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2017 CLEAN LABEL CONFERENCE SUMMARY

Sophisticated Solutions for Simplified Labels

The Clean Label Conference's tagline, "Sophisticated Solutions for Simplified Products," expresses the industry's challenge of simplifying products and also our belief that food science will deliver solutions. To meet consumer expectations, products must not only have great taste, value and nutrition, but increasingly possess attributes covered by the term "clean label." While far-ranging concepts like humane treatment of animals, transparency and purity are included, our event focuses on formulations and ingredient use.

This year's conference on March 28-29, in Itasca, Ill., provided 10 general session speakers unaligned with ingredient vendors and 18 jury-selected Technology Snapshot presentations. New to the program were three Application Brief presentations on natural colors invited by conference organizers.

This summary provides presentation highpoints. Presentations are available for download at www.GlobalFoodForums.com/2017-Clean-Label/Store. We'd love to see you at the 2018 Clean Label Conference on March 27-28, at the Westin hotel, Itasca, Ill., USA.



SOURCE: GLOBAL FOOD FORUMS INC., 2017 CLEAN LABEL CONFERENCE

■ Clean Label Conference attendees obtained new information on formulation tactics, both from speakers and the tabletop exhibitors.

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The Global Food Forums Story

Welcome to our 4th post-conference summary of our annual Clean Label Conference. Global Food Forums is also celebrating its 5th anniversary as a corporation.

When we launched the company in 2012, our vision was to develop a family of in-person, niche product development conferences for the food, beverage and nutritional products industries.

Each of our events, which also includes the Protein Trends & Technologies Seminar and Sweetener Systems Conference, is tied to a significant, long-term consumer and industry trend in which applied food science plays a crucial role. The technolo-

gy-based programs are designed to provide R&D and other food scientists with practical and impartial formulation advice, along with consumer trend insights, emerging ingredients, regulatory updates and other factors impacting product formulations.

With food technologists as our core customers, all our company decisions are guided by how they will impact this community's event experience. To date, our events have drawn over 2,400 attendees, from bench-level food scientists to VP/Directors of R&D, as well as those interested in interacting with this technologist community to better understand their needs and challenges.

We hope you'll attend some of our future events. We'll work hard to make them your best conference experiences ever!



Warm regards,
Peter Havens & Claudia O'Donnell
Co-owners, Global Food Forums, Inc.

Global Food Forum Team

For an inside look at the team, visit: www.globalfoodforums.com/about-us/gff-team/

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John Csukor, Founder / CEO



Instilling Consumer Confidence Through Clean Label Claims

Alan Rowan, Research Analyst with Euromonitor International, Inc., presented a data-laden status report on global clean label food trends, followed by a surprising interchange at the end.

“Eighteen months ago,” began Rowan, “we launched a new database called ‘Passport Ethical Labels’...where we track up to 26,000 brands and package claims across 26 markets.” The purpose is to establish the true value of such claims in the specific markets served.

International leaders in the clean label category include Nestle, PepsiCo, Unilever and Kraft Heinz (in descending order). “Clean label” is less a label policy than a corporate philosophy, posited Rowan. He segued to the recent attempted acquisition of Unilever by the Kraft Heinz Company, noting that Unilever very openly promotes its commitment to sustainability, environmental responsibility and corporate transparency. Had the acquisition been successful, “would Kraft Heinz therefore have had to adopt Unilever’s core values in order to protect all of its brands?” asked Rowan.

Another company, Mars, Inc., long was reluctant to reformulate its legacy brands but, in the end, listened to its customers, said Rowan. The language it used in its promotions clearly said to its consumers: “We hear you, and we have made an ongoing commitment to meet your needs.”

For Mars, this was a good outcome, but there are risks involved for early adopters: Rowan cited the case of The Campbell Soup Company’s highly publicized reformulations of its soup lines to significantly reduce sodium contents.

“The result was that consumers equated less salt with less flavor, and the effort failed, thereby putting all the company’s brands at risk.”

Euromonitor estimates the global value of the packaged foods’ clean label category at US\$165 billion across the 26 markets tracked. Rowan suggested that this is the outgrowth of consumer desires for clean, safe and natural products starting as far back as the 1960s. Events that fueled this trend included consumer fears of e-numbers (in Europe); melamine contamination; alleged links between artificial colors and hyperactivity; GMO controversies; and, more recently in the UK, the adulteration of ready-to-eat meals with horsemeat.

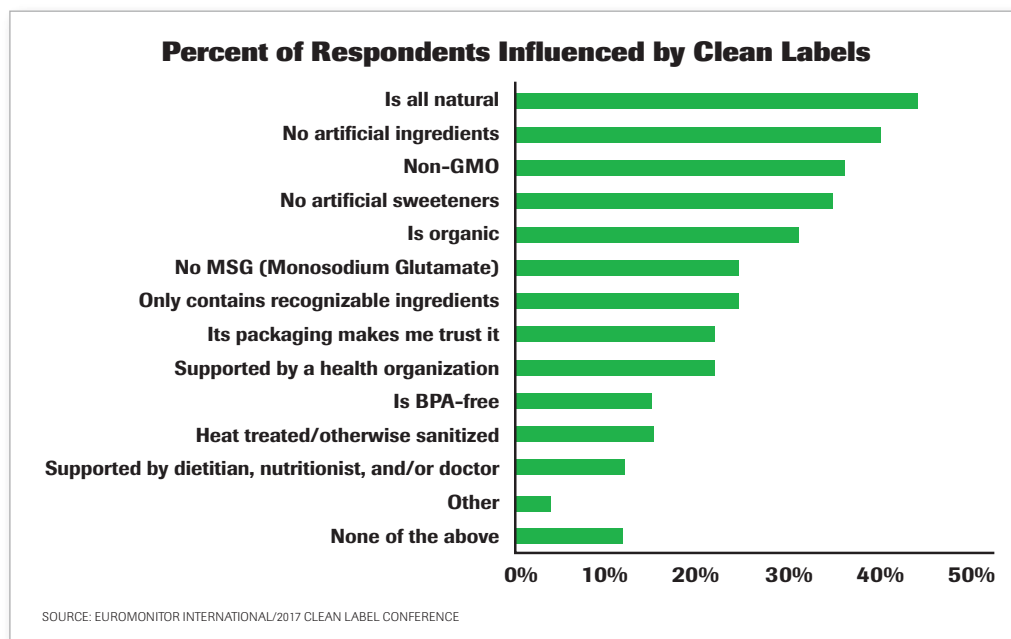
Euromonitor says that the market leader for clean label foods is North America (\$67 billion), followed by Europe (\$59 billion) and China (\$23 billion). The global clean label category itself is dominated by retail packaged foods (\$129 billion), soft drinks (\$34 billion) and hot drinks (\$3 billion). Rowan predicted modest CAGR growth (1-5%) in these categories over the 2015-2020 period, albeit from a conservative standpoint.

Complete presentations and/or adapted versions are available online at <http://GlobalFoodForums.com/2017-Clean-Label/Store>.

Underlying clean label concerns is the fact that consumers want to know not only what is in their food, but the contextual narrative behind it, said Rowan. Are ingredients locally sourced; produced by fair trade practices; or grown under environmentally sustainable conditions?

The most persuasive claims for clean labels was led by “all natural” (44%), followed by “no artificial ingredients” (40%). Organic garnered (31%), no-MSG (24%) and BPA-free (15%). Claims of support by health organizations (e.g., American Heart Association) garnered the interest of 22% of consumers polled.

Make clean label claims as simple as possible and avoid “green washing,” cautioned Rowan, “because underpinning all clean



Although specific clean label concerns may vary by country, many concerns overlap geographical boundaries. Common desires among clean label consumers include increased transparency, clarity and confidence in food and beverage formulations, as well as their manufacturers.



