by Donald E. Pszczola

A Progressive **Potpourri**

In light of certain recent events, I was thinking of forming the Progressive Ingredient Party, or (PIP) for short. This entity—more like a philosophy—would be designed to counter what I regard as a growing prejudice or suspicion by consumers regarding food science and processed foods. (A recent blog post where I addressed some of my concerns and what I think is at stake if we, as food professionals, don't do anything to adequately deal with this unfortunate perception is included in this article and hopefully sets the stage for some of the emerging ingredient developments that will be subsequently covered.)

Candidates for PIP would certainly include the kinds of emerging developments discussed in this month's *Ingredients* section, whether they be new sweetener blends, better-for-you fats, or salt alternatives. (Nominees for the party could also easily come from previous annual installments of emerging ingredients reported over the past two decades, with each development perhaps setting the framework for a later one.) To quickly review, emerging ingredients, which I cover every July, are novel, cutting-edge developments that can help shape parameters for future product formulating. They are frequently the result of new advancements in technology, the culmination of years of research by food scientists, or just creative instances of "thinking outside the box." As such, these ingredient developments have the necessary qualifications or "the right stuff" for my new party, and perhaps most important, capture the spirit of what constitutes a state of progressiveness.

Emerging ingredients certainly have the right qualifications to be candidates *for the Progressive Ingredient Party. These novel, cutting-edge developments can help shape parameters for future formulating, and provide potential solutions to health and functionality challenges.*

Candidates for the Progressive Ingredient Party would certainly include the kinds of emerging developments discussed in this month's Ingredients section, whether they be new sweetener blends, better-for-you fats, or salt alternatives.

And how would you define progressive?

Well, to be progressive means to move forward or advance. This approach consists of proceeding in steps, continuing steadily by increments toward the accomplishment of certain solutions in the areas of flavor, texture, functionality, appearance, and, of course, nutrition or health, and so could be considered evolutionary in nature, rather than revolutionary. Such a philosophy favors or advocates progress, change, or improvement, as opposed to what I consider to be the alternative: Taking a position that recommends a return to the past, to simplicity or the basics, and—also inherent in this approach—a denial of the value of food science or technology and its potential in solving escalating health challenges. My concern about the latter position, as I discussed in the blog post, is that it is not only naïve but that in limiting future progress it is counterproductive and even dangerous when considering the number of serious health problems, such as obesity and diabetes, which we need to address before it may be too late for our species.

Annual installments of emerging ingredients are in some ways an affirmation—or vindication—of the belief that these developments have the potential to provide answers to problems of varying types. This might mean the development of new sweeteners that combine sugar with other alternatives as a way of reducing sugar consumption without compromising taste or texture. Or it might mean the creation of better-for-you fats with improved functionality performance. Or the development of natural colors that offer enhanced stability and visual appeal. Or new soy proteins that allow the production of transparent, protein-fortified beverages. Or dairy ingredients that can help achieve salt reduction. Or exciting new flavor combinations that can stimulate formulating and the creation of tastier, healthier foods for future generations. Still other examples might include innovative flours that provide whole-grain benefits, nanoparticles that can deliver antimicrobial agents, improved cocoa powders, and new lecithin alternatives.

As you can see, my "ticket" for PIP certainly includes a broad range of progressive potpourri, covering a scope of pressing issues and potential solutions for them. And unlike those contemporary "Tea Parties," which take

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their inspiration from the past, hoping to invoke images and themes from the American Revolution, my Progressive Ingredient Party looks to the future, to a time when ingredient advancements may lead to a generation of children who do not have Type 2 diabetes. And hopefully that future time won't be two centuries from now.

With that said, here are some of this year's candidates and the campaign promises they make.

The New Sweet Deal

A new collaboration between three companies focuses on bringing healthier sweeteners to the marketplace. Domino Foods Inc., Iselin, N.J. (phone 732-590-1180, www.dominofoods.com), a major leader in the refined sugar industry, entered into an agreement with Wild Flavors GmbH and Sunwin International Nutraceuticals to offer sweeteners made from all-natural products such as cane sugar, rice, malt, and stevia, in addition to sweetening systems that can include both natural and artificial sweeteners with sophisticated flavor modifiers.

"With our strength and breadth in natural sweeteners, we are very excited about the opportunity to create new blends and offer the healthy benefits of stevia to consumers," said Brian F. O'Malley, President and Chief Executive Officer for Domino Sugar. China-based Sunwin International is one of the leading global suppliers of stevia. Wild, which aligned itself as a strategic stakeholder with Sunwin to ensure a consistent supply of stevia, has invested substantial time and technical efforts to develop proprietary taste modification technologies for stevia, sugar, and artificial sweeteners.

Together, this sweet triumvirate will provide a range of cost-effective

IngredienTalk:

Emerging ingredient developments are particularly exciting because of their potential for solving health and functionality challenges. While these developments can be correctly termed "progressive," there is a growing perception today that is anything but progressive and must be addressed. This view, de-evolutionary in nature, claims to look to the past for answers and is fueled by a growing distrust regarding food science and the subsequent value of processed food. In this blog post, I looked at some examples of this view and why I feel that it's counterproductive and even dangerous. If you care to cast your vote on this issue—and you're an IFT member—visit www.ift.org, type in your name and password, click on the IFT Community button, and go to the blog section. Make yourself heard!

