new flavors, but now they must also balance the demands of modern business. Doing so, they must have a wide vocabulary of raw materials, be able to translate consumer and client feedback into organoleptic targets, and continuously adapt to changes in regulations and ingredient availability.

Address correspondence to Willy Palmer, executive vice president, Flavor & Fragrance Specialties, 3 Industrial Avenue, Mahwah, NJ 07430; w.palmer@ffs.com.