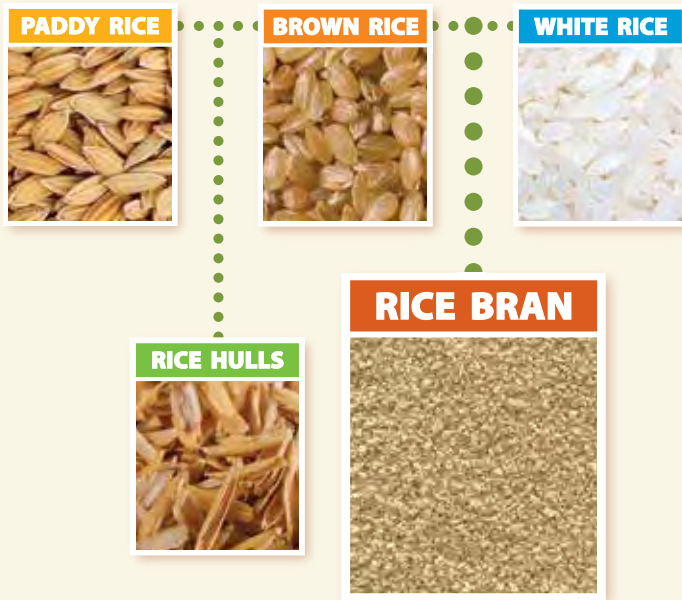
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label claims is the trust issue.” If claims are vague; inspire fear-mongering; or are so creative they lose specificity, they risk diluting the entire clean label category. Examples given included bottled water claiming to have been “made with clean water;” “say ‘no’ to sugar” claims; and a product that advertised “no added nasties.”

Rownan posited that increased transparency, possibly through QR codes, could only help the category. An audience member then asked if there was any evidence linking specific product claims in e-commerce to retail impacts? The response was that food products sold in e-commerce exhibit very few claims on the packages themselves, but offer significantly more claims on the website from where sold. Increasingly, these claims are accessible through QR codes. Both commentators may have inadvertently signaled how food-label regulations might become obsolete altogether.

Instilling Consumer Confidence Through Clean Label Claims, Alan Rowan, Research Analyst, Euromonitor International, Alan.rownan@euromonitor.com

Emerging Clean Label Claims: Regulations & Liabilities

Chip English, Esq.’s presentation on food and beverage regulations evoked recent drone videos of food and beverage entrepreneurs blithely surfing the waves while oblivious to the great white sharks perusing succulent, clean label menu choices from below. Metaphorically speaking, of course. English is a Partner in the Washington, D.C., office of the law firm Davis Wright Tremaine, LLP.

“I am the lawyer to dash cold water on all these wonderful clean label claims that people want to make,” he began.

“There are a whole lot of things that arguably could make clean label claims. But the meaning of some claims is not so clear. We still don’t know what ‘free-range’ or ‘cage-free’ are, and, although there are some hints of what ‘natural’ means, most such claims remain in the eye of beholder. What is ‘local’...10 miles, 50 miles, 100 miles? Does ‘local’ signify a different distance in New York City vs. in Des Moines, Iowa? Then, there are the emerging label claims: made from kitchen ingredients; craft; made from scratch; small batch, homemade...what do they all mean?”

“So, if you want to try to define such claims on your product, good luck, because lawyers will then tell you what they mean after the fact,” English continued.

According to the U.S. Code of Federal Regulations, a food shall be deemed misbranded if its label is false or misleading in any particular regard (21 CFR 343(a)(1)). But, while there can be a grey area surrounding the small number of clean label terms the Food & Drug Administration (FDA) has defined, there is a big



■ **Clean label claims can especially be risky if they state or suggest “healthy” on the package or company’s website, as the FDA has yet to redefine the term to reflect updated science around fat. Various natural product manufacturers have been sued over allegedly misleading packaging graphics, undeclared processing aids and minute pesticide residue levels—even when in full compliance with current federal standards and regulations.**

grey area of terms that remain undefined. Regulatory uncertainty provides considerable leeway for plaintiffs to complain about a product claim, said English.

According to English, the bulk of outstanding legal actions focus on “natural” and “healthy” claims. He provided examples.

“Healthy” can be an exceedingly narrow and difficult term against which to conform a product. Though the product is loaded with a surfeit of very healthy ingredients, the manufacturer of the KIND nutrition bar received a warning letter from the FDA in 2015 saying that its products could not be designated “healthy,” because their saturated fat content put them out of compliance with FDA guidelines for the term “healthy.” KIND bars contain saturated fat-rich nuts, otherwise known as a health food in most quarters. The company was ordered to remove all references to “healthy” from its packages...and website. Although FDA has allowed KIND to keep references to healthy on its bars and website (after some back-and-forth with the agency), use of the term outside of the narrow regulatory framework carries risk. [Editor’s note: In what it terms a “re-evaluation,” the FDA has since permitted KIND the use of the term “healthy” in relation to its “corporate philosophy,” not as a nutrient claim. See <https://goo.gl/M7P1bC>]

English cited a large retailer, COSTCO, that made “healthy” claims about a coconut oil product. This was based, in part, upon the oil’s medium-chain triglyceride (MCT) content. Yes, the science does say that MCTs are healthier than other oils, but some of the MCTs thereof are saturated, and their contents in these oils can vary greatly, so...lawsuit!

Sometimes, federal agency jurisdictions overlap. Quaker Oats was sued in 2016 over packaged oat cereals sporting “100%

Natural” claims. However, the oats contained minute levels of pesticide residues; the Environmental Protection Agency (EPA) has jurisdiction over establishing pesticide tolerance levels and has not established pesticide tolerance levels in all food. The result: lawsuit.

Packaging graphics also matter. When a large retailer promoted an organic milk package featuring a cow happily jumping a fence, plaintiffs argued that the “organic”-label package was misleading, because the milk producer actually kept its cows in tightly confined quarters.

Although he remains unsure of what future American labeling regulation will bring, especially given a new political administration in Washington, D.C., English counsels food companies not to remain passive.

“There is an important role for industry to establish and present its own standards to the government, rather than wait for lawsuits to be filed.”

For individual companies, he counseled them to assess their own risk tolerances: “How important is a claim to your product’s success, and can you back it up with evidence whereby to substantiate it? Look at all aspects of your product, including the messages that the packaging imagery conveys.”

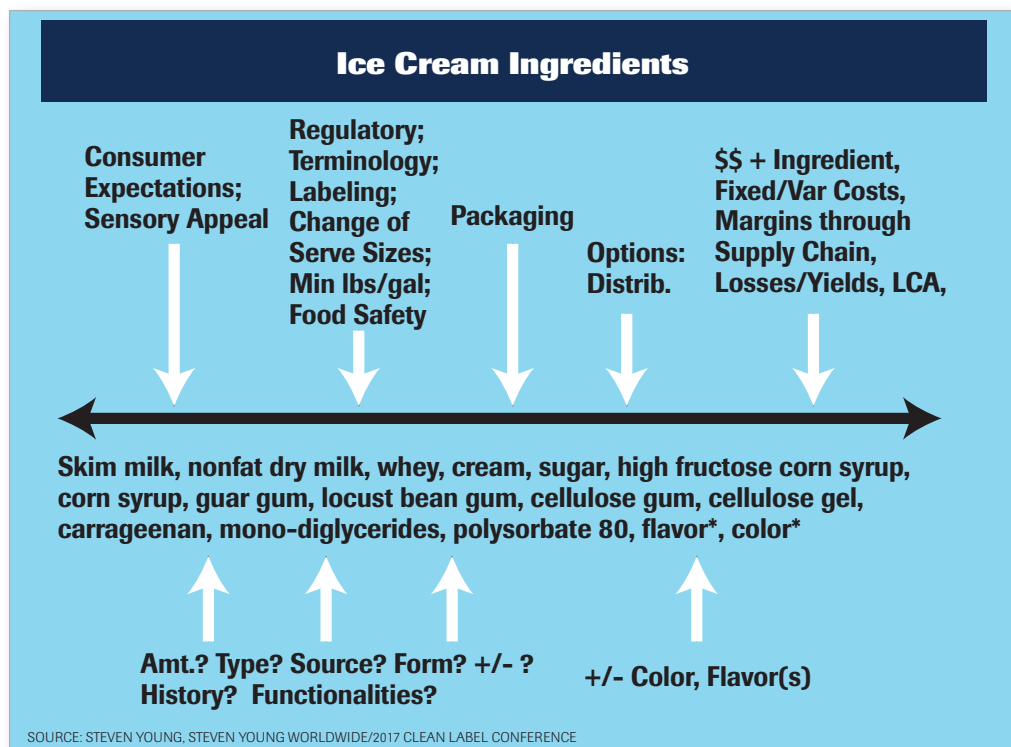
In other words, surf at your own risk!

