Branded Ingredients by Sabinsa, accept no imitations. Sabinsa offers a range of sports nutrition ingredients, which caters to the needs of sports enthusiasts and professional athletes alike. Manage healthy body weight and increase lean body mass using clinically proven weight management ingredients like ForsLean®, GarCitrin® and LeanGard®.*
NSF PRODUCT CERTIFICATION FOR PRIVATE LABEL

NSF’s Private Label Product Certification provides private label manufacturers all the benefits of the NSF certification mark.*

- Leverages existing product certification to promote privately labeled products
- Saves the full cost of independently certifying a product with NSF directly
- “Skip the line”— NO additional testing is required
- Place the NSF certification mark on product(s) in as little as three weeks

*Product sold must be identical to the certified product.

Visit NSF at Expo West booth #3965 or contact us at dietarysupplements@nsf.org.
Nature for Health

UClear® D-Mannose
Healthy Urinary Tract

- Dietary Supplement
- Spec: 99% by HPLC
- Form: Powder / Tablet
- CAS #: 3458-28-4
Operculina turpethum (synonym Ipomoea turpethum) is a plant found in the morning glory family (Convolvulaceae). The root of Operculina has been used in the traditional Unani System of Medicine in India for hundreds of years. Operculina is a herbaceous vine endemic to the Indian sub-continent.

OperQThin™ provides significant weight management benefits including:

1. **Promotes rapid lipid metabolism***
2. **Ameliorates high circulatory cholesterol***
3. **Reduces cellular insulin resistance***

*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.
Traceable, Sustainable, All Natural, Turmeric

We foster long-term relationships with independent farmers in India’s countryside to bring the highest quality Turmeric to the United States while supporting small farming villages in India.
FEATURES

16  2019 Ingredients to Watch
     Eight ingredients to watch this year

48  2019 Flavor Trends
     Experts predict 2019’s hottest food and drink flavors.

54  Immune Support
     Immune supplements for colds, flus, and beyond

60  Blood Sugar Support
     Botanicals are gaining traction in the blood sugar–management market thanks to new research.

64  Equipment
     2019 Dietary supplement equipment manufacturing update

72  Contract Manufacturing
     Manufacturing in a time of increased scrutiny

COLUMNS

8  From the Editor

10 News

12 Global Regulations
     5 CBD Regulatory myths

42 Market Report
     2018’s Biggest ingredient sales surprises

82 Last Bite
     Fiber

RESOURCES

80 Advertiser Index

81 Classified

MANAGE YOUR SUBSCRIPTION

For fast and easy subscription service, visit NutritionalOutlook.com

• Renew your subscription
• Change your address
• Sign up for a new subscription
• Cancel your subscription

Digital delivery now available!

For all other customer-service inquiries, e-mail fulfill@hcl.com
The hemp industry is hurtling forward, with new products turning heads left and right. Hemp, and especially hemp cannabidiol (CBD), is showing up in everything from coffee and snacks to condiments and even mascara. Changes in the market are happening quickly, starting with hemp agriculture itself with the December 2018 passage of the Farm Bill and an increase in U.S. hemp acreage. (More on this on pages 10 and 12.) For CBD, there could be more political play to come as some lawmakers push FDA to open a legal pathway to CBD in foods, supplements, and other products. (Read more on page 10.)

All of these developments have made CBD, and hemp, one of the highest-profile ingredients of 2019. The CBD market in particular is just beginning, and more companies are now assessing opportunities versus risks. It’s a new, exciting era, and changes are happening quickly. In the meantime, however, is anyone watching out for quality in the market?

Late last year, hemp-advocacy group the U.S. Hemp Roundtable, a coalition of hemp companies and grassroots organizations, launched a sister group called the U.S. Hemp Authority, which oversees a brand new hemp-certification program. “This is the first and only certification program for hemp inside the U.S.,” says Josh Hendrix, director of domestic hemp production for CBD company CV Sciences, whose products were one of the first to be certified by the new U.S. Hemp Authority Certification Program.

U.S. Hemp Authority and its certification program are endorsed by notable groups, including the nonprofit trade group Hemp Industries Association. The program also has the credibility of the American Herbal Products Association, whose guidelines were used to create the standards for the U.S. Hemp Authority’s certification program.

The U.S. Hemp Authority certification program addresses hemp growersprocessors and finished-product companies. Certified growers and processors can use the program’s certification seal in their advertising, marketing, and product labeling, while finished-product makers can use the seal on their products to give consumers added confidence in their products’ safety and quality. Audits are performed by certification body Where Food Comes From, which vets applicants’ adherence to FDA Current Good Manufacturing Practices (GMPs) and Good Agricultural Practices (GAPs). A comprehensive look at the program’s guidelines, encompassing everything from employee best practices and analytical and testing processes for purity and contaminants to guidelines for harvesting, handling, storage, distribution, and quality-management systems, are available at U.S. Hemp Authority’s website, www.ushempauthority.org.

Companies are flocking to participate. On January 29, U.S. Hemp Authority president Marielle Weintraub, business development director at Eurofins Food Integrity & Innovation, said that more than 175 companies are in the process of seeking to become certified. U.S. Hemp Authority plans to start releasing names of its certification awardees in March.

“Consumers will start to see products bearing the certification seal on store shelves and online around the second quarter of this year,” Hendrix adds. “The U.S. Hemp Authority stands out because it is specific to agricultural hemp and is focused on pushing the industry forward, from the farm to the consumer.”