Are We Moving Backwards?

From time to time I have been critical of the food industry's overall slowness when addressing the challenges of an escalating obesity epidemic and the related diabetes problem. Because of their alarming consequences, these challenges cannot be minimized, overlooked, or put off to another day. At the same time, as a rational human being (one who happens to have written about food ingredients and their functionality and potential health benefits for over a quarter of a century) I would never suggest that we should simply "chuck" processed foods, discard all forms of food science and technology, and return to a simpler time—like perhaps the day of the caveman who went out with a club to fend for his family.

Far from it. In fact, I have always believed that the answers to our problems can be found in food science and not in a rejection of that discipline. That still remains a credo of mine—one which explains why I'm critical of the food industry at times, why I applaud and cheerfully write about emerging ingredient developments (as I will be discussing in this month's *Ingredients* section), and why I'm so frightened—and even appalled—by a growing sense of bias and suspicion regarding food science. More about that later.

It also explains why the keynote session for the 2011 IFT Annual Meeting holds particular interest for me. Keynoter Michael Specter, staff writer for *The New Yorker* and author of the book, *Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet, and Threatens Our Lives*—makes his position quite clear: Abandoning scientific impartiality and instead embracing unsubstantial claims, hearsay, and rumors is dangerous and will limit future progress. In my opinion, those last three words, "limit future progress" is particularly important when confronted with a number of serious escalating health challenges, including obesity and diabetes.

This session comes at a very timely moment in light of recent events. Take, for example, Bill HR 1830 introduced in Congress, which would remove a federal ban on raw or unpasteurized milk. The legislation, introduced on May 12, would allow the shipment and distribution of unpasteurized milk and milk products for human consumption across state lines. And although the bill would not force a state to legalize the sale of raw milk from local producers, it would enable consumers to purchase raw milk and raw dairy products from other states without violating federal law. I keep wondering: Will it take a number of deaths before people wake up to the implications of such an ill-advised bill?

Here's another sad example of the times. An author of a recent book strongly claims that sulfites, "those infamous additives used to make food last longer and look fresher," are making millions of consumers sick, creating a global pandemic of symptoms, syndromes, illnesses, and even some deaths. It would be interesting, of course, to see how the author rationally documents each specific case of people being made "miserable" by sulfites. (Just a little sarcasm here.)

And then there's the view of the author of *Fast Food Nation,* who believes that "the current food system is broken" and that "everyone needs organic food." It would be interesting to explain to me how it would be possible to feed the world population using only organic farming methods. For that matter, you might want to try to explain to me how organic can better safeguard you from contamination in the kitchen.

For the past few years, when attending media events within the food industry, I have been getting a sense of bias regarding processed foods. At first I thought this prejudice was limited to a few "uninformed" individuals, and to be fair, I associated this lack of scientific understanding with the background of the individual. Some of them came from rural areas where it was possible to make greater use of produce stands, to grow their own gardens, and do most of their own

ingredient solutions that can help reduce calories or sugar amounts without compromising taste and the functionality benefits of sugar. For example, stevia might be blended with sugar, brown rice syrup, evaporated cane sugar, malt, or molasses. Or stevia might be combined with artificial sweeteners and flavor modifiers. Or future sweetener blends might be created with a combination of these ingredients.

Another collaboration, one involving a fruit-derived sweetener, may also bring sweet results. Tate & Lyle, Decatur, Ill. (phone 217-421-2331, www.tateandlyle.com), recently entered into a five-year strategic partnership agreement with New Zealand-based BioVittoria, a producer and processor of monk fruit. According to the agreement, Tate & Lyle receives exclusive global marketing and distribution rights for BioVittoria's monk fruit extract, which will be sold in the United States under the *Purefruit* brand name. Using proprietary, natural methods, the Tate & Lyle research team has further refined and improved the taste of its *Purefruit* products for a variety of commercial applications, although BioVittoria will continue management of the monk fruit extract supply line, including seedling cultivation, the grower network, and natural processing. »»

Monk fruit, stevia plants, and sap of coconut blooms *are a few of the natural sources that today's emerging sweeteners are being derived from. A coconut-based sweetener (shown in photo), has a darker color; a sweet coconut flavor; and a low glycemic index.* Photo courtesy of Carrageenan Company

cooking. I thought at least that could explain partially some of their views regarding processed foods. However, as blogs became more rampant, I detected more and more ideas which seemed to me—well, "crazy." Buzzwords like "organic" or "natural" were used but without any further explanation. At some media events, I heard chefs basically blame processed foods for the health problems we're faced with. And one chef (in a remark which I have to admit even caused me to raise an eyebrow) claimed that he drank only raw milk because he was allergic to pasteurization. Now while I know some people have an intolerance to milk protein, I never knew you could be allergic to pasteurization. I suppose it's possible, but I doubt it. The fact that some of these views came from chefs further bothered me—not because they wear white hats, but because many chefs (those I've known over the years) have close relationships with major food ingredient companies, working together using what has been described as the culinology approach. Needless to say, I was a little disappointed.