Emerging Clean Label Claims: Regulations & Liabilities, Chip English, Partner, Davis Wright Tremaine LLP, ChipEnglish@dwt.com

Clean Label Dairy

Ice cream originated as a clean label product, began Steven Young, Ph.D., Principal, Steven Young Worldwide, in his presentation “Formulating Clean Label Dairy (and Non-Dairy) Frozen Desserts.”

Historically ice cream contained: milk, sugar, cream and natural flavor. In the early 1950s, the FDA established Standards of Identity for Frozen Desserts to distinguish ice cream and similar products from competing products that might contain other ingredients or varying quantities of the basic ingredients.



❏ **Because of multiple manufacturing demands, ice cream has evolved from a clean label product into one with a long list of ingredients.**

Over time, Standards have been modified to redefine allowed ingredients and to fit evolving food technologies, approaches and regulations. The product originally called “ice milk” now is “reduced-fat ice cream.” There are also a wide range of non-standard products, including frozen yogurt, or “hybrid” frozen desserts, and novel plant-based products. Proposed revisions to the Nutrition Facts Panel will change the serving size for ice cream from ½-cup to ⅔-cup, creating challenges to formulating, eating quality and resistance to heat shock.

“The two largest ingredients by volume, air and water, and how they are managed, are critical to success,” said Young. As ice cream technology has evolved, additional ingredients have been added to allow the product to tolerate performance demands in a wide range of formats, including bulk food-service for dipping, and re-sale mixes for direct-draw soft-serve and shakes. This has resulted in a wide array of frozen dairy desserts with long ingredients lists that are not clean label-friendly.

The challenge is to create the same performance characteristics with fewer ingredients, while navigating the rigors of distribution—and maintaining any given brand equity. Manufacturers can use a variety of ingredient approaches to achieve a cleaner label ice cream. They can also alter manage processing approaches and conditions, such as for mix assembly; pasteurization; homogenization; mix aging; and whipping/freezing.

Managing the freezing point of water is the first challenge. Water freezes at 32° F, but the freezing point of an ice cream mix



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might be 27° F. One way to increase dairy ingredients' ability to interfere with the behavior of water is by heating skim milk and cream to 175 or 180°, thus denaturing whey proteins, increasing their capacity to do just that. A second option is to freeze as much water in the barrel of the ice cream freezer as possible, drawing the product from the freezer at the lowest temperature possible. The more water frozen, the greater positive influence on resistance to heat shock and eating quality. A third option is rapid hardening, with novel application of cryogenic gas to freeze as much water as possible. Essentially, this is enhancing hardening from the inside-out and outside-in.

Another approach is to leverage the functionality of milkfat to achieve sufficient, controllable “de-emulsification” (i.e., “fat agglomeration”) to create small agglomerates of fat, to allow for structure and inclusion of whipped-in air, both of which interfere with the transition of ice-to-water-ice, so critical during distribution, storage and sale. One solution might be pre-aeration of the liquid mix prior to freezing to create many small air bubbles and small fat agglomerates. Still another approach is to use dairy ingredients that contain higher levels of naturally occurring phospholipids. Sour cream or sweet-cream buttermilk (uncultured byproduct from butter making) are good sources, if managed properly.

Sweeteners have come under increased scrutiny by consumers. In frozen desserts, sweeteners serve the dual purpose of adding sweetness, allowing for the products to be made; and managing the amount, size and stability of ice. Lactose, sugar naturally present in dairy ingredients, has problems of its own to avoid “sandiness” in any finished product.

To manage the above, a number of formula guidance tools, i.e., indices, are used. These include Theoretical Sweetness, Texture Stability Index and Water Control Index, to calculate how any ingredient substitution can modify resistance to heat shock, body (bite and chew) and texture (smoothness, creaminess.)

Ice cream formulators must also pay special attention to flavors that might negatively affect any given finished product. These include flavors intrinsic to the mix and so-called added characterizing flavors. Milkfat is supportive to components of natural flavors down to below 4-5% milkfat. Thus, there are more challenges in reduced-, low- and no-fat formulas. Unique flavor challenges arise with plant-based “milks.” The flavor of nutmeat/seed/grain ingredients vary, depending on type and extent of extraction processes, and naturally occurring enzymes that often times create undesirable off-flavors. Components of these novel plant “milk” ingredients also can be incompatible with functional requirements, including freezing, whipping and the delivery of more aromatic characterizing flavors.

Finally, manufacturers must (and normally do) evaluate the cost of any and all approaches, keeping a keen eye on costs and point-of-sale pricing.

However, clean label, easy-to-make and economically viable products are certainly possible. A thorough knowledge of ice cream manufacturing principles, plus evolving ingredient, formula and manufacturing options, can expedite those factors critical to success.

“Formulating Clean Label Dairy (and Non-Dairy) Frozen Desserts,” Steven Young, Ph.D., Principal, Steven Young Worldwide, Steve@stevenyoung.net



■ Organo-sulfur extracts from garlic, onion and shallots (members of the genus *Allium*) are potent antimicrobials.

Emerging Research to Practical Approaches on Natural Antimicrobial Use

In his presentation, “Emerging Research to Practical Approaches on Natural Antimicrobial Use,” Mathew Taylor, Ph.D., Texas A&M University, shed light not only on the use of natural antimicrobials, but he also explained why there isn’t a host of new compounds to meet the demand. GRAS approval for food additives is an



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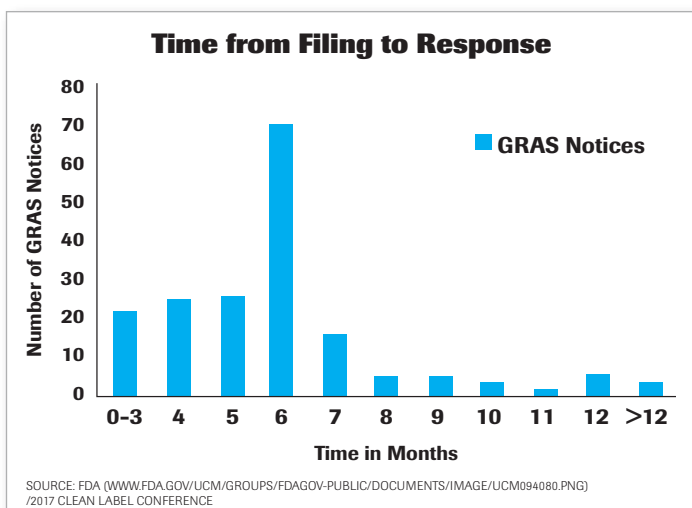
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Since its introduction in 1958, the FDA's GRAS list has evolved from an affirmation to a notification process. This chart shows the average time the FDA took to respond to a filing entity from 1998-2005. GRAS approval for food additives normally is an expensive, time-consuming process, noted Taylor.

expensive, time-consuming process that requires demonstration of the safety of the compound, in the manner it will be used, before it enters the market. Many spice extracts have antimicrobial properties, for example, but they are GRAS-based on their use as flavorants and aromatics.

Research on plant-derived antimicrobials is extensive, yet it's scattered across journals all over the world. Well-devised summaries are lacking. However, the data reveal they work very well in certain applications. Some of the extracts, as well as some of the individual components [within extracts], possess powerful antimicrobial activity that inhibit not only spoilage microbiota, but also pathogenic microbes, Taylor said.

Most of the data are on monophenols, such as essences of cinnamon, thyme, oregano, sage and ginger. "We have very good information on what organisms they work against; which ones they don't; which cultivars of plants are best for harnessing or harvesting; at what stage of maturity of the plant; what conditions of use; and what are their organoleptic impacts. We know the most about these," Taylor added.

Organo-sulfur extracts from garlic, onion and shallots (members of the genus *Allium* and family *Cruciferae*) are potent antimicrobials. These compounds cause cell death in Gram-positive and Gram-negative bacteria, and in fungi.

Biopreservation, another means of extending shelflife and food safety, utilizes natural or controlled microbiota and/or antimicrobial compounds. There are three key forms: fermentative non-pathogenic microbes, principally the lactic acid bacteria (LAB); fermentates from non-pathogenic fermentative microbes that are

purified and added to other foods, such as acids and bacteriocins; and bacteriophages. For example, *Carnobacterium maltaromaticum* is approved for RTE meats as an antilisterial agent in the U.S. and Canada. *Lactobacillus* and *Pediococcus spp.* are approved for fresh and processed meat safety by FDA/USDA. FDA has provided GRAS affirmation for many LAB products used in fermentation processing, but very few approvals in biopreservatives.