A quality-assurance program in the hemp industry could not be more necessary, especially as lawmakers and regulators scrutinize the hemp and CBD space and as members of the hemp industry look to show that this is a market that can operate responsibly. A U.S. Hemp Roundtable press release announcing the new certification program stated: “After decades of prohibition, the U.S. hemp industry has been reborn. Every day, more and more Americans adopt and come to rely on hemp-based products—for food, fabric, construction, and hundreds of other applications. With this growth only set to increase, the time is now for the hemp industry to establish and embrace standards, best practices, and self-regulation.”

Hendrix adds: “Introducing the certification program is our industry’s initiative to provide high standards, best practices, and self-regulation, giving confidence to consumers and law enforcement that hemp products are safe and legal.”

Jennifer Grebow
Editor-in-Chief
Jiaherb recognizes that there is much uncertainty among manufacturers and consumers about the integral quality of the botanical products they purchase. As a testament to our never-ending commitment to customer satisfaction, and to ease customer concerns about the integrity of our products, Jiaherb proudly introduces HerbaLink™.

HerbaLink, a unique chain-of-custody program, offers ultimate transparency in product identification and traceability. The program not only assures best practices in identifying sustainable and socially conscious sources, but also the implementation of stringent testing methods that include DNA, HPTLC, HPLC and GC throughout the processing and preparation of the finished product — documenting every link of the product’s journey from harvest to packaging.

Concerned about Botanical Identification?

Learn more about Jiaherb’s ID Program, scan QR code below.

Premier Manufacturer of Natural Ingredients
Democratic Senators Ron Wyden and Jeff Merkley sent a letter to FDA Commissioner Scott Gottlieb, MD, in January urging him to update federal regulations governing the use of hemp-derived cannabidiol (CBD) in food, beverage, and dietary supplements.

In December, a provision of the Agriculture Improvement Act of 2018, otherwise known as the 2018 Farm Bill, removed hemp from Schedule I of the Controlled Substances Act and legalized the cultivation of hemp as well as the production and sale of hemp and hemp derivatives. However, FDA holds the opinion that CBD may not be used in food, beverages, and dietary supplements because of an investigational new drug (IND) clause prohibiting an ingredient’s use in supplement products once it has been studied as a potential drug. In this case, CBD was investigated as a drug by GW Pharmaceuticals (Cambridge, UK) as a treatment for epilepsy and was later approved for sale as GW’s drug Epidiolex. Despite this, foods, beverages, cosmetics, and wellness products that contain hemp-derived CBD and other cannabinoids have taken off, and consumer awareness and market interest in CBD is very high.

“Current, outdated regulations limit producers from taking full advantage of the industrial hemp market by, for example, prohibiting food products containing CBD from being sold across state lines. In recent years, the public has developed a widespread interest in the production and use of CBD, one of the primary non-psychoactive compounds in Cannabis sativa L.,” wrote the Senators. “We therefore request the FDA immediately begin updating regulations for hemp-derived CBD and other hemp-derived cannabinoids, and give U.S. producers more flexibility in the production, consumption, and sale of hemp products.”

CBD is the dominant naturally occurring active cannabinoid in hemp, and while it was isolated for use in a pharmaceutical, hemp products like tinctures will inevitably contain CBD and other actives called cannabinoids. It is therefore significant that Senators Wyden and Merkley say “hemp-derived CBD and other hemp-derived cannabinoids” because it may force FDA to acknowledge the presence of these actives in hemp products and make a decision on how to update regulations under the newfound context of the 2018 Farm Bill’s hemp-farming provision.

U.S. Hemp Acreage Tripled in 2018, says Vote Hemp

The number of acres of hemp grown in the United States in 2018 more than tripled compared to the previous year, according to Vote Hemp’s 2018 U.S. Hemp Crop Report. In 2018, there were 78,176 acres of hemp grown across 23 states, compared to 25,713 acres of hemp grown across 19 states in 2017. In addition, there were 40 university-conducted research studies, and 3,546 state hemp licenses issued in 2018, compared to 32 studies and 1,456 state licenses in 2017. While 23 states cultivate hemp, 41 have enacted hemp legislation to remove barriers for its production.

The passage of the 2014 Farm Bill that included Section 7606, “Legitimacy of Industrial Hemp Research,” allowing pilot agricultural programs for research purposes, played a huge role in the rapid growth of the hemp market. Now, even more roadblocks have been removed with the passage of the 2018 Farm Bill in December and its hemp farming provision redefining hemp as distinct from marijuana, removing it from Schedule I of the Controlled Substances Act, and putting hemp under the jurisdiction of the USDA.

“Now that we have lifted federal prohibition on hemp farming, it’s time to invest our energy in expanding hemp cultivation and the market for hemp products across the country so that all can reap the benefits of this versatile, historic American crop,” said Eric Steenstra, president of Vote Hemp, in a press release. Product applications for hemp are numerous. Vote Hemp cites hemp seeds as one of the fastest growing categories in the natural products industry due to their nutritional value, specifically their fatty acid content.

Hemp extracts rich in the cannabinoid CBD have also gained substantial recognition from consumers. Hemp-derived CBD products remain popular as more consumers have become aware of the benefits cannabinoids provide, though many manufacturers avoid making any claims on their products to stay out of FDA’s crosshairs. According to Vote Hemp, hemp is also showing a great deal of potential in product applications outside of food such as in environmentally friendly packaging material and bioplastics.

Visit vitacholine.com to learn more.

*Based on a clinical study published in the FASEB Journal.