At food shows this past year, I've heard certain phrases such as "simplicity/back to basics" or "locally sourced" or "hyper-local," and with a growing sense of paranoia, I can't help wondering if these terms aren't somewhat coded, designed to take back-handed swipes at processed foods.

Well, I could go on and on with further examples of what I regard to be "signs of the times" or a de-evolution, if you will, but I want to review what's at stake if this backward approach continues to be taken.

First, food processing makes possible the feeding of seven billion people. As the population continues to grow, perhaps even double, it will be necessary for advancements in food processing to keep up if we are to continue to provide an abundant, diverse food supply. So to put it simply, without food processing, man as a species simply could not sustain itself on this planet. All the conversations or "blogs" in the world about neighborhood gardens, organic foods, and cookbooks designed to teach kids how to cook cannot change this fact. Unless, of course, man wants to decrease his numbers by about 90%.

Second, despite criticisms of food science and processed foods, we have largely a safe food supply. Without food processing, I don't think this would be the case. As I mentioned earlier, some foods can be dangerous if consumed unprocessed. Food science gives us the capability to add beneficial ingredients such as vitamins, and makes many foods safe to eat by inactivating or destroying the microorganisms. Some foods, if not prepared correctly, can pose a real health risk, especially for the young and those with weakened immune systems. Processed foods, because they are capable of making foods safe for us, should instill confidence in our buying decisions and not be the subject of criticism largely brought about by ignorance.

Third, we live in a fast-paced world, as evidenced by cell phones, texting, and computers. Many people simply do not have the time, inclination, or capability to grow a garden, raise their own food, and be completely self-sufficient. It's just not realistic to try to turn the hands of the clock back. Besides, it really wasn't all that great in the caveman days. Caves were drafty, mean animals were around, you were always hungry, and you didn't live that long. And, of course, texting was out of the question.

Fourth, we are faced with a growing obesity and diabetes epidemic. In preventing or managing these conditions, food science has to play a critical role. There is no other workable alternative. This might mean the development of new systems that combine sugar with other sweeteners such as stevia. Or it might mean the commercialization of new fats and oils. Or the creation of better-tasting gluten-free products. Solutions such as these must be developed, and this is the time when food manufacturers should be increasing their efforts to bring foods to the marketplace in response to these challenges. I'm afraid that a rejection of food science and processed foods by an increasing number of consumers will only prove to be counterproductive.

In closing, I would like to get back to the presentation of Keynote Speaker Michael Specter for a minute. Hopefully, most of the people in the audience will agree with his views about the importance of rationalism and belief in science. But where, as food professionals, do we go from there? Can we do more to defend ourselves, do more to persuade consumers about the value of processed foods and what's at stake for the future? That might make for an interesting blog, and I might try to suggest some possible ways to go about it.

But in the meantime, if you have any thoughts about the growing bias regarding processed foods–and the suspicion of food science in general—and what can be done about it, let's IngredienTalk.

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Monk fruit, also known as luo han guo, is native to Southest Asia. Its pulp is steeped in hot water to release a natural, calorie-free sweetening ingredient that is approximately 200 times sweeter than sugar. Monk fruit extract received a letter in January 2010 stating that FDA had no questions after receipt of BioVittoria's GRAS notification. The extract made from monk fruit can help reduce sugar and calories in a variety of formulations, including beverages, dairy products, cereals, confections, and bakery products.

"In addition to its great taste, *Purefruit* enables a 'sweetened with fruit extract' label claim, which our research shows is extremely appealing to consumers," noted Karl Kramer, President, Innovation & Commercial Development, for Tate & Lyle.

Imperial Sugar Company, Sugar Land, Texas (phone 877-212-2144, www.imperialsugar.com), recently launched *NatureWise Sweeteners*™, which features a product portfolio including zero-calorie and low-calorie natural sweeteners, specialty natural sweeteners, and natural sweetener substitutes for high fructose corn syrup. The brand's first product combines the natural benefits of monk fruit and pure cane sugar. It has one-third the calories of sugar yet it is twice as sweet. The company's proprietary process technology preserves the natural goodness of monk fruit while blending it with sugar in a way that allows for consumers to bake with it and give the mixture a desirable taste. Other sweeteners that the company is planning to launch include a reduced-calorie crystalline agave, a zero-calorie xylitol-stevia blend, flavored cane syrups as alternatives to high fructose corn syrups, molasses ferrins suitable for dark breads, and low-calorie free-flowing brown sugar.

"Our plan is to incubate a new sweeteners business that will market natural sweeteners based upon proprietary processing technology," said John C. Sheptor, the company's President and CEO.

A coconut-based sweetener, *CocoNat Sugar*™, is made from the sap of the coconut blooms of organically farmed coconut trees. After gathering the sap, it goes through a two-step process: cooking and granulation (with no further processing involved after the cooking stage). The natural sweetener, available from Carrageenan Company, Santa Ana, Calif. (phone 714-751-1521, www.carrageenancompany.com), is reportedly rich in vitamins and minerals, has a low glycemic index of 35, and can be used as a healthy replacement for cane sugar and synthetic sweeteners. To replace cane sugar, the rate of usage is 1:1. The product, which has a light to dark brown color and a coconut sweet flavor, is suitable for use in dairy applications, beverages, confections, baked goods, fruit preserves, and dietetic formulas.

