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The Natural vs. Synthetic Debate

Natural and synthetic ingredients have long co-existed in the marketplace. Last June, I wrote about companies now making synthetic, or nature identical, stevia. Synthetic ingredients certainly serve their purpose. Cost-efficiency, scalability, and sometimes even environmental friendliness can give synthetic ingredients an edge over natural ones. Natural, however, sounds friendlier than synthetic or nature identical. But is natural in fact better?

This debate is heating up over astaxanthin. See page 16. Algal companies point out that their astaxanthin is distinctly different from synthetic versions, in stereochemistry, esterification, and the presence of other beneficial carotenoids. Are such differences a big deal? When it comes to some ingredients, stereoisomer differences can be, says Markus Lipp, PhD, senior director of food standards, U.S. Pharmacopeial Convention. Take the drug thalidomide, which was once popularly a sleeping aid for pregnant women and thought to be safe—until the discovery that one of thalidomide's stereoisomer forms, but not another stereoisomer form, caused birth defects. "The differences between two stereoisomers can be dramatic," Lipp says.

So far, studies showing astaxanthin's health benefits in humans apply only to algal astaxanthin and not synthetic astaxanthin, algal suppliers say, and the significant differences mean algal astaxanthin's human health benefits cannot translate to synthetic astaxanthin.

But synthetic-astaxanthin supplier DSM says science shows its ingredient is safe and bioavailable. "We are disappointed by the tone of recent media articles on astaxanthin—particularly, the characterization of synthetic astaxanthin such as DSM’s nature-identical AstaSana brand as being inferior in terms of safety and efficacy compared to other sources of astaxanthin,” the company told me. “Synthetically produced essential nutrients, including vitamin E and vitamin D, are routinely found in today’s food supply chain and support the health and well-being of millions of consumers. DSM upholds the highest quality and safety standards for its ingredients—whether naturally sourced or produced as nature identical.”

Moreover, the company says, its astaxanthin has been used safely for decades and its safety studies are the “most extensive safety data set specific to any single astaxanthin product.” In fact, says DSM, natural astaxanthin producers have even referenced DSM’s safety standards.

So, can synthetic be as good as natural? Backing up further, is there even such a thing as “natural” or “synthetic”? Are we just arguing semantics? After all, there are no formal regulatory definitions, and the boundaries can blur. Even crude oil, the basis for most synthetic ingredients, started as living matter, Lipp points out. Alternatively, some “natural” sources are no longer living by the time we extract their chemicals. So, can we still call those natural?

As for benefits, there are cases when natural is better (e.g., harnessing the complex nutrient spectrum), and there are cases when synthetic is better (e.g., purity over crude extracts, in some cases). "It’s hard to use these overarching, blanket statements that natural is better or synthetic is better,” Lipp continues. “There are instances where synthetic is better. There are instances where natural may have benefits. And there are instances where we may take the natural version of something and modify it to improve it for what we want. And then what is it? Is it synthetic or is it natural?”

Duffy MacKay, ND, vice president of scientific and regulatory affairs for the Council for Responsible Nutrition, expresses similar sentiment. "When considering natural and synthetic ingredients, it is not a black and white issue. Each ingredient needs to be evaluated on a case-by-case basis. There are some truly nature-identical ingredients, such as synthetic ascorbic acid, that are structurally and functionally interchangeable with their natural counterparts. However, there are other ingredients where a small change in a single chiral center (small change in the chemical structure) can have a significant impact on its function.”

What role do manufacturers play in this debate? Know your ingredients. Make sure you have data backing the safety and efficacy of your ingredient, whether it is synthetic or natural. And, the proof is in the studies. If, like natural astaxanthin suppliers, you have the efficacy studies to support the human health benefits of your specific ingredient, then that is black and white. And that is gold.

Jennifer Grebow
Editor-in-Chief

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Inulin Gets Blood Sugar Health Claim in Europe

Thanks to a petition from chicory inulin suppliers, EFSA has approved an inulin health claim for European food and beverage firms.

Inulin is a soluble fiber found in rich amounts in plants such as Jerusalem artichoke, agave, and chicory. The ingredient is used for fiber fortification, but inulin also contains simple sugars known as fructooligosaccharides (FOS). These FOS allow manufacturers to repurpose inulin as a sweetening agent.

EFSA has decided that, based on provided evidence, inulin FOS can lower blood sugar spikes from foods and beverages when FOS replaces sugar. The effect is due to FOS’s resistance to absorption in the small intestine. The effect is considered beneficial for humans, especially diabetics, and will be approved as the following health claim language: “Consumption of foods/drinks containing non-digestible carbohydrates instead of sugars induces a lower blood glucose rise after meals compared to sugar-containing foods/drinks.”

EFSA admits the effect is not unique to FOS, but the health claim only applies to chicory-derived FOS because supporting evidence is based on chicory inulin studies only, submitted by Beneo-Orafti SA (Oreye, Belgium), Sensus BV (Roosendaal, the Netherlands), and Cosucra Groupe Warcoing SA (Warcoing, Belgium).

Beverage or Dietary Supplement? FDA Issues Final Draft Guidance

Liquid dietary supplements should not be sold as conventional drinks, and FDA is looking to make sure companies understand this. The agency has published the final draft of “Distinguishing Liquid Dietary Supplements from Beverages,” advising companies what conditions would classify a dietary supplement as a beverage, and vice versa.

The draft guidance addresses topics such as labeling and advertising, product name, packaging, serving size, directions for use, and ingredient composition. Some notable takeaways:

- Words like refresh or rehydrate, as well as drink, water, or soda, used in labeling or advertising indicate a conventional beverage—even if the product’s label bears a Supplement Facts Panel versus a Nutrition Facts Panel. “Drinking” symbols or graphics also classify a product as a beverage.
- FDA also takes into consideration the use of metatags that result in a product’s appearing in the results of an electronic search for sodas, juices, or other beverages.
- If a product’s directions for use are more inline with supplements (e.g., take one tablespoon three times per day), that may classify the product instead as a dietary supplement.
- Recommending that a product be taken with a meal does not necessarily make it a conventional food.
- If the bulk of a product’s ingredients are conventional food ingredients, simply adding one dietary supplement ingredient may not necessarily alter the product into a dietary supplement.

Powdered premixes and “add to water” liquid concentrates are also addressed. FDA says that if powdered premixes and liquid concentrates are labeled as dietary supplements, and not conveyed as beverages in any way, consumers are unlikely to confuse them with conventional foods.

Nutritional Outlook Welcomes EAB Members

Nutritional Outlook gives a warm welcome to its newest editorial advisory board members. The editorial advisory board helps guide the magazine’s editors and editorial focus.

The new members are: Lauren Clardy, BSc, founder and president of NutriMarketing:

Correction

Page 42 of Nutritional Outlook’s October 2013 issue announced that NutriScience Innovations LLC (Trumbull, CT) introduced a natural caffeine ingredient derived from green tea leaves. We erroneously stated that the ingredient is standardized to a minimum 95% polyphenol content; in fact, it is standardized to a minimum 95% caffeine content. Our editors apologize for the error.

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Kim Kawa, BSc, natural products specialist, SPINS; Maged Sharaf, PhD, chief science officer, American Herbal Products Association; Brian Tanzer, MS, CNS, scientific and regulatory affairs, the Vitamin Shoppe Inc.; John Villafranco, partner, Kelley Drye & Warren LLP; and Lu Ann Williams, head of research, Innova Market Insights.

Canada Approves Flax Health Claim for Lower Cholesterol

Though not yet formally announced, the Flax Council of Canada says Health Canada has approved a health claim for flax and cholesterol reduction. The claim is just the tenth allowed for foods and dietary supplements sold in the country.

Health Canada intends to treat this as a function claim only—unlike its therapeutic claims granted to ingredients such as barley, in which case manufacturers can describe lower cholesterol as "a risk factor for heart disease." The exact wording of the flax claim is not yet final.

In an interview with Nutritional Outlook, the Flax Council of Canada said flax's cholesterol claim will only relate to products made with milled or whole flax seed. Because the cholesterol-lowering effect appears largely related to flax's high fiber content, flax oil will not qualify for the claim. The Flax Council adds that high contents of lignans and omega-3 fatty acids may also be partly responsible for the health effect.

"We vetted about 1100 papers, and only seven were deemed of significant quality to actually be submitted to Health Canada," said Kelley Fitzpatrick, director of health and nutrition at the Flax Council. "A lot of this work began in the mid-1990s, but the studies are all metabolic clinical trials with seed amounts of up to 30–40 g per day."

The Flax Council doesn’t anticipate a lot of products to have such sufficient amounts of flax to carry the claim right now, but it is working with food developers to get qualified products onto the market soon enough. Aside from local products, most of Canada’s flax harvest is exported to the United States, where such a cholesterol health claim does not exist. The Flax Council says it hopes to approach the U.S. FDA with a similar dossier next year.

Besides cholesterol support, there may also be a significant link between flax and blood pressure, based on a study presented at the American Heart Association’s 2012 Scientific Sessions.
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Astaxanthin Suppliers Unite to Promote Natural over Synthetic Forms

Three suppliers of microalgae-based astaxanthin ingredients have come together to form the Natural Algae Astaxanthin Association (NAXA). The association’s goal is to educate the public about the differences and benefits of natural astaxanthin, especially compared to synthetic astaxanthin.

In general, astaxanthin suppliers started in the same place. That is, most began by supplying astaxanthin to the fish feed market. Synthetic producers like DSM (Parsippany, NJ) and BASF (Ludwigshafen, Germany) still widely serve the astaxanthin market for feed, which is estimated at $250 million annually. Producing microalgae- and yeast-based astaxanthin is more expensive, so algal astaxanthin suppliers are targeting the human nutrition market, where the ingredient can fetch a higher price, explained Michael McCoy in an article for Chemical & Engineering News. Now, other suppliers—notably DSM last November—have entered the market with nature-identical forms of astaxanthin.

But there are significant molecular and other differences between algal astaxanthin and nature-identical and yeast-derived astaxanthin, say microalgae producers. A research paper published in the December 2013 issue of Nutrafoods, sponsored and written by algal astaxanthin supplier Cyanotech Corp. (Kailua-Kona, HI), discusses some of the key differences, including stereochemistry, esterification, and the presence of other beneficial carotenoids in microalgae astaxanthin that are absent in the synthetic form, such as beta-carotene, canthaxanthin, and lutein.

Cyanotech is one of NAXA’s founding companies, along with Algatechnologies Ltd. (Kibbutz Ketura, Israel) and Fuji Chemical Industry Company, Ltd. (Toyama, Japan).

The Nutrafoods paper states that in vitro antioxidant activity testing performed separately by Creighton University and Brunswick Laboratories (Southborough, MA) showed algal astaxanthin to be over 50 times stronger than synthetic astaxanthin at singlet oxygen quenching, and 20 times stronger at eliminating free radicals.

“If synthetic astaxanthin has only 2%–5% of the antioxidant power of natural algae astaxanthin, how can it possibly work as well for heart health, brain health, joint health, skin health, and the other areas in which we have established solid evidence from human clinical trials on natural algae astaxanthin?” asked Kazuyuki Miyakawa, chief scientific advisor for Fuji Chemical Industry, in a NAXA press release.

Also, while yeast-based astaxanthin does have a new dietary ingredient (NDI) notification filled with FDA, there are “some fairly severe restrictions on use: it’s not for long-term use and not for children,” Gerald R. Cysewski, PhD, Cyanotech’s executive vice president and chief scientific officer, tells Nutritional Outlook. Also, in the NDI notification, the yeast-based dose is limited to 2 mg/day. Bob Capelli, Cyanotech’s vice president of sales, tells Nutritional Outlook that while this 2 mg/day dose has demonstrated antioxidant and immune health benefits, astaxanthin’s human clinical evidence for brain, joint, cardiovascular, and skin health is for doses ranging from 4–12 mg. Microalgae astaxanthin’s NDI notification covers a dose of up to 12 mg/day.

Human clinical studies showing astaxanthin’s safety and health benefits have been done only on the microalgae form, the NAXA companies add.

Based on these facts, NAXA’s members say their goal is to convince industry members that microalgae-derived astaxanthin is superior to other forms. The association says it will probably sponsor more research in the future comparing microalgae and synthetic/yeast forms.

How can companies distinguish between synthetic versus natural astaxanthin? Cysewski says thin-layer chromatography is one way. “Synthetic astaxanthin is all free astaxanthin, whereas natural astaxanthin is primarily a monoester, and thin-layer chromatography very quickly and simply makes that separation for you,” he tells Nutritional Outlook. “The next test is to look at the actual stereoisomers in a sample, and that requires some sophisticated HPLC work.”
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Probiotic Monograph Will Be First Ever for Food Chemicals Codex

The first probiotic monograph for the Food Chemicals Codex is now in draft form and accepting public comment. This is the first new FCC monograph the U.S. Pharmacopeial Convention (USP; Rockville, MD) has proposed in 2014. Once finalized, it will publish in the FCC’s ninth edition.

Manufacturers and industry members have until March 31, 2014, to comment on the newly proposed monograph via the FCC Forum at www.usp.org/food-ingredients/fcc-forum. FCC monographs set ingredient-specific quality standards to guide food manufacturers.

The probiotic monograph is specific to the probiotic strain *Bacillus coagulans* GBI-30, 6086. This Gram-positive bacterial strain is increasingly used in food products because its spore-forming nature can withstand rigorous food processing conditions such as heat. So far, the strain has been used in a variety of food products, including baked goods, coffee and tea, dairy products, and pasta. In 2012, it became the first *Bacillus* bacterial strain to receive FDA GRAS notification.

KD Pharma Targets U.S. Omega-3 Market

Omega-3 concentrates supplier KD Pharma (Bexbach, Germany) plans to increase market share in the U.S. dietary supplements market. The company has hired Brooklyn, NY–based ingredients distributor Nutribiotic-link to commercialize its patented, high-grade fish oils in the United States.

KD Pharma recently increased its production capacity to 2,000MT annually. Omega-3 concentrates are produced in a certified-GMP pharmaceutical facility.

KD Pharma’s patented kd-pür supercritical extraction process is said to enable a more-concentrated omega-3 fatty acid dose—up to 99% EPA and/or DHA—that the company says exceeds concentrations possible using traditional methods. The kd-pür process employs dual technologies: supercritical CO₂ fluid extraction and supercritical fluid chromatography.

“This gives our customers the ability to decrease the delivery size for the same daily dosage, or to increase the dosage in the same soft-gel size, both lowering the manufacturing costs,” said Peter Lembke, KD Pharma’s vice president of sales and business development, in a press release.

Symrise Nears Probi Takeover Bid

Symrise AG (Holzminden, Germany) has acquired extra shares in probiotic developer Probi AB (Lund, Sweden) and is now required to make a public offer for the company’s remaining shares.

A flavor and fragrance specialist, Symrise first took interest in Probi when the two companies entered a joint venture in December 2012, encompassing innovative projects relating to consumer categories such as oral health. Probi is responsible for developing a number of consumer product lines, including GoodBelly and ProViva probiotic beverages.

At the time, Symrise held 15% of Probi’s shares. It is now clear that Symrise has significantly stronger interest in probiotics.

“The globally recognized know-how of Symrise in sensory, active ingredients, and applications combined with Probi’s longstanding and proprietary expertise in patented probiotics will allow us to develop new consumer products with real health benefits and sensory profiles without compromises,” said Probi CEO Michael Oredsson, in a press release.

FTC Reaches $34 Million Settlement with Four Weight-Loss Marketers

Four weight-loss product marketers have settled with the FTC over what the agency says were deceptive advertising claims. The companies are Sensa, beauty brand L’Occitane, HCG Diet Direct, and LeanSpa LLC. In total, the companies will pay $34 million in consumer redress. The FTC says that the companies lacked competent and reliable scientific evidence to support their weight-loss claims.

Like most recent FTC orders over false advertising claims, FTC’s consent orders in these cases bar the companies from making any future weight-loss claims unless the claims are supported by two adequate, well-controlled human clinical studies.

The FTC has also turned its focus on the media outlets—print, television, radio, etc.—where these ads have run and says it is seeking to educate media about how to “screen out facially deceptive ads.” The agency sent letters to 75 broadcasters encouraging them to voluntarily screen ads. It also launched a website, www.business.ftc.gov/gutcheck, as a reference guide for media on how to identify false weight loss claims.

“For the most part, the examples we’re talking about apply to dietary supplements, including herbal remedies, over-the-counter drugs, as well as patches, creams, wraps, and similar products worn on the body or rubbed into the skin. They don’t apply to prescription drugs, meal replacement products, low-calorie foods, surgery, hypnosis, special diets, or exercise equipment," the website states.

The FTC does have the ability to take action against media outlets that air false claims. However, "It’s not something that the commission has done or plans to do; we’re really looking for voluntary action, as we have in the past," said Mary Engle, associate director for advertising practices at the FTC, during a press conference.

Of the four recent companies to reach a settlement with the FTC, the marketers of Sensa’s “sprinkle on food” powder will pay the biggest share of the redress, to the tune of $26.5 million. The FTC says this is the second-largest deceptive-advertising settlement in FTC history.
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Look for these other Natreon products.
The krill oil industry got an early Christmas present in December: a new monograph from the U.S. Pharmacopeial Convention (USP; Rockville, MD). Now published in USP’s Food Chemicals Codex (8th edition), the monograph aims to promote quality krill oil identification and purity testing across the board. This article is a follow-up to a USP byline on the monograph published in our October 2013 issue.

**Phospholipids**

The monograph contains methods to identify and quantify a krill oil’s phospholipid sources. Suppliers often tout krill oil’s high phospholipid content—including EPA and DHA fatty acids in phospholipid form—claiming that these phospholipid forms are highly bioavailable. However, some outliers are known to spike krill oil (Euphausia superba) with phospholipids from non-krill sources. As demand grows for any ingredient, so does market adulteration, and demand for krill oil is certainly growing. Recent estimates show that, while krill oil still accounts for a smaller slice of the omega-3 pie, it is also one of the category’s fastest-growing ingredients.

USP’s monograph uses NMR test methods: P31-NMR (Phosphorus Nuclear Magnetic Resonance and Proton Nuclear Magnetic Resonance). USP says these methods let manufacturers identify what types of phospholipids are present in an oil and how much there is of each source. Other quality standards on the market have not included these tools for differentiating phospholipid sources.

“Phospholipids are a very important component of krill oil, and the relative amounts and types of phospholipids present are characteristic of the ingredient; thus, this test... helps to establish the identity of the sample as authentic krill oil,” USP’s Kristie B. Laurvick, PhD, senior scientific liaison for food, dietary supplements, and herbal medicines, tells *Nutritional Outlook*.