A third category, antimicrobial metabolic products, are produced by non-pathogenic microbes via industrial fermentations. They are comprised by some combination of acids, antimicrobial peptides, peroxides and miscellaneous antimicrobials. Nisin, mixed fermentates, natamycin (an antifungal) and poly-L-lysine are examples that present options for clean label, depending on their usage/application. Some may have greater restrictions on labeling, but the natural aspect to this ferment antimicrobial product, despite these being traditional antimicrobials, may be successfully navigated for food safety, Taylor suggested.

Combining antimicrobials provides opportunities for synergism. Pairs or even three-compound applications have been reported to demonstrate synergistic inhibition of microbes. Pairing antimicrobials with thermal or non-thermal physical processing may reduce overall antimicrobial utilization without safety or quality detriment.

Taylor cautioned that replacing traditional antimicrobials with clean label alternatives requires careful planning. Naturally occurring acidulants may replace organic acid salts or inorganic acids for pH control, but the impact on pH control must be understood. "If you're replacing humectants for water activity control, again, do you gain the same functionality?" he asked. If one compound is taken out, something must be added that yields the same functionality. How much must be added? What are the side effects?

It's important to understand whether the antimicrobial will work within the food itself, because physical or chemical interactions may render it ineffective. "If it's a hydrophobic antimicrobial, does it partition into your fat phase? What's the impact on the pH?" Taylor asked.

There also should be a deep, intimate knowledge of the microbial ecology of the food before considering replacing compounds, he stressed. For example, susceptibility of *Listeria monocytogenes*, for example, to some bacteriocins (like nisin) can be reduced when the bacterial cells are in the resting stage. However, when replicating and growing, the pathogen causes gastrointestinal disease in immunocompromised individuals, and it can cause spontaneous abortions in pregnant women.



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Clean label opens a lot of doors, but it closes some too, he concluded. One cannot sacrifice the safety and wholesomeness of the food just for a clean(er) label.

“Emerging Research to Practical Approaches on Natural Antimicrobial Use,” Matthew Taylor, Ph.D., Associate Professor, Dept. of Animal Science, Texas A&M University, matt_taylor@exchange.tamu.edu



Selecting Natural Sweeteners: Products, Properties and Performance

Generationally speaking, “Millennials are driving consumer clean label expectations deep into the sweetener category,” said Melanie Goulson, General Manager and Principal Scientist at Merlin Development.

Natural sweeteners have been under sustained scrutiny, as consumers of all ages are confronted with news headlines pinning sweetener consumption as an underlying cause behind global obesity, diabetes and circulatory diseases. In 2015, the World Health Organization (WHO) recommended that adults and children reduce “free sugar” consumption (i.e., sugars added to foods) to less than 10% of total calories consumed, but said “5% would be even better.” That same year, the U.S. Department of Agriculture (USDA) published its 2015-2020 Dietary Guidelines—also recommending sugar consumption be reduced to less than 10% of calories per day. And, as of July 2018, U.S. food and beverage nutritional label panels might need to distinguish between naturally present sugars and “added sugars.” [Editor’s note: This deadline might be extended, pending review by the new administration.]

“Given that there exists no legal definition for ‘clean label,’ much is open to consumer interpretation,” explained Goulson.

“Here is my own version of a clean label lexicon: simple, familiar, natural, organic, local, whole, fresh, real, sustainable, transparent, trustworthy, authentic, ethical, wholesome, safe, healthy and nutritious.”

Goulson believes consumer expectations of sweeteners are akin to the concept of nutrient density: Consumers want sweeteners that offer some redeeming value along with the calories—a “sweetener-plus” halo. For example, coconut palm sugar is loaded with vitamins and minerals, and it comes with a relatively low glycemic index. Honey comes loaded with amino acids, minerals and pollen; maple syrup with minerals, vitamins and polyphenolic antioxidants; black strap molasses is high in vitamins B6 and K; while malt syrup extract’s antioxidants come with “impressively high ORAC value (a measure of antioxidant activity).”

According to data provided by one supplier, the majority of consumers perceive sucrose, “raw sugar,” molasses and monk fruit as “all natural.” According to 2014 Mintel data, honey, coconut palm sugar and agave lead the pack, while saccharine, aspartame and high-fructose corn syrup trail, in terms of consumer “health halos,” she said.

Goulson divided natural sweeteners into four categories:

1. Sugar syrups (e.g., honey, agave, tapioca syrup, yacon syrup)
2. Less-refined sugars (e.g., coconut palm sugar, turbinado, demerara, rapidura, jaggery, sucanat)
3. Zero-calorie/high-potency (stevia leaf and monk fruit extracts)
4. Low-/No-calorie sugar alcohols (erythritol, xylitol)

Yacon syrups are derived from an Andean root that has been promoted for alleged weight-loss and other nutraceutical benefits. Jaggery is a pressed cake made of date palm, coconut palm, or sugar cane sugar crystals and molasses: It is popular in Southern Asia and Africa. Muscovado sugar is a sticky mixture of sugar cane sugar and molasses. Rapidura, turbinado and demerara are first-press cane sugars with varying levels of residual molasses.

Sugars and sugar syrups vary significantly in their sucrose, fructose, glucose, maltose and maltotriose composition, which will affect their functionality.

The two natural, zero-calorie, high-potency sweeteners approved in the U.S. are stevia and monk fruit extracts. Steviol glycosides are 200-250 times sweeter than sucrose, while monk fruit (melon) juice is about 20 times sweeter than other fruit juices; its active components, mogrosides, are about 200 times as sweet as sucrose. However, these ingredients typically need to be paired with bulking agents, which may involve additional considerations, (e.g., naturally sweetened or all-natural; low- vs. no-calorie; functionality, taste, ingredient labeling and cost).

DELI SLICED
HAM

Nutrition Facts

Serving Size

18%

CENSORED

DATE
9.03.16

SELL BY:
9.08.16

TOTAL PRICE

\$3.38

UNIT PRICE
1.00 lb

NET WT.
3.38 lb



099127
3.38 lb



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In summation, concluded Goulson: “The clean label movement is reaching deep into the sweetener space, and there exist many consumer-friendly ingredient choices. Expect consumers to carefully examine the new nutritional labels as they relate to sugar and to actively seek natural sweeteners packaged with bonus nutrients.”

“Selecting Natural Sweeteners: Products, Properties and Performance,” Melanie Goulson, MSc, General Manager & Principal Scientist, Merlin Development and Adjunct Professor, St. Catherine University, mgoulson@merlin.com

Insights into Flavoring Use and the Impact of Clean Labels

The paradox of flavor is that its presence is tiny in the total composition of foods, yet it is a primary driver of consumer acceptance. Professor Robert J. McGorin, Oregon State University, explained that moreover, flavor is only about 20% taste, while aroma accounts for 80%.

Aromas must be volatile. Most are fat-soluble. Roughly 8,000 known aroma chemicals have been identified. “They are always organic molecules,” McGorin said. “They contain carbon, and usually in combination with oxygen, nitrogen and/or sulfur. We perceive them two ways: by smell through the nose, ortho-nasally; and through the back of the mouth, retro-nasally.” That’s why food doesn’t taste good when a head cold’s congestion blocks the back sinus passages.

Tastants are non-volatile. They are water-soluble. There are five categories: sweet, sour, salty, bitter and *umami*.

Chemesthesis is the third aspect of flavor. It’s a skin response in the mouth to chemical irritation. Sensations such as pepper burn or menthol cooling effects are examples.

Any natural flavor can contain 200-1,000 volatile constituents. “Those individual constituents are present anywhere from parts per million to parts per trillion,” he continued. All the aroma chemicals that nature provides have very different boiling points and polarities; and they differ in how they interact with the olfactory receptors in our nose and how we sense these different chemicals.

Labeling can be a quagmire, both on the bulk flavor label of the container from a supplier and in the finished product ingredient declaration for the consumer. For example, there has been much discussion around propylene glycol, which is used as solvent in flavorings. In the U.S., a food manufacturer does not have to list it on the label, because it is used in such small quantities. However, for the purposes of transparency, often considered an important aspect of a clean label, a company may choose to list it as part of the ingredient legend.