Switzerland-based Givaudan (phone 41 22 7809111, www.givaudan.com) is

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expanding its *TasteSolutions*™ health and wellness program by increasing investment and resources in taste technology to address food manufacturers' sweetness challenges. The company continues to grow its discovery program to develop new natural ingredients from botanical sources and biotechnology. Givaudan also has a pipeline of artificial molecules and GRAS regulatory approval for a new sweetness modifier to add to its existing flavor ingredients palette to help create sweetness and mouthfeel solutions for sugar reduction.

These initiatives are in response to increasing consumer demand for food and beverage products which are perceived as healthier yet do not compromise on taste. Over the past year, there has been an additional challenge as sugar prices have increased significantly and, in some countries, sugar itself is in short supply. "We can help customers mitigate rising raw material prices and obtain the great taste and mouthfeel they expect in foods and beverages by enhancing sweetness in low-sugar applications through novel ingredients and building-blocks to bring the taste profile as close as possible to full sugar," said Mike Size, Global Head of Beverages for Givaudan.

The company's program provides sensorially-balanced profiles for both naturally and artificially sweetened low- and zero-calorie products, by enhancing their sweetness characteristics while masking undesirable notes and improving the flavor to gain consumer acceptance in the finished application. For consumers who prefer natural ingredients, the challenge of masking the bitter off-notes of stevia extract Reb-A can be overcome using similar methods. In addition, Givaudan has developed an in-depth sensory program for better understanding of high-intensity sweeteners.

According to Beneo Inc., Morris Plains, New Jersey (phone 973-867-2140, www.beno.com), a division of the Sudzucker Group, one interesting application that uses a sugar-free solution is a fragrance-transmitting candy now available for the first time in Europe. Based on an idea that was developed by Beneo, this cutting-edge concept was picked up by Alpi, a confectionery company from Bulgaria. The rose-scented boiled sweet, called *Deo*, contains Beneo's isomalt, a sugar replacer naturally derived from sugar beet. The sugar-free, low-calorie, and low-glycemic confection is said to not only taste good, but after consumption, it will transmit an attractive rose fragrance through the skin. Because of isomalt's slow dissolution properties, the taste experience is enhanced by the prolonged transmission of the subtle flavor of rose in the mouth, and also through the longer-lasting rose-scented fragrance on the skin. This confection is also made possible by the ingredient geraniol, an acrylic monoterpene-alcohol, which is a colorless liquid found in plants such as rose, lavender, and vanilla. Geraniol is a natural antioxidant and its fragrance, once consumed as a candy, leaves the body through the pores, creating a naturally sweet smell that can last for hours.

Tippecanoe and Fats Too

Fats and oils is a particularly progressive area for emerging ingredient developments. This could easily be seen at the 2011 IFT Annual Meeting and Food Expo. In the August issue of *Food Technology*, post-show coverage will look at these developments in detail, but for now here are a few examples of progressive candidates that are leading the pack.

Shortenings that can reduce saturated fat content and calories in bakery and snack foods earned Loders Croklaan North America, Channahon, Ill. (phone 815-730-5200, www.northamerica.croklaan.com), an IFT 2011 Innovation Award. Part of the company's *SansTrans* line, *VLS30* and *VLS40* contain a fat-sparing emulsifier package that allows a reduction in use of up to 15% fat in applications that currently use an all-purpose shortening. The taste and texture of finished products using these shortenings is not altered by the fat reduction.

A high-lipid algal flour, developed by Solazyme Roquette Nutritionals, South San Franciso, Calif. (phone 650-780-4777, www.solazyme.com), contains more than 50% lipids (primarily monounsaturated fatty acids) and about one-third carbohydrates (fiber and simple sugars), as well as protein, phospholipids, and mono- and diglycerides. Its composition—coupled with proprietary processing techniques—yields a particle that can act as a lipid or natural emulsifier in products such as ice creams, crackers, cookies, cakes, sauces, salad dressings, and mayonnaise. The use of the algal flour allows fat or egg yolks to be reduced by 50% or more in the finished product.

***New generation of fats and oils** are providing improved functionality performance and nutritional value. For example, a high-diglyceride oil with zero grams of* trans *fat, decreased fatty acids, and a desirable flavor profile was developed for potato par frying.*
Photo courtesy of Caravan Ingredients

A saturated-fat-free Omega-9 sunflower oil was launched by Dow AgroSciences, Indianapolis, Ind. (phone 317-337-4142, www.omega-9oils.com), for use in salad dressings, spreads, mayonnaise, and retail bottled oil products. The oil also has zero *trans* fats and is high in heart-healthy monounsaturated fats. Because it has a very high level of stability, many formulators will not require antioxidants or partial hydrogenation to achieve a desired shelf life.

A next-generation high-oleic canola oil, *Clear Valley® 80*, delivers low levels of saturated fat, zero grams *trans* fat, and an exceptional shelf life. The oil from Cargill, Wayzata, Minn. (phone 952-742-9246, www.cargill.com), resists oxidation and the development of flavor off notes, allowing food manufacturers to overcome formulation challenges associated with the use of canola oil to create cereals, snacks, and baked products. The oil is described by Cargill as having the highest level of oleic acid of all canola oils, and the highest level of oxidative stability

among all high-oleic oils in the marketplace.