Enzymotec (Migdal Haemeq, Israel) is one krill oil company that advocates the pNMR method for measuring phospholipids. During the monograph’s comment period, many krill companies urged the method’s addition to the monograph, says Gai Ben Dror, vice president, process development, Enzymotec. “pNMR [has been] used by our company for more than a decade, and it is the best tool to resolve complex mixtures of naturally occurring phospholipids,” he says. (Sidenote: In December, an Enzymotec human clinical study published in *Lipids in Health and Disease* found Enzymotec’s K-Real krill oil more bioavailable than fish oil.)

Overall, USP’s monograph recommends total krill oil phospholipid content to be in the range of 28%-52% and a total phosphatidylcholine content range of 60%-90%. If these ranges seem high, USP’s Laurvick says it is necessary in order to accommodate expected differences, all of which can vary krill composition. “Because the range should encompass samples from different [fishing] seasons, samples from different times in the same season, samples processed under various manufacturing conditions, and sources of analytical bias in the extraction and testing of the phospholipids content, it is not surprising that such a seemingly wide range of specifications is required,” she says.

**Astraxanthin**

Astraxanthin is another krill oil component that can vary between suppliers. USP’s standard recommends a minimum astaxanthin content of 100 mcg/g.

Why do astaxanthin levels tend to vary so much? USP’s Laurvick explains. “Levels of astaxanthin reported in commercial products have been quite a bit more variable, partially based on the processing conditions of the krill, but also based on the analytical methodology used to measure the astaxanthin and the means of reporting its concentration, either as ‘free’ astaxanthin or as esters,” she says.

NKO krill oil supplier Neptune Technologies and Bioressources Inc. (Laval, QC, Canada) believes krill oil should comprise very little free astaxanthin, says Wael Massrieh, PhD, vice president, scientific affairs. He points out that free astaxanthin is more prone to oxidation because it not “protected” by the attached fatty acids, and it has a different solubility profile, which may decrease bioavailability.

Massrieh says the astaxanthin assay in USP’s monograph measures total astaxanthin as free astaxanthin. But, he adds, USP’s monograph does include a secondary assay that can pinpoint the ratio of diesters to monoesters, meaning that it can differentiate between astaxanthin from different sources, such as synthetic, algae, and krill sources.

**EPA, DHA, and Contaminants**

The monograph sets standards for DHA and EPA fatty acid content as well. For DHA, recommended krill oil composition is not less than 5.0%; for EPA, not less than 10.0%. Laurvick says these percentages are fairly industry standard.

Finally, the monograph addresses the presence of heavy metal contaminants, setting a limit of 0.1 mg/kg for arsenic, lead, and mercury.

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**Leveling the Krill Oil Playing Field**

By Jennifer Grebow, Editor-in-Chief
Beverages not only need to taste good, they are an important part of our nutritional intake, especially for those with active lifestyles. Functional beverages can deliver natural sources of essential Omega 3 and 6 Fatty Acids, Proteins from Whey and Milk, and Vitamins -- all providing Antioxidant Strength. CONNOILS is your best source for beverage-ready powders.

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The monograph should help to identify products "claiming to be krill oils simply because they are a red, omega-3 oil," says Neptune’s Massrieh. "These are the oils that sometimes contain no phospholipids and/or [contain] astaxanthin from external sources."

"We know for certain that some oils have been sold as mixtures with added fatty acids and astaxanthin," Laurvick adds. "While it is perfectly acceptable for a manufacturer to sell a product that has added ingredients intended to enhance the characteristics or functionality of the krill oil (properly labeled), our monograph is written in such a way that these added ingredients would be detected, as would undeclared additions of fatty acids, phospholipids, and astaxanthin from other sources."

"We believe that the monograph will help define a quality krill oil ingredient where no definition of such was previously available," she declares.

How will these standards benefit the consumer at retail? For instance, can we expect to see more-standardized krill oil labels in commerce? Laurvick says the monograph includes a labeling provision for declaring amounts of DHA and EPA in an ingredient—including DHA and EPA from other oils used to standardize the ingredient. "This type of standardization is common with oil products, in particular, and should be disclosed so that users understand how the standardization may affect the analysis of the krill oil," she says.

Additionally, the monograph suggests disclosing the types and levels of extraction solvents used that may be present in a krill oil post-manufacture.

"While the FDA does not require manufacturers to conform to Food Chemicals Codex labeling requirements, manufacturers who wish to sell oils that conform to Food Chemicals Codex monograph specifications will be required to do so in order to provide more complete information to their customers," says Laurvick.

Defining Krill Oil

"The new monograph does provide more definition to the identification of krill oil than is found on current commercial product specifications," says Becky Wright, communications and marketing manager for Aker Bio-Marine Antarctic US (Oslo, Norway), supplier of Superba krill oil. "This should help better characterize a quality, pure krill oil material."

"It will become useful if it sets a clear and uniform assay to measure the active ingredient levels and a standard way to report them so that the end-consumers can properly compare products," adds Enzymotec’s Dror.

Harry Rice, PhD, vice president of regulatory and scientific affairs for the Global Organization for EPA and DHA Omega-3s (GOED; Salt Lake City), says, “As I see it, the monograph should go a long way to prevent the selling of inferior krill oil. It levels the playing field, and that’s good for the honest manufacturers as well as consumers.”
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Regulating Health in the Middle East

The World Health Organization is working to curb high fat, salt, and sugar.

BY ROLA ARAB, EAS STRATEGIC ADVICE

Non-communicable diseases (NCDs) are prevalent in the Middle East, particularly in the Gulf Cooperation Council (GCC) countries of Bahrain, Kuwait, Oman, Qatar, the Kingdom of Saudi Arabia, and The United Arab Emirates (UAE). NCDs—particularly cardiovascular disease, diabetes, cancer, and chronic respiratory disease—cause an average of 53% of all deaths in the region, and in some countries up to 80% of all deaths, according to statistics from the World Health Organization Eastern Mediterranean Regional Office (WHO EMRO). NCDs affect young people in this region especially more than in any other in the world.

Unhealthy diets are a big reason for the rapid rise of NCDs in the GCC region. Unhealthy food is a key contributor to overweight, obesity, and diabetes, especially in children. Regulators in the region have even begun targeting some traditional foods as contributors to obesity and diabetes, such as dishes containing margarine; Arabic sweets containing high amounts of sugar and/or fat; traditional drinks with high levels of sugar; foods rich in salt, which are highly consumed in the region; and foods containing table salt and spices. Another cause of obesity is a lack of physical activity due to the hot weather conditions.

Regulators Step In

How are regulators addressing the rapid rise in NCDs? The WHO EMRO has pressed regulators in the region to adopt stricter measures to prevent and control NCDs. More-immediate actions include restricting the marketing of foods and beverages high in salt, fat, and sugar, especially to children. Health regulators have already started developing some measures to restrict the availability of unhealthy foods in primary schools, organize health-awareness campaigns, and develop physical-activity programs.

The WHO EMRO has also partnered with WHO Collaborating Centers for Nutrition to support WHO programs at the country level and regionally. Participants include universities, institutions, and research centers, such as the Department of Health Promotion and Community Health (HPCH) at the American University of Beirut (AUB) in Lebanon, and the faculty of food and agriculture at The United Arab Emirates University. By providing information, research, studies, training, and workshops, these partners help to support their countries’ national health and nutrition development.

Significant plans to prevent NCDs are underway. Member States of the Eastern Mediterranean region agreed to prioritize NCDs in their policies and budgets during a WHO EMRO regional meeting back in June 2012. The meeting’s purpose was to develop an updated 2013–2020 global action plan for the prevention and control of NCDs. The Member States agreed on the need to strengthen the role of NGOs in the fight against NCDs, to update public health laws to support NCD prevention and control, to focus on the global recommendations for promoting physical activity and national action plans, and to adopt more innovative health initiatives.

In January 2013, the WHO EMRO announced an action plan focused mainly on salt and fat reduction. Ministries of health in the region have started developing guidelines and recommendations and are raising awareness among the population on the negative health effects of high salt, fat, and sugar consumption.

In September 2013, WHO EMRO experts presented a plan to enhance regulations for marketing food and non-alcoholic beverages to children. Other developments include establishing a cross-departmental working group focused on legislation for preventing and controlling NCDs. A panel of regional experts and researchers is also convening to help the WHO and Member States implement region-specific recommendations to promote physical activity.

In May 2013 at the World Health Assembly, governments of Arab countries reiterated their full commitment to the voluntary targets of reducing premature mortality from NCDs by 25% by 2025, as highlighted in the “Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases.” There was also general support for the adoption of other targets to address raised blood pressure, salt/sodium intake, and physical inactivity.

In October 2013, The WHO Regional Committee for the Eastern Mediterranean held its 60th session in Oman. The Committee ad-
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addressed health issues and priorities, among which was the implementation of the UN Political Declaration on Prevention and Control of NCDs. The WHO EMRO is currently helping countries develop national targets and indicators on the basis of the regional framework for action, and to establish and implement national, multi-sectoral NCD policies and plans.

Additionally, the Health Ministers’ Council of GCC countries has developed an initiative called The Gulf Plan for the Control and Prevention of Non-Communicable Diseases (2011—2020). The mission is to promote awareness of NCDs and risk factors in the GCC, and to support the development of early-detection programs and integrated health care. The Gulf Plan’s main targets over the next 10 years include: (1) Decreasing prevalence of overweight and obesity by 5% at minimum (i.e., 0.5% annually); (2) Increasing the percentage of physically active people by 10% at minimum (i.e., 1% annually); (3) Reducing the prevalence of high cholesterol by 5% in men and by 1% in women; (4) Reducing the intake of carbohydrate- and fat-rich foods by 10%; (5) Reducing salt intake rate; and (6) Increasing awareness of NCDs and its causes and methods of prevention by 5%. Measures to achieve these targets include addressing NCDs in school curricula and conducting field programs and health education and media campaigns about risk factors and how to avoid them.

Some countries have also developed their own national programs to prevent and control NCDs. Iran, for instance, has developed a national program to reduce salt, sugar, and fat intake. The program’s main goal is to promote healthy diets; to encourage reducing oil, salt, and simple sugar in processed foods; and to promote low-fat diets and appropriate food labeling. Iran’s Ministry of Health and Medical Education, which is responsible for developing relevant standards and strategies, is working on revising national standards for levels of salt in processed and ready-to-eat food. It is also working to encourage food processors to make low-fat, low-sugar, and low-salt foods; to expand/strengthen nutritional labeling laws and regulations; to alert consumers of salty food through food labeling; to educate food processors, technical personnel, health and agriculture personnel, and schoolteachers about health initiatives; and to provide the public with nutrition education through radio, television, and other media. Additionally, the program will conduct surveys to determine salt, sugar, and oil consumption patterns; collaborate to develop relevant food standards; expand nutritional labeling by working with the food industry; and implement programs among health workers and technical staff in provinces.

Iran also plans to develop food legislation and standards that will be endorsed as national law and which include: (1) Limiting trans-fat content to less than 10% of total oil and fat of corn, palm, and mixed liquid oils, as well as frying oil; and (2) Reducing the salt content of food products by at least 33%.

Challenges Ahead
Despite these initiatives to prevent NCDs in the Eastern Mediterranean region, there are still many challenges ahead, such as the lack of technical capacity and sufficient funds, surveillance gaps, and lack of recent data on obesity and diabetes published by the Ministries of Health. The only currently available data on obesity and diabetes in the region is from regional universities, WHO Collaborating Centers, and the Arab Center for Nutrition. A 2011 WHO NCD profile report on select countries is currently the main reference used for diabetes and other NCD trends in the region. The data is based on estimates from 2008.

Moreover, the region still suffers from an absence of a clear political commitment and policy framework on health and nutrition, a lack of institutional capacity to develop sustainable nutrition programs, and disproportionate allocation of health budgets despite the heavy impact these diseases have on the socioeconomic development of countries. References available on request.

Rola Arab is adviser of health and nutrition policy, Middle East and Africa, for EAS Strategic Advice (www.eas.eu).
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Health and wellness trends have long driven innovation in the food industry as consumers look to take advantage of healthy food options in new, convenient ways. Food industry manufacturers and suppliers must understand which ingredients to add—or subtract—to meet consumer needs and demands.

As a global ingredients distributor, we see the changing landscape of consumer food preferences and, consequently, what manufacturers around the world are—and aren’t—asking for. During 2013, healthy reduction and fortification trends remained at the forefront of innovation in food production and formulation. While these trends will continue to evolve in 2014, we also expect to see an increased focus on clean labeling and natural ingredients, along with new formulations driven by industry regulations.

**Tried and True: 2013 Trends**

### Healthy Reduction: Sodium and Sugar

Less was more when it came to sugar and sodium in 2013. The focus on diets lower in sodium and sugar significantly impacted many traditional food and beverage products over the past year. A range of foods and beverages—from breads and cakes to soups and frozen meals—are now reformulated with reduced sugar and sodium. However, marketers must still get consumers on board with these healthy changes. Consumers often don’t perceive these healthy reductions as a positive because they are concerned about sacrificing the flavor of their favorite foods.

In fact, roughly two-thirds of consumers say they value “high in” characteristics (e.g. fiber, vitamins) as opposed to “reduced/low” attributes (e.g. sodium, sugar, and calories) in food.¹

Some manufacturers reduce sugar and sodium without claiming that fact on food labels.

Are consumers willing to sacrifice flavor for reduced sugar and salt?

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and sugar is maintaining mouthfeel. Often, reducing sugar leads to a sensory perception that a food or beverage is too light or watery. By adding hydrocolloids as a texture modifier, formulators can achieve the desired attributes of a product while reducing sugar and/or sodium.

Healthy Enhancement: Fortification
Over the past year, fortification of foods and beverages has expanded and increased in complexity to include fiber, vitamins, and minerals for everything from bone health to improved digestibility and enhanced immunity and alertness. This trend for fortified foods is particularly evident among Baby Boomers looking to fuel a longer life with enhanced versions of their traditional favorite foods.

Consumers are looking for food products fortified with health benefits, but without reduction in texture and taste. The incorporation of fiber in foods like snack products, drinks, and energy bars is a prime example of this. Acacia gum, for instance, contains 90% soluble fiber, improving the fiber profile without impacting texture and taste. Another challenge to consider with fiber fortification is digestibility, which can range between fiber ingredients. To reduce the possibility of gastric distress, fiber ingredients should have a very high digestive tolerance.

Currently, natural preservatives are often not as cost-effective.

On the Horizon: 2014 Trends
Clean Labeling & Natural Ingredients
Over the past year, we’ve seen an increase in the number of consumers looking for healthy, natural, and easy-to-understand ingredients. Products positioned to contain fewer ingredients and labeled as natural are becoming more popular. More than 60% of U.S. adults say they perceive products labeled all natural as healthy.1 (There is somewhat of a disconnect, however, with the fact that only 33% of U.S. consumers state they can trust the term natural on a label.)

With no legal definitions for clean label (nor for natural) in the United States, many manufacturers must define clean label for themselves. Many look to potentially remove and/or replace complicated ingredients by reformulating products. For example, manufacturers are turning to natural hydrocolloids such as pectin, a polysaccharide derived from naturally occurring structural components in fruits and vegetables, to act as a gelling agent, viscosity builder, protective colloid, and stabilizer in a variety of food and beverage products. Finding natural options for preservatives is also a challenge for formulators and manufacturers that want to create a clean label. Currently, natural preservatives are often not as cost-effective.

Industry Regulations
Manufacturers may be challenged to reformulate further to meet new regulations in 2014, from FDAs Food Safety Modernization Act (FSMA) to the agency’s announcement in November 2013 that it is considering a ban on partially hydrogenated oils (trans fat). Partially hydrogenated oils (PHOs) are the major dietary source of trans fat in the processed food supply; once these are no longer Generally Regarded as Safe (GRAS) by FDA, manufacturers will be asking for innovative and cost-effective ways to replace these oils in their products.

Continuing the clean labeling and natural ingredients trend, formulators are sure to look to natural alternatives to trans fat. Some have leveraged coconut and palm oils as potential options; however, the different chemical makeup of these ingredients compared to trans fat creates a challenge for formulators. Others are looking to limit trans fats through innovative emulsification systems, but this causes a more complicated list of ingredients in food products and, as a result, a less consumer-friendly label.

Looking Forward
Manufacturers who are able to meet these industry regulations while achieving healthy products that consumers can easily accept are well positioned for success. Understanding how to incorporate these trends in food products can be a daunting process, as manufacturers must decide and prioritize which health-focused changes to make, while considering logistics such as production times and cost-efficiencies. The good news is that these challenges are driving innovation in the industry. There are now a number of ingredient and formulation alternatives for successfully making healthy adjustments to foods. Shifting consumer demand will continue this momentum and manufacturer innovation in 2014.

References

Charles Purcell is a technical development specialist, food ingredients, for ingredients distributor Univar, headquartered in Redmond, WA. Purcell has over 30 years of experience in the food and beverage industry, including as beverage R&D manager with Bunge Foods and vice president of manufacturing for Meridian Beverage Co.
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Ancient grains” are standing tall. These grains were once very popular basic food cereals, but faded away and became largely obsolete in many countries with the rise of modern cereal crops such as wheat and corn. But their resurgence, especially in the past few years, reflects rising levels of interest in alternative grain products that are positioned as traditional, natural, and nutritious. The United States now leads ancient grain demand, although launches are also increasingly common in Europe.

Quinoa is still driving category growth, according to Innova Market Insights data. But the lesser-known chia has come to the fore. Chia is a Latin American annual herb high in protein, fiber, and antioxidants. Its oil is rich in omega-3 fatty acids. Although chia’s market is much less established than quinoa’s, chia is now showing even higher rates of growth.

Globally, chia product launches rose from barely three figures five years ago to well over 600 now, with the number of launches more than 20% higher in 2013 over 2012. The United States dominated launch activity, accounting for nearly 45% of total introductions. (In 2008, U.S. launches accounted for only 20% of the total.) Europe comes in second, with 17.5% of total launch activity, ahead of Asia’s 11.5% and the 10.5% of chia’s home market, Latin America.

Chia launches span a range of categories, led, as one might expect, by cereal products. Breakfast cereals and cereal bars accounted for over one-fifth of total chia launches. Activity was also strong in bakery products (12% of the total), followed by supplements with 11% and sports nutrition lines with 9%. Other sectors seeing relatively high interest are ready meals, sauces and seasonings, dairy products, baby food, and soft drinks.

In the United States, the cereal and snack markets were among the first to see significant mainstream chia usage. Examples include Nature’s Path’s Qia “superfood” breakfast cereal made with chia, hemp, and buckwheat, as well as Lesser Evil’s Chia Crisps savory snacks in novel flavors like Crunchy Dill Pickle Zing, Southern Barbeque Hot Dang, Feta & Black Olive Opa, and Jalapeno White Cheddar Pow.