A Natural Challenge



Choosing the appropriate all-natural flavor is difficult for some applications. Variability in compounds derived from natural sources often increases difficulty in controlling the proper level of flavoring to use. Achieving the desired flavor intensity also is challenging, since the number of available ingredient tools is restricted. Additionally, botanicals and minerals that are added to achieve label claims can wreak havoc with the flavor system. “They will not only interact with the flavor, but sometimes contribute off-flavors, like chalkiness or bitterness,” McGorin said.

When it comes to declaring the presence of a natural flavor, if all the flavor materials are from the named fruit, it may be called by its name. For example, “natural strawberry flavor” may be used if all components are naturally derived from strawberries. If the flavoring contains some quantity of the named flavor, but the rest of the flavor ingredients are natural but not from the named fruit, it would be labeled “natural strawberry flavor WONE” (with other natural flavors). “Natural strawberry-type flavor” indicates that the flavor portion is natural, and the aroma resembles the name, but it does not contain any flavor ingredients from the named fruit (i.e., strawberries). “Natural and artificial strawberry flavor” contains both natural and artificial ingredients that simulate, resemble or reinforce the named flavor. Non-flavor ingredients, such as an added carrier or color, do not affect the flavor name.

Creating globally compliant flavors has its own challenges, due to differences in international standards. Different countries have different approaches. Safety, labeling and intellectual property issues all come into play. “While small strides have been made to harmonize flavor regulations globally, there is still a long way to go,” he pointed out.

Clean labels are not based on legislation. The perception of clean labeling is consumer-driven, so McGorin recommends using words that give the impression of real foods. He closed

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with two examples. The food industry recognizes oleoresin black pepper as a natural ingredient. Black pepper extract is more consumer-friendly. Consumers may not know what stevia is, but they may respond more favorably to whole-leaf stevia extract.

“Insights into Flavoring Use and the Impact of Clean Labels,” Robert J. McGorin, Ph.D., Department Head and Jacobs-Root Professor, Food Science & Technology, Oregon State University, robert.mcgorin@oregonstate.edu



🧪 In order to mimic the texture of meat-based products, many complicated ingredients may end up being used in plant-based ones.

Strategies to Create Consumer-friendly Ingredient Statements

Challenged with the need to reformulate products with clean labels, manufacturers have the options to eliminate, modify or replace offending ingredients, said Ronald Visschers of Netherlands-based TNO. Visschers presented a systematic approach to clean label reformulation, accompanied by illustrative case-studies.

Though constantly evolving, clean label products today are characterized by short ingredient lists; consumer familiarity and acceptability of ingredients listed; a lack of chemical-sounding names; and low degrees of processing, said Visschers.

To establish a rapid, systematic way of addressing evolving clean label trends, TNO created a “decision tree” approach that begins by looking at the body of regulations affecting ingredient systems.

“We collect all types of regulatory facts regarding the ingredients that we want to use in a clean label formulation,” said Visschers. “In some cases, it may be possible to simply rename ingredients instead of replacing them.”

After that comes alternative ingredient identification and screening. This requires modeling of food systems. “Replacing one ingredient for another is sometimes possible, but one needs to consider functionalities.” This requires the ability to test ingredients variations or natural ingredient alternatives, as well as ingredient interactions.

Visschers provided two case studies undertaken by TNO and its industry partners that focused on the textural and other mouthfeel aspects of clean labels.

The first was a gelatin-based “wine gummy” candy. “Most consumer concerns regarding gelatin pertain to its animal origin. Especially in Europe, people still remember the BSE scare, and there are also vegetarians to consider: Plant ingredients are more appealing to a growing segment of consumers,” said Visschers.

“Foods are highly complex materials,” he continued. In order to replace gelatin in gummy confections, one needs to translate mouthfeel properties into measurable physical parameters. Gelatin contributes a wide range of properties to gummy candies, including chewability, flavor release and “longness.” These must be translated into an array of physical measurements, including for stiffness, toughness, tearing, melting and glassy-state transition properties.

Working with a confectionery manufacturer, TNO developed a model “that allows us to understand how gelatins themselves change with aging and composition, and to quickly identify alternative ingredients with the same characteristics.”

The next example given involved meat analogues, which have become increasing popular in the Netherlands. A large number of consumers are “very keen on finding meat look-alikes made from lupine, soy, insect or other proteins,” explained Visschers. “It’s not just vegetarians, but also ‘flexitarians,’ that actively seek out such products.”

Animal proteins contribute a very unique “bite,” so meat analogues often end up with very long and complicated ingredient lists trying to simulate animal protein textures.

TNO and its partners again developed a model to predict ingredient interactions in meat analogues: They developed a food “micro” model to study actual ingredient interactions and quantify physical and sensory properties using textural analysis and sensory panel data.

For ham and sausage, chewing consistency is very important. TNO developed a test to simulate chewing using a mechanical plunger. This allowed evaluation of different proteins for textural consistency under simulated chewing conditions. “We found that egg albumin, for example, forms a fine-stranded gel that exhibits

a high water-holding capacity under stress, which translates into good chewiness.”

If a protein gel loses water while being chewed, it becomes dry and inedible. The researchers also evaluated the role of different salts on gel characteristics. Shifting from calcium salts to magnesium salts caused soy proteins to aggregate (denature) more readily, affecting chewiness properties. By interplaying the gelation and denaturation characteristics of different proteins and salt adjuncts, chewiness characteristics could be optimized resulting in (for example) improved vegetarian burgers.

In conclusion, said Visschers, clean label formulation is not a straightforward process, as most ingredients have multifunctional roles in foods. “Development of models that translate important sensory characteristics into physical attributes allows us to systematically identify clean ingredient alternatives.”

*“Strategies to Create Consumer-Friendly Ingredient Statements,”
Ronald Visschers, Ph.D., TNO, ronald.visschers@tno.nl*

Consumer & Restaurant Menu Trends: The Clean Label Influence

Approximately 50% of U.S. consumers’ food expenditures are allocated to food eaten away from the home. The foodservice and restaurant industries also function as important trend leaders. Lizzy Freier and Aimee Harvey, Managing Editors at Technomic, Inc., a foodservice research and consulting firm, discussed the impact of consumer clean label concerns on this important industry segment.

“Clean food is a topic that we are always talking about,” said Freier. Technomic regularly polls consumers and foodservice operators, and tracks menu trends “from field to fork,” she explained. Here are some research results.

Definitions of “healthy” are always changing, especially for younger consumers. And six out of 10 consumers equate “clean labels” with healthfulness.

“It’s not just physical, but also mental wellness...a sense of well-being tied to feeling good” that consumers associate with their food choices, Harvey continued. How do consumers

define clean labels? Primarily, “clean” equates with a lack of preservatives and other additives, or food that is raw and natural. Other “clean” claims include “fresh,” “non-GMO” and “hormone-free.”

But are consumers willing to pay more for clean label foods? On this question, they are split. Harvey cited Technomic’s “2016 Healthy Eating Consumer Trend Report,” saying, “43% said that they would be willing to pay more for ‘natural,’ but 37% would not. 39% would pay more for unprocessed foods, but 34% would not. 40% would pay more for ‘clean label,’ 29% would not.”

Importantly, 53% believed that “natural” equated with being tastier, up from 45% that indicated the same in 2014.

Technomic polled foodservice operators on their perceptions of clean label expectations. “89% of operators acknowledged that ‘health and wellness’ was a leading trend, but definitions thereof were extremely broad and fuzzy,” said Lizzy Freier. “However, eight or more out of 10 agreed that clean labels will impact their purchase decisions in the future, taken to mean buying more locally produced foods that are chemical- or pesticide-free; produced under sustainable conditions; free of hormones or antibiotics; and the product of humane animal treatment.”

As result, many operators have been adding clean label designations to their menus: Clean label menu statements tracked by Technomic increased 19%, from 1,191 in 2015 to 1,419 in 2016. “Such claims are showing up in every menu category,” said Freier.


Clean Label Fats & Sweeteners = Healthy?

38%
of consumers consider some types of fats to be good for them.

PDQ

SOURCE: "2016 HEALTHY EATING CONSUMER TREND REPORT," TECHNOMIC /2017 CLEAN LABEL CONFERENCE

One interesting development is that certain restaurant and other foodservice outlets have recognized that consumers are associating certain “clean label” fats and sweeteners as healthy, such as butter, coconut oil, duck fat, honey, maple sugar and agave syrup.