A zero *trans* solution for potato par frying is offered by Caravan Ingredients, Lenexa, Kansas (phone 800-669-4092, www.caravaningredients.com). The result of a breakthrough high-diglyceride technology, *Trancendim® 130* enhances the nutritional profile of the product while maintaining a desirable flavor profile. When used in potato frying, the high-diglyceride oil produces a product with zero grams of *trans* fat, decreased saturated fatty acids, and the necessary structure to prevent freezer clumping and crumbling. Additionally, the oil has no impact on finished product sensory attributes.

A high-oleic soybean oil, *Plenish*, provides higher heat stability for frying, increased fry life, improved flavor, increased shelf life for manufactured products, decreased equipment maintenance, and blending opportunities. The oil, available from Pioneer Hi-Bred, Johnston, Iowa (phone 515-727-7414, www.plenish.com), has zero grams of *trans* fat, 20% less saturated fat than commodity soybean oil, and more than 75% oleic content (said to be the highest of any soybean under commercial development). Commercialization is anticipated in 2012, upon full regulatory approval and field testing.

Two new margarine products using canola oil were introduced by Richardson Oilseed Limited, Winnipeg, Manitoba, Canada (phone 204-934-5287, www.canolaharvest.com). *Bake-It Sweet* is a non-hydrogenated, all-purpose baking margarine suitable for cookies, cakes, icing, crumble-style pie shells, and toppings. *Roll-It* is a non-hydrogenated, premium, roll-in margarine for croissants and Danish pastries. Both products are significantly lower in saturated fat compared to high palm content alternatives.

A new line of shortenings and oils from Bunge North America, St. Louis, Mo. (phone 800-828-0800, www.bungenorthamerica.com), uses a proprietary enzymatic interesterification process to eliminate *trans* fats and optimize saturated fats, while delivering superior functionality, desirable taste, and the quality customers demand. This process of rearranging the fatty acids to provide structure and functionality at room temperature leads to the production of a wide variety of *UltraBlends Enzymatic Solutions*, including an all-purpose shortening, pie shortening, donut frying shortening, and bakers margarine. An all-purpose shortening (*No. 172*) offers zero *trans* fat per serving, 34% less saturated fat than traditional shortening, and more heart-healthy monounsaturates and PUFA levels than conventional shortening. *Designer Solutions No. 358* is an emulsified cake and icing shortening with the same benefits as No. *172*. These two products are expected to be commercialized later this year.

Better-for-you oils are derived from *Vistive® Gold* low-saturate, high-oleic, low-linolenic soybeans developed by Monsanto Co., St. Louis, Mo. (phone 314-694-2039, www.monsanto.com). Soon to be commercialized, these soybeans provide oils

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that have decreased levels of polyunsaturated fat, reduced saturated fat, and higher monounsaturated fat, along with improved oxidative stability, excellent flavor performance, and a reduction of grease buildup on cooking surfaces. The oils can be used for frying, topical applications, and oil blends.

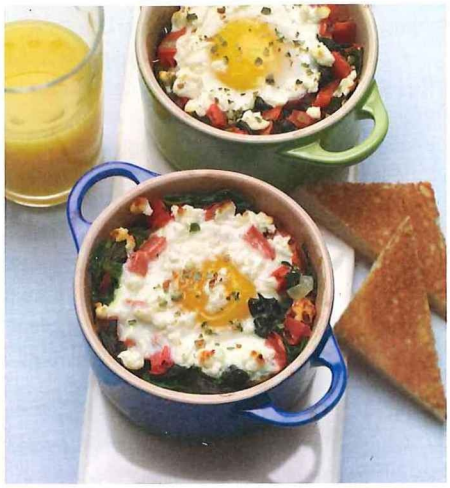
I Like Milk

One emerging dairy ingredient may be goat's milk, which offers health benefits and may be more readily consumed by those individuals who are lactose intolerant or who suffer from allergies caused by casein alpha 1. Recent research also claims that the consumption of goat's milk can improve recovery of individuals with iron deficiency anemia.

Goat's milk is a centuries old product, but in recent times its usefulness as an ingredient is becoming more apparent. Mt. Capra Products, Chehalis, Wash. (phone 609-693-6446, www.mtcapra.com), produces several ingredients derived from goat's milk, including mineral whey, whole goat milk proteins, and full cream flake. The company's nutrition scientists are working closely with a number of food and beverage companies who are developing new products using these ingredients.

The company is making available what it describes as the first instant yogurt mix made from pure goat's milk. The mix, called *Yo-Quick!*™, reportedly provides three times the amount of probiotics that is customary in other yogurt products. It is easy to use, requires no refrigeration, and comes in three flavors (vanilla, strawberry, and blueberry). To consume, just pour the single-serving powder pack into a glass or bottle of water, shake or stir vigorously, and enjoy real, ready yogurt.

In addition to the yogurt mix, Mt. Capra offers *Solar Synergy*, a power sports drink made with goat milk mineral whey, electrolytes, and other healthful components. It is available in a powdered form that can be reconstituted in water.