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.
The passage of the 2018 Farm Bill capped off a momentous year for cannabidiol, or CBD, a non-psychoactive derivative of cannabis. The year kicked off with the January 2018 rescission of the Cole Memo, the U.S. Department of Justice’s policy statement regarding cannabis enforcement in states where cannabis is legal, which essentially stated that, given limited resources, the federal government would not enforce the federal marijuana prohibition in states that had legalized marijuana in some form. Following this move, many expected an increase in federal marijuana enforcement. The feared enforcement uptick never materialized, though. By mid-year, FDA approved Epidiolex, a prescription drug made from a CBD isolate for treatment of rare forms of epilepsy. Later in the year, Senate Majority Leader Mitch McConnell (R-KY) saw opportunity with the Farm Bill update to expand industrial hemp legalization at the federal level and introduced new legislation within the Farm Bill to legalize U.S. industrial hemp as an agricultural commodity. Following conference committee work to iron out differences, the House and Senate passed the final version of the Farm Bill in mid-December, and the President signed it on December 20, 2018.

Companies are now considering which new business opportunities will result following the Farm Bill’s passage. It’s important to separate the myths regarding what the Farm Bill did from the realities of where CBD’s legal status stands.

**Myth #1: CBD is fully legal since it’s not a controlled substance anymore.**

It’s more complicated than that. Regulation exists at the federal and state levels. At the federal level, the 2018 Farm Bill de-schedules industrial hemp and various derivatives thereof, including CBD, from the Controlled Substances Act when produced in compliance with a state hemp program. Industrial hemp is defined as cannabis (Cannabis sativa L.) and derivatives of cannabis with extremely low (less than 0.3% on a dry weight basis) concentrations of the psychoactive compound delta-9-tetrahydrocannabinol (THC). The U.S. Drug Enforcement Administration (DEA) retains jurisdiction over CBD from marijuana because marijuana

---

**CBD Regulatory Myths**

Where does CBD’s legal status stand following the 2018 Farm Bill? One attorney looks at common misperceptions.
FLAVORS & COLORS

Organic
Natural
Non-GMO
Allergen-Free
Gluten-Free
100% Vegetarian
Masking
and more custom flavors

GFSI
Organic
Halal & Kosher
certified

Visit us at Natural Products Expo West 19
Hall A  Booth #425

Browse through thousands of
sweet & savory flavors
at www.goldcoastinc.com

GOLD COAST.
ingredients, inc.

Tel +1 (323) 724-8935
Contact: info@goldcoastinc.com
remains a Schedule I substance. The DEA isn’t the only relevant regulator, though. The FDA and the states also have jurisdiction.

State laws currently are a patchwork. Approximately one-third of states have hemp programs set up pursuant to the 2014 Farm Bill. One-third of states do not have hemp programs and therefore do not have legal mechanisms for sale. Finally, approximately one-third of states have programs in some developmental stage, but regulations are not final.

**Myth #2: FDA has approved CBD, so the claims I’m seeing online must be substantiated.**

FDA has only approved Epidiolex for treatment of rare forms of epilepsy. This approval does not mean that other CBD claims are approved or that FDA agrees that CBD can be lawfully used in other products.

FDA’s position is that CBD from any source is an active drug ingredient. FDA has voiced this position in warning letters and reiterated it in late December. The agency also highlighted its continuing concern about consumer safety and disease treatment claims featured on unapproved CBD products.

Further, FDA acknowledged the public’s growing interest in CBD’s potential therapeutic capabilities and expressed a commitment to consider whether there are circumstances in which certain cannabis-derived compounds might be permitted in a food or dietary supplement. FDA stated that it intends to hold a public meeting to solicit input relevant to a CBD regulatory strategy and to allow stakeholders to express their views on topics, including safety. The agency also expressed a “commitment to pursuing an efficient regulatory framework for allowing product developers that meet the requirements under our authorities to lawfully market these types of products.” Although not specific to CBD, in that same press release, FDA announced that three hemp ingredients—hulled hemp seeds, hemp seed protein, and hemp seed oil—may be legally marketed in foods under the conditions set forth in their respective Generally Recognized as Safe (GRAS) notices. In short, there’s reason to be hopeful that industry and the regulators can chart a pathway to legal use of CBD in products beyond Epidiolex, but this will take time.

Regarding claim substantiation, companies should also be mindful that the Federal Trade Commission and state consumer protection authorities have jurisdiction to pursue unfair and deceptive advertising. Product health claims must be substantiated by “competent and reliable scientific evidence.” Currently, while there is a lot of anecdotal evidence regarding the benefits of CBD, the scientific evidence is just emerging. When forging ahead in this new frontier, companies will want to remain mindful of the legal standards regarding claim substantiation and testimonials in particular.

**Myth #3: The 2018 Farm Bill preempts all state laws.**

On the issue of preemption, Section 10113 of the 2018 Farm Bill expressly does not preempt laws that are more stringent than those found in the bill regarding the production of hemp. See Sec. 297B(a)(3)(A) ("No Preemption. – Nothing in this subsection preempts or limits any law of a State or Indian tribe that (i) regulates the production of hemp; and (ii) is more stringent than this subtitle."). However, Section 10114(b) of the 2018 Farm Bill does provide: "No State or Indian Tribe shall prohibit the transportation or shipment of hemp or hemp products produced in accordance with . . . Section 10113[,] through the State or the territory of the Indian Tribe, as applicable.” Section 10114(b) thereby clearly preempts any state law prohibiting shipment of industrial hemp through a state or territory of an Indian tribe.

It also arguably preempts any state law prohibiting the sale of industrial hemp in a state or territory of an Indian tribe, so long as the hemp was produced (in another state) pursuant to the requirements of Section 10113. Unfortunately, it is not clear whether Section 10114(b) of the Farm Bill preempts state laws disallowing sales of industrial hemp. It will likely take litigation to decide the extent of the preemption, if any, regarding sale of industrial hemp in states which have laws disallowing such sales.

