

by Donald E. Pszczola

New Batters and Breadings Go Beyond Just Crumbs

With the recent emphasis on low carbs, the rising interest in obesity, and corresponding concerns over frying, it would be logical to assume that manufacturers of batters and breadings are, so to speak, in the process of “picking up the crumbs.”

By this I mean that, based on the above circumstances, one might conclude that coatings—crumb by crumb—have fallen to the wayside, and that innovations, in the form of ingredient developments and technologies, have gone to other food categories. If this were so, then I might as well stop this update on breadings and coatings right here.

Fortunately, however, to assume that this is the case would be wrong, as this article hopes to demonstrate. A wide range of “coated” products have popped up in the marketplace. Recently, for example, Burger King restaurants introduced *Chicken Fries*—thin strips of premium chicken breast coated with zesty, seasoned batter and served in a distinctive portable container with a built-in well for such dipping sauces as creamy buffalo, barbecue, honey mustard, sweet and sour, or ranch. And at Outback Steakhouse, a *Cairn Citrus Chicken*, which is marinated, seasoned, chargrilled, and then basted with a citrus glaze, made an innovative addition to the menu. Red Lobster harbors

called *Muncheze*™. The product line included *Cheeseburger Fries*™, a combination of beef and Cheddar cheese made with a crispy crumb breading; *Jalapeno Cheeseburger Fries*™, a breaded combination of beef, bits of jalapeno pepper, and Monterey Jack cheese; *Santa Fe* sticks consisting of beef and Pepper Jack cheese breaded with a masa-style corn breading with red and green highlights; and *Philly Cheesesteak* sticks, a breaded combination of beef, green peppers, onions, Mozzarella cheese, and white Cheddar cheese.

In fact, as these examples illustrate, if any crumbs have fallen, they would certainly leave a creative trail, as batters and breadings are adapting in a number of ways to today’s health-conscious, flavor-driven marketplace. The media sometimes look at batters and breadings from a negative perspective, but let’s examine this category from other perspectives.

From a health perspective, proteins are being used to block fat absorption during deep-fat frying so that lower-fat breaded foods can be created. Batters and breadings are also being reformulated with whole-grain ingredients to create good-for-you options.

From a sensory view, alternatives to traditional breading systems are providing

Batters and breadings are adapting in a number of ways

to today’s health-conscious, flavor-driven marketplace.

a jumbo shrimp dipped in batter flavored with rum and coconut flakes and served with a sweet pina coloda dipping sauce.

And over the past year, Advance Food Co., Enid, Okla., started distributing to restaurant and other foodservice facilities a new beef-containing breaded appetizer

special textures and appearances with an emphasis on new crumb sizes and enriched colors. Layers of exciting flavors reflecting global taste trends are being built into systems that include predusting, batters, and breadings. Furthermore, these flavors go beyond just savory, now appealing to



Breaded products have evolved beyond the traditional crumb in terms of functionality, potential health benefits, flavor, texture, and appearance.

Photo courtesy of Southeastern Mills.

other taste senses, especially sweet, or combinations such as savory and sweet, sweet and sour, and spicy and sweet. Also, with technologies focusing more and more on aromas, there may also be opportunities in that area when formulating new batters and breadings.

And from a performance standpoint, ways are being found for better adherence so that the coatings and their ingredients stay on the product. Clear coatings help improve the performance and quality of such products as French fries. Technologies are helping to create products that are less soggy or greasy. And added value, such as convenience, product differentiation, and upscaled tastes, is being imparted by these systems to a wide range of traditional and nontraditional applications, including seafood, poultry, meat, vegetables, appetizers with fillings, and even fruits.

These are just a few examples. But compare them to the traditional perception of the breadcrumb—plain, simple, and unflavored—and we can see how far batters and breadings have already evolved. Now look forward, taking into consideration such influences as concerns about obesity, new taste or texture profiles coming from Asian or Hispanic markets, and new ingredient and technology developments, and we can see some of the directions that batters and breadings may be moving toward, going well beyond the traditional crumb in functionality, potential health benefits, flavor, texture, and appearance.