A variety of formulations can take advantage of the nutritional benefits of goat's milk. *For example, this baked breakfast dish consists of eggs, goat's cheese, and green peppercorns.*
Photo courtesy of McCormick Flavors

Goat milk ingredients seem to be finding their way into more prototypes. For example, at the 2011 IFT Food Expo, Corn Products/

National Starch showcased wild mushroom Madeira cream sauce over goat cheese grits. In its *2011 Flavor Forecast*, McCormick & Co. Inc., Hunt Valley, Md. (phone 410-771-7333, www.mccormick.com), included a flavor pairing of goat's milk and green peppercorns. And various culinary chefs are creating innovative formulas utilizing goat's milk, such this pumpkin pizza, *Smashing Pumpkin with Goat's Cheese*.

Sodium alternatives with dairy origins are also being developed. *Lactosalt Optitaste®* from Armor Proteines, a subsidiary of the dairy group Bongrain based in France (phone +33 (0) 2 99 18 52 52, www.armor-proteines.com), is derived from milk, and has five times less sodium than salt, allowing for sodium reductions up to 80%. With no aftertaste or bitterness, it offers taste advantages compared to other alternatives such as potassium chloride. It has the same ionic strength as salt and different size grading will allow a large process compatibility in manufacturing facilities. At the 2011 IFT Food Expo, U.S. Dairy Export Council, Arlington, Va. (phone 703-528-3049, www.innovatewithdairy.com), also demonstrated a dairy ingredient that can help address sodium challenges in food formulating. Permeate, a dairy ingredient, provides salty characteristics while helping formulators reduce sodium content levels in products without compromising their taste. A butternut squash soup prototype is made with the permeate.

Color First

A little later in this article, several delivery systems will demonstrate how the appearance of the finished food product can be enhanced. Maintaining clarity in a beverage can also be an important consideration when discussing visual qualities.

At the 2011 IFT Food Expo, ADM, Decatur, Ill. (phone 800-637-5843, www.adm.com), unveiled *Clarisoy 100*, a soy protein that is 100% soluble, transparent, and very low in viscosity in low pH beverages. Use of this vegetable protein allows for the production of transparent, protein-fortified beverages such as juices, soft drinks, and sport drinks in the low pH range. It is also heat stable, allowing thermal processing such as hot fill without any loss of clarity or notable change in viscosity. In addition to its use in ready-to-drink beverages, the ingredient may also be used to fortify powdered beverages. Recently, ADM entered into a license agreement with Burcon NutraScience Corp. for the worldwide production, distribution, and sale of Burcon's *Clarisoy* soy protein.

Several natural color developments are also emerging. For example, natural water-soluble colors can be created without opacity. The clear color emulsions from Wild Flavors Inc., Erlanger, Ky. (phone 859-342-3744, www.wildflavors.com), are said to have bright, appealing color and can be made in a variety of shades without imparting a negative taste to the end product. They have a high stability over shear forces and phase separation such as ringing or sedimentation, and are heat and light stable. The emulsions are not only suitable in providing bright natural color in enhanced water applications, but can also be easily incorporated into most beverages, yogurt, baked goods, confections, sauces, and nutraceutical products. These formulations can benefit from being crystal clear while having the eye-catching appeal of added color without being cloudy.

A new line of colors, *FISclear*

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from Food Ingredient Solutions, Teterboro, N.J. (phone 201-440-4377, www.foodcolor.com), uses emulsification techniques to address stability concerns. The micro-emulsion colors are produced with particle sizes in the 50-100 nm range, providing clarity, stability, and shelf life. The colors are clear and do not ring. They offer a wide range of shades from pale to greenish yellow to various peach, orange, and pink tones to a rich, deep red. Potential applications include clear confections, liqueurs, and other beverages.

It's Time to Deliver

A nanoparticle, developed by a Purdue University research team, can hold and release an antimicrobial agent as needed for extending the shelf life of foods susceptible to *Listeria monocytogenes*. Yuan Yao, an Assistant Professor of food science at Purdue University, altered the surface of phytoglycogen, a carbohydrate found in sweet corn, which led to the creation of several forms of a nanoparticle that could attract and stabilize nisin, a food-based antimicrobial peptide. The nanoparticle can then preserve nisin for up to three weeks, combating *Listeria*, a potentially lethal foodborne pathogen found in meats, dairy, and vegetables. "People have been using nisin for a number of years, but the problem has been that it is depleted quickly in a food system," said Arun Bhunia, a Purdue professor of food science who co-authored a paper with Yao. "This nanoparticle is an improved way to deliver the antimicrobial properties of nisin for extended use."

Yao used two strategies to attract nisin to the phytoglycogen nonoparticles. First, he was able to negatively charge the surface of the nanoparticle and use electrostatic activity to attract the positively charged nisin molecules. Second, he created a partially hydrophobic condition on the surface of the nanoparticle, causing it to interact with partially hydrophobic nisin molecules. When the particles are hydrophobic, or repel water, they become attracted to each other. "Both strategies may work together to allow nanoparticles to attract and stabilize nisin," Yao said. "This could substantially reduce the depletion of nisin in various systems."