In addition, there is a patchwork of state-level product considerations. For example, California expressly follows FDAs position that CBD cannot lawfully be used in foods or dietary supplements. By contrast, New York expressly allows CBD in dietary supplements (although FDA does not) when the products meet other program requirements. Companies should consider these types of regulations on a state-by-state and product-by-product basis, particularly in the context of the state enforcement environment when considering whether to enter a particular market.

**Myth #4: Now that CBD is legal, we can advertise everywhere.**

Not quite. Even setting aside the claim substantiation issue flagged above, certain platforms such as Google, Facebook, and Instagram prohibit CBD advertising. Likewise, although CBD is not psychoactive, there may be product confusion particularly among a younger audience. Companies creating and distributing CBD advertising can help protect brand value by being sensitive to these considerations.

**Myth #5: Since CBD is legal, there is no risk in selling it.**

While the 2018 Farm Bill provided needed clarity as to the status of industrial hemp at the federal level, this remains murky territory, with localized enforcement in many states adding to the confusion about the product. Companies seeking to sell CBD should consider their specific products in conjunction with the other federal and state considerations discussed above.

It’s 2019, and we’re all entering a new frontier. As companies race to take advantage of this emerging market, thoughtfulness and attention to the patchwork of legal obligations and uncertainties are likely to pay off in the long term.

Kristi Wolff is a partner in the Advertising and Food and Drug Law practice of Kelley Drye & Warren LLP.
Discerning customers expect more out of their supplements. Sometimes fewer ingredients with a better delivery is just right. Vcaps® Plus capsules are the premier vegetarian clean label solution for the health and nutrition markets. These capsules deliver superior performance with only two simple ingredients. With a glossy, high-end finish, these capsules are Non-GMO Project Verified, vegetarian, vegan, kosher and halal certified and offer a clear path forward to broad market acceptance. To learn more about Vcaps® Plus capsules solutions for liquid and powder concepts, visit capsugel.com.

*Our capsules are Non-GMO Project Verified; however, if your final product is to carry the claim, your ingredients must be independently Non-GMO Project Verified.
Nutritional Outlook thanks SPINS (Chicago, IL) for sharing market research data and insights for this story.

**CBD**

The rise in hemp-derived cannabidiol (CBD) products on the market has been astronomical. While the recent passage of the 2018 Farm Bill ensures that the hemp agriculture industry will continue to prosper, the bill’s passage does nothing to clear up questions about whether non-pharmaceutical hemp-derived CBD products are legal. While the Farm Bill sees hemp removed from Schedule I of the Controlled Substances Act, defining it as distinct from marijuana, and placed under the jurisdiction of the U.S. Department of Agriculture (USDA), jurisdiction of finished products remains under the control of FDA. FDA continues to hold the opinion that CBD cannot be marketed as a dietary supplement because of an investigational new drug (IND) clause that forbids the use of an ingredient in a dietary supplement if it was first studied for use in a drug. In this case, GW Pharmaceuticals has studied CBD for the treatment of epilepsy. Last year, FDA officially approved GW’s CBD drug, Epidiolex.

“With dietary supplements, our view has not changed from what we’ve stated in the past and what we continue to point to: CBD falls within the [IND] exclusion clause,” explained Steve Tave, director of FDA’s Office of Dietary Supplement Programs, at the Council for Responsible Nutrition’s The Conference in October 2018. “It’s an ingredient that’s been studied and authorized in publicized clinical trials, and therefore CBD cannot be used lawfully in dietary supplement products. Period. Full stop.”

So, while the Farm Bill’s green light on industrial hemp agriculture gives hope and excitement to many, on the question of whether products made with CBD specifically are allowed, many in the supplements industry feel like they are feeling their way down a dark hallway. (Read more on page 12.)

The uncertainty surrounding CBD hasn’t stopped a burgeoning market. According to the American Botanical Council’s (ABC, Austin, TX) latest *HerbalGram* Herb Market Report*, published in September 2018, CBD ingredient sales grew 303% in the U.S. natural channel in 2017 compared to the previous year, to $7,583,438. The following year saw even greater growth. According to SPINS (Chicago, IL), in the U.S. natural channel in
the 52 weeks ending November 4, 2018, CBD ranked fully in 7th place on a list of the 25 top-selling ingredients in the natural channel, with CBD sales in that channel amounting to $40,393,188—a 382% increase from the previous year, when CBD grossed only $8,377,750. That is an enormous jump for an ingredient operating in regulatory gray area.

As the hemp-derived CBD category continues to mature, responsible manufacturers must take the lead and demonstrate how to safely produce and sell CBD products. For example, in September 2018, CV Sciences (San Diego, CA) announced self-affirmed Generally Recognized as Safe (GRAS) status for its PlusCBD Gold Formula, coinciding with the release of its hemp-derived CBD gummy. This GRAS assessment is based on a set of toxicology studies that the company said are the first peer-reviewed toxicology reports published on hemp extracts since 1981, and the first ever conducted on a CBD-containing extract.

With this new scientific toxicological data, CV Sciences said it hopes to change the optics of hemp-derived CBD. Releasing a gummy was a big part of that as well. “[Hemp-derived CBD] has equally as big a future in the functional food category as it does in the dietary supplement category. We see how these functional foods have blurred the lines in every single way between food and nutrition and dietary supplements, and we see CBD as the perfect adjunct or hero ingredient to be included in a litany of food products,” explained Stuart Tomc, vice president of human nutrition at CV Sciences. “We’re trying to set an example: we’re responsible actors and we’re trying to set an example of how we can walk this fine line of a fun functional remedy done responsibly.”

