

From Idea to Execution: A Recipe for Food Product Innovation

How research chefs contribute culinary expertise to technical teams in the quest for successful product development.

Research chefs play a unique and crucial role within flavor and consumer product manufacturers, combining expertise in food science, culinary techniques, research and development, and trend hunting to drive successful product development.

In practice, research chefs throughout the industry cooperate with flavor chemists, applications staff and food technologists in product development, the formulation of benchmarks, identification and leveraging of trends and local tastes, customer presentations and more.

Fast-paced Development

“It’s a team effort,” says Christopher Warsow, corporate executive chef at Bell Flavors & Fragrances. “Marketing, science and sales all get involved to get a flavor from an idea through to production and sales. It takes a lot of moving parts to get that to completion.”

Research chefs work to create gold standards of key food items such as demi-glace, says Warsow. The gold standard, in this instance, would maximize roasted, toasted and umami facets of the demi-glace, against which flavor chemists would compare an array of aroma chemicals to create a matching profile.

“Chefs develop gold standards (benchmarks) and present them to our flavorists and food scientist so they become familiar with the bench marks,” says Kevin McDermott, senior research chef at International Flavors & Fragrances Inc. “In the case that the flavor chemist doesn’t have the tools to match the benchmark, we conduct further analysis through our research team. This may involve headspace and other analyses to determine what flavor compounds make up the target. The flavorist reviews the analysis and builds flavors accordingly. When the flavors are developed they are reviewed alongside the benchmark to determine how close it has come to the target. We work very closely with our food scientists in a similar way, except that in most cases it involves applying the finished flavors in a well-rounded base that is applicable to our clients’ needs.”

“The chefs know the ingredients and the recipes,” says Willy Hajdarevic, senior flavorist and team leader for culinary flavor creation for Mane in Le Bar-sur-Loup, France. “They explain

More on Research Chefs and Trends

Chris Warsow and Kevin McDermott will speak as part of the 2014 annual meeting of the Flavor and Extract Manufacturers Association, May 4–7 at Marriott Marco Island, Marco Island, FL. For more information, visit www.femaflavor.org/events/.



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how ingredients work together, what their interactions are and how they’re cooked. We as flavor chemists have our own tools ... to reproduce that original recipe.”

In addition, says Hajdarevic, chefs play a central role in understanding markets. Chefs will be sent to a specific region to work with local chefs to learn how they develop recipes, what ingredients they use and what cooking techniques they employ.

The pace of projects has increased in recent years, Warsow says, adding, “There’s the old adage that ‘if I needed it tomorrow I would have ordered it tomorrow.’ We work at a pretty fast pace. We don’t have time for flavor chemists to do basic chemistry and research to figure out [a project]. You have to have rapid turnaround because trends and people’s tastes are changing.”

Changing Role

“The role of the research chef in a flavor house or food manufacturer has really changed over the last 15 years,” says Warsow, who has a background in organic chemistry and food chemistry.

In the past, chefs tended to come to flavor and consumer product teams from traditional restaurant backgrounds.

“Sometimes that didn’t work out so well because they didn’t have that science background,” says Warsow. “They [traditional restaurant chefs] were very creative, but weren’t able to relate to the scientists. Now, research chefs have more of a food science, chemistry and culinary arts background. That helps with the interaction with the scientists because they can speak the same language.”

Having this shared language allows research chefs to communicate clearly with flavor chemists in the midst of developing flavor profiles.

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Bell Flavors & Fragrances

Changing Nutritional Profiles

The ever-growing scrutiny of ingredient labels and diet trends continue to reshape the product development processes, says Warsow.

“You have to think with the end [product] in mind now,” he explains. “When that consumer picks up that package in the grocery store and looks on the back of it you have to be in their mind, what they’re going to think when they look at this package.”

Much of the work undertaken by chefs and the rest of the product development team may focus on boosting the actual and perceived nutritional value of foods. This includes delivering natural flavors, despite that artificial flavors are in no way inherently harmful, and developing reduced-sodium formulations. In the arena of sodium reduction, formulators are increasingly pressed to omit flavor-friendly standbys such as monosodium glutamate (MSG), and disodium inosinate and guanylate.

“People want to formulate those [ingredients] out of their products,” says Warsow. “Sodium reduction is the holy grail of food formulation right now. There really is no one-size-fits-all [solution] for all products. It really takes a keen flavor chemist, chef and applications person to reduce the sodium in products.”