Chia is also growing in soft drinks, particularly in the United States where launches include Ahlmigo’s Chia & Water spring water drinks formulated with chia fiber, omega-3, and protein to keep consumers both “hydrated and satiated.” There is also activity in juice drinks, exemplified by Green Mustache’s Mango Orange, Tropical Twist, Strawberry Banana, and Mixed Berry “super-smoothies.”

Each contains one serving of fruit and one serving of vegetables, plus ground chia seeds to add calcium, omega-3 fatty acids, magnesium, and fiber.

Where does chia supply come from? Australia is the main source for products launched in the United States and Europe. But competition is growing from a South American source, Nutrisure, which is currently seeking EFSA approval for chia use in selected food products in Europe.

Australian chia supplier The Chia Company got its own EFSA approval earlier in 2013. Australia chia seeds are now widely used by other countries. In Australia’s own market, 2013 launches included unusual products such as the AntiOx Chia & Quinoa snack bar from Vitality Brands, as well as mainstream products and own-label products such as Woolworth’s Select Chia Sandwich loaf (bread).

In the UK, new product activity is also up, thanks especially to publicity over the UK novel food approval of The Chia Company’s chia seeds. As for UK products, The Chia Company’s own on-the-go Chia Pod breakfast line launched in 2013. The porridge-style, dairy-free, vegan products come in single-serving pots. They contain chia seeds, coconut water, and fruit purees, and are mar-

Chobani’s Flip Blueberry Power yogurt
keted as high in omega-3 and fiber. Other UK launches include a Chia & Coconut Bar from Roo’bar, and Next Generation’s Smooch fruit purees with chia and acerola berries in single-serving pouches with resealable screw caps.

In the dairy sector, recent U.S. launches include Greek yogurt brand Chobani’s Flip Blueberry Power line with chia. Baby food is also including ancient grains. U.S. launches include Plum Organics’ Mighty 4 Essential Nutrition Blends that feature Greek yogurt flavors such as pumpkin–pomegranate–quinoa and purple carrot–blackberry–quinoa. All tout chia as a source of omega-3s.

Ancient grains are returning to consumer diets with rising awareness of their nutritional properties, as well as the unique flavor they can impart to a wide range of food and drink products. Chia is well positioned to lead this trend, as its versatility enables a growing—and dazzling—array of products.

Innova Market Insights is your source for new-product data. The Innova Database, online at www.innovadatabase.com, is the product of choice for the whole product-development team, offering excellent product pictures, search possibilities, and analysis. See what food manufacturers are doing around the world: track trends, competitors, ingredients, and flavors. In today’s fast-moving environment, this is a resource you cannot afford to be without.

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To Market, To Market

Shopping for 2014’s hottest ingredients? Look no further.

BY ROBBY GARDNER AND JENNIFER GREBOW

Thank you to our editorial advisory board member SPINS for its market research support and insight.

Curcumin

Curcumin makes our list for the third year in a row. Last year, curcumin product sales (Curcuma longa) rose 29.5% in the natural channel, totaling $21.6 million, SPINS says. The mainstream market is also ready for curcumin, adds Lynda Doyle, vice president, global marketing, OmniActive Health Technologies (Morristown, NJ). Overall, she says, “recent data from Nutrition Business Journal places turmeric in the top 10 bestselling supplements in the United States, at $108 million in 2012, and it is expected to grow [during] 2013–2016 to $235 million.”

Bioavailability is a challenge—or a marketing advantage, depending on the supplier. Last year saw two notable ingredient launches: Curcumin C3 Reduct from Sabinsa Corp. (East Windsor, NJ) and OmniActive’s CurcuWIN.

Sabinsa’s new curcumin platform is intriguing. Suppliers often hype curcumin’s curcuminoid content, but Sabinsa’s C3 Reduct centers instead on tetrahydrocurcuminoids. The company says clinical research shows that, in the human body, tetrahydrocurcuminoids are the most active and effective metabolites of curcuminoids (curcumin’s active constituents). Tetrahydrocurcuminoids exhibit superior physiological effects, and are more absorbable and superior antioxidants, compared to curcuminoids, Sabinsa says. This makes lower dosages possible.

Steering curcumin dialogue in a new direction is important, says Shaheen Majeed, Sabinsa’s marketing director. “In recent times, we have seen in the market an overemphasis on the bioavailability of curcumin and curcumin absorption, and not the science of the curcuminoids and what happens to them in the body,” he says.

Also outstanding is C3 Reduct’s unique, off-white color. Curcumin’s typical yellow-orange hue, which stains, is always a manufacturing hurdle. But C3 Reduct avoids this. Majeed cautions that products labeled as “white curcumin” are not the same as C3 Reduct and probably turmeric bleached white. “White curcumin is not the same substance mentioned in the published science in peer-reviewed journals.”

Already on the market in a few supplements, including one for animal joint health, C3 Reduct will no doubt see interesting new applications down the road. (Note: Tetrahydrocurcuminoids are also the basis of Sabinsa’s skin-lightening ingredient SabiWhite.) Look for tetrahydrocurcuminoids to become a bigger piece of the curcumin conversation.

OmniActive’s new CurcuWIN ingredient (20% curcuminoids) is highly bioavailable, thanks to UltraSOL molecular dispersion. UltraSOL “converts lipophilic nutrients into water-dispersible ingredients and enhances the bioavailability of poorly absorbed nutrients using food-grade excipients and antioxidants,” Doyle says.

CurcuWIN’s bioavailability is backed by a clinical trial by the University of Tampa and Increnovo LLC. The results were impressive: CurcuWIN increased serum curcuminoid
levels 46 times over standard curcumin. Importantly, instead of comparing against standard curcumin ingredients, which may not be very bioavailable, the researchers also made sure to compare CurcuWIN to other bioavailable curcumin ingredients for true, apples-to-apples results. CurcuWIN was more bioavailable by far, Doyle says. The company is now pursuing clinical trials in healthy populations.

**Protein**

These days, consumers want high protein any way they can get it—and they can get it in many ways. For more info on different protein sources (plant and dairy), see the sports nutrition story on page 58.

Sales of plant proteins (other than soy) outpaced sales of soy and whey in the natural channel last year, according to SPINS. “Consumers like plant proteins for improved taste, the allergen-free benefits, ease of digestion, and due to the expansion of vegan and vegetarian diets,” says Kathy Lund, vice president of business development and marketing for AIDP Inc. (City of Industry, CA). “In addition, plant-based proteins are more environmentally friendly.”

**Chia**

If chia is gaining traction with consumers, slowly but surely, it may be because those chia products are just so eye-catching, whether it’s a drink (Chia Mamma, Drink Chia!, or Ahhmigo’s Chia & Water), a squeezable pouch (Chia Mamma, as well), rice pudding (RiceBliss), or a breakfast “pod” (The Chia Company).

Last year, the European Commission, like the United Kingdom, effectively doubled the percentage at which chia (*Salvia hispanica*) can be included in food products (up to 10%). Read more about chia’s rise on page 32.

*Continued on page 43*
**CONVENTIONAL CHANNEL: 10 BESTSELLING INGREDIENTS (BY HEALTH FOCUS)**

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<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
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**NATURAL CHANNEL: 10 BESTSELLING INGREDIENTS (BY HEALTH FOCUS)**

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<td>Alpha-Lipoic Acid</td>
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**Bone Health**

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<td>$190,765,463</td>
<td>$208,653,792</td>
<td>-8.6%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$157,861,979</td>
<td>$140,388,237</td>
<td>12.4%</td>
</tr>
<tr>
<td>Calcium/Magnesium Combinations</td>
<td>$77,194,300</td>
<td>$85,879,541</td>
<td>-10.1%</td>
</tr>
<tr>
<td>Multivitamin - Senior</td>
<td>$53,714,760</td>
<td>$54,105,302</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Multivitamin - Women</td>
<td>$32,725,671</td>
<td>$25,286,483</td>
<td>29.4%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$9,898,126</td>
<td>$7,914,992</td>
<td>25.1%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$1,566,628</td>
<td>$1,556,165</td>
<td>0.7%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$1,540,359</td>
<td>$4,259,042</td>
<td>-63.8%</td>
</tr>
<tr>
<td>Fiber - Other</td>
<td>$1,010,778</td>
<td>$2,560,163</td>
<td>-60.5%</td>
</tr>
<tr>
<td>Coral Calcium</td>
<td>$620,314</td>
<td>$670,523</td>
<td>-7.5%</td>
</tr>
</tbody>
</table>

**Heart Health**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Oil Concentrate</td>
<td>$214,260,646</td>
<td>$229,286,288</td>
<td>-6.6%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$134,418,655</td>
<td>$152,970,861</td>
<td>-12.1%</td>
</tr>
<tr>
<td>CoQ10</td>
<td>$127,357,250</td>
<td>$117,646,948</td>
<td>8.3%</td>
</tr>
<tr>
<td>Krill Oil</td>
<td>$83,799,470</td>
<td>$65,173,772</td>
<td>28.6%</td>
</tr>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$27,694,514</td>
<td>$2,127,361</td>
<td>1201.8%</td>
</tr>
<tr>
<td>Multivitamin - Senior</td>
<td>$25,751,943</td>
<td>$26,083,948</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Vitamin E (Not Ester-E)</td>
<td>$25,584,670</td>
<td>$26,169,242</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Vitamin B3 (Niacin)</td>
<td>$22,520,394</td>
<td>$24,332,484</td>
<td>-7.4%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$15,187,335</td>
<td>$17,164,759</td>
<td>-11.5%</td>
</tr>
<tr>
<td>Garlic</td>
<td>$14,305,374</td>
<td>$14,796,556</td>
<td>-3.3%</td>
</tr>
</tbody>
</table>
HE WANTS THE EDGE THAT A BETTER MEMORY WILL GIVE HIM.

Build your brands around an ingredient that can deliver it.

Synapsa
THE FUTURE OF MEMORY

• Enhance memory and improve mental performance & speed of learning
• Clinical studies targeted to information age consumers
• Patented, standardized extract of Bacopa monnieri
• Seed-to-shelf quality control
• Effective in single or multi-ingredient cognitive health formulations
• Studies support fast-acting formulations for improved mental performance

Experts and employers agree that the ability to learn and adapt to a constantly changing world is critical to success. For college students & knowledge workers of all ages, Synapsa™ Natural Memory Support can help them an edge. Studies on the unique composition of Synapsa have shown improved working memory, information retention and learning - and fast-acting support of mental performance.

PLT Health Solutions, together with the quality control and clinical studies behind Synapsa, can help you build your brands in the category of cognitive support.

For more information on Synapsa Natural Memory Support, contact your PLT Health Solutions representative, or visit us at www.PLTH ealth.com; keyword – Synapsa.

Contact PLT Health Solutions for samples and more information.
+1.855.PLTHEALTH • www.PLTH ealth.com

THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE, OR PREVENT ANY DISEASE.
### Conventional Channel: 10 Bestselling Ingredients (by Health Focus)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ginkgo biloba</td>
<td>$11,137,685</td>
<td>$11,216,818</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$6,658,003</td>
<td>$6,521,206</td>
<td>2.1%</td>
</tr>
<tr>
<td>Misc Supplements - Other</td>
<td>$4,644,683</td>
<td>$3,392,041</td>
<td>39.4%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$4,076,061</td>
<td>$7,948,223</td>
<td>-48.7%</td>
</tr>
<tr>
<td>Acetyl-L-Carnitine</td>
<td>$3,218,818</td>
<td>$3,689,842</td>
<td>-12.8%</td>
</tr>
<tr>
<td>DMAE</td>
<td>$3,621,561</td>
<td>$3,482,143</td>
<td>-4.2%</td>
</tr>
<tr>
<td>Multivitamin - Children</td>
<td>$1,424,590</td>
<td>$1,455,149</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Lecithin (Phosphatidylcholine)</td>
<td>$631,604</td>
<td>$667,992</td>
<td>-5.4%</td>
</tr>
<tr>
<td>CoQ10</td>
<td>$566,254</td>
<td>$707,142</td>
<td>-19.9%</td>
</tr>
<tr>
<td>Phosphatidylserine</td>
<td>$521,255</td>
<td>$333,931</td>
<td>56.1%</td>
</tr>
</tbody>
</table>

### Digestive Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$360,239,457</td>
<td>$264,504,168</td>
<td>36.2%</td>
</tr>
<tr>
<td>Fiber - Other</td>
<td>$67,460,694</td>
<td>$61,798,317</td>
<td>9.2%</td>
</tr>
<tr>
<td>Lactase</td>
<td>$40,803,652</td>
<td>$42,388,732</td>
<td>-3.7%</td>
</tr>
<tr>
<td>Digestive Enzymes - Other</td>
<td>$35,820,054</td>
<td>$42,906,532</td>
<td>-16.5%</td>
</tr>
<tr>
<td>Laxatives</td>
<td>$18,022,970</td>
<td>$1,649,927</td>
<td>992.3%</td>
</tr>
<tr>
<td>Ginger</td>
<td>$15,603,904</td>
<td>$15,242,311</td>
<td>2.4%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$14,267,763</td>
<td>$14,566,591</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$7,482,456</td>
<td>$6,077,825</td>
<td>23.1%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$5,505,335</td>
<td>$4,783,278</td>
<td>15.1%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeo)</td>
<td>$4,109,578</td>
<td>$2,938,469</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

### Energy Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taurine</td>
<td>$265,801,387</td>
<td>$283,218,008</td>
<td>-6.1%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$99,619,449</td>
<td>$93,584,886</td>
<td>6.4%</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>$75,884,574</td>
<td>$102,249,859</td>
<td>-25.8%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$56,132,152</td>
<td>$55,195,363</td>
<td>1.7%</td>
</tr>
<tr>
<td>Multivitamin - Women</td>
<td>$21,923,563</td>
<td>$26,004,542</td>
<td>-15.7%</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>$14,455,449</td>
<td>$16,782,489</td>
<td>-13.9%</td>
</tr>
<tr>
<td>Ginseng - All (X Siberian Ginseng)</td>
<td>$12,635,570</td>
<td>$15,727,358</td>
<td>-19.7%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>$10,467,147</td>
<td>$8,979,953</td>
<td>16.6%</td>
</tr>
<tr>
<td>Multivitamin - Senior</td>
<td>$10,314,339</td>
<td>$6,687,864</td>
<td>54.2%</td>
</tr>
<tr>
<td>Multivitamin - Men</td>
<td>$8,929,372</td>
<td>$7,877,955</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

### Natural Channel: 10 Bestselling Ingredients (by Health Focus)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ginkgo biloba</td>
<td>$3,426,747</td>
<td>$3,556,220</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$3,154,855</td>
<td>$3,353,298</td>
<td>-5.9%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$2,619,633</td>
<td>$2,627,527</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Phosphatidylserine</td>
<td>$2,039,722</td>
<td>$1,888,565</td>
<td>8.0%</td>
</tr>
<tr>
<td>Acetyl-L-Carnitine</td>
<td>$1,256,422</td>
<td>$1,285,494</td>
<td>-2.3%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$968,321</td>
<td>$850,043</td>
<td>13.9%</td>
</tr>
<tr>
<td>Lecithin (Phosphatidylcholine)</td>
<td>$943,926</td>
<td>$886,689</td>
<td>6.5%</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>$362,503</td>
<td>$329,651</td>
<td>10.0%</td>
</tr>
<tr>
<td>Ayurvedic Herbs - Other</td>
<td>$304,736</td>
<td>$258,242</td>
<td>18.0%</td>
</tr>
<tr>
<td>Mushrooms - Other</td>
<td>$281,457</td>
<td>$115,626</td>
<td>143.4%</td>
</tr>
</tbody>
</table>

### Digestive Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$75,783,902</td>
<td>$59,823,598</td>
<td>26.7%</td>
</tr>
<tr>
<td>Digestive Enzymes - Other</td>
<td>$15,450,162</td>
<td>$14,374,606</td>
<td>7.5%</td>
</tr>
<tr>
<td>Aloe vera</td>
<td>$8,448,714</td>
<td>$7,894,048</td>
<td>7.0%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$4,748,240</td>
<td>$4,437,461</td>
<td>7.0%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$2,659,285</td>
<td>$2,714,277</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Papaya</td>
<td>$2,154,774</td>
<td>$1,927,341</td>
<td>11.8%</td>
</tr>
<tr>
<td>Licorice</td>
<td>$1,480,172</td>
<td>$1,093,318</td>
<td>35.4%</td>
</tr>
<tr>
<td>Fiber - Other</td>
<td>$1,346,807</td>
<td>$1,199,114</td>
<td>12.3%</td>
</tr>
<tr>
<td>Chia Seed or Oil</td>
<td>$1,094,290</td>
<td>$590,512</td>
<td>85.3%</td>
</tr>
<tr>
<td>Laxatives</td>
<td>$1,025,817</td>
<td>$976,005</td>
<td>5.1%</td>
</tr>
</tbody>
</table>

### Energy Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multivitamin - Adult</td>
<td>$7,872,626</td>
<td>$8,278,872</td>
<td>-4.9%</td>
</tr>
<tr>
<td>Protein - Other</td>
<td>$7,583,772</td>
<td>$3,524,355</td>
<td>115.2%</td>
</tr>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$7,367,107</td>
<td>$8,044,742</td>
<td>-8.4%</td>
</tr>
<tr>
<td>Protein - Multisource without Soy</td>
<td>$7,181,240</td>
<td>$4,982,378</td>
<td>44.1%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$3,447,472</td>
<td>$3,375,392</td>
<td>2.1%</td>
</tr>
<tr>
<td>Protein - Whey and Milk</td>
<td>$3,197,345</td>
<td>$3,212,073</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$3,126,787</td>
<td>$2,944,820</td>
<td>6.2%</td>
</tr>
<tr>
<td>Multivitamin - Men</td>
<td>$2,677,239</td>
<td>$2,440,368</td>
<td>9.7%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$2,223,530</td>
<td>$2,074,406</td>
<td>7.2%</td>
</tr>
<tr>
<td>Grass (Wheat or Barley)</td>
<td>$1,464,652</td>
<td>$1,227,516</td>
<td>19.3%</td>
</tr>
</tbody>
</table>
See us at Natural Products Expo West, Booth #5729
### Conventional Channel: 10 Bestselling Ingredients (By Health Focus)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Health Formulas</td>
<td>$168,525,338</td>
<td>$158,392,025</td>
<td>6.4%</td>
</tr>
<tr>
<td>Multivitamin - Senior</td>
<td>$48,939,142</td>
<td>$47,348,390</td>
<td>3.4%</td>
</tr>
<tr>
<td>Lutein</td>
<td>$26,502,562</td>
<td>$22,701,906</td>
<td>16.7%</td>
</tr>
<tr>
<td>Multivitamin - Adult</td>
<td>$25,350,099</td>
<td>$17,812,372</td>
<td>42.1%</td>
</tr>
<tr>
<td>Specialty Remedies (Homo)</td>
<td>$17,168,485</td>
<td>$17,050,137</td>
<td>0.7%</td>
</tr>
<tr>
<td>Combination Oils (Supplements)</td>
<td>$4,194,161</td>
<td>$4,430,795</td>
<td>-5.3%</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>$1,164,838</td>
<td>$1,321,125</td>
<td>-11.8%</td>
</tr>
<tr>
<td>Bilberry</td>
<td>$758,885</td>
<td>$1,107,300</td>
<td>-31.5%</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>$383,371</td>
<td>$437,451</td>
<td>-12.4%</td>
</tr>
<tr>
<td>Beta-Carotene (Not Combo)</td>
<td>$302,337</td>
<td>$448,048</td>
<td>-32.5%</td>
</tr>
</tbody>
</table>