How these advancements will affect the market share of breading systems, we'll just have to wait and see. For now though, let's follow this trail of breadcrumbs through the woods—I mean marketplace—and see where it leads.

High-Protein Coatings Offer Opportunities for Deep Frying

Proteins derived from a number of sources such as fish, soy, and dairy are playing an increasingly important role in creating healthier deep-fried breaded products. These ingredient developments may help revolutionize the fried-food sector, as food developers, faced with an obesity epidemic especially among children, attempt to address nutritional and health challenges associated with frying.

For example, these developments can make possible breaded fried products that are low in fat—a scenario which can appeal to individuals who are interested in reducing fat in their diet because of concerns over weight, diabetes, or general state of health.

Or they can make possible coated fried products that are low in carbohydrates. Offering alternatives to high-glycemic flours or bread coatings, these products can appeal especially to diabetics and those individuals interested in blood glucose or insulin levels.

Or they can make possible healthier products that still offer the functionality benefits of conventionally fried foods. Not only appealing to the health conscious, these products would be marketed to those individuals who prefer fried foods in their diet because, simply put, they are “finger-lickin’ good.”

Here are some examples of the directions that protein-based coatings are taking in the marketplace:

- A new retail product, a protein-based fried-food coating called *Long's Fry It Right™*, is especially suitable for diabetics because it contains no sugar or starches, and offers 1 g of carbohydrates per serving. It does not elevate blood glucose or insulin levels, and may be used as a safe

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With the average American consuming more than 80 lb of chicken each year, food developers are looking for healthier ways to prepare breaded chicken. One possibility might be proteins that block fat absorption.

Photo courtesy of Southeastern Mills

alternative to high-glycemic flour or breading coatings. Because of these benefits, it earned “low glycemic” and “diabetic friendly” seals of approval from the Glycemic Research Institute, Washington, D.C.

Furthermore, the low-carbohydrate coating does not trigger adipose tissue fat storage, has no cholesterol, and can appeal to individuals interested in reducing fat from their diet. “Independent laboratory studies have shown that foods fried with *Fry It Right* coating in canola oil have up to 55% fewer calories from fat than similar food that has been commercially prepared,” said Jim Long, a co-developer of the product.

The dairy protein-based formulation can be used on chicken, fish, country steak, or vegetables fried in canola oil. Foods prepared with the coating are said to be light, crisp, and flavorful, and require no additional seasoning. The product is distributed to retail markets nationally by Stones River Foods, Inc.,

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Fresh Japanese-style bread crumbs, *nama panko*, is an increasingly popular alternative to traditional breading systems. Known for its larger particle size and significantly lighter and crispier texture, the coating is ideal for applications such as seafood.

Photo courtesy of Hydroblend, Inc.

Murfreesboro, Tenn. (phone 888-249-3737, www.fryitright.com).

- Low-fat deep-fried breaded foods such as meat, poultry, and seafood can be produced by a process using *NutraPure*[®] proteins extracted from animal or fish muscle tissue and applied to the surface of a substrate prior to deep frying. The process, which increases both the moisture and protein content of the foods while blocking their fat absorption, was developed by Proteus Industries, Gloucester, Mass. (phone 978-675-9140, www.proteusindustries.com).

This development was presented at a New Products & Technologies session at the 2005 IFT Annual Meeting + Food Expo[®] by company founder and chief scientist Stephen D. Kelleher. He explained that separation technology is used to isolate soluble proteins, which are then concentrated by an ultrafiltration membrane. The liquid proteins, incorporated into a batter mix or applied as a coating by spraying over the product prior to frying or by dipping the product after it has been breaded, can establish a physical barrier

that prevents water molecules from evaporating out during the deep-frying process. Because of the increased moisture content of the final product (10-15% higher), less frying oil is absorbed by the product. The decreased oil uptake leads to decreased fat and calories.