Ultimately, self-regulation is crucial. The success of the category to this point has clearly convinced Congress that hemp can be a valuable agricultural commodity, but while CBD’s legitimacy remains under question by FDA, manufacturers must be nothing short of perfect in order to deflate any arguments by the agency that would threaten the ingredient’s future. Industry-wide, self-regulation has been the answer to criticism of the dietary supplement industry. CBD sits in a gray area, and there needs to be some sort of framework for quality control.

This is all the more important as more fly-by-night companies enter the marketplace, making dubious claims. The most recent example of a self-regulatory initiative in the CBD space is the U.S. Hemp Authority Certification Program, which provides guidance for best practices and third-party audits to certify growers and processors of hemp products. Announced late last year, this new certification program is funded by the U.S. Hemp Roundtable. (Read more on page 4.)

Currently, FDA, based on its interpretation of the U.S. Federal Food, Drug, and Cosmetic Act, has not altered its position on CBD—but it also has not, up to this point, taken action against hemp-derived-CBD manufacturers, outside of warning letters sent to companies making blatant disease claims. Many believe that FDA has the power to change its own position on CBD, noting that the U.S. Secretary of Health and Human Services could issue a regulation following a notice and public comment period that would make CBD a lawful dietary ingredient. The Secretary can do this under a provision of the Dietary Supplement Health and Education Act, though the provision has never been utilized since the law’s passage.

“If FDA does nothing, the agency is essentially declaring this to be an unregulated class of goods that’s inconsistent with the agency’s strong commitment to protecting public health,” said Michael McGuffin, president of the American Herbal Products Association (AHPA; Silver Spring, MD), during a December AHPA-sponsored webcast on the subject of the 2018 Farm Bill. “[AHPA] thinks that we can influence the agency to urge the Secretary of Health and Human Services to grant the exemption.” In late January, Democratic Senators Ron Wyden and Jeff Merkley from Oregon sent a letter to FDA urging the agency to “immediately begin updating regulations for hemp-derived CBD and other hemp-derived cannabinoids, and give U.S. producers more flexibility in the production, consumption, and sale of hemp products.”

CBD will be the highest-profile ingredient of 2019. All eyes will be on regulators as this market continues to mushroom. In the meantime, the industry will have to lead itself, making high-quality products that demonstrate safety and efficacy.

Reference

Omega-3s

Upswings and downswings are not unusual for popular nutritional ingredients, especially one as high profile as omega-3 fatty acids. Omega-3s, a mainstream success story, are as beloved by many as they are fiercely criticized by those who underlie clinical trials with negative or null results as point-blank evidence that omega-3 supplementation
Ingredients to Watch

does not yield health benefits. The story, of course, is never that simple. Unfortunately, newly published omega-3 clinical studies are often the subject of splashy black-and-white media headlines that often fail to delve into gray area or the intricacies of any positive findings around omega-3 supplementation. Thus the story will continue in 2019, with the industry’s biggest omega-3 advocate, the Global Organization for EPA and DHA Omega-3s (GOED; Salt Lake City, UT), continuing to fight to overcome any unfairly negative messaging about omega-3 ingredients and, often, to help the public read between the lines and understand a study’s less-publicized takeaways.

Omega-3s actually had a lot to celebrate last year, with long-awaited results finally coming in from REDUCE-IT\(^1\) (Reduction of Cardiovascular Events with EPA Intervention Trial). This trial, on Amarlin Pharma’s omega-3 EPA drug, Vascepa, was a large-scale, 8179-subject, five-year clinical trial that looked at any omega-3-based effects on reducing long-term cardiovascular events in dyslipidemia patients on statins. Researchers saw statistically significant 25% risk reduction in major adverse cardiovascular events, including cardiovascular death, nonfatal myocardial infarction (heart attack), and nonfatal stroke. This big study, showing big effects, was celebrated by health practitioners, media, and the omega-3 industry alike.

Two other primary, large-scale omega-3 studies showed some benefits from omega-3, but garnered mixed headlines. One of those was the VITAL study\(^2\) (Vitamin D and Omega-3 Trial), a 25,871-subject, five-year study examining whether omega-3 fatty acids helped prevent serious vascular events in diabetes patients. The study found no statistically significant differences in the risk of serious vascular events between the supplementation and the placebo group; however, GOED pointed out that there was an 18% statistically significant reduction in risk of vascular death in the omega-3 group compared to the placebo group.

These three, large-scale trials commanded attention last year, even as there were other publications, positive and negative, that yielded headlines of their own. These included a negative—and controversial—Cochrane Review\(^6\), which GOED and many in the omega-3 industry criticized on many fronts; a positive Cochrane Review\(^7\) showing that prenatal omega-3s reduce the risk of premature birth; a new, largely negative book on fish oil, The Omega Principle, by environmental author Paul Greenberg; and a balanced, objective review\(^8\) of omega-3 research and design issues, issues that the industry and GOED have pointed out limit the results of many large-scale omega-3 clinical trials.

Any positive findings from recent studies, even less-publicized ones, add to what we know about omega-3 fatty acids, points out Chris Gearheart, GOED’s director of member communications and engagement: “What’s important is that the three above studies together”—REDUCE-IT, VITAL, and ASCEND—strengthened the body of evidence supporting omega-3’s effect on cardiovascular outcomes, particularly myocardial infarction and coronary heart disease.”

Harry Rice, PhD, GOED’s vice president of regulatory and scientific affairs, says: “First, while there are a whopping 4,000-plus published clinical trials on using omega-3s as a treatment, the reality is that we are still learning a great deal with each study that is published. Each year, our knowledge base grows. Many of the studies not reporting positive results were designed many years ago, before we had the advantage of our current understanding. I think our most recent learning, which we’ve suspected for a number of years, is that dose really matters and that if you don’t provide enough EPA/DHA, you aren’t going to move the needle and demonstrate a positive effect on the intended outcome(s) of interest. Second, because of shrinking research budgets, corners on experimental design have been cut, which has resulted in insufficiently powered (i.e., too few subjects) clinical trials.”