A new flavor delivery system has been developed by David Michael & Co. Inc., Philadelphia, Pa. (phone 215-632-3100, www.dmflavors.com). The system, *Michael-Specks*™, has larger insoluble particle sizes which are ideal for loose or bag teas or to enhance visual appeal in bakery applications. According to the company, flavor is plated onto the *Michael-Specks* rice-based all-natural ingredient, which is labeled as "rice concentrate." No other carriers or processing aids are used, and the particle size can be customized to suit customer needs. At the company's 2011 Innovation Roadshow, the ingredient was featured in anise-flavored tea cookies and in tea bags flavored with jabuticaba, an Amazonian fruit high in antioxidants.

Individually quick frozen beverage pellets can deliver ingredients such as juice, fruit, and yogurt,

which are blended together, then quick frozen to retain their fresh flavor. The pellets are available from Sargento Food Ingredients, Plymouth, Wis. (phone 800-795-7090, www.SargentoFoodIngredients.com), developed using the company's *Portionables*® technology, which was first applied to sauces. The technology allows beverages to be made with minimally processed ingredients, avoiding the separation and technology problems that often occur with other processing methods. The technology also accommodates the incorporation of particulates, such as fruit pieces, within the size and shape of the IQF pellet. Frozen coffees, teas, fruit smoothies, milk shakes, nutritionally enhanced meal replacements, or other specialty frozen beverages can be formulated using the technology. For an added boost, the pellets can be fortified with vitamins, minerals, protein, antioxidants, or live and active cultures. A few seconds in a blender reconstitutes the pellets into a frozen beverage.

Delivery systems from QualiTech Inc., Chaska, Minn. (phone 952-448-5151, www.qualitechco.com), can add value through enhanced flavor, color, and function. Some examples of these ingredient inclusions include blueberry/acai berry/chocolate/pecan particulates in bagels and baked goods; bits mixed in with the flour used in tortillas to add flavor, texture, and a more "stone ground" look; and inclusions that provide the nutritional properties of omega-3s without a negative taste for enhancement of muffins, cookies, and other products. At the 2011 IFT Food Expo, the company partnered with Omega Pure (a major manufacturer of omega-3s) to show blueberry and cinnamon particulates that provide the benefits of omega-3s for use in baked goods or on top of cereals. These inclusions provide a better shelf life of fish oil, good masking quality (no aftertaste), and a new delivery system instead of fish oil. Other inclusion systems from the company can help deliver fiber, flax, chia seeds, prebiotics and micronutrients, acai berries and

***A new system, individually quick frozen beverage pellets**, can deliver blended ingredients such as juice, yogurt, and fruit into a formulation. The technology allows beverages to be made with minimally processed ingredients, avoiding separation problems and other challenges.*
Photo courtesy of Sargento Food Ingredients

A Progressive Potpourri continued...

other fruits, and allergen-free alternatives. The company is also working on creating protein inclusions for various applications. The protein inclusions can overcome traditional challenges associated with the addition of protein such as "rubbery qualities" or "harder/denser."

Are You Better Off Without Chocolate?

A new product innovation in cocoa powder improves wettability and dispersability in cold drink mix applications. This breakthrough from the Netherlands-based Cargill (phone +44 1869 353 813, www.cargill.com) means that the cocoa powder disappears twice as quickly below the surface of the cold liquid and will disperse evenly throughout the liquid. The company claims that as a result, drink mixes using the new cocoa powders are truly putting the 'instant' into instant cocoa drinks.

According to Henri Kamphuis, Quality and Technology Director for Cargill Cocoa & Chocolate, this performance will be maintained throughout the product's shelf life, something that doesn't hold true for existing products, which suffer from decreasing wettability as they near the end of their shelf life. "Following years of research and development work, Cargill is the first to make this cocoa powder breakthrough," maintains Kamphuis. "With a number of patents pending, we will be in the unique position to bring this innovation to market in 2012, complementing our existing premium *Gerkens*® cocoa powders range."

In addition to greatly improved wettability and dispersability in cold drink powder mixes, this development also opens up the possibility of varying the balance of sugar and cocoa in recipes as it allows for lower amounts of sugar to be used. This will enable producers to offer a broader variety of options, such as a lower-calorie drink, or one with a stronger chocolate taste, depending on preference.

As reported in the 2011 June *Ingredients* section, the use of an advanced cocoa fermentation method developed by Switzerland-based Barry Callebaut (phone +41 43 204 04 04) has resulted in the new *Terra Cacao* chocolate range, said to be a vastly superior chocolate line. Because of the improvements in the fermentation of the raw cocoa beans, the cocoa used to make this product line has virtually zero defects or off flavors. The *Terra Cacao* range covers several milk and dark chocolate references that vary from 33.5% to 70.5% cocoa mass. The range is available to industrial customers worldwide.

Seeds of Change

What do you see on the horizon? My guess is that it could be the rising sun...flower. The potential for new ingredients derived from sunflower kernels seems to be growing. For example, sunflower lecithin offers an alternative to lecithin derived from soybeans, according to Germany-based Sternchemie GmbH (phone +49 (0) 40/284 039-0, www.sternchemie.de).