According to Kelleher, with this technology, fat reductions of 25-50% have been achieved. In par-fried shrimp, for example, fat has been reduced by 40% with an increase in moisture of 22% compared to controls. Fully cooked, breaded 6-oz chicken patties treated with extracted proteins were found to contain 23-48% less fat than the leading national brands in similar product categories. And in laboratory conditions, some applications achieved a 90% fat reduction.

Furthermore, because the moisture is “locked in,” this protects the breaded coating from absorbing water during the evaporative process, resulting in a fried coating that stays crispier and avoids the risk of softening or sogginess after cooking. Sensory panels have rated the finished product as having a clean flavor, a moist substrate, and a crunchy coating with an attractive bronze color. In addition to decreasing fat absorption and improving the quality of the deep-fat products, the process extends the food’s shelf life and reduces bacteria level.

The extracted proteins are Generally Recognized As Safe (GRAS) when mixed into or used as coating in like-species foods. Labels must list the proteins as “(species) protein.” The technology is said to function effectively with muscle from fish, seafood, beef, pork, and poultry.

Proteus has licensed its technology to several food processors. For example, Good Harbor Fillet Co., Gloucester, Mass., has incorporated the

proteins into a healthy line of low-fat and reduced-fat frozen seafood products under the *Caroline Cederquist Bistro 4* label, and is marketing the product to school lunch programs, the military, and healthcare facilities nationwide. North Atlantic, Portland, Maine, is using the proteins on fresh cod, pollock, and hake, and is marketing the product to supermarkets and foodservice customers.

- Innovative coatings made from soy protein are also being developed as an alternative to traditional breading-type coatings. One such coating system was formulated by the Solae Co., St. Louis, Mo. (phone 314-982-1983, www.solae.com). Not only do the coatings bring the carbohydrate content down, but also, because of the structure of the protein, up to 20% less fat is picked up in the final product.

The soy-based coating systems, available in textures ranging from crunchy to flour-type, are suitable for cheese appetizers; breaded poultry and steaks; seafood items such as crab cakes, fish sticks, and breaded shrimp; and breaded vegetables.

Japanese Breadcrumb Trail Leads West

Fresh Japanese-style bread crumbs—or *nama panko*—may become increasingly mainstream as an innovative alternative to traditional breading systems in the United States. Because these breadcrumbs impart a special texture and appearance, they can help add value and market differentiation to products while creating new concepts in formulation.

The technology used to produce these breadcrumbs originated in Japan, where the product is popular. Authentic *panko* is produced by electrostatic baking, a process in which

heat is created by passing an electric current through the dough. Because there is no Maillard reaction, the product does not develop a crust.

The product's migration from the Far East has not yet been fully realized. This scenario may be changing soon as new opportunities are rising for food formulators to have access to premium coating systems that can save time and labor, while being made with traditional Japanese methods that preserve an authentic quality.

For example, *nama panko* is now being produced domestically through a joint venture between Canadian-based Prestige Panko, Inc., Lethbridge, Alberta, and Hydroblend, Inc., Nampa, Idaho (phone 972-517-5240, www.hydroblendinc.com). The joint venture, which will combine Prestige's technology with Hydroblend's expertise in the batter and breading business, will make possible the production of large quantities of the breadcrumb using traditional Japanese methods. The company also maintains that the breadcrumbs produced will be of a higher quality than other products currently available in the U.S. marketplace.

Munetaka Yamada, President of Prestige Panko, immigrated to Canada from Japan in 2001, bringing his 25 years of expertise in the production of the Japanese breadcrumb. The product, through a specially designed and engineered process developed by Yamada, is said to bring a harmony of texture between the breading and substrate. Compared to standard dry crumb products, *nama panko* has a texture that is significantly lighter and crispier, complementing the substrate rather than overpowering it.

The breadcrumb product reportedly has spike levels far beyond what can be achieved

with standard dry crumb. A spike level is defined as the height at which the crumb presents itself above the batter surface. The spikes, created by the electrostatic process, contribute to the texture and appearance of the product. Furthermore, the breadcrumb is durable without being "breadly" and adheres well to the substrate.