### Natural Channel: 10 Bestselling Ingredients (By Health Focus)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Health Formulas</td>
<td>$2,440,400</td>
<td>$2,304,834</td>
<td>5.9%</td>
</tr>
<tr>
<td>Lutein</td>
<td>$2,051,282</td>
<td>$1,812,912</td>
<td>13.1%</td>
</tr>
<tr>
<td>Specialty Remedies (Homo)</td>
<td>$1,612,770</td>
<td>$1,465,196</td>
<td>10.1%</td>
</tr>
<tr>
<td>Bilberry</td>
<td>$761,433</td>
<td>$775,802</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>$347,795</td>
<td>$374,937</td>
<td>-7.2%</td>
</tr>
<tr>
<td>Pycnogenol (Pine Bark)</td>
<td>$218,822</td>
<td>$139,187</td>
<td>57.2%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$203,972</td>
<td>$176,718</td>
<td>15.4%</td>
</tr>
<tr>
<td>Eyebright</td>
<td>$150,147</td>
<td>$138,440</td>
<td>8.5%</td>
</tr>
<tr>
<td>Homeopathic - Other</td>
<td>$138,168</td>
<td>$124,726</td>
<td>10.8%</td>
</tr>
<tr>
<td>Carotenoids - Mixed</td>
<td>$134,542</td>
<td>$161,667</td>
<td>-16.8%</td>
</tr>
</tbody>
</table>

### Hair, Skin, and Nails

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotin</td>
<td>$46,128,127</td>
<td>$29,136,256</td>
<td>58.3%</td>
</tr>
<tr>
<td>Specialty Remedies (Homo)</td>
<td>$34,163,814</td>
<td>$13,169,097</td>
<td>159.4%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$9,678,197</td>
<td>$7,899,132</td>
<td>22.5%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$6,434,661</td>
<td>$9,790,278</td>
<td>-34.3%</td>
</tr>
<tr>
<td>Multivitamin - Women</td>
<td>$4,578,994</td>
<td>$7,338,601</td>
<td>-37.6%</td>
</tr>
<tr>
<td>Lysine</td>
<td>$4,558,173</td>
<td>$4,061,723</td>
<td>12.2%</td>
</tr>
<tr>
<td>Multivitamin - Adult</td>
<td>$1,732,233</td>
<td>$1,430,652</td>
<td>21.1%</td>
</tr>
<tr>
<td>Fo-Ti</td>
<td>$1,524,978</td>
<td>$2,120,960</td>
<td>-28.1%</td>
</tr>
<tr>
<td>Alpha-Lipoic Acid</td>
<td>$1,286,568</td>
<td>$1,620,310</td>
<td>-20.6%</td>
</tr>
<tr>
<td>Vitamin E (Not Ester-E)</td>
<td>$1,254,677</td>
<td>$1,596,763</td>
<td>-21.4%</td>
</tr>
</tbody>
</table>

### Immune Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$25,002,425</td>
<td>$30,055,610</td>
<td>-16.8%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$14,956,019</td>
<td>$15,697,812</td>
<td>-4.7%</td>
</tr>
<tr>
<td>Multivitamin - Men</td>
<td>$11,791,031</td>
<td>$18,953,277</td>
<td>-37.8%</td>
</tr>
<tr>
<td>Multivitamin - Adult</td>
<td>$10,469,094</td>
<td>$12,220,145</td>
<td>-14.3%</td>
</tr>
<tr>
<td>Multivitamin - Children</td>
<td>$7,197,953</td>
<td>$6,822,718</td>
<td>5.5%</td>
</tr>
<tr>
<td>Soy Foods</td>
<td>$5,883,257</td>
<td>$4,885,281</td>
<td>20.4%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$3,980,422</td>
<td>$4,905,054</td>
<td>-18.9%</td>
</tr>
<tr>
<td>Probiotic Supplement</td>
<td>$3,328,536</td>
<td>$3,389,957</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$225,675</td>
<td>$1,033,794</td>
<td>-10.5%</td>
</tr>
<tr>
<td>Andrographis</td>
<td>$795,769</td>
<td>$281,996</td>
<td>182.2%</td>
</tr>
</tbody>
</table>
“Enjoy a little more... Absorb a lot less!™”

We love our carbs! Sometimes, a little too much.

Phase 2®, the original, clinically studied white kidney bean extract, partially blocks the enzyme that digests starch, enabling us to enjoy some of our favorite carbs without the full caloric impact.

Contact us to find out how you can incorporate Phase 2 in a dietary supplement, food or beverage to reach the growing number of consumers pursuing a low-carb lifestyle. Sales@pharmachemlabs.com; 1-800-526-0609; (201-246-1000 outside the U.S.)

These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease.
For more than a decade, *Nutritional Outlook* has remained the leading publication in the North American nutraceuticals market. Now with the UBM family of brands inclusive of magazines, websites, digital products, and trade shows, the leading information provider has become the biggest international powerhouse in the industry. *Nutritional Outlook* is the most comprehensive and effective platform providing you with innovative content, reliable products and services and unlimited ways to reach your potential customers across the world!
Ginger
Ginger will be one of 2014’s tastiest flavor fashions, landing at numbers three and four on the 2014 top-trends lists of flavor houses Bell Flavors and Fragrances (Northbrook, IL) and Sensient Flavors (Hoffman Estates, IL), respectively. (Specifically, Sensient’s pick is “Ginger Plum.”) And flavors firm Virginia Dare (Brooklyn, NY) passed out samples of a Ginger Rooibos drink at industry events last year.

Expect to see ginger more in healthy beverages like vitamin waters and smoothies, as well as baked goods and even beer, says Bridget Schigoda, Sensient’s consumer insights manager. “The sky really is the limit in terms of what type of application ginger can be used in, from sweet to savory, beverage to food, classic to new,” she adds.

But ginger (Zingiber officinale) is more than just a pretty flavor. Satiety and digestive health are just a few benefits. Of the ginger studies published last year, two caught our eye. One, a meta-analysis published in *Women and Birth*, builds evidence that ginger alleviates nausea and vomiting. Specifically, the meta-analysis looked at pregnant women (504 test subjects total). Ginger may relieve these symptoms by helping muscles to contract and push food through the gastrointestinal tract (an effect called peristalsis). The other study, in *Phytotherapy Research*, concluded that ginger may be a natural alternative to migraine drugs. See page 86 for more.

Kale
If one member of the *Brassica* family is expected to grow this year, it’s kale. This leafy green earned its own National Kale Day last year, and it continues to pop up at mass retail grocers and farmers markets around the United States, and now in a nationwide Jamba Juice promotion.

Available in green, purple, and black varieties, kale can be manufactured into numerous food and beverage formulations, including chips, energy bars, juices, smoothies, and green powder blends. But the market for kale

Ginger does more than just taste good.
## CONVENTIONAL CHANNEL: 10 BESTSELLING INGREDIENTS (BY HEALTH FOCUS)

### Joint Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucosamine-Chondroitin Combo</td>
<td>$235,655,963</td>
<td>$247,828,327</td>
<td>-4.9%</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>$62,391,514</td>
<td>$62,733,864</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Hyaluronic Acid</td>
<td>$16,769,132</td>
<td>$17,488,361</td>
<td>-4.1%</td>
</tr>
<tr>
<td>Krill Oil</td>
<td>$3,061,857</td>
<td>$1,276,804</td>
<td>198.8%</td>
</tr>
<tr>
<td>Chondroitin Supplements</td>
<td>$2,860,968</td>
<td>$2,320,694</td>
<td>23.3%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$1,989,112</td>
<td>$2,460,594</td>
<td>-19.2%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$1,295,905</td>
<td>$1,309,979</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Garlic</td>
<td>$1,043,500</td>
<td>$751,016</td>
<td>38.9%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$863,627</td>
<td>$726,394</td>
<td>18.9%</td>
</tr>
<tr>
<td>MSM</td>
<td>$749,025</td>
<td>$843,284</td>
<td>-11.2%</td>
</tr>
</tbody>
</table>

### Weight Loss

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein - Milk Protein</td>
<td>$144,242,579</td>
<td>$163,396,335</td>
<td>-11.7%</td>
</tr>
<tr>
<td>Protein - Multisource without Soy</td>
<td>$95,976,453</td>
<td>$80,581,392</td>
<td>19.1%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>$76,215,267</td>
<td>$75,128,295</td>
<td>1.4%</td>
</tr>
<tr>
<td>Green Coffee Extract</td>
<td>$68,022,427</td>
<td>$18,427,986</td>
<td>269.1%</td>
</tr>
<tr>
<td>Green Teas and Supplements</td>
<td>$65,852,478</td>
<td>$89,276,343</td>
<td>-26.2%</td>
</tr>
<tr>
<td>Ketones</td>
<td>$39,408,524</td>
<td>$17,457,328</td>
<td>125.7%</td>
</tr>
<tr>
<td>Glucomannan</td>
<td>$35,147,640</td>
<td>$31,692,413</td>
<td>10.9%</td>
</tr>
<tr>
<td>Protein - Whey and Milk</td>
<td>$17,505,478</td>
<td>$14,543,305</td>
<td>20.4%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$15,642,519</td>
<td>$19,639,911</td>
<td>-20.4%</td>
</tr>
<tr>
<td>Garcinia cambogia</td>
<td>$15,267,595</td>
<td>$5,742,488</td>
<td>165.9%</td>
</tr>
</tbody>
</table>

### Vegetarian/vegan gummies are driving demand for gelatin alternatives.

## NATURAL CHANNEL: 10 BESTSELLING INGREDIENTS (BY HEALTH FOCUS)

### Joint Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucosamine-Chondroitin Combo</td>
<td>$7,425,689</td>
<td>$7,443,003</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Hyaluronic Acid</td>
<td>$3,386,693</td>
<td>$3,083,034</td>
<td>9.8%</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>$2,868,861</td>
<td>$2,863,558</td>
<td>0.2%</td>
</tr>
<tr>
<td>Proteolytic Enzymes</td>
<td>$2,071,615</td>
<td>$2,050,459</td>
<td>1.0%</td>
</tr>
<tr>
<td>MSM</td>
<td>$2,037,642</td>
<td>$1,885,029</td>
<td>8.1%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$1,426,607</td>
<td>$1,202,157</td>
<td>18.7%</td>
</tr>
<tr>
<td>Boswellin or Boswellia</td>
<td>$1,196,953</td>
<td>$635,660</td>
<td>88.3%</td>
</tr>
<tr>
<td>Bromelain</td>
<td>$1,067,776</td>
<td>$953,474</td>
<td>12.0%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$712,446</td>
<td>$466,066</td>
<td>52.9%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$582,523</td>
<td>$790,074</td>
<td>-26.3%</td>
</tr>
</tbody>
</table>

### Weight Loss

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Coffee Extract</td>
<td>$6,731,071</td>
<td>$4,553,461</td>
<td>47.8%</td>
</tr>
<tr>
<td>Garcinia cambogia</td>
<td>$5,604,178</td>
<td>$376,503</td>
<td>1388.5%</td>
</tr>
<tr>
<td>Ketones</td>
<td>$3,471,821</td>
<td>$5,355,391</td>
<td>-35.2%</td>
</tr>
<tr>
<td>Protein - Multisource without Soy</td>
<td>$2,744,029</td>
<td>$341,247</td>
<td>704.1%</td>
</tr>
<tr>
<td>Conjugated Linoleic Acid</td>
<td>$2,315,617</td>
<td>$2,917,762</td>
<td>-20.6%</td>
</tr>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$2,104,505</td>
<td>$1,818,141</td>
<td>15.8%</td>
</tr>
<tr>
<td>Kelp (iodine)</td>
<td>$1,320,111</td>
<td>$1,466,449</td>
<td>-10.0%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$1,037,521</td>
<td>$1,540,023</td>
<td>-32.6%</td>
</tr>
<tr>
<td>Green Teas and Supplements</td>
<td>$1,029,734</td>
<td>$1,344,872</td>
<td>-23.4%</td>
</tr>
<tr>
<td>Vegetable Supp Oils - Other</td>
<td>$1,015,784</td>
<td>$2,790,716</td>
<td>-63.6%</td>
</tr>
</tbody>
</table>

Source: SPINSscan Conventional AOC
Time period: 52 weeks ending 11/23/13 versus the 52 weeks ending 11/24/12
Channel: Conventional food and all outlets combined (includes Wal-Mart)

Source: SPINSscan Natural
Time period: 52 weeks ending 11/23/13 versus the 52 weeks ending 11/24/12
Channel: Natural supermarkets (excluding Whole Foods Market)

Gelatin

As manufacturers seek consumer-compliant forms for today’s many dietary supplements, gummies are indeed taking over. Whether used for fish oil concentrates, green blends, and extracts to their vegetable offerings.

Apart from its density in vitamins and minerals, kale is rich in lutein and potential cancer-fighting compounds called glucosinolates. Kale is grown worldwide in temperate climates, and the time of harvest may dictate this ingredient’s taste.

Continued on page 48
A woman’s decreased desire, low arousal, or inability to enjoy climax can be attributed to many factors, including normal hormonal changes. Women now have a natural way to arouse sexual desire.

Introducing Libifem™, a clinically tested supplement that helps revive her drive.* Winner of Engredea’s “most novel ingredient” award, Libifem raised sexual desire and arousal in a placebo-controlled study on 80 healthy females using the DISF-SR standard*. For a full report on the study, or to introduce a female sexual health ingredient to your product line, call 714-870-8723. You can read about Libifem at www.gencorpacific.com

Could this award-winning ingredient be your next successful product?

Libifem helps increase female sexual arousal*

Libifem is clinically shown to promote healthy sexual function*

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

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## 25 BESTSELLING INGREDIENTS (ACROSS ALL PRODUCTS)

### Conventional Channel:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$3,434,840,501</td>
<td>$3,063,739,666</td>
<td>12.1%</td>
</tr>
<tr>
<td>Misc Supplements - Other</td>
<td>$3,044,137,889</td>
<td>$3,092,896,438</td>
<td>-1.6%</td>
</tr>
<tr>
<td>Soy Foods</td>
<td>$2,525,247,602</td>
<td>$2,531,249,345</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Taurine</td>
<td>$1,927,339,396</td>
<td>$1,879,050,739</td>
<td>2.6%</td>
</tr>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$1,398,585,669</td>
<td>$1,157,584,758</td>
<td>20.8%</td>
</tr>
<tr>
<td>Multivitamin - Adult</td>
<td>$838,898,834</td>
<td>$842,309,608</td>
<td>-0.4%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$792,723,534</td>
<td>$756,673,656</td>
<td>4.8%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$763,327,593</td>
<td>$703,044,434</td>
<td>8.6%</td>
</tr>
<tr>
<td>Fiber - Other</td>
<td>$762,114,510</td>
<td>$889,826,663</td>
<td>-14.4%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$614,159,812</td>
<td>$554,374,030</td>
<td>10.8%</td>
</tr>
<tr>
<td>Protein - Milk Protein</td>
<td>$600,366,842</td>
<td>$611,260,070</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$467,557,224</td>
<td>$516,026,257</td>
<td>-9.4%</td>
</tr>
<tr>
<td>Green Teas and Supplements</td>
<td>$435,699,486</td>
<td>$327,513,259</td>
<td>33.0%</td>
</tr>
<tr>
<td>Glucosamine-Chondroitin Combo</td>
<td>$430,440,370</td>
<td>$436,266,366</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Unknown</td>
<td>$413,683,359</td>
<td>$379,769,287</td>
<td>8.9%</td>
</tr>
<tr>
<td>Stevia</td>
<td>$408,669,489</td>
<td>$433,832,197</td>
<td>-5.8%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeo)</td>
<td>$368,244,695</td>
<td>$314,662,400</td>
<td>17.0%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$333,793,848</td>
<td>$347,218,328</td>
<td>-3.9%</td>
</tr>
<tr>
<td>Multivitamin - Women</td>
<td>$318,542,741</td>
<td>$280,755,446</td>
<td>13.5%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$304,308,703</td>
<td>$284,544,320</td>
<td>6.9%</td>
</tr>
<tr>
<td>Multivitamin - Senior</td>
<td>$302,693,653</td>
<td>$304,525,402</td>
<td>-0.6%</td>
</tr>
<tr>
<td>Calcium</td>
<td>$298,865,521</td>
<td>$325,397,667</td>
<td>-8.2%</td>
</tr>
<tr>
<td>Protein - Multisource without Soy</td>
<td>$292,878,609</td>
<td>$288,950,936</td>
<td>1.4%</td>
</tr>
<tr>
<td>Potassium</td>
<td>$281,875,350</td>
<td>$175,903,135</td>
<td>60.2%</td>
</tr>
<tr>
<td>Carnitine</td>
<td>$269,888,100</td>
<td>$281,049,259</td>
<td>-4.0%</td>
</tr>
</tbody>
</table>

### Natural Channel:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Sales</th>
<th>Year-Ago Sales</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$288,091,328</td>
<td>$247,421,176</td>
<td>16.4%</td>
</tr>
<tr>
<td>Soy Foods</td>
<td>$172,920,656</td>
<td>$176,736,537</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$66,119,428</td>
<td>$56,532,519</td>
<td>17.0%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$65,876,731</td>
<td>$64,557,604</td>
<td>2.0%</td>
</tr>
<tr>
<td>Kombucha</td>
<td>$58,240,881</td>
<td>$48,843,705</td>
<td>19.2%</td>
</tr>
<tr>
<td>Misc Supplements - Other</td>
<td>$53,880,526</td>
<td>$46,052,939</td>
<td>17.0%</td>
</tr>
<tr>
<td>Whole-Food Concentrate</td>
<td>$37,411,897</td>
<td>$31,243,288</td>
<td>19.7%</td>
</tr>
<tr>
<td>Hemp Products</td>
<td>$37,013,756</td>
<td>$30,168,879</td>
<td>22.7%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeo)</td>
<td>$36,443,947</td>
<td>$32,457,413</td>
<td>12.3%</td>
</tr>
<tr>
<td>Coconut Oil</td>
<td>$35,705,119</td>
<td>$27,918,365</td>
<td>27.9%</td>
</tr>
<tr>
<td>Chia Seed or Oil</td>
<td>$34,502,700</td>
<td>$22,581,348</td>
<td>52.8%</td>
</tr>
<tr>
<td>Protein - Other</td>
<td>$33,867,215</td>
<td>$22,371,736</td>
<td>51.4%</td>
</tr>
<tr>
<td>Protein - Multisource without Soy</td>
<td>$33,368,867</td>
<td>$20,473,948</td>
<td>63.0%</td>
</tr>
<tr>
<td>Multivitamin - Women</td>
<td>$31,867,086</td>
<td>$28,695,885</td>
<td>11.1%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$31,319,269</td>
<td>$30,708,504</td>
<td>2.0%</td>
</tr>
<tr>
<td>Protein - Whey Protein</td>
<td>$30,690,496</td>
<td>$30,513,836</td>
<td>0.6%</td>
</tr>
<tr>
<td>Stevia</td>
<td>$29,334,754</td>
<td>$25,673,856</td>
<td>14.3%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$27,344,504</td>
<td>$24,026,868</td>
<td>13.8%</td>
</tr>
<tr>
<td>Multivitamin - Adult</td>
<td>$26,771,930</td>
<td>$28,097,290</td>
<td>-4.7%</td>
</tr>
<tr>
<td>Calcium/Magnesium Combinations</td>
<td>$26,507,155</td>
<td>$26,317,763</td>
<td>0.7%</td>
</tr>
<tr>
<td>Grass (Wheat or Barley)</td>
<td>$22,874,536</td>
<td>$19,559,236</td>
<td>17.0%</td>
</tr>
<tr>
<td>Aloe vera</td>
<td>$22,153,915</td>
<td>$21,321,594</td>
<td>3.9%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$21,567,315</td>
<td>$16,656,570</td>
<td>29.5%</td>
</tr>
<tr>
<td>Spirulina Blue Green Algae</td>
<td>$19,744,259</td>
<td>$17,922,158</td>
<td>10.2%</td>
</tr>
<tr>
<td>Protein - Multisource with Soy</td>
<td>$19,176,177</td>
<td>$18,892,459</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Source: SPINSscan Conventional AOC  
Time period: 52 weeks ending 11/23/13 versus the 52 weeks ending 11/24/12  
Channel: Conventional food and all outlets combined (includes Wal-Mart)  

Source: SPINSscan Natural  
Time period: 52 weeks ending 11/23/13 versus the 52 weeks ending 11/24/12  
Channel: Natural supermarkets (excluding Whole Foods Market)
Let’s face it. The consumer is bombarded with way too many beverages and shots. Fact is, they are basically the same kind of spin on energy drinks. Isn’t it time for a change?

