The Cereal and Bakery Segments Get a Wakeup Call

As suppliers drive more innovation for their customers, they confront increasing demand for added value and healthier and more targeted products.

The boom in convenience foods comprises breads, donuts, pizza, pastries, cakes, biscuits and gourmet products, according to Global Industry Analysts.

For many flavor companies, the days of serving clients by simply delivering a new strawberry flavor are over. Today, customers require their suppliers to provide complex flavor and food systems and even complete product prototypes. This is particularly true in the bakery and cereal segments.

One of the reasons for this change is that consumer product companies are no longer looking merely to add line extensions or "make the grocery aisle any longer," as T.J. Widuch, executive vice president and head of the grains team at FONA International, puts it.

"There has to be a value added in terms of those deliverables," says Widuch. "Those could be added ingredients [such as] protein, fiber and whole grains. Those could be what is taken away, a cleaner label statement." (See: **Whole-grain Challenges**.)

Every claim of the final product, he says, is a message to the consumer. The more messages, the larger the potential consumer base for that product. Organic, non-GMO, whole grain, gluten free—every product promise is another opportunity to connect with consumers.

Customers may want the final product to be declared gluten-free and/or bear labels from groups like the U.S. National Organic Program and Non-GMO (genetically modified organism) Project. The goal, Widuch explains, is to bestow products with a consumer-recognized value-added differentiator. This is not always easy.

For example, says Widuch, if a company wishes to incorporate honey into a product and have that product certified non-GMO, the challenges are vast. (See: **GMO-free Challenges.**) The non-GMO honey cannot be comingled with conventional types and the pedigree of the bees must be verifiable. This attention to detail is required for every ingredient along each step of the supply chain.

"There's a lot more work between the flavor company and the cereal company to deliver on those," says Widuch.

At the same time, he says, customer budgets are tight and R&D teams are stretched thin. Increasingly, they are turning to their supply chain to innovate on their behalf. As a result, customer briefs often seek finished product concepts, analysis of market white space and other innovations. In this new environment, a win by a supplier requires a greater degree of accuracy.

"The number of new concept ideations that delvier full concepts, not just delivering new flavors, has increased more than tenfold," says Widuch.

Cereal Market Figures

The evolution of cereals' nutritional profile has accompanied a 2.1% decline in U.S. growth (2009–2014), totaling $11 billion/year, according to IBISWorld (*www.ibisworld.com*). While the cereal category benefitted during relatively lean times following the Great Recession, it was conversely impacted as the economy improved.

"During the five years to 2019, revenue performance is forecast to improve compared to the previous five-year period," the report adds. "As the economy continues to recover, per capita disposable income is anticipated to increase, resulting in mixed demand for cereal products."

Meanwhile, the European Breakfast Cereal Association (*www.ceereal.eu*) estimates that Europe's breakfast cereal industry is worth more than €4.5 billion.

A 2013 Mintel report (*www.mintel.com*) estimated that U.K. sales totals of breakfast cereals rose 4% in 2012, totaling £1.6 billion, even as volumes fell 1% in the period. Sales of breakfast cereals achieved growth of 4% in 2012, while volumes declined by 1%. Ready-to-eat products accounted for about 85% of the overall total.

On a global scale, the breakfast cereal industry achieved valuation of $28 billion in 2010 on 4% annual growth, according to

A 2013 study in the journal Procedia Food Science reported that sugar and sodium levels in existing ready-to-eat cereals fell 7.1% and 11.2%, respectively, between 2005 and 2011, while fiber levels increased 13.4%.

MarketLine (*www.marketline.com*), led by markets such as the United States, United Kingdom, France, Spain, Italy and Russia. "Ready-to-eat cereals represented the leading market segment, generating almost $24.5 billion in 2010 to account for more than 87% of the overall market in terms of value," MarketLine reported.

With continuing 4% annual growth, the global breakfast cereal segment could achieve sales of $34 billion by 2015, driven by healthy eating habits and a search for healthier snacking options, which continue to spawn organic and specialty food products, according to research from Global Industry Analysts (*www.strategyr.com*). However, ready-to-eat cereals continue to face competition from on-the-go cereals, hot cereals, cereal bars, breakfast biscuits, pastries and other breakfast food alternatives that may offer greater variety and/or portability.

As analyst Heidi Lanschützer explained in Mintel's 2013 report, "Considering the widespread associations of protein and building muscle, protein-focused recipes could also help to boost usage of cereals before or after exercising, with usage on these occasions so far remaining niche."