Nama panko has a pleasing light golden color and a larger, more visually exciting particle size. In fact, according to Mike Guthrie, President of Hydroblend, "the fresh *panko* crumb size is the key to its success. It creates a larger, more dramatic visual appearance on the plate." This appearance helps differentiate the product from other crumb products in the marketplace and adds value.

Because of these advantages, *nama panko* is suited for delicately flavored foods such as fish and seafood, poultry, cheeses, croquettes, and other foods where a lighter fry is warranted. Variations of the authentic *panko* are available in fresh, semi-dry, and dry formats. Each of these formats provides certain key benefits.

"The partnership between our coating R&D team with one of the world's leading *panko* experts is an exciting innovation in the processing industry," stated Guthrie. "Our success is founded on a true partnership with our customers, working directly with them to develop leading-edge products vs serving the typical supplier role."

Giving Clarity to the French Fry

Over recent months, several batter coating developments have advanced the quality and performance of the French fry. These coatings help provide such benefits as easier handling for the foodservice operator; enhanced texture, flavor, and appearance;

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Clear coatings applied to French fries can help improve the performance and quality of the product. Texture, flavor, and appearance of the fry can be enhanced, and the fry can retain heat longer.

Photo courtesy of Penford Food Ingredients.

the ability to retain heat longer; and a range of international flavor profiles that add value and marketing differentiation.

In particular, however, one might say that food formulators are finding innovative ways through technology and the use of ingredients to give this popular potato product a kind of clarity that it has never really received before.

Take, for example, some of the frozen batter-coated potato products from J.R. Simplot Co., Boise, Idaho (phone 208-336-2110, www.simplot.com). *Ultra-Clear*[™], with its patented coating technology, provides the look, feel, and flavor of a classic uncoated product, while cooking quickly and having a long holding time. Also, *Conquest*[™], a micro-thin, clear batter coating, provides enhanced potato flavor and extra crispiness. >>>

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A variety of coated products are appearing in the marketplace, such as this one, Burger King's Chicken Fries—thin strips of chicken breast with zesty seasoned batter accompanied by a dipping sauce.

Photo courtesy of Burger King.

Heat-Treating Facility Makes Flour for Crisper Batters and Breadings

A new heat-treating complex which processes flour to make crisper batters and breadings has been installed by Siemer Milling Co., Teutopolis, Ill. (phone 800-826-1065, www.siemermilling.com). The facility uses wet or dry heat to create specialty flour with altered functional characteristics that offer the customer an expanded range of improvements to meet a variety of needs.

"The uses for heat-treated flour offer many performance and cost advantages," said Richard Siemer, President of the company. "For example, you can add this product to a mix for coating fish or chicken and have a batter that coats more fish, is crisper, and has longer hold time." In addition to batters and breadings, the flour may be used in soups, sauces, gravies, refrigerated and frozen doughs, nutritional supplements, and food starches.

The company will work with local growers to identify specific wheat varieties and establish special quality standards that will enhance the heat-treated product and result in added value for the customer.

Lamb-Weston Stealth Fries[®] from ConAgra Foods Specialty Potato Products, Omaha, Neb. (phone 800-766-7783) is processed with a thin coat of transparent potato starch batter which allows the product to retain heat longer than conventional fries. According to the manufacturer, the thin, transparent coating fries up crisp and insulates the fry to hold heat inside, while the exterior color stays golden, maintaining a fresh-cooked appearance. Consequently, French fries made with the coating are said to have the taste and appearance of traditional fries. Furthermore, the coating maintains the quality and shape of each fry, adding additional strength to minimize breakage from mishandling while frozen. Unlike regular French fries, the product will not collapse or go limp after cooking, even when covered with toppings such as chili or cheese.