AlphaSize® A-GPC is widely used in dietary supplements. And look around. Use in functional beverages and shots is exploding. Why? Because AlphaSize® A-GPC is a natural, safe, GRAS ingredient that is science-proven.

**TASTELESS, WATER SOLUBLE AND STABLE:** Excellent performance in all liquid applications.

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Ingredients to Watch

Continued from page 44

or multivitamin formulas, gummies give children and adults a pleasant break from the otherwise dull routine of popping pills.

But, with the rise of gummies comes an important decision for each and every dietary supplement and confectionery manufacturer: do you include or omit animal-derived gelatin from your product?

Derived from cattle, pig, and even fish, gelatin has long been a traditional choice for formulating chewy yet sturdy gummies. But pectin, starch, and other plant-based options are now proving competitive, if only limited by their ability to act as a one-to-one gelatin replacement. With vegetarians and vegans increasing in numbers, and kosher and halal certifications gaining greater recognition, the decision on whether to purchase gelatin is getting a bit tricky. Expect to hear a lot about this ingredient, or its alternatives, in 2014.

Cranberry

Still a favorite dietary supplement for consumers, cranberry should prove a more sophisticated ingredient in 2014 than in prior years. Beyond its use for potential relief of urinary tract infections, cranberry continues to show promise in a number of health areas related to pesky bacteria, including oral care and digestive health. Select cranberry suppliers are even starting partnerships with probiotic developers.

As cranberries continue to be juiced and mashed for beverages and extracts, cranberry leftovers may start coming into good use. One of the newcomers to the expanding plant protein category is cranberry protein, and, while its price point is still high, this protein could prove to be a nice complement to plant protein blends for years to come.

For a look inside the current discussion surrounding cranberries and urinary tract infections, turn to page 48.

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Continued from page 44
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Cranberries and the Future of UTIs

A hidden compound is about to change everything.

BY ROBBY GARDNER, ASSOCIATE EDITOR

For decades, if not centuries, women and men have used cranberry products for relief from urinary tract infections (UTIs). Convention has it that cranberry nutrients prevent bad bacteria from attaching to the human bladder, which would otherwise cause an infection. But, despite their popular use, cranberry products don’t always impress in clinical settings.
For every trial that finds a cranberry juice or capsule reduces the risk of repetitive UTIs, another trial finds no such benefit. The doubt is perhaps best illustrated in a 2012 review by the Cochrane Collaboration, which compiled data from 24 historic studies on 4473 subjects to make its point: neither juice nor supplements can be prescribed for treatment at this time.

If cranberries can prevent recurrent UTIs, it’s safe to say there is still more to learn about these red berries and the forms through which we most often consume them. Thankfully, our understanding is improving.

**Insoluble PACs**

The trouble with previous studies is likely a lack of cranberry characterization, according to cranberry suppliers and the Cochrane collaborators themselves. While proanthocyanidins (PACs) are an active component of cranberries—one that experts believe is intimately involved in cranberry’s anti-adhesion effect—a great majority of previous studies never quantified their cranberry PAC contents. In other words, those studies can’t be repeated.

“There just weren’t analytical tools available by the time a lot of those clinical studies were conducted,” says Christian Krueger, CEO of Complete Phytochemical Solutions LLC (Cambridge, WI), a consulting and analytics services provider specializing in cranberry research.

A variety of test methods are now available for quantifying cranberry PACs—including the popular BL-DMAC method developed by Brunswick Laboratories (Southborough, MA)—but they can only identify water-soluble PACs, the types present in cranberry juices and cocktails. Newer, more sophisticated cranberry extracts derived from the fruit’s pomace—including the seeds, skin, flesh, and stems—contain soluble PACs. But they also contain insoluble PACs, which until recently couldn’t be quantified.

Krueger and a team of researchers recently devised a method, based on butanol and hydrochloric acid, for quantifying insoluble PACs, and it’s pending publication. The ability to quantify insoluble PACs—compounds that were hidden from researchers for all those years—begs the question of whether the presence (or absence) of these particular PACs had any significant impact on past studies.

“Now, we have to look at the bioavailability of the insoluble PACs, and the clinical results on cranberry ingredients with insoluble PACs versus those without them,” says Skip Hammock, director of technical affairs at Pharmacem Laboratories Inc. (Kearny, NJ), supplier of Cran-Max cranberry extract. “We knew we had a raw material that worked, based on human clinicals, but we couldn’t quantify how much of what was in there—at least in a way that was replicable for the industry.”

So far, researchers have yet to explore the potential health benefits of insoluble PACs, but the early hypothesis is that these PACs might perform in much the same way as their soluble counterparts.

**Monographs and Product Labels**

Some cranberry suppliers are hoping that, with increased awareness for all kinds of PACs, cranberry product manufacturers will start calling out the importance of PACs in their own marketing language.

“We’re asking buyers to start looking for a way to identify PACs in all cranberry products, and to identify this on their product labels,” says Stephen Lukawski, vice president of sales and product development for Fruit d’Or Nutraceuticals (Notre Dame de
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Lourdes, MB, Canada), supplier of Cran d’Or and Cran Naturelle cranberry extracts. “We have to focus on something that is easy for the consumer to understand, and this would be the PAC activity found in cranberry in its natural state.”

Aside from dedicated cranberry suppliers, even the United States Pharmacopeia (USP; Rockville, MD) is interested in the latest cranberry findings—perhaps because the attention was long overdue. USP develops ingredient monographs to give everyone, from researchers to end-use customers, expert-verified standards for what should be present in ingredient materials. Its cranberry monographs needed some updating.

Actually, USP’s sole cranberry monograph, intended for cranberry juice concentrate, hadn’t been updated since its introduction in 1999. But a spokesperson for the USP says the group is now considering updating that monograph with a determination for soluble PACs. It’s also exploring the development of new monographs for other cranberry products, “for which the determination of insoluble PACs would be important.”

Complementing those monographs should be a variety of standard reference materials, which Krueger and his team are hoping to contribute.

“In an ideal situation, every commercial cranberry product on the market would have its own customized standard reference material,” says Krueger. “Think about a juice that would have a particular distribution of PACs that would vary in size and amount. That’s going to be different from something like a refined extract or a sweetened, dried cranberry. The distribution of that class of compounds is different across all of these commercial products.”

While the existing standard reference material—known as procyanidin A2 dimer—is available for everyone, Krueger says this provides just a rough estimate of what’s in a product, and “it certainly isn’t the most accurate way of quantifying PACs.”

**USP’s cranberry monograph, intended for cranberry juice concentrate, hasn’t been updated since its introduction in 1999.**

**Processing**

With USP keen on updating its cranberry monographs, maintaining precious PACs will become all the more important. And suppliers say this is where processing temperatures are critical.

“We use soft, gentle conditions in order to not apply high-heat treatment, because we know that the PACs are a bit destroyed by
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high temperature,” says Damien Guillemet, technical manager at Nexira (Rouen Cedex, France), supplier of Exocyan cranberry extract. “We’ve proven that, with temperature and time applied, you can lose 5% to 20% of the PAC content.”

Beyond thermal influence, geography, climate, and year-to-year seasonal differences can also affect the innate PAC content of cranberries before their extracts and juices are standardized. For manufacturers, this presents a real risk, as in-house tests conducted by some cranberry suppliers already indicate that finished products on the market vary dramatically in terms of PAC content. When USP monographs are in place, the disparities may get much more attention.

**Whole Fruit**

While industry urges manufacturers and customers to take a closer look at PACs, it’s worth noting that PACs probably isn’t the single deciding factor for cranberry products and urinary health. Other cranberry compounds are most certainly at play, which is why many of today’s ingredient suppliers promote whole-fruit, full-spectrum cranberry ingredients.

The recent discovery of a new kind of PACs is evidence of this potential whole-fruit effect. “What we’ve found through science on our full-spectrum cranberry ingredient, PACran, is that we are having superior anti-adhesion activity with one-twentieth the soluble PACs of a juice extract,” says Dan Souza, director of sales and marketing for Naturex-DBS (Sagamore, MA). In other words, the ability of cranberry ingredients to perform against urinary tract infections is almost certainly a result of synergistic cranberry nutrients. Manufacturers would be wise to consider the demonstrated anti-adhesion activity of a cranberry product rather than merely looking for its content of one or two lone compounds.

And what’s to say that, somewhere down the road, researchers won’t discover another cranberry compound that’s just as beneficial for urinary health? Would this ingredient require standardization and quantification, too?

“That’s a very important question, because there are many, many other compounds in cranberries,” says Krueger. “While we talk about PACs as one class of compounds, we also have anthocyanins, flavonols, and hydroxyl-cinnamic acids. All of these have been shown to have some biological activity—in cell cultures, in animal studies, and in human clinical studies.”

The quest for the ideal solution for pesky UTIs is leading industry to reconsider the cranberry entirely. At some point in history, humans made a connection between urinary health improvements and the cranberry fruit before there were extracts and juices. That plump red fruit—in its whole, natural, and tart state—must hold the answer.

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Protein, sports nutrition’s heavy hitter, continues to win, with double-digit sales gains and an outflux of high-protein product claims. "High-protein intake is trending with most consumers," says Scott Steil, president of Nutra Bridge Corp. (Shoreview, MN).

A formulator has many protein options these days. Ahead is a quick rundown, including what the latest studies say.

BCAAs
Protein is rich in essential amino acids—particularly, the branched chain amino acids (BCAAs) leucine, isoleucine, and valine, which are highly concentrated in muscle tissue. "BCAAs play a special role in muscles because they can be metabolized within the muscles—rather than in the liver, where all other aminos are metabolized—and be used for energy," says Scarlett Blandon, registered dietitian for Axiom Foods (Los Angeles). BCAAs play a key role in muscle recovery/synthesis and sports performance.

How do BCAAs compare in different protein sources—specifically dairy and plant?

BCAAs are very high in dairy protein compared to other protein sources, says Bryan Helwig, PhD, director of nutrition research for the Dairy Research Institute (Rosemont, IL). Where dairy proteins are considered "complete" because they contain all nine essential amino acids, most plant proteins (including beans and peas, seeds, nuts, vegetables, and grains) are considered "incomplete"—and even plant proteins that are considered complete still have lower BCAA levels compared to dairy, he says.

Dairy, and whey especially, is high in the BCAA leucine compared to other proteins. Leucine is linked to increased muscle protein synthesis when consumed as part of a resistance-training program, Helwig says.

Brown rice protein and pea protein comprise about 19% and 18% BCAAs, respectively, Axiom’s Blandon says. These percentages are comparable to dairy protein casein, which is typically 20% BCAAs, she adds. Axiom offers Oryzatein brown rice protein, Veg-O-Tein yellow pea protein, and Incatein Sacha Inchi protein.

Plant proteins boast other amino acids as well. Take soy. "Soy has different amino acid ratios than whey, including greater levels of glutamine and arginine," says Tom Burrows, director of strategic marketing, ADM Soy Proteins (ADM; Decatur, IL). Glutamine, for example, may help prevent fatigue in athletes.

Wheat protein is rich in glutamine—nearly double that of soy and whey, according to supplier MGP Ingredients (Atchison, KS). Last year, the company introduced Optein hydrolyzed wheat protein for post-workout muscle recovery.

Pea protein offers glutamine, arginine, and lysine, says Neelesh Varde, PhD, senior product manager for Roquette America (Keokuk, IA). Roquette supplies Nutralys pea protein, which is an isolate (85% protein) and naturally high in BCAAs (18%).

Rice protein can sometimes be lower in lysine, but supplier AIDP (City of Industry, CA) uses sprouting to enrich the lysine content of its recently launched Gabiotein rice protein, making it a complete protein, the firm says.

Digestibility

There are fast-digesting proteins and slow-digesting proteins. Which do you want? It depends on the goal.

Whey protein digests quickly, making amino acids and their muscle-repairing benefits quickly available to the body—desirable for post-workout recovery, for instance. Casein, by contrast, is slower to digest. Some studies also suggest that consuming whey protein during and/or after exercise may improve strength and support muscle function and fatigue, but more research is needed here, says Kara McDonald, director, U.S. ingredients marketing and communications, U.S. Dairy Export Council (Arlington, VA).

Soy protein digests slower than whey protein, and there may be benefits to that, says ADM’s Burrows: “This enables more prolonged absorption.”

By Jennifer Grebow, Editor-in-Chief
Your Source for NATURAL Science-Based Specialty Ingredients

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Digestion ease and efficacy are also key. Protein digestibility is most commonly measured by a ratings system called the Protein Digestibility Corrected Amino Acid Score (PDCAAS). Burrows says isolated soy protein is the only vegetable protein whose PDCAAS score compares with animal proteins.

Hemp is considered a slow-digesting protein according to PDCAAS, says Richard Pierce, president of Canadian supplier GFR Ingredients. Last year, the company introduced a water-soluble hemp protein powder, HempSol-65, which it calls the most concentrated hemp protein powder on the market. The company manufactures out higher percentages of hemp seed shell, which it says lowers carbohydrate levels and enables higher protein content. Also, hemp has an 87% Biological Value (BV) score (a measurement of protein absorption), which Pierce says is lower than whey or rice’s but significantly higher than soy’s. Hemp is considered a complete protein, containing all nine essential amino acids.

Nutaryl pea protein is a “fast-intermedi ate” digesting protein, says Roquette’s Varde. He ranks it between whey and casein, with a digestion window of 20 minutes to 8 hours. Varde offers other Nutaryl’s numbers: 98% fecal digestibility, 89% gastroileal digestibility, and 78% postprandial nitrogen retention compared to other plant and dairy proteins.

Pea is Vega’s protein of choice for its plant-based recovery drink mix Vega Sport Recovery Accelerator. “Pea protein supplies an easily digested source of BCAAs, which act as signaling molecules to transition muscles from a catabolic state (breaking down) to anabolic (building up)”—key for the product’s recovery benefits, says Emma Cutfield, Vega’s innovation manager. (Sales of Vega products currently account for 30% of all plant-based protein sales in the U.S. natural channel, she says.) Designed for use in the 20-minute window immediately following a workout, Vega Sport Recovery Accelerator provides a specific 4:1 ratio of carbohydrates-to-protein to enhance muscle glycogen synthesis and therefore muscle recovery, she says. She adds that pea protein is more soluble for drinks than other plant proteins.

Enzymes aid protein’s amino acid release. “For sports, enzymes are being used in several ways, which include nutrient delivery and energy metabolism, as well as post-workout recovery support. One interesting new trend is the use of proteases to release amino acids more quickly, especially leucine,” says Richard Mihalik, director of innovation and product development, National Enzyme Co. (NEC; Forsyth, MO). In vitro tests show that NEC’s BioCore Edge enzyme blend breaks down whey protein quicker, reducing the size of protein molecules and speeding the release of BCAs, he says.

Plant proteins tend to release their amino acids more slowly compared to whey protein, so enzymes are important here if the goal is a quick release, Mihalik says. “Plant-based proteins have the most to gain from targeted protease blends like BioCore Edge,” he says.

Finding the right blend of proteases to make a specific protein/protein blend digestion friendly requires knowing which amino acid bonds and sequences make the protein resistant to digestion. For instance, “less processed” plant proteins may have significant fatty acid and carbohydrate residue that makes digestion inefficient, Mihalik says. “Soy protein tends to be more resistant to our natural digestive enzymes, so adding appropriately selected proteases may accelerate the release of amino acids, making them more rapidly available for absorption,” he adds. And proteases may act differently on different protein sources. “Even proteins of the same type can behave differently depending on how a manufacturer processes them.”

**Stacking Up the Science**

How do protein sources compare in muscle-building studies? Most comparison studies to date pit whey protein against soy. “When it comes to promoting muscle protein synthesis, whey protein almost always beats soy [in clinical studies]; soy has never beat whey protein,” says Jose Antonio, PhD, editor-in-chief of the *Journal of the International Society of Sports Nutrition*.