Gary Patterson, principal research chef and manager of culinary development at McCormick, says, “Working toward a balance of flavor using herbs and spices, along with flavor ingredients such as acids, research chefs work with product developers to take the consumer’s taste buds to a different, better place, allowing the food to deliver on flavor while reducing our reliance on salt, sugar and fat. Many ethnic flavor profiles traditionally deliver flavor by adding herbs and spices in the right combinations. For example, combining varieties of chilies, herbs and citrus with roasted or toasted cumin delivers high flavor and aroma with little or no added sugar, fat or salt.”

“Herbs, spices and umami are all good choices for developing products with less salt, sugar and fat,” says McDermott, who adds that IFF has developed a portfolio of health and wellness solutions under its FlavorFit brand.^a “Some of these tools include solutions to improve mouthfeel in products with less sugar or fat.”

“Chefs help us understand what those ingredients [salt, fat, MSG, etc.] bring in the recipe,” says Hajdarevic. “Our job, for example, is to reduce salt with internal tools without compromising the taste of the product, to get the same profile.”

The chefs, he adds, can then help the technical team validate its work to better understand what is achievable from a sensory point of view.

Even as teams work to address established health and wellness needs, new ones continue to emerge. For instance, says Warsow, many consumers, perhaps already having adopted gluten-free diets, despite that they do not suffer from celiac disease, are beginning to expand their dietary omissions.

“The latest [trend] I heard of was the allergen-free diet, avoiding all the big allergens,” says Warsow.

This diet, which capitalizes on the perceived health benefit of avoiding any food allergens, foregoes such core food ingredients as milk, eggs, peanuts, tree nuts, soy, wheat, fish and shellfish. The challenge for product developers in creating alternatives is clear.

New Techniques

“An example [of a new/emerging cooking technique] is an item that is cooked slow, as in sous-vide, and then is quickly browned and presented at service,” says McDermott. “Also, the use of alternative sauces, not just mother sauces anymore, such as wine reductions, juice reductions and vegetable reductions [that are] reduced or thickened with alternate starches.”

The new cooking processes applied to product development are aimed at maximizing freshness, flavor and safety, says Warsow. For instance, high-hydrostatic pressure processing (HPP) and ultra-high-pressure processing can be applied to ready-to-eat meals, meats, products comprising fruits such as tomato and avocado, and even oysters. Using pressures up to 87,000 psi, the technique can extend microbiological shelf life and freshness, and improve appearance, texture and nutrition without thermal degradation. Applying HPP in a sous vide process allows product developers to cook foods for longer periods at relatively low temperatures, which allows for even cooking and moisture retention. Warsow explains that sous vide is ideal for pulled pork or carnitas-type products. However, because sous vide does not allow for the development of seared, roasted and Maillard reaction notes, they must be supplemented by the flavor chemist team. This allows product developers to give a slow-roasted-type profile without undergoing the slow roasting process.

Patterson says that consumer expectations are evolving and being shaped by slow cookers in the home, exposure to sous vide in restaurants (and slowly coming to the home), and precision cooking techniques for gums and starches for sauces.

He adds, “Compact kitchens at home and foodservice venues require creative, cross-functional ways to develop flavors in smaller spaces and make the most of each and every ingredient that is available. A perfect example is the use of teas for marinades, desserts and cocktails.”

In addition to slow cooking techniques, customers are looking to minimal processing.

“We have a real back-to-basics [trend],” says Clément Buvry, culinary development chef (Europe, Middle East, Africa) and savory application technologist for Mane. “You don’t want a lot of processes around your ingredients. We want to apply simple processes to simple products.”

These techniques, says Buvry, include smoke and barbecue flavors. Smoke flavors contain wood smoke, a traditional process that provides a desirable flavor profile.

New Trends

The way trends develop is changing rapidly, according to Warsow. In a traditional model, research chefs and their colleagues might look to gold standards coming out of fine-dining restaurants, which would eventually trickle down to the casual dining, fast food and consumer packaged goods categories.

^aFlavorFit is a trademark of IFF

Today, the advent of pop-up restaurants and food trucks, and the spread of information via social media, afford consumers an easy opportunity to experiment and share experiences, which drives a rapid pace of emerging trends. In addition, marginal trends can quickly rise to prominence if a major consumer goods company decides to incorporate a relatively obscure flavor profile into a conventional product such as a potato chip, in effect driving new trends.