Clear-coat products created from potato starch, such as *PenBind 190* from Penford Food Ingredients, Centennial, Colo. (phone 303-649-1900, www.penfordfoods.com), provide French fries a crisp tender bite over time without product toughness and impart a smooth French fry surface. Manufacturers benefit from its reduced ingredient cost, less coating, and the ability to accommodate high-speed potato plant processing operations. All clear coatings are invisible, have low oil content, and extend hold time. According to the company, future improvements to clear coat technologies are in sight as well.

Pectin- and gellan gum-based oil barrier coatings for French fries and battered and breaded foods have been developed by CP Kelco, a Huber Co., Chicago, Ill. (phone 312-554-7800, www.cpkelco.com). The coatings reduce the amount of oil absorbed by foods during

deep-fat frying, resulting in products having a crisp texture, less fat, and fewer calories, and a more natural taste, texture, and appearance. The coatings were produced through the company's new oil barrier technology that uses variations of *Slendid* pectin and *Kelcogel* gellan gum products. For example, pectin blanched with a calcium salt forms a film barrier that resists oil migration into the product tissue, and can reduce oil migration by as much as 50%. The barrier performance is retained in extended storage and handling. The gums may be applied by spraying or dipping during the processing stage of production. The company holds four patents on its oil barrier technology.

Chicken Crosses the Road for Better Coatings

The average American reportedly eats more than 80 lb of chicken each year. However, discovering new ways to prepare and offer chicken in today's market can be an ongoing challenge. A variety of batters, breadings, seasonings, and marinades that can provide new solutions to "dressing up" poultry are available from Southeastern Mills, Inc., Rome, Ga. (phone 706-291-6528, www.semills.com).

According to the company, seasonings, marinades, batters, and breadings for chicken products have a variety of functions. They can help retain juiciness, improve flavor, add texture, increase eye appeal, and help reduce food costs. Furthermore, the company encourages food formulators to take a systems approach with these ingredients. By combining a seasoning or marinade with a complementary batter or bread-ing, chicken can be taken to a whole new flavor or texture level.

Such an approach allows layers of flavor to be created that

deliver more impact than a single seasoning system. Also, interesting pairings of seasonings and breadings can help enhance some flavors while toning down others. Some examples might include a lemony herb marinade with a crunchy peppery breader, a sesame-ginger marinade with a crispy tempura, or a spicy barbecue seasoning with a sweet cornmeal breading.

And as all chicken lovers know, there is a wide variety of poultry dishes out there, including new products or updated versions of classics. With seasoning and coatings from Southeastern Mills, flavors and texture can be specifically tailored to meet these products.

The first one that probably comes to mind is an American classic—crispy or fried chicken.

Custom-developed adhesion or tempura batters and breading systems deliver functionality characteristics suited to the flavor and processing needs of each customer. For instance, whole-grain flours can be promoted for their potential health benefits while contributing to the creation of unique textures. By carefully balancing the viscosity of the batter and the texture of the breading, the quality of the final product can be enhanced. And for those wing lovers out there, one might want to try innovative taste sensations such as *Wasabi Seasoned Batter and Breading* with its hint of soy and garlic. Wasabi is a vegetable known in Asian cuisine for its pungent heat that quickly dissipates into a mild, pleasant flavor.

Then there's the classic

chicken cordon bleu that uses a crispy breading to seal in moistness and give the dish flavor and eye appeal. The coating can then be flavored to specification, allowing the product to be differentiated in the marketplace.

Popcorn chicken has all the flavor and texture advantages of traditional fried chicken, but the bite-sized pieces are more convenient with less waste. Promoted as an appetizer or a fun food for children, this product can especially take advantage of the right seasoning system and coating process. For instance, playing off of Asian cuisine, Southeastern Milling developed a prototype, *Tandoori Chicken Bites*—chicken marinated with garlic, paprika, lemon, ginger, and cayenne pepper, then lightly breaded

Blendex 1/2 Horiz No Bleed 4C

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and fried, and served with a yogurt-cucumber dipping sauce.