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While “natural” and “organic” claims still predominate on menus, “the fastest growing clean menu claims between 2015-2017 related to animal products, such as ‘sustainability caught’ (+1,100%), ‘no steroids’ (+250%); ‘humanely raised’ (+159%), ‘GMO-free’ (+138.7%) and ‘cage free’ (+32.3%),” said Freier. “Many people want to hear narratives about the animal products they eat.”

Even as restaurants and lodging venues experienced steadily increasing penetration of clean label claims, the prevalence of such claims actually decreased at university outlets. Freier suggested that for these venues, “clean label” claims have become mainstreamed expectations, an insight that could prove a leading indicator for other foodservice and food industry venues.

Harvey reviewed a list of major American restaurant chains that have recently emphasized clean label policies: “Panera finished its goal of creating a ‘100% clean menu;’ McDonald’s has removed some artificial preservatives; Pizza Hut has removed preservatives from meat and cheese; and Papa Murphy’s has begun serving antibiotic-free chicken,” she noted.

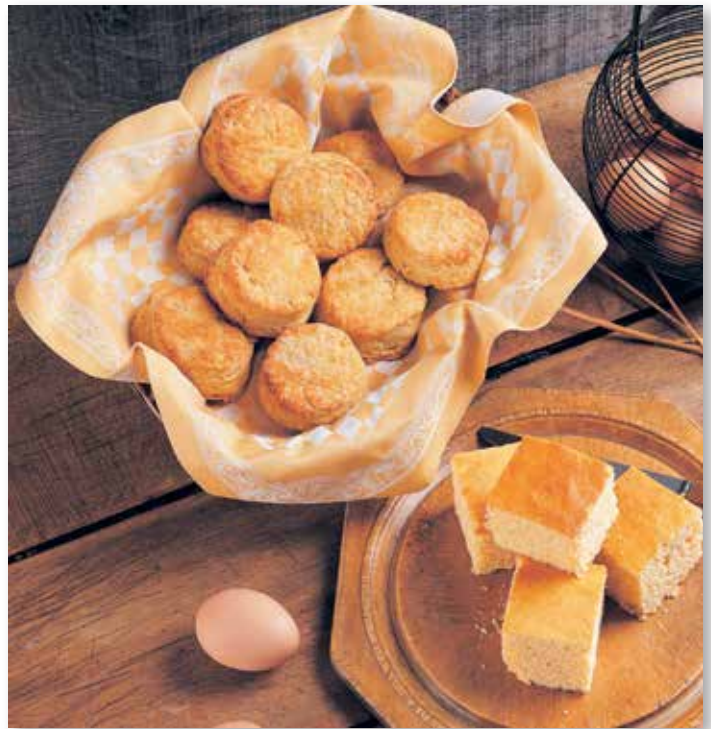
Others have announced plans for major clean label initiatives. Organic has pretty much gone mainstream, which puts the industry on notice to identify the next wave of clean label buzzwords that will bring customers to their doors. However, Harvey counseled caution: “Chipotle’s new Tasty Made venture sought to differentiate itself from the competition with responsibly raised, hormone- and antibiotic-free meat, only to discover that consumers were not willing to pay the premiums that such claims entailed.”

The presentation concluded with the notion that “you build trust through transparency,” and you do it by being open about providing compelling whole food and clean label narratives about your food, beverage and ingredient histories. “Most consumers say a number of clean label claims actually taste better,” said Harvey. Such should define the bottom line for any food-related business.

“Consumer & Restaurant Menu Trends: The Clean Label Influence,” Lizzy Freier and Aimee Harvey, Managing Editors at Technomic, Inc., lfreier@technomic.com and aharvey@technomic.com

Clean Label for Gluten-free Bakery Products

Can clean label baked goods rise even further by combining two of the hottest trends going? Stevan Angalet, Principal Consultant at Angalet Group International, detailed how to adjust gluten-free formulas to also deliver clean label claims.



❏ **Leavening ingredients pose the biggest challenge to clean label baked products. Yeast poses no issue, but chemical leavenings, such as baking powder, do.**

Despite perennial proclamations of the gluten-free category’s imminent demise, it just keeps going and going. In 2014, the market research company Mintel projected the gluten-free market to grow from \$10.5 billion in 2013 to \$15 billion in 2016. Data from *Food Specialty Magazine* pegged the bakery product share of this market at 29.3% worldwide, said Angalet.

According to data pulled from a 2016 Natural Marketing Institute survey, the leading reasons cited by consumers for purchasing gluten-free product had nothing whatsoever to do with gluten-sensitivity: The top reason cited was “to eat healthier and/or improve overall health” (51%). Other reasons included “wanting to look or feel better” (38%), or simply because they tried and liked the product (24%). Celiac disease was cited by only 6% of respondents.

A 2016 Packaged Facts report noted that many of the consumer expectations of gluten-free foods and clean labels overlap. For example, both groups sought fewer and simpler ingredients; “free from” formulations; minimal processing with organic, sustainable product methods; and transparency in business practices.

Angalet surveyed retail, gluten-free Ready-to-Eat (RTE) and Ready-to-Cook (RTC) products and measured them against clean label expectations, as defined by the website: <https://gocleanlabel.com/> [Editor’s note: this is one of several clean label guide websites that offers clean label certification services. Not all sites use the same criteria].



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“A major distinction between RTE and RTC is that RTE products, such as breads, cakes, pancakes and cookies, are almost totally within the control of the manufacturer, whereas RTC products must be robust to a considerable range of consumer-controlled variables during final preparation,” said Angalet.

Gluten-free bread formulation requires that one be able to replace gluten with a viscoelastic dough that entraps gas and rises. One must accommodate a batter; a mixing step; the addition of batter to fill pans; a fermentation or leavening period; a baking step to develop flavor and set the structure; followed by de-panning, cooling and packaging.

In the first example provided, the 17 ingredients listed for a gluten-free white sandwich bread included modified food starch and sodium alginate. “According to the GoCleanLabel website, any modified alginates are a ‘no-no,’” said Angalet. Neither can one use modified food starch,” he continued. However, the website does not distinguish between starches that have been chemically modified vs. those physically modified (as by heat, shear and/or moisture, for example).

Leavening ingredients pose the biggest challenge to clean label baked products. Yeast poses no issue, but chemical leavenings do (i.e., baking powder).

If baking powder is to be replaced, Angalet suggested a number of possible solutions:

- Creaming fat and sugars under chilled conditions, to increase air incorporation into a dough or batter. Butter, especially, will incorporate more air into a product as the water in the emulsion turns to steam
- Whipping air into dry ingredients, especially sweeteners, to aid incorporation into fat and water
- Increasing levels of free water for conversion to steam during baking
 - Using carbonated water as a gas source
 - Creating egg and fat emulsions
 - Dropping mix temperatures and extending whipping time to increase air incorporation

Said Angalet, “Whatever the proposed approach to leavening, the most important variable is the level of free water in the formulation.”

Even if alkaline sodium bicarbonate is acceptable, baking powder acidulants can be problematic. Angalet suggested experimenting with various natural acidulants: Cream of tartar (potassium bitartrate) is a byproduct of wine making, so it might be acceptable. Sodium aluminum pyrophosphate most definitely is not.

Angalet proceeded to forensically review a variety of additional RTE and RTC bread, leavened cake, cookie (biscuit) and pancake clean label formulation options.

“Clean Label for Gluten-free Bakery Products,” Stevan Angalet, Ph.D., Principal, Angalet Group International, sangalet@angaletgroup.com



Antioxidant amino acids and peptides are a rich, new frontier for development of clean labels. “All types of animal skins are rich sources of bioactive peptides, once hydrolyzed, and quite a number of amino acids [including those from some plants] exhibit antioxidant properties,” said Shahidi. Research in his laboratory has demonstrated significant inhibition of browning using shrimp hydrolysate.

Advances in Naturally Derived Antioxidants for Enhanced Shelflife and Efficacy

As he is wont to do, Professor Fereidoon Shahidi, of Memorial University of Newfoundland, somehow managed to cram an encyclopedic overview of the functions of phenolic and amino acid-based antioxidants in foods and health into a 45-minute time frame. Here are just some highlights of his 2017 Clean Label Conference presentation titled “Advances in Naturally Derived Antioxidants for Enhanced Shelflife and Efficacy.”