Many consumers and healthcare providers find themselves pushed/pulled by the controversial media coverage on omega-3s when trying to decide if omega-3 supplementation is beneficial. This is where GOED’s new education campaign comes in. Last year, the association announced a new website and series of campaigns geared at teaching health practitioners—including nurse practitioners, physician’s assistants, and pharmacists—about the myriad health benefits of omega-3s. The association also continues to maintain its www.AlwaysOmega3s.com consumer education website.
Chaga mushroom (*Inonotus obliquus*) is a hard, deeply cracked, stalkless conk that has the appearance of burnt charcoal with a burnt orange interior, found on the trunks of birch, alder and elm trees. It has a long history of traditional use in Russia and Poland as a tonic, blood purifier and pain reliever. Studies have shown its effectiveness as an anti-cancer agent, reducing tumors and providing support for reduced bleeding, better sleep and improved appetite during cancer recovery.

**Oyster**

Oyster mushroom (*Pleurotus ostreatus*) (pictured on front cover) grows in clusters on rotting hardwood logs. Delicious and popular in cuisine, it is an excellent source of vitamins and minerals as well as polysaccharides and antioxidants. It helps support normal cholesterol and lipid levels, cardiovascular health, and liver health. In addition it has been shown to support appetite control, boost antioxidant enzyme levels, and help with a normal inflammation response.

Lion’s Mane

Lion’s Mane mushroom (*Hericium erinaceus*) grows in a single large clump of dangling spines on the side of hardwood trees. Medicinally, it helps support normal cholesterol and lipid levels, cognitive health and mood, and immune health. Human studies show a beneficial effect for cognitive health and mood in aging populations. Active constituents in Lion’s Mane have been shown to stimulate nerve growth factor associated with repair and rejuvenation of the brain and nervous system in animal experiments.

Polyporus umbellatus

*Polyporus umbellatus* (Zhu Ling in Chinese) is a very rare, short lived edible polypore mushroom consisting of many small, smoky brown rosettes that appear at the base of mostly oaks. It contains polysaccharides, minerals, and various sterols. The mushroom supports normal kidney function, water balance, and healthy bladder function. It has antimicrobial properties, and a hair growth stimulating effect.

Cordyceps

*Cordyceps* Cs-4 extract is cultivated from the fungal strain *Paecilomyces hepialii* of the species *Cordyceps sinensis*. The original strain is an endoparasitic fungus that grows out of the body of a caterpillar (pictured). It contains essential vitamins and minerals and is rich in powerful polysaccharides. It supports a healthy immune system, feelings of energy, positive mood, libido, healthy aging, and normal lung function.

Agaricus blazei murrill (ABM), also known as Himematsutake, is native to Brazil and popular in Japan. Its fruiting bodies appear as button caps singly or in clusters in leaf litter. It is a very good source of nutritious vitamins and minerals. It is also rich in complex polysaccharides and sterols. The mushroom supports normal cell function, normal seasonal histamine levels, and immune function.
**Tremella** comes from the Latin word for “to tremble”, which appropriately captures its gelatinous qualities. There are over 100 species of this “jelly fungus” recognized worldwide. *Tremella fuciformis* or Snow Fungus, *LVJHQHUDOOÀDYRUOHVVEXWSURYLGHVVXSSRUWIRU* immunity, cardiovascular health, normal blood sugar, and normal cell growth. Additional research shows that it also helps with cognitive health and PDQDJLQJLQÀDPPDWLRQ.

**Maitake**

*Maitake mushroom* (*Grifola frondosa*) is known as the “king of mushrooms” as it grows up to 100lbs in size in large clusters of leafy ruffles, usually at the base of oak trees. Maitake is a culinary mushroom in Japan, but is also used in Traditional Chinese Medicine as a remedy to help support normal intestinal comfort, healthy weight management, normal blood sugar levels, and increased exercise output. Containing beta-glucan polysaccharides, it also offers powerful immune system support.

**Turkey Tail**

*Turkey Tail mushroom* (*Trametes versicolor, syn. Coriolus versicolor*) is a polypore mushroom with flat caps that grow in concentric zones of varying color on decomposing wood. It is rich in polysaccharides and sterols. The active compound PSP supports healthy immune function, and normal cellular health of the prostate, breast, and liver. In addition, PSP supports normal nerve response and comfort. The mushroom stimulates SOD activity and liver detoxification.

**Enokitake** or Enoki (*Flamulina velutipes*) is an edible mushroom popular in gourmet Japanese restaurants. It grows at the base of the Chinese Hackberry tree. It is an anti-aging mushroom with blood pressure and cholesterol lowering effects that has also been used effectively for gastroenteric ulcers. It has significant anti-tumor effects. Enokitake can also be used to support healthy liver function and healthy cognitive function.

**Reishi**

*Reishi mushroom* (*Ganoderma lucidum*) is a medicinal mushroom that has symbolized great health and longevity throughout thousands of years of Chinese history. It is used in Chinese herbal medicine for supporting a calm state of mind, energy, and supporting normal cell function. Scientific studies show that it helps promote a healthy immune response, normal liver function, and a healthy seasonal histamine response.