Chicken made with specialized batter and breading systems is also suitable for use in creating upscale salads that take advantage of texture, color, and flavor. These salads may be formulated with buffalo chicken that explodes with flavor, a fried chicken that crackles with texture, or a chicken tender that features a light, crispy coating.

Coating Systems for the Microwave

A new generation of coating systems are ideal for microwavable foods. The systems, developed for the frozen retail market as well as the foodservice sector, are available under the name *MicroCrisp* by Griffith Laboratories, Alsip, Ill. (phone 708-239-2402, www.griffithlaboratories.com).

The coating system, which consists of seasoning binder, adhesion batters, and breadcrumb, is combined with the use of susceptor packaging to deliver succulence to the matrix while maintaining a crispy texture. Products such as fish, poultry, vegetables, and vegetables with cheese may be made with the system, which requires standard process equipment.

According to the manufacturer, products with *MicroCrisp* systems offer consumers a number of benefits, including easy preparation, convenience, and no clean-up. The microwavable systems can be adapted to create a number of optimum food products.

Breading Systems Have Built-In Flavors

In the past, breading systems were frequently plain, with flavors being obtained through dipping sauces; condiments such as mustard, catsup, or honey; or a combination of ingredients found in the substrate. However, today, breading systems are incorporated with specific flavors or blends that reflect a broad range of global tastes.

Compared to traditional coating systems, these products provide flavor complexity in a number of ways. They can provide layers of multiple flavor profiles achieved through a combination of pre-dusting, batter, and breading; they can add new twists on traditional flavors; and they can complement well the textures and visual appearance of the foods.

For example, at the 2005 IFT Food Expo, *Choco-potle Chicken Thigh Strips*—a combination of dark chocolate and dark chicken meat spiced with chipotle pepper in the molé tradition of southern Mexico—was highlighted by Kerry Ingredients U.S., Beloit, Wis. (phone 608-363-1200, www.kerryamericas.com).

This concept, which creates an exciting layering of Mexican flavors, uses a marinade/batter technology (*Battinade*) to eliminate the marinating step in a frying process and function as an excellent flavor carrier. The dry glaze, in addition to being flavorful, provides visual interest.

This prototype coating is the latest addition in a broad range of concepts that included *Honey Mustard*, *Szechwan*, *Zesty Taco*, *French Onion*, *Thai*, and *Southwestern*. Several of these formulations, such as *Southwestern* (a blend of chilies and aromatic spices) or *Thai* (a blend of creamy coconut, ginger, lemongrass, and red chile), feature colorful soy bits which can reflect the colors associated with ingredients from that region while adding a festive appearance to convenience foods and other coated products.

Suggested applications for these coatings can include poultry, beef, pork, fish, seafood, and nugget-style items. But applications don't stop there. Another food category that can be dressed up by innovative breading systems is fruits and vegetables, as Kerry showed at Food Expo with its *Multi-Grain Fruit + Veggie Bites*. The indulgent snack features whole pieces of apples, carrots, pineapple, and raisins finished with a multi-grain breader. The breading system contains whole oats, which add visual appeal and contribute fiber. The product concept reflects another example of flavor layering as well as a convenient way to add fruits, vegetables, and whole grains to the diet.

It should be emphasized, however, that many of the novel coating systems highlighted in this article wouldn't be possible without different technologies—traditional or emerging—being used to improve the overall quality of the breading system. This

Nuts about Coatings

Traditionally, almonds have been primarily used in confections, snacks, and bakery products, and as a topping for salads and desserts. A recent prototype that won the Almond Board of California's 2005 Almond Innovations Contest, *Cone-coxions* is a bite-sized crispy almond waffle cone layered with dark chocolate and drizzled with almond pieces. Such an application demonstrates the "sweet" direction that almonds frequently take.

However, almonds can take other directions as well—for example, playing a role in the development of batters and breadings. According to the Almond Board of California, almond meal can function as a low-carbohydrate breading alternative for chicken, fish, and shellfish. Inclusion of this ingredient in the formula can provide a number of benefits, including enhanced flavor and texture, an improved nutrition profile, and product differentiation.