Boosting the Health and Wellness Profiles of Cereals

The ready-to-eat breakfast cereal landscape is shifting in line with broader trends in health and wellness. A 2013 study in the journal *Procedia Food Science* reported that sugar and sodium levels in existing ready-to-eat cereals fell 7.1% and 11.2%, respectively, between 2005 and 2011, while fiber levels increased 13.4%.[1]

"Whole grain ingredients were found in at least 2/3 of the cereals examined," the authors explained. "Trends observed in this important breakfast category demonstrate positive changes in the nutrient composition which may have an important impact on public health."

The *Procedia* authors' findings paralleled those of the European Breakfast Cereal Association, which reports, "Most breakfast cereals today contain small amounts of salt per portion and contribute less than 5% of the average daily intake of salt."

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> —T.J. Widuch, FONA International

Manufacturers are also boosting the nutrition profiles of cereals by incorporating trans and hydrogenated fat alternatives, as well as superfruits, while providing consumers with gluten- and acrylamide-free products.

Cutting sugar and fat has practical consequences aside from the nutrition label. Typically, says Widuch, flavor is added to a cereal system via a sugar coating or an oil/fat spray. And so the challenge for flavor suppliers is to deliver consumer-appealing flavors without these crucial tools.

As alluded to by the *Procedia* authors, many cereal manufacturers have cut sugar levels in the majority of their SKUs [stock-keeping units] from the 13–16 g/serving range to about 9 g/serving. Eventually, this could be cut as low as 6 g/serving, says Widuch. Sweetness impact and overall flavor quality will be greatly challenged by such cuts. This is not an overnight change, but rather something that will have to be developed and implemented in stages.

Widuch explains that the consumer is not concerned with the technical challenges raised by reduced sugar or fat levels in products. They want such products to taste just as delicious as any conventional offering.

"The parameters for what is good hasn't changed in the consumer's mind," he says. "They want reduced sugar and for it to taste just as good."

GMO-free Challenges

This past January, Post Cereals announced that its Grape-Nuts cereal would be issued in a verified non-GMO version. That same month, General Mills announced that its original Cheerios would no longer contain GMOs. The moves were the latest in a rising tide of high-profile reformulations in the wake of non-governmental organization criticism and consumer petition drives based less on science than on perception. However, they don't tell the whole story.

There is general consensus that there are insufficient supplies of available non-GMO crops—including corn and beet sugar—to support the non-GMO reformulation of all brands and products. The challenge is equally great when one considers the flavorist's palette. Of the several thousand ingredients on the Flavor and Extract Manufacturers Association (*www.femaflavor.org*) generally recognized as safe (GRAS) list, only a few hundred are verified non-GMO. If a formulator needs to use only those materials that are both non-GMO and organic, the list shrinks even further because not all organic ingredients are non-GMO-verified and vice versa.

While niche brands may go wholly non-GMO, the largest consumer product manufacturers operate on a scale that does not allow them to divert all production away from conventional GMO crops. As a result, large cereal and bakery companies have reformulated a portion of their product portfolios in non-GMO versions to meet the needs of a segment of its consumer base while simultaneously reiterating that GMOs continue to be safe for use.

Customizing Flavor Profiles

Customers are optimizing SKUs in the marketplace for targeted groups of people, says Widuch. For example, he explains, a brand may not launch a product to be universally marketed to the entire European Union. To be successful, a chocolate flavor profile in France will have to meet local tastes and be distinct from that of, for instance, Belgium. The customer companies are fine-tuning their formulas based on the local preferences to maximize impact. In some cases, sensory may determine that a universal launch is possible. In others, several variants may be more successful.

Flavoring large pieces of whole grain cereal requires flavor delivery throughout the individual pieces to counteract the off or bitter notes of the grains.

Bakery Market Figures

The global bakery products market is estimated to reach $447 billion by 2017, according to Global Industry Analysts, led by increasing urbanization of consumers and accompanying demand for convenient and mobile food options. The boom in convenience foods comprises breads, donuts, pizza, pastries, cakes, biscuits and gourmet products, according to the research firm.

The European Union's combined bakery and cereal market is valued at about $185 billion, according to Business Insights (*www.business-insights.com*), with growth driven by increased demand for baked goods.

Meanwhile, the American Society of Baking (*www.asbe.org*) notes that the U.S. commercial baking industry has estimated annual revenues of almost $97 billion.

The increasing demand for healthier foods is driving growth in the frozen bakery additives market, including flavors, notes a 2013 R&R Market Research (*www.rnrmarketresearch.com*) report. The research firm estimates the size of the global frozen bakery additives market to reach $1,469.7 million by 2018, supported by a 6.8% compounded annual growth rate. The growth is also being attributed to product launches and increased volumes in Latin America and Asia, in addition to expansion in more mature markets.