**Poria cocos**

*Poria cocos* grows underground as a sclerotium, which is a compact mass of hardened mycelium. It helps promote healthy kidney and bladder function, and digestive and stomach health. *Poria cocos* is also known to support calmness and healthy sleep by reducing anxiety, tension, and fatigue. It stimulates healthy brain function, reducing memory loss. As with many other mushrooms, it helps with a healthy immune response, and supports a normal inflammation response with topical use.
Mushrooms, fruits and vegetables are ready-made powerhouses of vitality that are important building blocks for a healthy body. Studies show that high consumption of fruits, veggies, and mushrooms can significantly promote heart health, strengthen immune system function, as well as play a prominent role in supporting healthy blood glucose levels. They are also our best source of antioxidants like polyphenols, flavonoids, carotenoids, lignans, and other important anti-aging agents. **Potent, nutritious, and functional, Draco Fruit, Vegetable & Mushroom Bioactive Botanical Extracts** are effective ingredients for functional food, beverage, dietary supplement, and topical skin care applications.

**Legendary Draco Manufacturing**
Draco Mushroom Extracts are pure, clean, safe, and natural. They are nutrient dense, whole food extract ingredients. **Draco Mushroom Extracts** are Full Spectrum extracted in pure, natural water, resulting in a balanced, efficacious extract powder. We start with the entire whole mushroom, sustainably grown and harvested. No excipients nor growing media like grain substrates found in cheaper mycelium versions are used. No chemical solvents are used, which can leave residues, and/or inhibit complete extraction.

In conventional methods used by most processors, organic solvents are used to penetrate cell walls and extract lipid soluble compounds, but this leaves behind valuable water soluble bioactives like polysaccharides. These are left unextracted due to their limited solubility in chemical solvents. **Draco’s unique Full Spectrum** extraction breaks down the cell walls of mushrooms using our certified organic pure water technology, freeing bioactives, and efficiently extracting a full spectrum of phytochemicals. Our extracts are never subjected to high heat which can damage important compounds. Due to our unique spray-drying process, our mushroom extracts are also carrier-free. We can also process with advanced **supercritical CO2 extraction** and/or bio-fermentation to produce special extracts with active metabolites and/or high lipid-soluble content, while increasing bioavailability, upon request.

We process our extracts in our own state-of-the-art 120,000 square foot processing facility, which is **Certified Organic** to both USDA NOP and European EEC/834 standards. Our facilities are also **Food GMP Certified, GFSI Certified, ISO 9001:2015 Certified, HACCP Certified, Kosher Certified, and Halal Certified** for your additional assurance of quality. As part of our vertically integrated “Seed to Drum” monitoring process, our extracts undergo Rigorous Analytical Testing for constituent assay (HPLC, HPTLC, UV), moisture, bulk density, heavy metals (USP methods), pesticides, and microbiological plate counts. We lead the botanical extracts industry in purity with plate counts that are frequently several times lower than our competitors and we never irradiate or fumigate either our plants or finished extracts. Extracts also include full traceability from start to finish.
GOED will continue to try to provide a balancing voice in the media. “It’s unfortunate that we are forced to fight the messaging war in the media, as dissecting the science does not easily fit into media headlines or Twitter posts,” Gearheart says. “GOED’s plan is to continue to highlight positive studies and parse out the nuances of seemingly neutral studies. We share this information with our network of reporters and consumer influencers in the nutrition space in hopes that consumers will at least see a balanced story in all of the coverage.”

In addition to anticipating new research—and new headlines—on omega-3s in 2019, Rice says GOED continues to keep its eye on potential regulatory developments that would be important to the industry, including: 1) an FDA decision regarding a GOED petition for a qualified health claim linking omega-3s to blood pressure management, 2) a possible review of omega-3 supplementation by the U.S. Dietary Guidelines Advisory Committee, and 3) a proposal in Egypt to adopt the Codex Standard for Fish Oils as its own. Keep all these potential developments on your radar in 2019.

As for further industry developments in 2019, Gearheart says: “The market potential for omega-3s varies considerably on a global basis, with the largest growth coming from the Asia region. In the U.S., concentrates will continue to grow, primarily at the expense of 18:12 oils. The success of REDUCE-IT and new headlines—on omega-3s in 2019, [flu medication] Tamiflu brought elderberry to the forefront of products recommended during flu season. So far this flu season, manufacturers and retailers are adjusting from the lessons learned in 2018 with increases in both internal and retailer inventory.”

Renewed awareness of elderberry is encouraging brands to revisit their elderberry product lines and even develop new elderberry products in anticipation of the upcoming winter season. “Leading brands have, in some cases, enhanced their product line and expanded and promoted elderberry much more aggressively,” continues Gallo. “Even the big box stores are jumping on the elderberry bandwagon and developing elderberry-based immune/flu syrups and gummies for their brand.”

While best known for its immune-supporting properties, elderberry is a versatile ingredient whose use is not limited to cold syrups. Renewed interest in the ingredient may in fact open doors to a wide gamut of elderberry products. “For a lot of our customers, they’re looking for something novel and different than just capsules and tablets,” explains Melanie Bush, science director of Artemis International. “Those products will always have a home base, but really innovation and creativity seem the way that we’re going right now. We’re incorporating elderberry, for example, in chocolates, in lollipops, in different types of deliveries that are crossing over into the functional food realm, because we see that’s where the demand of the consumer is. They want to have the health benefits of these ingredients but in a more fun, palatable way.”

Novel elderberry product formulations also open the ingredient up to a larger consumer

References
6. Maki KC et al. "Omega-3 fatty acid supplementation and cardiovascular disease risk: Glass half full or time to nail the coffin shut?" Nutrients, vol. 10, no. 7 (July 4, 2018).
base, which is clamoring for immune-health support. According to SPINS, “cold and flu” was the number-one health focus in the multi-outlet retail channel and the number-two focus in the natural channel. Consumers are always looking for ways to fortify their immune system, and by offering elderberry in functional foods and beverages, elderberry can act as a preventative product rather than a cold syrup—including for children.