In the area of weight management, almond-derived ingredients such as meal or flour can help provide satiety while allowing food developers to create foods that have lower carbohydrate or calorie levels. At the 2005 IFT Food Expo, the Almond Board of California sponsored a symposium, "Foodservice Industry: Solutions to America's Obesity Problems," which highlighted recent discoveries involving specific food ingredients such as almonds that address consumer health concerns. The use of almond-derived ingredients in the development of batters and breadings is one example of the future directions that food developers may be taking when addressing the obesity problem.

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Innovative breading system adds layers of flavor and texture to this nontraditional application—a snack featuring pieces of apple, carrots, pineapple, raisins, and oats.

Photo courtesy of Kerry Food Ingredients

is particularly important as flavor profiles grow more complex.

Consider spices which can diminish or flash off during the frying process. However, spices using encapsulation technology are resistant to most high-temperature processes, thus preserving their impact in batters and breadings.

Or consider how some ingredients—such as inclusions that can add flavor, texture, or visual appeal to the final product—might fall off the coating during the production process or storage. Since we're dealing with different layers of ingredients, it becomes even more important that starches, egg proteins, or some other development be employed to provide better adherence so that this common problem does not happen.

And finally, this section began by noting that when plain coatings were used, one common way to obtain flavor was via a dipping sauce. Although a number of today's coatings are being developed which have built-in

flavors, this does not necessarily mean the end of dipping sauces. In fact, the multi flavors in breading systems may create new opportunities for dipping sauces. Imagine the different flavor combinations possible, involving sweet and sour, spicy and sweet, hot and cooling, and even possibly umami, that can come forth when a flavored coating is dipped into a sauce.

Ongoing Impact of the Low-Carb Trend

As noted in this year's *Ingredients* post-show article in the September issue, the low-carb trend is being "restructured" in applicable and useful directions, setting the stage for a new understanding of carbohydrates. This evolution can help influence the formulation of batters and breadings, as well as its future directions.

For instance, batters and breadings are being reformulated with whole-grain ingredients which can help expand the options for manufacturers. One example is an extensive line of ingredients available from Briess Malt & Ingredients Co., Chilton, Wis. (phone 920-849-7711, www.briess.com). These ingredients include *Organic Insta Grains® Whole Grain Crunchy Brown Rice Products*, *Roasted Corn Ingredients*, and *Specialty Whole Grain Flours*, including *Insta Grains Soft White Wheat* and *Insta Grains Brown Rice*.

The ongoing evolution of carbohydrates is probably also helping to fuel customization of breadings and coatings, as systems are designed using specialty flour or flour alternatives to provide specific health and functionality benefits. Such a scenario is ideal for companies, such as Blendex Co., Louisville, Ky. (phone 502-267-1003, www.blendex.com), which creates customized blended mixes, ingredients, and batters that meet the customer's specific requirements.

With the emphasis on health, new opportunities can be created which make use of different spices, seasonings, flavors, and textures—all aspects that the company, by working closely with its customer, can help provide; in addition, the company can help solve problems which could be very time-consuming and costly, and which could affect the overall quality of the final product.

Interestingly, while the low-carb trend may have resulted in foods being produced that have less batter and breading (and, of course, more substrate, which from a consumer perspective could be a good thing), it may have also helped shape the presentation of the batter and breading in a broader range of flavors and textures. And it may have also sparked an innovative use of alternative ingredients, such as almonds (see sidebar "Nuts about Coatings").

As can be seen, the restructuring of the low-carb message, instead of having a limiting or hindering effect on product formulation, may actually have a broadening influence, sparking new innovations in flavors, seasonings, textures, ingredient alternatives, sourcing, visual appeal, and other areas that may yet be emerging. **FT**

Next month's Ingredients section takes an odyssey to view the newest spice developments from a global perspective, focusing on functionality, health benefits, sourcing, and applications.



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