"Sunflower lecithin is hypoallergenic, so it doesn't need to be declared," explained Michael Heidland, the company's Lecithin Division Head. "Since it has a very similar composition of fatty acids and phospholipids to soy lecithin, more and more companies are starting to use it. The functional properties of soy-derived lecithin are well known, but customers have many questions about the functional and other properties of sunflower lecithin. The company's food scientists look into parameters such as oxidation stability, feel, viscosity adjustment, baking qualities, color, and processing effects, ensuring that the final product retains its desired qualities, despite the use of a different lecithin.

Another product that is derived from sunflower kernels is *SunButter*, an alternative to peanut butter. The product was the result of a cooperative effort between Red River Commodities, Fargo, N.D. (phone 701-282-2600, www.redriv.com), and the Agricultural Research Services (ARS) of the U.S. Dept. of Agriculture. Today, this product can be found in grocery chains, health food stores, and school lunch programs, as well as be used as an ingredient in baking and snack foods. Because it is gluten-free and provides an alternative for people with peanut allergies, this product may find emerging use in a wide range of applications that previously used peanuts or peanut butter.

A Flavor in Every Pot

A good place to end this article is in the area of flavors, and without doubt, emerging flavors are taking some decidedly interesting directions. At one time, sweet flavors were primarily used in sweet applications and savory flavors in savory products. But this is no longer the case, as demonstrated at the 2011 Innovation Roadshow, held by David Michael & Co.

Take, for example, savory-inspired cocktails where flavors such as salmon or bacon may be used in the creation of alcoholic drinks. The company served up a few examples with its *Fajita Rita Beverage*, *Smoke 'N Bacon Mary Beverage*, and *Steakhouse Mary Beverage*. Interestingly, a savory spirit, such as salmon vodka, can find use, if not for drinking, then in a food product such as a pasta sauce. Or how about chicken nuggets—a savory application popular with children—made with fruity flavors and fortified icings? *Apple Pie A La Mode Fortified Chicken Nuggets* are made with real apple juice concentrate and dried apples (delivering one fruit serving per four ounces), coated with real pie crust, and iced with vanilla ice cream flavored coating. *Cherry Lime Fortified Chicken Nuggets* feature a wild cherry flavor incorporated into the chicken and a lime flavor and vitamins in the icing. What about a meat-flavored hot cereal for breakfast? *10-Grain Hot Cereal Gravy* is a meatless, sausage-flavored gravy served over grits or cereal to simulate the flavor of country-style chicken and gravy sauce.

Wixon, St. Francis, Wis. (phone 414-769-3000, www.wixon.com), recently created salad dressing flavors that can help give vegetables a zip. These include *Curry Mustard*, *Sweet and Sour Thai Chili*, *Thai Peanut Ginger*, *Asian Coconut*, *Cajun Honey*, *Creamy Cucumber & Black Pepper*, *Maple Sugar & Herb*, *Peanut Ginger*, *Pink Grapefruit Vinaigrette*, *Taco*, and *Tortilla Lime Vinaigrette*.

At its 2011 Flavorology event, Bell Flavors & Fragrances showcased the next taste sensations by "travelling throughout the universe." *Nebula Nectar Moon Crater*, a gelatin dessert, combines the flavors of pineapple and cilantro. *Neptune Nirvana Bubbly*, a carbonated beverage, is a blend of cucumber, lime, and spearmint flavors. *Betelgeuse Breakfast Asteroid*, a truffle, consists of coffee, maple, and bacon flavors. And *Black Hole Parfait* combines

Today, savory flavors can find their way into sweet applications. *And sweet flavors can be used in savory products. These fun and adventurous combinations can lead to tastier and better-for-you products, especially for the next-generation consumer. Anyone for a chicken nugget with an apple pie flavor?* Photo courtesy of David Michael & Co.

black tea and soy sauce flavors. All these prototypes are described appropriately as "beyond exotic." All of them are definitely "spacey" in a good sense.

Getting back to earth, Bell also did some globe-trotting with spirited flavors. These alcoholic prototypes included *Fuji Apple Vodka* (Asia), *Mango Peppadew Cooler* (Africa), *Chamomile Liqueur* (Europe), *Citron Vodka* (Southeast Asia), *Purple Passionfruit Vodka* (Australia), and *Hypzoxotic*, a tropical fruit-flavored liqueur (Latin America). Prototypes that demonstrate premium indulgent flavors for private label included *Iced Wine Chocolate Raisins*, *Orange Ginger Dark Chocolate with Stevia*, *Sweet Potato Yum Yums*, *French Toast Granola Bar*, and a *Champagne Cola Beverage*.

Exotic fruit flavors continue to find their way into today's formulating. For example, in the marketplace, are dragon-fruit-flavored products such as vodka, green tea, juice products, and liqueurs. And some formulators are getting goosebumps over prickly pear, which has a flavor profile that can be described as mildly sweet with berry and melon notes. Many of these flavors are fun and adventurous, and can help create products that are tastier and better for you, especially for next-generation consumers. And as we try to better address health challenges, these flavors can be combined with sweetener blends, healthier fats, and a variety of other ingredients, to provide a clear signal of what's up ahead in food formulating.

So, in keeping with my Progressive Ingredient Party platform, support your ingredient and the value it can provide for tomorrow. It's got my vote! **FT**

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