Innovative Baking

Baking has been around for all of recorded history. Innovation is the creation of something new that has not been made or done before. To this, you need to add something “of value” for the consumer. We can make a dense gooey mass that is tough as nails but is it innovation? Only if you have a customer or an application for it; every new product needs a market.

How do you come up with something new in baking that hasn’t already been done in the previous 4,000 years? Over the past 300 or so years, we have begun to understand more about what goes on in a loaf of bread and why, or more often than not, why not. Like space probes or the ability to look at ever-smaller particles, this raises more questions and presents more opportunities than it answers. With this new understanding, or rather, vision, of possibilities, the opportunities for innovation should be everywhere.

What Is Innovation?

What does the consumer value? This is the $64,000 question. With the further understanding of our world around us, from ingredient sources to composition to function to human nutrition, the choices for consumers have become limitless. They are not afraid to ask “What about this?”; “Can it do that?”; and “Can it taste great, be good for me, and have no calories?”

The obvious values are first, quality, and second, value. Here, quality is defined primarily as having good taste and meeting the expectations of the consumer. Value is the product having quality, and giving the consumer what they want at a reasonable price. What comes after this? Marketing calls R&D at 4:30 p.m. on Friday afternoon with this answer.

How do you, the developer, see the possibilities? The innovator has to then ask the question, “Given this knowledge, what can we do with this?” Or, to add another level of complexity, “What if, in combination with ‘this other speck of knowledge’ can we do with this, or how can we get this result?” or “What does the consumer value that could be made with this new knowledge?” R&D should never get bored with these questions always hanging out there.

Innovation in Ingredients

The world has become a smaller place. Ingredients are now sourced from as far away as the other side of the world. Where and what ingredients come from has expanded to the limits of our imagination (e.g., omega-3s from algae; various chain lengths of fiber from different carbohydrate sources with the use of enzymes; or, interestification, the reshuffling of the fatty acids in a fat or blend of fats to produce a low-trans fat functional shortening).

When looking for an ingredient, the questions—“What about this?”; “Where do we find this?”; and “How can it be modified?”—come to mind and can keep the innovator busy for years.

An interesting exercise for this was looking for protein to use in a particular application. First, you ask what sources of protein are around (that can be reasonably extracted)? Then, How can it be modified to function better in your product? There are hundreds if not thousands of options to look at. The next challenge for the R&D person is to setup some kind of protocol to quickly and accurately test these to screen out the 90+% of possible proteins that won’t work in your product.

The next level of complexity is to understand how these ingredients function in a finished product or in another ingredient. For example, the blending and hydration of sugars, fibers, and gums to make crumb softeners for longer-shelf life products; or the use of emulsifiers to give a shortening more softening or tenderizing functionality, thus allowing for lower fat usage and lower calories in a product. Often times, it is not just a matter of blending these ingredients together. They require their own special process to be blended or combined or they will function differently. However, with these blends, ingredient labeling can become an issue with some markets, thus limiting what ingredients you can use.

When incorporating a new ingredient into a product, especially one that will get broad distribution, make sure there is an adequate supply of the ingredient, preferably from more than one supplier. This happened in the sugar-free days of the late 1990s. A particular type of maltitol was the polyol of choice for baking. Although there were large quantities available when development started, by the time it was needed for production it was available on an allocation basis only. This really cramped the launching of the product.

What’s New in Ingredient Innovation?

The big new innovation fronts are still genetic modification and nanotechnology. With any innovation, the question of safety comes up. For GMOs, time will answer this, rather, is answering this, from human health and environmental perspectives. For nanotechnology, its safety needs to be and is being explored much more deeply. Research shows that, at such small sizes, chemicals or compounds react and are absorbed differently by other substances and tissues. The questions I have are: Once made, are the substances here to stay in the environment or tissue only to be passed around when consumed, or will they breakdown or coalesce and become bigger particles that are less reactive with the environment? These are questions that need to be answered with each nano product.

Another area of ingredient innovation is the exploration of uses for waste products of different processes (e.g., whey protein from cheese production, betaine from sugar beet waste, etc.). The more
you know about your ingredients and how they are made and processed, the more opportunities you may become aware of.

From the ingredient manufacturer’s side of the equation, it can pay to understand what you are throwing away and make a connection with knowledgeable people in the various food areas to see if there is anything of value in what you throw away. It could provide a new profit stream.

**Process Innovation**

“It’s always been done that way” is a familiar comment coming from the processing floor. Screening new ingredients can be relatively inexpensive to do, while trying a different process can be very expensive. The payoffs can be tremendous though. Coming up with more efficient means of making something, while the rest of the industry is doing it the way it’s always been done, gives you a cost advantage. This can be a life-or-death difference for a company or its competitor.

In process innovation, another cost to consider, besides the equipment investment, is getting an accurate measure of the improved throughputs. Is it enough to justify the cost of the change? What is the payback period? To improve one part of the process—speeding it up especially—you have to understand the bottlenecks up and down the line. These costs have to be put into the equation to calculate when to implement a new process or if it is even worth doing.

The other aspect of process improvement is confirming that product quality has not changed. If the product quality is affected you need to understand how so and if it matters to the customer. This can be very dangerous territory and needs to be thoroughly understood. This too can be a life-or-death decision for the company.

**Product Innovation**

This brings us back to the $64,000 question: “What does the customer value?” This depends on knowing your market and understanding it. In the 1990s, people thought they wanted low fat, so they were given low fat. When they saw they weren’t losing weight, they thought maybe low fat wasn’t so good. What the market wanted was low calorie. Along with innovation, a story or message needs to accompany it. Sometimes this can be as important to the success of a new product as the product itself. For the “fat-free” scenario, a message of consume in moderation would have been helpful.

One truism that holds for all finished product innovation is that it needs to taste good. If the taste isn’t there, the product is sure to fail or at best it will not capture a large market share.

**Know Your Market**

The path to innovation is to know what tools and ingredients you have to work with. Know what’s in the works for new ingredients. The more you know about how ingredients are made, the better you will understand how they will function and what possible alternatives are around.

Know your market so you know what your market values. Innovation is only innovative if it has value to a market. Preferably, you want to make something for a market you know, not one you have to find.

David F. Busken is manager of research and development for Oak State Products, a copacker of cookies and bars. He grew up in a full-line retail bakery and, in all, has more than 30 years of baking and development experience. Busken can be reached at david.busken@oakstate.com.