As with cereals, the baking industry is generally focused on sodium, sugar and fat reduction, while limiting calorie totals and incorporating healthy ingredients such as whole grains.

Business Insights cautions, however, "In the European Union, evolving health claim regulation is likely to prove an obstacle to the expansion of the functional bakery and cereals products market."

There are formulation challenges associated with functional ingredients as well.

"A lot of those functional ingredients bring off notes that have to be masked or covered over," says Widuch. "And a lot of those functional ingredients may interact with the flavor itself. If you add high levels of protein to a baked good or handheld bar, the protein, over the shelf life of the product, binds up the flavor's aromatic chemicals and doesn't let the flavor release. So [formulators] try to find a way to protect or segregate the flavor from the other ingredients and add more [flavor] than you would typically want to counteract those off notes."

In the case of a handheld bar, formulators have found ways to incorporate flavor into several areas of the product to maximize flavor impact and consistency. Flavor touchpoints can include the binder, such as a sugar matrix, the bar's topping, and an oil-soluble flavor added directly to the bar's ingredients.

Bakery: the Impact of Health & Wellness

"In the bakery world [there are] two avenues that people are looking for, indulgence or health and wellness," says Courtney Cusat, senior technologist at Firmenich. "Both of those trends are still growing. Ultimately, people still want products to taste delicious and to satisfy their sweet cravings . However, from a nutrition perspective, it continues to be about the presence of positives or absence of negatives. People are looking for satiety, added whole grains, fibers and protein while also trying to reduce calories, sugar and sodium."

As a result pea and other novel protein sources are being added to products to upgrade nutritional profiles and allow manufacturers to make healthier product claims.

"It's more challenging to cover up [those proteins]," says Cusat. "These ingredients, which aren't necessarily part of the original formulation of the product, can significantly affect the overall flavor profile. And sometimes they contribute off notes, such as bitter and earthy, or have a lingering aftertaste. Our challenge is to mask those off notes by developing flavor solutions to restore the taste of the original product."

"While the health and wellness trend is nothing new," says Cusat, "we are glad to see an improvement in the quality and refinement of healthier ingredients, such as finer ground whole wheat flour and faster dissolving fibers."

This makes it easier for food developers to boost their nutritional claims by incorporating greater amounts of healthful ingredients into products without sacrificing on flavor and other sensory attributes.

Gluten-free Integrity

The gluten-free category has been particularly strong in the health and wellness arena, showing ongoing growth, says Cusat. The major challenge for formulators in this area is texture and flavor. As a result, flavor companies have developed solutions such as flavor maskers to counteract sensory issues.

"Gluten-free is probably the most prevalent [trend] right now," says Widuch. "When done right it's difficult."

The main challenge he outlines is the need to guarantee that the entire supply chain adheres to gluten-free practices, ensuring customers can feel confident telling their consumers that their products are indeed safe for consumption by those suffering from celiac disease. Ingredients may be assessed at multiple points in the process to confirm their gluten-free status. Validation and verification is crucial in this and other free-from allergen products.

Whole-grain Challenges

Boosting the level of whole grains in bakery and cereal products is crucial for manufacturers.

"The more whole grains you add, the more you're going to get the grainy, bitter and off notes," says Widuch. "When you refine grains into fine white flour there's almost no taste to it. With whole grains you have to accentuate, cover and mask [various] notes quite a bit."

If a whole-grain product also incorporates added protein or vitamins, the technical challenges multiply.

Meanwhile, says Widuch, "When [manufacturers] are adding multiple grains and whole grains to products you'll notice that the pieces are getting a thicker texture and getting bigger. You're seeing fewer small pieces and more bite-size and morsel-size pieces. As we include more whole grains and protein … to make the nutritional panel more appealing, there's more and more of the taste that it impacts."

It is challenging to flavor such products efficiently, he explains, because typically flavor is delivered in a coating on the outside of the cereal. When larger whole grain pieces are chewed, the sugar and flavor on the outside is overwhelmed by the volume of exposed grains. This is difficult to resolve merely through masking, and so the solution is to find ways to deliver flavor, taste and sweetness all the way through the individual pieces. Success is measured not only by overall flavor quality, says Widuch, but by flavor consistency throughout consumption.

Improving Nutritional Profiles

The sodium reduction movement originally focused on obvious targets, including crackers and topical seasonings. Today, consumer awareness has expanded to other categories.