Antioxidants help to control oxidative processes that deteriorate food quality, while also protecting human tissues from degenerative diseases that account for a majority of global death and morbidity statistics—ergo their popularity.

“Phenolic antioxidants, of which there are more than 7,000, are plant metabolites,” said Shahidi. These, in turn, metabolize into a wide range of other derivatives affecting human physiology, and food and beverage quality. Phenolic antioxidants occur naturally in plants, primarily as natural plant protectors, but also contributing to wound healing and pollinator attraction. In foods and beverages, they act against a range of oxidative reactions that result in off-odors, aromas and colors.

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Acetate
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Propionate

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Ingredients:

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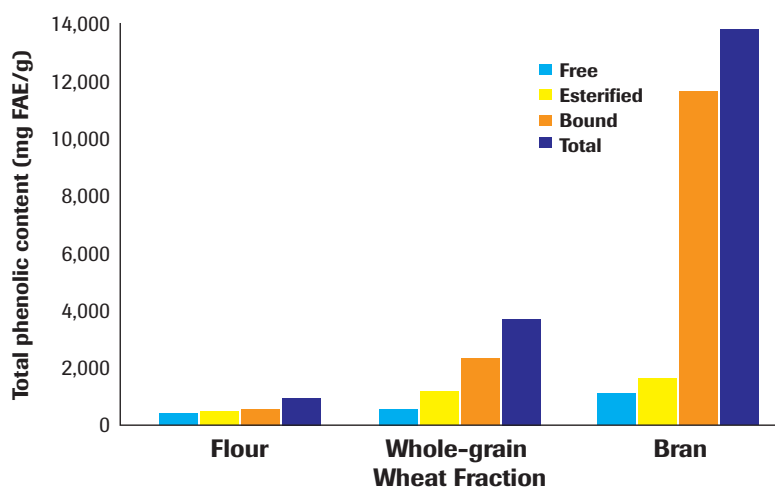
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■ Particle size, extraction conditions and media used (e.g., water, ethanol) all affect antioxidant quality, as well as whether the desired antioxidants are in free form, esterified form or otherwise bound within the food material matrix. For example, in grains, antioxidants are tightly bound within the outer bran layers.

Variables that need to be considered in selecting antioxidants for food and beverage applications include the conditions under which the source materials are grown; the parts of the plant utilized; and processing variables.

Whether the herb or spice is fresh, dried or comminuted plays a role. Particle size, extraction conditions and media used (water, ethanol, acetone, etc.) all affect antioxidant quality. “Length of extraction, processing efficiency and end-product quality do not follow linear relationships,” cautioned Shahidi. Also important are whether the desired antioxidants are in free form, esterified form or otherwise bound within the food material matrix.

This is especially important when dealing with seed and cereal grains in which antioxidants are tightly bound within the outer bran layers. Humans benefit from these bound antioxidants when they are released in the colon during digestion. Thus, bran particle sizes can be very important determinants of antioxidant function and availability.

There are regulatory hurdles that must be navigated: In the U.S., a nutrient content claim can only be made for antioxidants if there exists a Required Daily Intake (RDI) value for the specific antioxidants cited (21 CFR 101.54(g)). In addition, the nutrients claimed “must have recognized antioxidant activity; be present in a quantity sufficient to qualify for the nutrient content claims; and be included as part of the claim” (e.g., “high in antioxidant vitamins C and E”). This is very limiting.

But, antioxidants don’t have to be so-labeled, said Shahidi. De-flavored rosemary, sage and green tea can be added to foods and still be designated as “flavors.” De-flavored mustard seed (a seasoning), when added to comminuted meat at up to 2%, contributes an antioxidant effect similar to nitrite—without affecting the flavor or color of the meat.

Adding green tea extract to fish oil yielded interesting insights: “After seven days, we found that the green tea extract converted into a pro-oxidant,” said Shahidi. The researchers attributed this to the green tea’s chlorophyll. Once stripped of chlorophyll, the extracts were highly effective. Thus, antioxidant effectiveness can depend greatly upon material to which they are added, as well as pre-treatments.

In another example, the primary antioxidant in green tea is epigallocatechin-3-gallate (EGCG). Though highly effective in foods, it does not fully contribute to physiological benefit to consumers, due to its low absorption.

“The bioavailability of highly hydrophilic EGCG is less than 0.1%, because it cannot cross the mitochondrial membranes of cells. When esterified with fatty acids, the antioxidant became highly bioactive. Further work by Shahidi and his colleagues found the lipophilized EGCG esters to exhibit intriguing nutraceutical properties, especially in the treatment of some cancers and hepatitis C, as revealed in cell line studies.

Shahidi closed by citing a new and growing area of interest: antioxidant amino acids. “Animal skins are rich sources of bioactive peptides, once hydrolysed, and quite a number of amino acids exhibit antioxidant properties,” explained Shahidi. “Our laboratory studies have demonstrated significant inhibition of browning using shrimp hydrolyzates at concentrations of 0.5-3.0%. Such amino acids and peptides present a rich, new frontier for clean label development.” Expect many more developments to come.

“Advances in Naturally Derived Antioxidants for Enhanced Shelflife and Efficacy,” Prof. Fereidoon Shahidi, Dept. of Biochemistry, Memorial University of Newfoundland, fshahidi@mun.ca

Global Food Forums, Inc. again wishes to thank the speakers, attendees, sponsors and tabletop exhibitors for making the 2017 Clean Label Conference a success. We hope to see you all at the 2018 Clean Label Conference on March 27-28 at the Westin Hotel, Itasca, Ill. (www.globalfoodforums.com/2018-clean-label)!



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Consumers increasingly study product labels and want the label to be as clean as possible. Many also seek non-GMO &

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2017 Clean Label Conference Summary Advertiser Profiles



Lycored offers Real Food Ingredients made from 100% tomato, enabling formulators to label products

with reassuringly simple food declarations that all consumers will recognize. The range offers ideal clean label solutions for taste, texture and color enhancement. SANTE can be used to reduce sodium, and remove MSG and artificial taste additives, while providing improved taste, and can be declared as simply “tomato concentrate.” Dry Tomato Pulp is a 100% natural foodstuff ingredient from tomato that adds a vibrant, consistent red color to sauces, condiments, soups and ready meals. Want to know more? Visit <http://www.lycored.com>



ThirdWave Bio™, a Division of **Agro BioSciences**, is focused on developing novel, science-based microbial solutions for the food and human wellness industries. ThirdWave Bio’s bioVONTAGE™ range of cultured dextrose

and whey-based food ingredients are designed to enhance the flavor profile of perishable foods while maintaining product quality, helping customers adapt to meet the growing consumer demand for healthier, cleaner labeled foods. ThirdWave Bio’s open innovation platform and collaborative team make product selection and project engagement simple.



Magrabar is a leading manufacturer of defoamers for food grade uses and a specific line of antifoams for use in organic food processing. Magrabar follows strict manufacturing procedures and our HACCP based food safety program is certified to a Global Food Safety Initiative (GFSI) recognized standard, the SQF Code-Level 2, as well as having achieved QAI organic certification for a series of liquid and powder based antifoams under the USDA National Organic Program. (www.magrabar.com)



RiceBran Technologies (NASDAQ: RIBT and RIBTW), is a global leader in the production and marketing of value-added ingredients derived from stabilized rice bran. RIBT has proprietary and patented

intellectual property that enables the conversion of rice bran, one of the world’s most underutilized food sources, into a number of highly nutritious human food ingredients, which are vegan, non-GMO-verified and gluten-free, and make “Whole Grain Rice” and “Brown Rice Flour” packaging claims possible. (www.ricebrantech.com)



Sola® is the new sweetener you’ve been waiting for. A delicious-tasting alternative that sweetens, measures and bakes like ordinary sugar. Sola® is the perfect combination of the best sweeteners that can be found in fruits, vegetables and dairy.

It tastes exactly like sugar, but with 75% fewer calories and 0 grams net carbs. Replacing sugar has never been so simple.



WENDA INGREDIENTS offers all-natural, clean label meat and poultry ingredients with a focus on replacing chemicals and providing honest solutions to processors and brands. WENDA’s all-natural fruit and spice extracts are used globally in meat and poultry. They increase yield (eliminate phosphate) and pathogen protection, extend shelflife and color, and offer the world’s best “uncured” labeled meat ingredient solution for replacing celery powder, cherry powder, HPP and chemical nitrite, erythorbate, lactate, diacetate and so on. Going clean label has never been easier.