Whey protein came out on top again most recently in a 2013 *Journal of the American College of Nutrition* study comparing the muscle protein synthesis effects of a 22-g supplement of carbohydrate, whey, or soy after resistance training in 63 young adults (aged 18 to 35). Compared to soy or carbohydrates, whey caused bigger gains in lean muscle mass (3.3 kg versus 1.8 kg for soy), as well as higher leucine levels in blood. The researchers said the nine-month study is unique because it is the longest resistance-training study comparing protein sources, to date. The Dairy Research Institute funded the study. “Because the research was conducted in healthy young adults as opposed to professional athletes, the results have implications for a much larger demographic,” Helwig says.

Most other plant proteins lack compari-
Roquette conducted some of its own preliminary research comparing Nutralys pea protein and whey for post-workout muscle building. “Initial results seemed to indicate that Nutralys pea protein had a similar impact as whey protein on muscle development,” says Varde.

Most notably, brown rice protein and whey met head-on in a *Nutrition Journal* study published last year. The results? Rice protein grew muscle, power, and strength as well as whey protein did—as long as the rice protein dose was high. In the study, 24 college-aged, resistance-trained males consumed either 48 g of rice or whey protein isolate immediately post-exercise on training days for eight weeks. Researchers said these doses equate to 3.8 g of leucine in the rice supplement versus 5.5 g of leucine in the whey supplement. “The present results suggest that differences in protein composition are of less relevance when protein is consumed in high doses throughout periodized [resistance training],” the researchers wrote.

**Better Together**

With protein sources, the whole is often greater than the sum of its parts. Combinations are commonplace and fill nutrient gaps of single protein sources.

“When using plant-based proteins, a multisource blend is always preferable, as it contains a balanced amino acid profile... as each source of protein complements one another,” says Vega’s Cutfield. A blend can achieve higher amino acid content overall.

“Other plant proteins can be mixed to create a complete amino acid profile and improved taste, like our Advantein, which is a brown rice and pea blend,” says Kathy Lund, vice president of business development and marketing for AIDP.

Sports supplement makers are looking at all their options. Mintel says sales of non-soy and non-dairy protein rose 87% in the past five years, and predicts 50% growth over the next four years. Lund says, “As whey protein costs rise, manufacturers have searched for new forms—while consumers are seeking a better-tasting, more easily digested protein.” Luckily, there are options for everyone.

View references at www.NutritionalOutlook.com/1401/sports
The prevailing theme in contemporary beverage design puts a whole new spin on the statement, “I sure could use a good drink.” That’s because now more than ever, good—as in “good for you”—moves product. Today’s most successful beverage launches are in the wellness category, where packing good-for-you functional ingredients into something more palatable than a pill is the name of the game.

But the same functional formulations responsible for the sector’s dynamism also set up obstacles in the way of wellness beverage creation—for these drinks aren’t just dynamic as a category; each is a dynamic chemical and physical medium that can confound even well-plotted fortification efforts.

As a result, “not every functional ingredient can be part of a beverage-delivery system,” says Michael Bush, senior vice president, Ganeden Biotech (Mayfield Heights, OH). Nevertheless, he insists, “There is tremendous opportunity in this market.” Capturing that opportunity requires focused formulation and familiarity with the tools that best pull it off.

Pouring It On
The value of the U.S. functional beverage market topped $25 million in 2012 and will likely continue rising at a rate close to 9% through 2017, according to research firm MarketLine. When you consider all wellness beverages have going for them, that growth makes sense.

Americans’ adoption of generally healthier diets and lifestyles may be the greatest contributor to the growth. But beyond that, the beverage format itself has an inherent advantage in that it permits what Mathieu Dondain, marketing and communications director for Nexira (Rouen, France), calls “nomadic usage”—that is, it lets you grab it and go.

This is the vaunted convenience factor, and, says Bush, “The convenience of wellness beverages fits today’s on-the-go lives. They’re a great way for consumers to receive desired health benefits without changing their day-to-day routines.”

Moreover, wellness beverages may represent the next stage in supplements’ evolution. As an alternative to tablet- and capsule-taking—which Mitch Skop, senior director of new product development, Pharmachem Laboratories Inc. (Kearny, NJ), notes “many people can’t stand”—wellness beverages are hard to beat.

And the fact that consumers now flock to wellness drinks is the flipside of their defection from sodas. U.S. soda consumption saw its eighth consecutive year of decline in 2012, falling by 1.2% according to Beverage Digest. This doesn’t surprise Skop, who calls sugar-sweetened and even diet sodas “passed, as we all know from the data,” and adds that “juices aren’t doing as well, either—they contain sugar, too.”

Identity Crisis
Indeed, added sugar is growing unwelcome across the beverage spectrum and especially in products built for wellness. “Though product formulators may not be trying to achieve a low-calorie product, there are still limits to how many grams of sugar are acceptable to wellness consumers,” says Bob Verdi, business director, health and wellness, Virginia Dare (Brooklyn, NY).

That just underscores yet another feature of the category that can be both vexing and liberating, depending on your perspective. That is, with no definition of wellness beverages, what we put into them is largely up to us—and our audience’s demands.

“Manufacturers are approaching this from many angles,” says Thomas Douglass, category director, food market unit, Corbion Caravan (Lenexa, KS). “Some merely want to add a touch of the basics, like vita-
mins A and D to dairy-based drinks. Others are adding a broader palette of nutrients at levels ranging from 10% to 100% of the RDI. Still others are adding nutrients to make specific health claims.”

Nature Calls
One clear theme aims to keep things simple, leaving the bulk of the formulation to Mother Nature. Bush sees this “natural” trend as strengthening and predicts that “back-to-basics juices, teas, coffees, and milks are going to be the leaders going forward, as consumers typically want to feel that the beverages they consume are normal parts of their diets versus ‘frankenfoods’ that have been designed in a lab somewhere.”

That helps explain the success of coconut water, which witnessed a whopping 540% rise in product launches from 2008 to 2012, according to Mintel research—attributable mainly to the products’ reputation as “natural” wellness beverages.

“Coconut water is one of the most versatile natural products consumed worldwide for its nutrition and health benefits,” says Reza Kamarei, PhD, vice president, science and technology, Sabinsa Corp. (East Windsor, NJ). Sabinsa’s Cococin product is a freeze-dried coconut water made from green coconuts. “Shikimic and quinic acids—with potential antiviral effect—have been detected in coconut water,” Kamarei says, as have cytokinins, phytohormones that promote healthy cell growth, maintenance, and aging. What’s more, he adds, coconut water “delivers more electrolyte potassium than typical sports drinks.”

“Not every functional ingredient can be part of a beverage-delivery system,” says Michael Bush, senior vice president, Ganeden Biotech

Another wellness drink with close ties to nature comes from Aloe vera, which Peter Haferman, president, Improve USA (DeSoto, TX), a division of Pharmachem Labs, calls a hot and emerging category. Its wellness buzz involves the main constituents of the plant’s inner leaf gel. Probiotic bacteria in the small intestine break down these constituents to short-chain fatty acids, oligosaccharides, and monosaccharides—including mannose, which macrophages and fibroblasts use to make glycoproteins and glycolipids, compounds crucial to intercellular communication, Haferman says.

Russ Hazen, PhD, raw materials and innovations specialist for DSM’s Fortitech Premixes group (Schenectady, NY), notes that some consumers want natural caffeine alternatives, with guarana, green-tea extracts, theobromine, ashwagandha, and ginseng “all seeing increased interest.” Similarly, functional ingredients recognizable to the home cook are enjoying attention, as in the case of curcumin derived from turmeric, whose “anti-inflammatory properties make it a good addition to heart- and joint-health products,” Hazen says. “It fits well into a variety of popular targeted-nutrition categories.”

Stable Solutions
But fitting everything from vitamins and botanicals to proteins and probiotics into one bottle is a tall order, with ingredients interacting in ways that can threaten stability and quality. Trying to keep the beverage label “clean” makes the task even harder.

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Stable Solutions
But fitting everything from vitamins and botanicals to proteins and probiotics into one bottle is a tall order, with ingredients interacting in ways that can threaten stability and quality. Trying to keep the beverage label “clean” makes the task even harder.

“Not every functional ingredient can be part of a beverage-delivery system,” says Michael Bush, senior vice president, Ganeden Biotech

Another wellness drink with close ties to nature comes from Aloe vera, which Peter Haferman, president, Improve USA (DeSoto, TX), a division of Pharmachem Labs, calls a hot and emerging category. Its wellness buzz involves the main constituents of the plant’s inner leaf gel. Probiotic bacteria in the small intestine break down these constituents to short-chain fatty acids, oligosaccharides, and monosaccharides—including mannose, which macrophages and fibroblasts use to make glycoproteins and glycolipids, compounds crucial to intercellular communication, Haferman says.

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CONDITONAL LOVE

Beverage ingredients target on-trend issues

We don’t expect nutritional supplements to be “one size fits all,” so why should we expect the same of wellness beverages? Increasingly, we don’t, as consumers seek targeted formulations that address their unique wellness concerns. As Russ Hazen, PhD, raw materials and innovations specialist, DSM’s Fortitech Premixes (Schenectady, NY), says, “Condition-specific products are coming on strong. Given enough time you could likely find a beverage targeting any condition—and if you can’t that may be the next big opportunity.”

Here are some issues gaining traction with consumers:

The Healthy, Aging Heart

“With baby boomers the largest consumer segment for the foreseeable future,” Hazen says, “we’re seeing more formulations targeting ‘healthy aging.’” He says boomers are eager to confront head-on aging’s attendant health issues, including heart health, blood sugar management, and diabetes.

Keeping cholesterol levels in check fits that to-do list. Melanie Goulson, applications manager, Cargill (Minneapolis), notes that regulatory authorities, cholesterol education coalitions, and independent researchers have reviewed the data from multiple clinical studies and concluded “that dietary intake of plant sterols is effective in lowering LDL cholesterol,” she says.

Her company’s line of plant sterols, called CoroWise, is able to block cholesterol absorption following consumption of a meal because plant sterols are structurally similar to the blood lipid. Products made with the sterols can qualify for the FDA-approved health claim linking their intake to reduced risk for heart disease if they contain 0.4 g per serving to be eaten twice daily with meals—and as part of a diet low in saturated fat and cholesterol—for a total daily intake of at least 0.8 g.

Probiotics Go for the Gut

Wellness beverages with a probiotic payoff are a hit with the moms, athletes, and active seniors who’ve helped goose the good bacteria’s popularity. According to Michael Bush, senior vice president, Ganeden Biotech (Mayfield Heights, OH), “Currently about 80% of consumers know what probiotics are and associate them with a health benefit.”

But not all probiotics are created equal. The harsh pH of the gastrointestinal tract, not to mention the rigors of beverage processing, distribution, and storage, can be murder—literally—on the live and active cultures manufacturers add to their products.

To overcome this, Bush’s company developed GanedenBC30—Bacillus coagulans GB-30, 6086—a patented probiotic strain whose spore-forming ability protects it throughout gut transit. Once in the intestine, the spores germinate and the probiotics initiate their digestive and immune support “through direct interaction with the intestinal and immune cells,” Bush says.

Further, the same spores that protect the bacteria from our own stomach acid and bile help the probiotics survive beverage manufacture. Bush notes that the ingredient “maintains its viability in beverages with a temperature-controlled cold chain typical of refrigerated beverages during manufacture and distribution.”

Prebiotics: Probiotic’s Partner

Just like us, probiotics have to eat, and it appears their favorite meal consists of prebiotics, a class of fibers that, while largely indigestible to humans, are perfect for probiotics to digest. The products of that digestion include the short-chain fatty acids (SCFAs) that are tant to consider simplicity in the design of a product.” For instance, “clean label means that many of the usual ingredients that solve formulation challenges are no longer options. “It will be the ingredient suppliers who continue to lead the charge in identifying new and innovative natural alternatives,” he says.

Such alternatives may already be available, as with chia and quinoa powders that processors have “repurposed” for beverage formulation. “These ingredients can help replace some stabilizers,” Hazen notes, “while at the same time providing protein and fiber from natural sources.”

Clean label means that many of the usual ingredients that solve formulation challenges are no longer options.

But more typically, manufacturers will have to rely at least somewhat on “high-tech” ingredients. Consider the issue of solubility. Wellness beverages are water-based; vitamins A, D, E, and K; omega-3 fatty acids; plant sterols; and many botanicals are not. Though processors can suspended these materials in hydrocolloid stabilization systems, or encapsulate or spray dry them for greater solubility, they still “often end up dispersible but not soluble,” Hazen says, thus clouding an otherwise clear beverage. New emulsion technologies have allowed the delivery of some ingredients in nanoparticles “so small they appear clear,” he notes, “but these materials are not suitable for powder applications.”

Colorants can also behave unpredictably. “Wellness beverages often employ natural colors, which can be less stable in light, heat, and acidic pH than artificial FD&C colors,” says Melanie Goulson, applications manager, Cargill (Minneapolis). Moreover, many nutritional ingredients are colorants themselves, like curcumin, beta-carotene, and lycopene, and at certain use levels may
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When it comes to on-trend wellness issues, “ingredients common to wellness beverages while improving the overall taste profile.”

As if that weren’t enough, chicory-root fiber has a natural sweetness about 65% that consumption of chicory root fiber causes increases in satiety-related hormones such as GLP-1.

One of the fibers associated with increased satiety is inulin derived from chicory root. As a soluble prebiotic fiber, chicory-root inulin promotes the growth of beneficial Bifidobacteria, which Turowski says “have been linked to a variety of health benefits.” Emerging research suggests that their fermentation of chicory root fiber may have positive implications in the area of weight management, he continues. “The data show that the consumption of chicory root fiber causes increases in satiety-related hormones such as PYY and GLP-1.”

Research also shows that the fiber can help reduce calorie intake at a dose of 16 g per day. As if that weren’t enough, chicory-root fiber has a natural sweetness about 65% that of sugar’s, which helps mask the off flavors of the high-intensity sweeteners and nutritional ingredients common to wellness beverages while improving the overall taste profile.

The Best Offense Is an Immune Defense

When it comes to on-trend wellness issues, “Boosting the immune system is consistently on the hot list,” says Richard G. Mueller, CEO, Biothera (Eagan, MN). He’s seen immune-boosting ingredients in everything from drinkable yogurts to energy shots and functional waters. “While consumers may not understand everything about immunity, they know that providing support to their immune system is an important part of overall health and well being,” he adds.

To help them do just that, beverage manufacturers can formulate with Wellmune WGP, Biothera’s natural beta-1,3/1,6-glucan derived from the cell walls of highly purified, proprietary strains of baker’s yeast, Saccharomyces cerevisiae.

Researchers have sussed out how it works at the cellular level. To wit, after we consume it, immune cells in the gastrointestinal tract absorb and transport it to immune organs throughout the body, Mueller explains. There, another set of immune cells called macrophages break it down into smaller fragments that bind to yet another class of immune cells: the neutrophils, which account for 40% to 60% of all immune cells in the body, Mueller says. Wellmune then “primes and strengthens the key immune function of neutrophils,” he goes on, “which now more quickly move throughout the body.”

U.S. beverage manufacturers using the ingredient can make health claims regarding “immune system support, health and wellness, energy and vitality, sports performance, and stress management,” Mueller says. “We offer claims guidance to customers thoroughly vetted by the foremost legal experts in this specialty area.”

Interact with the color the manufacturer is trying to achieve.

But perhaps even trickier to tie down is taste. As Donna Rosa, senior director, consumer-health business unit, Symrise (Teterboro, NJ), says, “Just about anything that’s good for you tastes bad or has issues like ‘off’ notes, astrigency, etcetera.” Common culprits include vitamins, minerals, herbs, omega-3s, proteins, and caffeine.

And while encapsulation can restrain the taste impact of these somewhat, manufacturers more likely use masking flavors to neutralize or cover the ill effects of good-for-you ingredients. Flavor masking “is a biggie—huge” in wellness beverages, Rosa says, and she notes that building these flavors is no treat. “Every time we think we’ve tasted the worst thing on earth, the next worst thing comes into our lab and takes the prize,” she says.

Natural high-intensity sweeteners hardly fall into that category, but the strong licorice-like quality of some stevia-based sweeteners has been an Achilles’ heel that suppliers are only now beginning to overcome. “We routinely work with a number of stevia products,” Hazen says, “and the advancement in these materials has decreased the undesirable licorice note significantly, though they often still need careful flavor profile selection and some masking.”
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And if masking flavors alone can’t do the trick, Hazen suggests adding a small amount of vanilla or a subtle fruit note to the dominant flavor to reduce any bitterness. Even better: formulate beverages with flavor profiles that complement whatever flaws the functional ingredients might impose in the first place. “Flavors like cranberry, coffee, mocha, or grapefruit may allow you to end with an acceptable flavor profile,” he says.

Texture can also make or break a beverage, and both proteins and insoluble fibers may leave a gritty mouthfeel or even precipitate out of solution. Hydrocolloids like guar, locust bean, and xanthan gums can even out the texture, Hazen says, and carrageenan, pectins, and similar stabilizers can hold ingredients in suspension and improve mouthfeel. “This is especially true in reduced-fat dairy-based products or smoothies,” he says, “and in low-calorie products that have had drastic reductions in sucrose or corn syrup.”

**On the Level**

But no less important than texture and flavor—albeit less noticeable—is the need to ensure that nutrient levels stated on a wellness beverage’s label match what’s actually in the beverage.

This isn’t simply a matter of what you add is what you get. Vitamins A and C are notoriously labile, for instance, and interactions among iron, zinc, and calcium can interfere with their absorption. “The pH, solids, and ingredients involved in the system can have a significant impact and need to be factored into the nutrient levels used,” Hazen adds.

Then there’s processing. Heat and shear can destroy nutrients “and should also be considered during formulation to ensure sufficient nutrient additions to meet label claims at the end of shelf life.” That means overages.

Getting the overage math right requires stability testing and nutritional analysis, which Haferman encourages manufacturers to conduct before they go to market. “Often we see formulations where little or no work is done,” he says, “but customers need to do a pilot run and stability work to ensure their products will deliver what they promise. The pasteurization process, bottle, cap, and ingredients all have to work in concert to make the product work. If one element fails, the product fails, and it will not meet its label claims.”

And don’t forget the three magic words: “Science, science, science,” says Skop. Long gone are the days when anecdotal information made any difference to a wellness beverage’s credibility with consumers, let alone with regulators. These days, he says, “It’s all about the clinicals and safety data and how we communicate those to the consumer.” Do so with clarity and accuracy, and you’ll have with a good-for-you beverage that everyone can feel good about.
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Love Connection
Making the match with a contract manufacturer

BY KIMBERLY J. DECKER

Anyone who’s tried online dating understands that some relationships are just too important to leave to chance. Having the opportunity to vet a potential paramour’s profile and weed out the duds is so much more efficient—and more civilized—than trying to guess if that person at the end of the bar is Mr. or Ms. Right.