Currently, Warsaw sees potential for Peruvian cuisine. In the wake of Peru's national grain, quinoa, becoming a global phenomenon, other flavor profiles offer promise. For consumers seeking a "new heat experience," Warsaw believes aji amarillo chilies offer an appealing novelty. Other Peruvian profiles include chicha morada, a type of purple corn tea incorporating cinnamon, clove and sugar, and kola champagne, a carbonated local favorite that has a flavor that is part cream soda and bubble gum.

McDermott, a member of IFF's global team of chefs and culinary experts, says, "The team is in constant communications regarding trends in all the regions, and we frequent restaurants both high-end and down and dirty authentic. We have resources that are instrumental in providing ideas to the team around the world, such as a dedicated blog, daily messages with culinary reads, trade shows, ethnic markets and farm stands.

Looking at notable trends, McDermott has identified the following:

- Natural—minimal is preferred
- Fermentation/brining/pickling
- Do-it-yourself when it's possible
- Locally sourced
- Pick it fresh and preserve it to capture the freshness
- Natural sources of umami (glutamate from mushrooms, aged cheeses, tomatoes, etc.)
- More vegetable options with rising protein cost and popularity of grains plus vegetables

Hajdarevic's team works with marketing staff and chefs to identify and respond to trends.

"As a chef, I have to find all the new trends in Michelin-starred restaurants, new ingredients they're using, and translate that for the flavorists and marketing to find an industrial way to explore those trends," says Buvry.

Buvry explains that sourcing food products locally is a culinary trend that is currently making its way into the consumer product world.

"People like to buy things that are produced locally, such as ingredients, raw materials and vegetables," says Hajdarevic. "People want to know where it comes from, so transparency is important."

Showing customers that flavors can be produced using locally sourced materials has been a key project in the last couple of years, says Hajdarevic. This includes natural extracts, particularly meat, in the wake of Europe's 2013 meat adulteration

scandals, which centered around undeclared meat such as horse and pork. As a result, says Hajdarevic, Mane has developed a range of meat flavors for customers with meat sourced in France for maximum traceability.

Buvry has also witnessed an uptick in the influence of cuisines from Peru, Brazil and Mexico, which offer consumers new tastes, including unique pepper profiles.

In addition, says Hajdarevic, there is a big trend for flavors that are "interactive."

"People want something that is more exciting, dynamic" he says. "It's not only simple flavors. It's a whole experience."

For instance, formulations may be developed so that end products yield different flavors throughout consumption via encapsulation technology, and even visually signal flavor types—what Hajdarevic calls "flavor you can see." This "multi-sensorial approach," he says, is highly appealing to consumers and customers.

"Our culinary teams collaborate with trend trackers and food technologists, among others, globally to identify the trends and cutting-edge flavors that will emerge in the following few years," says McCormick's Patterson. "We also expand our research to focus not only on culinary and food trends, but overall consumer trends. This broad view helps us to create exciting new flavor experiences for the consumer. For example, chefs find inspiration by combining two industry trends to create one new, exciting taste innovation.

Patterson says that the company's flavor trend research has identified the unlikely hybrid called "Greek udon noodle salad," which comprised Japanese udon noodles and katsu sauce with the typical ingredients found in a Greek salad. Other trends include retro cocktails in recipes such as a "dirty martini steak kabob," which makes use of dry vermouth, mustard seed and olive juice.

"The world is craving heat in a big way," says Patterson. "There are hundreds of varieties of chilies grown throughout the world, each with their own unique flavor characteristics, heat levels and uses. Chiles from Mexico, Asia, South America, Africa and India are leading the way. Beyond just discovering new chile varieties, this obsession has extended into using techniques like grilling, smoking, pickling, fermenting and candying to tease out their flavor potential. Chilies to watch include the guajillo and chile de arbol from Mexico, aji amarillo from Peru and the hot Szechuan chile (*Tien Tsin*) from China.

He adds, "Indian food is finally having its global moment. Already familiar with basic curries, people around the world are taking their appreciation for this richly spiced cuisine to the next level, exploring more flavors in new contexts, from food trucks to fine dining. Americans are exploring Indian flavor profiles in approachable everyday fare such as salads and sandwiches. A notable Northern Indian spice blend is Kashmiri masala, which contains cumin, cardamom, cinnamon, black pepper, cloves and ginger. Similar to garam masala, Kashmiri masala is a fragrant blend of spices from the region of Kashmir and is used to season lamb dishes such as the classic rogan josh, chicken curries and vegetables. Many Indian home cooks have their own unique blend and roast the spices."

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