WTI has led and continues to be the most trusted and innovative ingredients source in the business for over 35 years.

WTI produces functional ingredients that help processors improve their products by inhibiting pathogens, extending shelflife, reducing sodium content, increasing yields and improving product quality—tenderness, flavor, slice-ability and color. WTI’s product line includes clean label, all-natural antimicrobials and all-natural shelflife extenders. Organic versions are also available. See what a difference the right ingredient makes.

NEW!

Global Food Forums®

2017 R&D Report: *Protein Ingredients*

Global Food Forums® 2017 R&D Report: Protein Ingredients offers ingredient suppliers, product development firms and food companies in-depth strategic analysis and actionable data on R&D's formulation usage, key functional attributes, health trends and predictions of future growth on a wide range of protein ingredients.

This 87-page report provides valuable insights into key protein formulation trends that will guide corporate strategy, R&D initiatives, product re-positioning, enhanced competitive intelligence and ultimately drive increased protein sales.

As the organizers of the **Protein Trends & Technologies Seminar**, Global Food Forums is uniquely positioned to tap into the expertise of R&D decision-makers who are keenly involved in protein formulations.

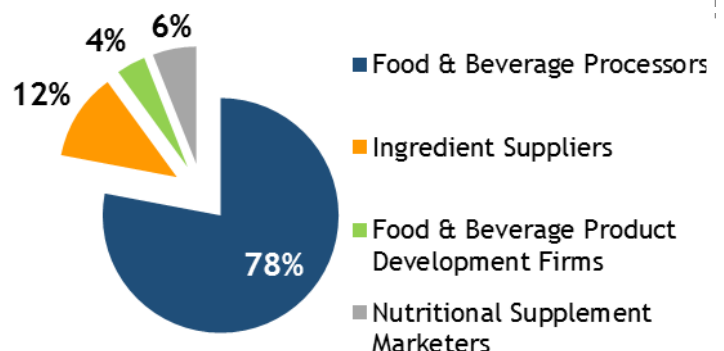
Conducted by NSM Research, Inc., the **R&D Report** provides insights on 14 protein categories 24 applications, most valued functional characteristics, consumer trends and important supplier services.



- Which health trends will increase the most in importance?
- Which foods will be increasingly promoted for their protein content?
- What protein characteristics and functions are considered most important?
- How important will traceability, non-GMO, local sourcing, Paleo and other certifications be to business?
- How does R&D rank the value of various supplier services?
- What are R&D's leading reasons for blending multiple proteins in a consumer product?

Survey Respondents:

200 Product Formulators from Four Industry Segments



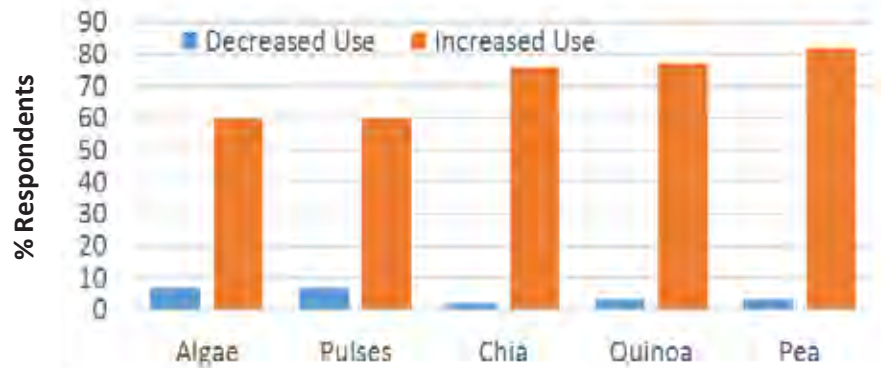
Source: Global Food Forums® 2017 R&D Report: Protein Ingredients

Deep Dive: Protein Types

Insights on proteins such as whey, egg, pea and soy by application food scientists who primarily work with those proteins. For example, among formulators who primarily use whey proteins, “Taste” was ranked as the most important characteristic, while “Clean Label implications” and “Consumer popularity” the least important of the nine listed.



Protein Types Predicted to Increase/Decrease in Use (5 of over 25 listed)



Source: *Global Food Forums® 2017 R&D Report: Protein Ingredients*

Deep Dive: Applications

Survey results provide insights on R&D’s current and future protein use, segmented by work area such as Beverages, Health Bars, Sports Nutrition, Dairy, Confections and Grain-based Products.

See www.globalfoodforums.com/PIR

- Please reserve my digital copy of **Global Food Forums® 2017 R&D Report: Protein Ingredients**.
- Single subscriber license \$1,800 Site license (unlimited users, same company) \$3,500

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Please submit your 2017 R&D Report: Protein Ingredients reservation form to Peter@GlobalFoodForums.com or mail to: Global Food Forums, P.O. Box 1421, St. Charles, IL, 60174 or fax to 1-208-246-2242. Questions, contact **Peter Havens at 1-630-621-030**.



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In conjunction with the Protein Trends & Technologies Seminar



Additional Resources & Insights



Global Food Forums and Social Media

FaceBook: Visit Global Food Forums' FaceBook page! Scan the QR code on left or visit www.facebook.com/GlobalFoodForums/

Twitter: Follow us at @globalfoodforum



Free Shopping!

Since its first conferences in 2013, Global Food Forums, Inc. has offered unique, practical information for use in the development of food, beverage and nutritional products. Most presentations focus on applied food science and technology. Links to pdfs of these presentations and conference summaries can be accessed at www.GlobalFoodForums.com/store or by scanning the QR code on left.

For direct access to presentations from this 2017 Clean Label Conference and the digital version of this Summary, go to www.GlobalFoodForums.com/2017-clean-label/store.



Looking to the Future

Are you or your company interested in making a presentation at the 2018 Clean Label Conference? Global Food Forums will once again have a series of Technologies Snapshot Presentations.

To obtain more information such as the purpose of Technology Snap-

shots; how they are chosen; the criteria used; and how to submit a proposal, go to <https://goo.gl/yIgeVm> or scan QR code.

For future events, including the coming year, please find the dates and locations at: <https://www.globalfoodforums.com/events/>



Clean Label Insight

The term "clean label" has no regulatory definition in the U.S., and perhaps it never should. It is a consumer-driven movement. Broadly, clean label products are those that consumers trust and with characteristics that they value. Key to that trust is their understanding of the product's ingredients, including where they came from and how they were (or weren't) processed. Not only do consumers vary as to what they value and how knowledgeable they are, but these factors are constantly changing. Any regulatory definition that would soon be obsolete.

As one example, interest in clean labels has expanded from foods to dietary supplements. Sports nutrition companies are adapting the clean label concept to address consumer concerns more unique to their industry, such as amino acid spiking and use of banned substances. This topic was briefly discussed in opening remarks at the 2017 Clean Label Conference. Download the moderator slideshow at <https://goo.gl/StbDcC> or scan the QR code.



Date: November 7, 2017

Location: Westin Hotel, Lombard, Illinois, USA

The 2nd annual Sweetener Systems Conference is the industry's only technical, product development summit dedicated to providing practical, impartial and "how-to" formulation advice to R&D and applied food scientists working in this arena.

Examples of confirmed speakers:

Sweeteners in the Cross Hairs: How do Consumers Really Feel about Sweeteners & Are These Feelings Changing?

—Thomas Vierhile, MSc, Innovation Insights Director, GlobalData Consumer

Why "No Calorie" makes "No Sense"

—Nancy E. Rawson, Ph.D., Associate Director, Monell Chemical Senses Center



www.globalfoodforums.com/SweetenerSystems

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Contact us to learn more about our unique clean label ingredients.



Roya Sayyah - Roya@bpflavors.com www.bluepacificflavors.com



New 2017 R&D Report: Protein Ingredients

New market research conducted by NSM Research, Inc. surveys R&D and food application formulators on their attitudes, formulation issues and future trends, as related to their use of protein ingredients. This 87-page *Global Food Forums® R&D Report:*

Protein Ingredients is now available. For more information go to:

<http://goo.gl/WEJ4KQ> or contact Jenny Stricker at Jenny@GlobalFoodForums.com
or +1.800.799.9671 ext. 1.

PROTEIN TRENDS & TECHNOLOGIES SEMINAR

www.globalfoodforums.com/ProteinSeminar



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