Which is why today’s harried supplement marketer might be wondering when someone’s going to launch an OkCupid for the contract manufacturing set. After all, with increasing costs, accelerated competition, and changing regulations upping the value of a competent, reliable co-manufacturer, now’s no time for blind dates.

But don’t expect a computer algorithm to do the matchmaking for you—yet. Until one does, supplement marketers will have to find true love the old-fashioned way: getting out there, meeting the suitors, and asking all the right questions. With patience and persistence, you and your co-man may wind up happily ever after.

The New Normal
Co-manufacturing has become so standard in the supplement industry that it’s hard to remember a time when companies made and marketed products without outside help. “Contract manufacturers are definitely playing a major role,” says Tim Bray, vice president, key accounts, Pharmachem Laboratories Inc. (Kearny, NJ). “Based on the added costs of new regulations and the complexity of products entering the market-place, we see a heightened demand for the role of the contract manufacturer.”

Some of that ascendance owes to the strength of the industry itself. Consumers have “shifted gears” in how they manage their health, notes Olivia London, senior operations manager, National Enzyme Co. (NEC; Forsyth, MO), steering toward supplements as a cost-saving, more “holistic” alternative to pharmaceuticals. “This has created a greater demand for dietary supplements,” she says, “and contract manufacturers are rising to the challenge.”

More significant, though, has been the implementation, beginning in 2007, of FDA dietary supplement current good manufacturing practices (GMPs). In requiring proper controls during manufacturing, packaging, labeling, and holding operations, as well as extensive testing, validation, and record-keeping for compliance, they pile more onto industry’s already heaping plate.

But, in the end, says Shabbir Akand, vice president, sales and marketing, NHK Laboratories Inc. (Santa Fe Springs, CA), GMPs are “definitely a move in the right direction.” Prior to their enactment, “a CM could technically just sprout up and start doing business with minimal oversight,” he says. No longer. And while “compliance has been a journey,” he adds, it’s also “been an opportunity to enhance internal processes and yield higher-quality products.”

Trimming the Fat
Opportunities have costs, of course, and in this case, those costs amount to increased investments in equipment, analytics, and personnel, among other expenses, all of which can be “time-consuming and financially difficult...
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for companies interested in bringing products to market,” says James McNeal, quality-control supervisor at NEC. “This is where a quality contract manufacturer can be invaluable. Their familiarity with these requirements and established procedures can greatly enhance the assurance that a company’s product is safe, effective, consistent, and compliant.”

Just consider equipment. Whether you’re making tablets, capsules, soft gels, or other formats, “there is no one piece of equipment that can do all things,” Bray says. “There are many types of granulators, and many pieces of milling equipment that would break the bank of many companies if they tried to invest in all phases of production.” By taking on these capital-intensive purchases upfront, the contract manufacturer shoulders costs that would be “untenable for the customer to handle alone and still be competitive in the marketplace,” he says.

A similar cost sharing occurs with respect to analytics—also emphasized in the new GMPs—as well as raw-materials sourcing, quality control, even labor. Eugene Ung, CEO, Best Formulations (City of Industry, CA), notes the added expense of workers’ compensation and health insurance, as well as additional hiring to help implement GMP reforms. “CMs can trim the fat by investing to become more operationally efficient,” he says, adding that their inside knowledge of the industry lets them extract efficiencies from the supply chain itself.

Indeed, marketers can aid this extraction by forecasting their production needs so their contract manufacturer can “work strategically” with vendors to keep required materials in the inventory, Akand says. “This helps hold costs down by locking in high-quality materials at a more competitive cost.” It also averts production gaps, reduces downtime, allows for larger-volume runs, and more—all of which put marketers’ focus and capital back where they belong: on their brands.

But perhaps most importantly, contract manufacturers guide their customers through today’s uncharted regulatory terrain. “Gone are the days when you could formulate a product on day one and have it ready to ship on day five,” Ung says. “GMPs are continuing to evolve, and we’re continuing to adapt and inform our customers of the changes as they occur.”
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Question Time
What supplement marketer wouldn’t want that? But finding such a partner and forming a mutually productive relationship takes work. And it doesn’t benefit from bargain hunting. “Price should not be an initial part of the conversation,” Bray says. Only after signing a joint confidentiality agreement and conducting what he calls “a frank discussion” should the parties “put pencil to paper and review the ultimate price of the program. If we go in with the cheapest price being the only determinant, then we might find out that it costs more in the end.”

Beyond that, the trick to making that coveted co-manufacturing love match boils down to asking the right questions, London says, to “determine not only the best contract manufacturer for the needs, but also to determine if a particular contract manufacturer is worth their salt, so to speak.”

Among the questions she suggests: Do you offer in-house lab testing? What certifications do you hold? Is your staff knowledgeable, with extensive contract-manufacturing backgrounds? What’s your regulatory process, and how will you help me stay compliant? What’s your QC process? What type of audits do you perform: Internal? External? And how often?

The trick to making that coveted co-manufacturing love match boils down to asking the right questions.

Shaheen Majeed, marketing director, Sabinsa Corp. (East Windsor, NJ), adds that a marketer should inquire about the manufacturer’s organizational structure and capacity to grow, “particularly if you have an SKU that you see doing well in the marketplace.” And don’t neglect the value of experience. Ask how long your suitor has been in the business; supplier relationships built over time can pay off in cost savings. “And you might not think to ask something this basic,” Majeed says, “but ask if they’ve manufactured similar dietary supplements before.” The more familiar they are with your product, the better able they’ll be to produce it.

Even questions about “greenliness,” as you might call it, are fair game. Bray finds that the topic of sustainability comes up often. “We have discussions on which solvents are used, and how we test for residual solvents in finished product,” he says. “Our staff is always in discussions with our suppliers for the best alternatives. And the new methods of analyzing for nanoparticles requires us to be constantly updating our analytical ability.”

If the candidate balks at any of this, be wary. “The CM should be open to answering...
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questions,” Ung says. And try to get references, while you’re at it. While nondisclosure agreements may bind contract manufacturers from providing access to current clients, raw-material suppliers are "a good place to check for recommendations, as well as other industry-related parties," Ung says.

Certifiable
Oftentimes, those other industry-related parties grant certifications that can open a window onto a co-manufacturer’s competency. As Ung explains, "Because the industry was somewhat unregulated for such a long time, several industry-based certifications came about. Even after the GMPs were established in 2007, the importance of these third-party GMP certifications is still quite strong.”

For example, finding a manufacturer with a facility licensed to produce pharmaceuticals is a "very good start” in demonstrating a contract manufacturer’s bona fides, Ung says—and, it so happens, Best Formulations has a California Drug license, along with GMP certifications from both the Natural Products Association (NPA) and NSF International.

Akand notes that NHK was among the first companies to obtain NPA GMP certification in 2001. And Bray points out that Pharmachem is aligned with Oregon Tilth for organic certification, while it looks to independent auditors like NSF and USP "to certify those overseas plants that our own auditors cannot review.”

As for NEC’s certification roster, it includes NSF GMP certification and certification from the Therapeutic Goods Administration of Australia and New Zealand, both of whose certifications "are very rigorous and help NEC to ensure compliance for its clients,” McNeal says.

Other third parties offering certification include U.S. Pharmacopeial Convention (USP), ISO 9001:2008, California Certified Organic Farmers (CCOF), and Quality Assurance International (QAI) Organic, among others. And while "no certification or registration is a guarantee that a CM is competent,” McNeal says, "it’s certainly a helpful tool when making decisions about which CM to use.”

Wraparound Services
So, too, is a willingness to perform wraparound services beyond the manufacturing basics. Providing such amenities has been a growing trend recently, says Melony Fuller, director of marketing at NEC. "Customers want ease of business, and we’re always looking for innovative and creative ways to provide them with customized solutions to help them succeed.”

For example, she and her colleagues “collaborate from concept to consumer,” offering everything from R&D and regulatory support to packaging, labeling, and marketing support, including advertising. NEC has put social media to use in improving commu-
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CONTRACT MANUFACTURING IN A GLOBAL AGE

These days, neither supplement marketers nor manufacturers can afford isolationism. We operate in a global market where brokers and buyers, suppliers, and sources are all rather far flung. But as Eugene Ung, CEO, Best Formulations (City of Industry, CA), says, “Manufacturing in international markets can be tricky.” Learning to speak the language, as it were, “starts with setting the appropriate expectations,” he says.

Looking overseas is inevitable in part because global sourcing is “the only way to get the majority of nutritional ingredients, as several raw materials are simply not made or available in the United States,” Ung says. But contract manufacturers are not always expert at navigating international supply chains, he notes, “so it’s important to work with reputable and established raw-materials suppliers who understand the importance of proper documentation and compliance.” Don’t be afraid to ask details about the ingredient’s original source. And get references. “The industry is very small, and people know each other” he says, “so ask around and a picture will emerge.”

If you’re manufacturing for foreign markets, bear in mind that contract manufacturers without a direct presence in those markets themselves may not fully grasp “the ever-changing regulatory requirements of different countries,” Ung continues—in which case “the customer needs to be the quarterback to understand the international requirements and communicate those to the CM,” he says.

Many of his company’s domestic customers’ largest growth markets are outside the United States, he says, “so understanding these international markets does help our customers. It can be slow and difficult in the beginning to understand international supply chains and requirements, but in the end, it can be a rewarding, mutually beneficial opportunity.”

Highly Analytical

Bray also notes that in an era of increased informational transparency, supplement companies “cannot hope to compete without new products that have clinical studies to back them up.” And though some manufacturers will conduct these studies for you, more often, Ung says, the brand marketer takes the lead in selecting which studies to undertake, while the contract manufacturer sticks to “manufacturing products for the study, helping to review the scientific validity of the study—if the CM possesses such capable individuals—and helping perform stability studies, as well,” he says.

Those stability studies have become standard procedure with supplements, as FDA now requires that any direct or indirect reference to a shelf-life date be substantiated with data. It’s part and parcel of an analytical emphasis that’s gone into overdrive with the new GMPs. As a result, contract manufacturers are offering services covering everything from those stability tests to raw-materials identification and organoleptic evaluations to quantitative assays of potency, composition, and heavy-metal and microbial content, including total plate count, absence of pathogens, and related tests.

Indeed, McNeal thinks that “quality control should begin as soon as your ingredients hit the dock.” His company starts taking samples for analysis in both the micro and chem labs. “Each raw material undergoes intense scrutiny to ensure its quality,” he continues.

“This includes a gamut of microbiological testing, chemical identification, and potency testing.” They also put the manufacturing process “under the microscope,” he says. A program of environmental swabbing is carried out through our micro lab to continually monitor the effectiveness of our sanitation procedures. And they screen all finished products a final time for microbiological contamination before they leave the facility.

Test results should be summarized on the certificates of analysis (CoA) for both the starting ingredients and finished products. Akand says, “both which should be available to the customer.” As for vetting all of this legally, supplement marketers should “definitely expect regulatory guidance” from their manufacturers regarding FDA GMP compliance, California’s Proposition 65 compliance—if applicable—and “any other assistance pertaining to the quality of the product,” he says.

But don’t expect your contract manufacturer to take legal or regulatory responsibility for an opinion. “When all is said and done,” Bray says, “it’s the marketer’s name that’s on the side of the box, and they’re responsible for the label.”

Audits on the Upswing

With audits on the upswing thanks to GMPs, that’s no small matter. And as FDA heightens its scrutiny, it’s finding more infractions than it—or industry—would like. No doubt, the specter of an FDA Form 483 citation—“issued to firm management at the conclusion of an inspection when an investigator(s) has observed any conditions that in their judgement may constitute violations of the Food Drug and Cosmetic (FD&C) Act and related Acts,” per FDA’s website—keeps supplement marketers and manufacturers up nights.

Nevertheless, notes Ung, “Many of the warning letters FDA is issuing regarding
dietary-supplement audits are for very basic deficiencies, such as the lack of batch records, lack of standard operating procedures, poor sanitation." On-the-ball companies will, upon request, supply their customers with copies of CofAs for ingredients used and finished products, master manufacturing records (MMRs), and batch production records (BPRs) as reassurance, along with test results required for GMP compliance, Akand says.

And beware if a CM quails at the prospect of you conducting your own audit. In so doing, "the brand owner can witness firsthand if all requirements of 21 CFR 111"—the part of the Code of Federal Regulations governing GMPs—"are being adhered to," Akand says. "They can also evaluate the overall facility for cleanliness and GMP compliance. The supplement marketer should make sure the CM has a fully staffed and well equipped in-house lab to perform most, if not all, quantitative and qualitative testing to ensure product identity, purity, potency, composition, and so on."

They should kick the tires, too, metaphorically speaking. Look for signs of wear and tear in the line, Majeed says. "Ask about calibration, when it last took place, and how often it occurs," he adds.

A solid co-man will spill the beans on all of this. According to McNeal—who notes that NEC has never "had the misfortune of a 483 citation from FDA"—the company tries "to foster a positive, transparent atmosphere with all our auditors," customer, government, or otherwise. "Our goal is to never hide problems but instead to improve our processes to make a better product for our customers. We find that this atmosphere makes all the difference in whether an audit is ‘painful’ or ‘helpful.’ Ultimately, every audit is a chance for us to be better, and we welcome that opportunity."

No One’s a Small Fry
They also welcome the opportunity to strengthen their bonds with their customers.

"Listening is fundamental to successful relationships," says Demetrius Bledsoe, director of sales at NEC. And technology helps get the discussion started. "Social media, websites, and customer-service avenues make communicating with customers more efficient and faster," he says. "Customers should have the expectation that a CM will work to meet their needs, not vice versa. Every customer and project that our team works on is viewed as important."

Majeed agrees: there’s no such thing as small fry. "Don’t forget the little guys!" he emphasizes. "Smaller runs are always favorable in almost any economy, particularly for startups."

While "we don’t expect you to be our number-one manufacturing client overnight," he says, "we would like to help and support you to become that someday."
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**LATEST Launches**

**Natural Appetite Suppressant**
Life Extension's new Advanced Natural Appetite Suppress features a European white kidney bean extract that the company says helps support normal levels of the gut hormones that control appetite and satiety. The Borlotto white kidney bean extract is said to help the body modulate levels of ghrelin and satiety hormones CCK, GLP1, and PYY. Additionally, the extract modulates alpha-amylase, the enzyme that converts dietary starch into simple sugars, which may help control the rate at which free sugars are absorbed from the digestive tract into the blood stream. The company says that in a recent trial in overweight subjects, the Borlotto white kidney bean group lost on average nine pounds in 12 weeks. The company recommends the product be combined with healthy diet and exercise.

**A Boost of Omega-3**
Nordic Naturals' newest offering is Omega Boost, a mango-flavored supplement that can be taken by the spoonful or added to a smoothie, the company says. Each teaspoon of the product provides 525 mg of omega-3s. The product is sugar-free and sweetened with xylitol. It is suited for adults and children.

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Coconut Oil for Atopic Dermatitis?


Coconut fruit is prized for its water content, but the oil that resides in its leftover coconut meat, or copra, has nutrients of its own. Now, researchers in the Philippines are onto a potential link between virgin coconut oil and relief of itchy skin.

Writing in the *International Journal of Dermatology*, researchers at Manila’s Jose R. Reyes Medical Center recruited 117 children with mild to moderate atopic dermatitis—a skin disease characterized by severe itching and inflamed skin—to participate in a trial with topical oils. For eight weeks, parents were instructed to apply 5 ml of either virgin coconut oil or mineral oil, both known moisturizers, twice daily to their children’s bodies after warm bathing and at night.

After eight weeks, coconut oil users scored higher on the SCORAD (Scoring of Atopic Dermatitis) index, and experienced less trans-epidermal water loss and greater skin capacitance, which is a measure of skin hydration.

The researchers claim this is the first study to use virgin coconut oil on children with atopic dermatitis. An estimated 10%–20% of children develop atopic dermatitis in their first decade of life, whereas only 1%–3% of adults have the condition.

The positive effect of virgin coconut oil is likely a result of the oil’s fats and antioxidants. Virgin coconut oil may be preferred over refined coconut oil because the high-heat refining process breaks down fatty acids and antioxidants.

Amla Fruit: Anti-Clotting Without the Bleeding?


Amla may not have as extreme effects on blood clotting as aspirin, but the greenish fruit seems to hold an advantage while just modestly reducing blood clots: a lower risk of induced bleeding.

In a crossover trial, researchers assigned type 2 diabetics to a daily dose of amla extract, aspirin, or clopidogrel (known commercially as Plavix) for 10 days. Amla extract was associated with a 36% reduction in platelet aggregation, or blood clotting. Both drugs provided upwards of 50% reduced blood clotting, but the greater reductions might not be ideal.

Multiple studies, including a large cohort published in the *European Heart Journal*, suggest a connection between platelet reductions, anti-clotting drugs, and bleeding events. A recent study on women with “heavy” menstrual bleeding identified platelet dysfunction in one-third of them. A milder reduction of blood clots—say, with amla—could accomplish the anti-clotting effect without bleeding and other potential drug side effects.

The study on amla extract and blood clotting is not the first to compare the fruit product to a drug. In another 2013 trial, amla and statins both improved endothelial function and lowered inflammation compared to placebo. Each of these studies utilized Capros, a water-soluble amla extract from Natreon Inc. (New Brunswick, NJ).

Chelated Iron May Enable Lower Iron Dose in Pregnant Women

N Milman et al., “Ferrous bisglycinate 25 mg iron is as effective as ferrous sulfate 50 mg iron in the prophylaxis of iron deficiency and anemia during pregnancy in a randomized trial,” *Journal of Perinatal Medicine*, published online October 24, 2013.

A low dose of Albion’s (Clearfield, UT) Ferrochel ferrous bisglycinate chelate has shown to achieve the same iron status in expectant women as a higher-dose ferrous salt.

Many women have difficulty maintaining adequate levels of iron during pregnancy. Iron supplements can help, but the bioavailability of different forms of iron can vary. For instance, Albion says that its chelated form, ferrous bisglycinate chelate, is more bioavailable than inorganic iron supplements such as ferrous sulfate. Forms like ferrous sulfate may even cause adverse side effects such as gastric upset and nausea. As a result, many obstetricians now recommend a lower iron dose instead of a very high dose.

A study on 80 subjects focused on Albion’s Ferrochel as part of the finished dietary supplement Aminojern. Women were given either 25 mg of ferrous bisglycinate or saline once or twice daily for 24 weeks. More than 90% of the Albion users showed improved iron status, whereas only 40% of the control group did.
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cinate iron per day, or a control comprising 50 mg ferrous sulfate. Hematological status and iron status were measured at 15–19 weeks (baseline), 27–28 weeks, and 36–37 weeks of gestation.