"Reducing sodium is becoming more relevant in bread products or baked goods where consumers were not aware of the high sodium content," says Cusat. "Our clients have been getting ahead of this need by reducing sodium where they can."

Widuch notes that partially hydrogenated oils (PHO) are being removed from prepared bakery formulations in anticipation of actions on the part of the U.S. Food and Drug Administration. This impacts frozen and refrigerated dough and pre-made bakery items, among other products. The PHO is being replaced with alternatives such as palm oil, which contain high levels of saturated fat, which affect the taste and aroma profiles of products, in addition to the release of salt.

"How do I develop the same good taste when I don't have the [PHO] that let everything release," says Widuch.

The removal and replacement of PHO in products will be a multiyear process. Bakery companies are taking a proactive approach to working with suppliers ahead of any official government action.

Natural and Clean Label

"People are becoming a lot more active in their search for foods," says Cusat. "They are becoming more educated in the area of food and ingredients from watching food shows and reading food blogs. They are interested in buying local or more natural food products and are inspired to cook at home. When they do purchase additional foods like snacks, desserts, cereals etc, they are reading food ingredient statements to see if they recognize ingredients that they would find in their pantry or can pronounce. We're getting many more requests for natural flavors than ever before."

While not all cereal or bakery manufacturers are going all-natural, a key constituency of these product segments have, Widuch explains. Kids' brands of cereal may have natural and artificial flavors, while a more adult-positioned brand may use natural flavors as one of its core selling points. Conversely, he says, the hand-held bar market has largely shifted to natural flavor systems.

"They don't want big words or chemical-sounding words [on the label]," he explains. "It doesn't matter if it's a kids' SKU known all over the world or a fringe SKU—they don't want those ingredients on the label. Clean label claims are becoming huge in our marketplace. Consumers are becoming more and more conscious of what's on the label. [Customers] want those triggers on the label to grab every part of the marketplace that they can."

Staying On-trend

The way technical teams function has remained the same, even as they respond to evolving customer and consumer demands, says Cusat. What has changed is the group's focus on staying ahead of trends.

"We have a great marketing team who keeps track of all the emerging trends," says Cusat. "When new products come out on the market in one area, we know that the flavors and ideas will translate into other products. It's always about trying to stay ahead of the trend in our category. As we see different products appear on shelves, we train ourselves to know how things should taste."

To keep on-trend, Cusat and her colleagues go on trend excursions and work with research chefs to understand and meet gold standards.[a]

Technical Solutions

Cusat and her colleagues address formulation issues with several tools, including the trademark Flexarome encapsulation technology, which protects aromatic ingredients through the baking process in order to deliver a fresh, authentic flavor upon consumption.[b] These encapsulated products are moisture-resistant and thus feature extended shelf lives. They can also be colored and used as baking inclusions.

The group also uses masking ingredients to counteract off notes and enhance overall flavor perception in proteins and whole grains. In addition, to lower sugar in formulations, Cusat and her colleagues use the company's TasteGEM products in reduced sugar formulations to restore food and beverage taste profiles.[c] The group also has access to salt enhancers like SaltPrint[d] for lowered salt formulations. These technologies can be applied alone or in combination, depending upon the demands of the project.

Controlled release of flavor is one of the areas Widuch and his advanced technology team are focused on in the quest for better tasting products. This involves many questions. When and where is the flavor going to be released? For example, will it be released when a bakery mix is placed in the oven? Will it be released during mastication? Each scenario has its own technical answer, including spray-dry encapsulation and multistage encapsulation for release during several stages of a product's life (ex: baking, followed by mastication).

Taste modification is also crucial, says Widuch. Rather than apply a strictly trial-and-error approach in which various masking flavors are paired with functional ingredients until the intended result occurs, technical teams are assessing the actual chemical makeup of additives such as vitamins to modify or recondition a consumer response. A basic example is the use of vanilla to boost sweet perception without the addition of sugar, or adding a maple note to a product to enhance salt perception (at least for U.S. consumers).

As the demands of the marketplace continue to evolve, the technical and creative solutions needed will shift to meet them.

References

1. RG Thomas, PR Pehrson, JKC Ahuja, E Smieja and KB Miller, Recent trends in ready-to-eat breakfast cereals in the U.S. *Procedia Food Science,* **2**, 20–26 (2013)

[a]Read more about the role of research chefs in flavor and product development on Page 24 of the March issue of *Perfumer & Flavorist* magazine; *www.perfumerflavorist.com/magazine/pastissues/*

[b]Flexarome is a trade name of Firmenich

[c]TasteGem is a trade name of Firmenich

[d]SaltPrint is a trade name of Firmenich