Researchers found that the 25-mg dose of ferrous bisglycinate was comparable to the 50-mg ferrous sulfate dose for preventing iron deficiency and iron-deficiency anemia in the pregnant women. Ferrous bisglycinate also resulted in fewer digestive complaints. The average weight of newborns in the ferrous bisglycinate group was slightly higher than in the control group.

“Because of the potential negative interaction of iron on the intestinal absorption of other essential divalent cations, e.g., zinc and manganese19, and the risk of damage to the intestinal epithelium due to the formation of free radicals in the intestinal mucosa2, the iron dose should be as low as possible,” the researchers said.

Vitamin E May Help Drugs Slow Alzheimer’s Progression

A high dose of vitamin E (alpha-tocopherol) may help slow cognitive decline in those with mild to moderate Alzheimer’s disease (AD), according to a new study on vitamin E supplementation in conjunction with an acetylcholinesterase inhibitor drug for AD.

The double-blind, placebo-controlled trial tested 613 mild-to-moderate AD patients (mainly older male veterans). Subjects received 2000 IU/day of alpha-tocopherol; 20 mg/day of the AD drug memantine; alpha-tocopherol and memantine; or placebo. Decline in cognitive function was measured using the Alzheimer’s Disease Cooperative Study/Activities of Daily Living (ADCS-ADL) Inventory score.

Those taking alpha-tocopherol alone exhibited slower functional decline compared to placebo, a difference the researchers said “translates into a delay in clinical progression of 19% per year compared with placebo…”

By contrast, patients receiving memantine alone, or memantine plus alpha-tocopherol, did not show significant difference in cognitive decline compared to placebo.

Researchers say this study is important for several reasons. First, while studies have shown that vitamin E and memantine have benefits against severe AD, this study provides more evidence in subjects with mild to moderate AD. Secondly, the study subjects showed no severe adverse
effects from the alpha-tocopherol. Responding to the study through an editorial comment in the same journal, D Evans et al. said alpha-tocopherol’s lack of adverse side effects may make it worth combination with other treatments for AD.

“The results seem especially pertinent to the use of combinations of agents to treat AD,” they wrote. “Combination therapy for AD has substantial appeal because agents currently available for treating AD offer, on average, only modest therapeutic benefit, and some have bothersome adverse effects. Achieving greater benefit without more adverse effects by using medications in combinations, especially agents with different presumed mechanisms of action, is a reasonable goal.”

Dietary supplement association the Council for Responsible Nutrition (CRN; Washington, DC) commented favorably on the study, noting that it is one of the largest and longest treatments in patients with mild to moderate AD.

“This study is significant as it presents strong data on the safety of vitamin E, at high doses, and dismisses previous questions raised about the safety of this essential nutrient,” said Duffy MacKay, ND, CRN vice president of scientific and regulatory affairs. “The authors stated, ‘In contrast to the conclusion drawn from a 2005 meta-analysis of vitamin E, which showed that high-dose vitamin E (≥400 IU/d) may increase the risk of all-cause mortality, we found no significant increase in mortality with vitamin E.”’ (The 2005 meta-analysis MacKay referenced is ER Miller et al., “Meta-analysis: high-dosage vitamin E supplementation may increase all-cause mortality,” Annals of Internal Medicine, vol. 142, no. 1 (January 4, 2005): 37–46.)

**RESEARCH BUZZ**

**RIBOSE, CAFFEINE MAY BETTER FIGHT FATIGUE WHEN COMBINED**

When used alone in high doses, caffeine may provide an energy boost. But it might also result in side effects such as increased anxiety, elevated heart rate and blood pressure, and reduced blood flow. A new mouse study, however, suggests that adding D-ribose may counter some of these caffeine side effects, and that the two nutrients combined may synergistically provide a better energy boost than either ingredient individually.

The mouse study was an exercised-induced fatigue model testing for the effects of caffeine, glucose, and a ribose ingredient from Bioenergy Life Science Inc. (Minneapolis). Mice were fatigued by being made to swim to the point of exhaustion for three days prior to the study’s start. On the fourth day, mice were given one of four treatments: (1) glucose only, (2) caffeine only (at doses up to 75 mg/kg/day), (3) ribose only (at doses up to 1 g/kg/day), and (4) a 50/50 combination of ribose and caffeine. By analyzing swim times and body concentrations of nucleotides such as adenosine triphosphate (ATP), the researchers then judged whether the mice’s endurance dropped, stayed the same, or improved.

The ribose–caffeine combination achieved the best improvements in swim time, at 150%. The ribose-only treatment also improved swim time, but by a lower 135%. By contrast, the caffeine-only model led to worsening endurance, and the glucose-only model saw swim time about same as the study’s baseline average.

Why the drastic improvement with caffeine plus ribose? The researchers speculate that caffeine and ribose act synergistically to provide benefits. For instance, they said, D-ribose may protect the heart from any overwork caused by caffeine, while also improving energy. The researchers believe the optimal energy-boosting amount of caffeine and ribose, in a human-equivalent dose, is 4 g ribose and 10 mg/kg/day caffeine.

D-ribose is a key component of ATP. When used as a supplement, it can help to restore ATP levels, including after intense exercise.

Bioenergy Life Science says this study will soon be published. ☑️
Ginger
A root with far-reaching health and culinary benefits

By Geemon Korah, Kancor North America

Perhaps the gingerbread cookies we consume and the bits of gingerbread houses we surreptitiously nibble aren’t cause for guilt after all. Often considered a spice, ginger is in fact an herb that has been used since ancient times for its medicinal properties and its unique appeal to the palate.

As the rhizome of the *Zingiber officinale* plant, ginger or ginger “root” is thought to have originated in South Asia, with introduction to other parts of the world via trade ships. Ginger was a sought-after prize in the days of the Roman Empire, continuing its popularity in Europe (despite the very high price its scarcity demanded) following the empire’s demise in 476 AD. Today, ginger is still popular around the globe in wide-ranging applications both for its nutritional attributes and its distinctive taste.

Ginger for Health
Ginger is well known for its ability to alleviate nausea and vomiting, but it boasts many other additional health benefits, extending from reducing pain and allergy symptoms to serving as a source of cancer-fighting antioxidants. A veritable host of ailments throughout the body have shown a positive response to ginger.

Ginger is commonly used as a digestive aid. For this reason, some may eat fresh ginger before a meal. Post-meal, ginger improves food and nutrient absorption. The ingredient is even known to reduce bloating and gas.

Ginger also delivers anti-inflammatory and analgesic qualities, which may reduce the pain of arthritic joints, sore muscles, headaches, and menstrual cramps. The antioxidant properties of this herb have also shown an ability to kill cancer cells. In some regions, ginger juice is even used as a topical treatment for burns.

Recent Science
Cancers/Chemotherapy
In a University of Michigan Medical School study, published in the journal *Cancer Prevention Research*, 30 volunteers were randomly assigned to 2 g of ginger root supplement or placebo for 28 days. Results showed a reduction in many inflammation markers, such as PGE2, in the colon. Because inflammation of the colon is thought to be a precursor to colon cancer, reducing this inflammation may aid in preventing this type of cancer.

Results of a 2009 Phase II/III study conducted on 644 cancer patients at the University of Rochester Medical Center showed that ginger supplements, taken with anti-vomiting drugs before a chemotherapy treatment, reduced lingering nausea by 40%. Since an estimated 70% of cancer patients experience nausea and vomiting with chemotherapy, ginger may provide welcome relief.

Blood Glucose Levels
A 2012 University of Sydney study, published in the natural product journal *Planta Medica*, investigated the ability of ginger to control blood glucose levels. Independent of insulin, ginger extracts were shown to increase the uptake of glucose into muscle cells, a significant area of glucose use in the body. Much of the success was attributed to gingerols, the major phenolic components of the ginger rhizome—particularly the [6]- and [8]-gingerols. Because glucose uptake to muscles in type 2 diabetes patients is markedly decreased due to impaired insulin signal transduction and inefficiency of the protein GLUT4, ginger could potentially help these patients manage blood sugar levels.

Weight Management
A 2012 pilot study, reported on in the journal *Metabolism*, indicates that consumption of a hot ginger beverage enhanced the thermic effect of food and promoted feelings of satiety, suggesting a potential role of ginger in weight management. Research from the Netherlands also supports the notion that ginger helps accelerate metabolism and burn fat.

Ginger has also been shown to exhibit cholesterol-lowering properties. A double-blind, controlled clinical trial at Iran’s Babol University of Medical Sciences compared the effects of ginger and placebo on cholesterol. Researchers found that including ginger powder in diets resulted in significantly reduced LDL cholesterol. Study participants who took ginger supplements also showed improvements in triglyceride levels.
**Inflammation**

Inflammation contributes to a host of health issues, and ginger once again is proving its worth here, too. In comparing ginger extract to prescription anti-inflammatory drugs (cortisone and ibuprofen) for the treatment of osteoarthritis and rheumatoid arthritis, the authors of a December 2012 study in the journal *Arthritis* said “ginger extract was as effective an anti-inflammatory agent as betamethasone in [an] *in vitro* model.” And while cortisone has been linked to a litany of serious potential side effects, ginger was determined to be a powerful yet safe anti-inflammatory.

**Ginger Flavor**

The popularity of ginger in food and drink applications is on the rise, with ginger drawing accolades for its pungent, spicy flavor.

Ginger is part of the *Zingiberaceae* family, along with cardamom and turmeric. Besides ginger’s rising popularity in the United States, its spicy taste and aromatic quality have made it a longtime favorite for dishes in India and China—two key producers of the world’s ginger supply. Ginger is also an important ingredient in Japanese, Korean, and Jamaican specialty cuisine, and it is popular in Africa and many countries of South Asia.

A wide array of foods and beverages benefit from ginger’s distinctive flavor and taste. Candy, cakes, cookies, soups, curries, sauces, wine, beer, liqueur, coffee, tea, and, of course, ginger ale are all crafted with this fragrant herb.

With its long, rich history that spans millennia and continents, ginger has proven itself as a wonderful herb—both for its therapeutic benefits that improve health and for its fresh and aromatic tang that is a feast for the senses.

Ginger has a promising future, trending as a flavor to watch in the industry, while gaining scientific momentum as clinical studies continue to illustrate the bounty of health benefits and potential hidden beneath the knobby, ugly duckling exterior of the ginger root.

References available upon request.

*Geemon Korah is CEO of Kancor North America (Morristown, NJ), an ingredients manufacturer serving the flavor, fragrance, food and beverage, and personal care industries.*
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PEOPLE & PLACES

Matt Thiel is now president of Rochem International Inc. (Ronkonkoma, NY). Thiel was the company’s COO for three years, helping to grow its raw-materials business in the pharmaceutical and nutraceutical industries.

Sabinsa Europe GmbH (Langen, Germany) has named Rashid Umar Jan, PhD, its technical sales manager. Jan will manage technical aspects of Sabinsa’s European sales, customer service, and food ingredient exhibitions. Previously a senior scientist at Goethe University’s Institute of Biochemistry, Jan authored peer-reviewed scientific articles for the likes of Nature, The Journal of Biological Chemistry, and The EMBO Journal. In other Sabinsa news, the company is constructing a new continuous extraction facility in Karnataka, India. Once completed, the facility will give Sabinsa a 200% increased production capacity.

Bioenergy Life Science Inc. (Ham Lake, MN) has selected Marianne McDonagh as its new regional sales director. The company hired McDonagh to boost sales of its Bioenergy Ribose ingredient in the western United States. McDonagh previously worked for APP Global Inc., ProTab Laboratories, and Blue California.

Alkemists Laboratories (Costa Mesa, CA) has rebranded itself as Alkemist Labs, complete with a redesigned company logo. New York–based design firm M Berg & Associates’ (Oslo, Norway) in Australia, is now the deputy chair of the company’s Australian operations.

Omega Protein Corp. (Houston) is renaming its trio of human nutrition subsidiaries—Cynex Nutrition (Irvine, CA), Wisconsin Specialty Protein (Reedsburg, WI), and InCon Processing (Batavia, IL)—as Nutegrity (www.nutergencyusa.com). Marketing and sales for the three companies will fall under the leadership of chief commercial officer Matt Phillips in Irvine, CA. David Corcoran has joined Nutegrity as central regional sales manager.

Health journalist and Nutritional Outlook columnist James Gormley will receive Emord & Associates’ Excellence in Health Journalism Award, part of the law firm’s 20th Anniversary Celebration Awards. The award will be presented at a gala in September in Cambridge, MD.

Lalen Dogan, managing director for Aker BioMarine Antarctic (Oslo, Norway) in Australia, is now the deputy chairman of The Omega-3 Center, an advocacy group dedicated to supporting the local omega-3 industry and raising awareness of omega-3 health benefits. Members include seafood companies, ingredient suppliers, universities, and even governmental agencies in Australia and New Zealand.

The Natural Products Association (Washington, DC) says Olivia Igboke is its new director of government relations. She will represent the group’s interests on Capitol Hill.

Naturex (South Hackensack, NJ) is opening three new U.S. sales offices, in Dallas, Atlanta, and Chicago to better serve local customers.
**Reb M Stevia Gets FDA GRAS Nod**

Steviol glycoside rebaudioside M (Reb M) has received an FDA “No Objections” Generally Recognized as Safe (GRAS) letter for use as a general purpose sweetener for foods and beverages in the United States. PureCircle (Chicago) developed Reb M in partnership with The Coca-Cola Co. It says Reb M tastes closer to table sugar than previously offered stevia ingredients. Whereas some steviol glycosides may contain challenging bitter notes, Reb M’s sweetness means the glycoside can be used in food and beverage products at a higher percentage, enabling even greater calorie reductions, especially in foods and beverages that have a high level of sweetness. PureCircle is now focusing on bringing the zero-calorie natural sweetener to market.

Jason Hecker, PureCircle’s vice president of global marketing and innovation, says the company has already invested in its supply chain and leaf development to support imminent commercialization. PureCircle (Oak Brook, IL), 630/361-0374, www.purecircle.com.

**Non-GMO Project Capsules**

Capsugel is the first capsule manufacturer to market Non-GMO Project capsules—specifically, its PlantCaps capsules (made of pullulan, masking strong ingredient odors and protecting sensitive ingredients) and Vcaps capsules (sourced from hydroxypropyl methylcellulose and water and ideal for moisture-sensitive ingredients). Securing Non-GMO Project status for capsule materials is a relevant venture because, as a Capsugel regulatory manager told Nutritional Outlook, many ingredients used to produce hard and soft capsules have a significant risk of being genetically modified. These ingredients include, but are not limited to, corn, cotton, soy, sugar beets, and derivatives such as ascorbic and citric acid, maltodextrin, and xanthan gum.


**Natural Tanner from Microalgae**

Microalgae (*Isochrysis galbana* var T.ISO) is the source of a new cosmetic bronzer ingredient, SymBronze 1659. SymBronze 1659 lends skin the look of a healthy, natural-looking tan. The clinically tested ingredient can be used in cosmetics such as sunless self-tanning creams.


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Source: BPA Worldwide, June 2013.
Yes to More Acacia Gum

An FDA ruling lets manufacturers use more acacia gum and label it as a fiber.

BY ROBBY GARDNER, ASSOCIATE EDITOR

Before the end of 2013, FDA published a final rule to expand the safe use of acacia gum in foods and beverages. The rule became effective December 6, 2013.

Also known as gum arabic, acacia gum has been consumed around the world for centuries. It’s a sap extracted from the stems and branches of acacia trees, many of which are commercially grown in Africa. As a hydrocolloid, acacia gum can act as an emulsifier and improve mouthfeel of foods and beverages. But call it a fiber, and the ingredient gets a lot more attention.

Applications

Thanks to the rule’s petitioner, acacia gum supplier Nexira (Rouen Cedex, France), FDA is increasing maximum use levels for acacia gum in breakfast cereals, cereal bars, baked goods, soups that are not subject to meat or poultry regulations—even alcoholic beverages.

Acacia gum helps manufacturers with emulsification of oil and water, adhesion characteristics (e.g. sticking spices to nuts), and product mouthfeel. But the ingredient also contains fiber, and this fiber can be used more effectively than that of other gums.

“With other gums, high usage levels can result in undesirable textures, therefore they are not usually looked at as a source of added fiber,” says Josh Brooks, president of Gum Technology Inc. (Tucson, AZ). “Since acacia gum does not start to impart viscosity until it makes up 20% or more of a product, it can be used as a significant fiber source.” Understanding this and acacia gum’s strong safety record, FDA is increasing maximum usage levels that could pave the way for high-fiber products based largely on acacia gum. For example, manufacturers can now increase their use of acacia gum in grain-based cereal bars, granola bars, and rice cereal bars to as much as 35% of the final product.

The added benefit is that manufacturers can also now call acacia gum a fiber instead of just an emulsifier or texture agent. The new characterization should be preferable to consumers who so often relate fiber to “healthy” or “good for me.”

Sourcing

To understand how the world gets its acacia gum, one must look to the Sahel region of Africa, a dry, desert landscape comprising many acacia-producing countries, most notably Chad, Senegal, Nigeria, and Sudan (the world’s leading acacia gum exporter). It’s what some industry experts call “the gum belt.”

Gum suppliers don’t expect FDA’s ruling to significantly impact supply or prices of acacia gum, but that’s not to say this market isn’t potentially volatile. Two unusual events nearly compromised the acacia gum market in recent history. Rumors that Osama Bin Laden held stake in Sudanese acacia gum production led to public boycotts of acacia gum products in 2001, and Sudan’s U.S. ambassador to Washington threatened to halt acacia gum exports as a response to U.S. sanctions on the country in 2007.

Like any plant, a number of factors can influence the composition of acacia gum. Differences in weather and soil from various acacia-harvesting countries can lead to differences in acacia gum quality and fiber content. One feature that does appear somewhat consistent, however, is that acacia gum is usually grown through organic standards of practice. Suppliers say the high price of obtaining certification is often the only reason for marketing non-organic acacia gum.

Safety

Tree sap isn’t necessarily a conventional food product (maple syrup exempted), but FDA backs its ruling with a hefty amount of safety and toxicological data. Much of the data is historic—including a 1982 National Toxicology Program report on two-year carcinogenic feeding studies and a 1990 positive evaluation from the Food and Agriculture Organization and the World Health Organization—but two new studies reassure FDA’s position. A 2004 review for cosmetic products found acacia gum is safe and not allergenic, and results of a clinical trial on acacia gum consumption in humans, at 50 g daily, detected only mild physiological effects from the ingredient.

Future Use

Even though acacia is just beginning its fiber status in the United States, some suppliers are already positioning the ingredient more specifically as prebiotic fiber. Early research is compelling, with a study on Nexira’s Fibregum brand acacia gum production led to public boycotts of acacia gum products in 2001, and Sudan’s U.S. ambassador to Washington threatened to halt acacia gum exports as a response to U.S. sanctions on the country in 2007.

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