“Different ways to deliver healthy functionality is something we’re getting daily questions about from our customers,” says Bush. “We’re just encouraging our customers to be creative, to embrace where possible in their product line and their mission different ways to reach consumers so that everyone can benefit from these ingredients.” For example, she says, children and seniors often have trouble swallowing capsules, and thus gummy manufacturers may also find opportunities in elderberry. “The more diverse the applications, the deliveries, the better,” Bush advises.

Magnesium

Magnesium’s growth hasn’t slowed. Magnesium, the second most popular mineral on the market, is still projected to eventually overtake the current number-one standalone mineral, calcium.

“Magnesium sales are seeing consistent year-on-year growth, and 2018 was no different,” says Samantha Ford, business development director for ingredient supplier AIDP Inc. (City of Industry, CA). “Magnesium is the second-highest-selling mineral, just behind calcium, but is expected to surpass calcium sales within the next three years.”

In the U.S. today, magnesium is alarmingly underconsumed; government estimates suggest that at least half of the population today does not meet Estimated Average Requirements (EAR) for magnesium. This deficiency is concerning, as magnesium is a critical nutrient implicated in hundreds of reactions in the body.
A Singular Focus

We make softgels. Various shapes, sizes, and colors. Custom and stock formulas. Solvent-free. That’s all we do. In a GMP-certified U.S. facility. We do one thing and we do it well. By choosing us as your softgel contract manufacturer, you can concentrate on what you do best.

If we may have your attention for a moment, we’ll make you the center of attention. Contact us today.

Delivering custom and branded softgels, naturally.™
Patrick Sullivan, Jr., CEO of magnesium supplements brand Jigsaw Health LLC, says: "It’s commonly cited that magnesium is involved in over 325 biochemical reactions in the body, but that number is from the 1950s and was a ‘best guess’ by Harvard medical professor Dr. Bert Vallee." The actual number could be much higher—even as high as 3,751 reactions, Sullivan, Jr., says, citing recent findings by magnesium researcher and author Morley Robbins (a.k.a. "Magnesium Man"). "That’s the reason I refer to magnesium as the ‘conductor of the mineral orchestra,’" Sullivan, Jr., adds.

Magnesium’s health benefits are wide reaching, encompassing bone health, heart health, and brain health. Recently, *Nutritional Outlook* wrote about growing interest in magnesium for muscle function and performance. Considering this country’s underconsumption of magnesium, the magnesium supplements market is still largely untapped, with lots of potential for growth.

On a global scale, market research provider Euromonitor International forecasts that volume consumption of magnesium ingredients will grow nearly 11% during 2017-2022. And SPINS numbers looking at ingredient sales during the 52 weeks ending November 4, 2018, also show magnesium’s growth in some key areas, and especially in the natural retail channel. Magnesium ranked 9th on the list of top-selling ingredients in the natural channel. In this channel, sales grew 16% last year, to $35.8 million. Magnesium also saw positive growth in the specialty gourmet channel, where SPINS estimates sales grew nearly 13%, making it the 17th-top-selling ingredient in that channel.

Success is happening across the board. Jigsaw Health and AIDP Inc.—a brand owner and an ingredient supplier, respectively—say they saw double-digit sales growth for their magnesium products or ingredients in 2018, and that they expect to see the same kind of success in 2019.

"Consumers are really grasping the importance of magnesium in the diet—not just for bone and heart health, but also in the realm of cognition," says AIDP’s Ford. Drilling down to health conditions, SPINS numbers indicate small to medium boosts for magnesium in the areas of digestive health (mainstream channel), bone health (mainstream channel), mood (natural channel), and heart health (natural channel).

Companies are now focused on making magnesium ingredients easier for product formulators to work with. Ford says that AIDP’s flagship magnesium ingredient, Magtein (mainly for cognitive health), "can be easily formulated into finished products such as beverages, bars, chocolate, coffee, gummies, and more."

Last year, another ingredient supplier, Marigot Ltd. (Cork, Ireland), added a water-soluble magnesium ingredient to its Aquamin line of marine-derived, multimineral-complex ingredients.

Absorption is another focus. Jigsaw Health’s MagSRT product, for instance, is a time-release magnesium supplement that Sullivan, Jr., calls "the only time-release magnesium supplement with a peer-reviewed clinical trial." The 91-subject study, published in 2019, showed a 12% increase in magnesium absorption when compared to a placebo.

Companies are now focused on making magnesium ingredients easier for product formulators to work with. Ford says that AIDP’s flagship magnesium ingredient, Magtein (mainly for cognitive health), "can be easily formulated into finished products such as beverages, bars, chocolate, coffee, gummies, and more."

Last year, another ingredient supplier, Marigot Ltd. (Cork, Ireland), added a water-soluble magnesium ingredient to its Aquamin line of marine-derived, multimineral-complex ingredients.

Absorption is another focus. Jigsaw Health’s MagSRT product, for instance, is a time-release magnesium supplement that Sullivan, Jr., calls "the only time-release magnesium supplement with a peer-reviewed clinical trial." The 91-subject study, published in 2019, showed a 12% increase in magnesium absorption when compared to a placebo.

### Ingredients to Watch

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$242,182,261</td>
<td>$198,525,403</td>
<td>22.00%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$234,146,270</td>
<td>$206,543,743</td>
<td>13.40%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C Only)</td>
<td>$149,383,315</td>
<td>$141,766,452</td>
<td>5.40%</td>
</tr>
<tr>
<td>Horehound</td>
<td>$148,559,371</td>
<td>$135,840,582</td>
<td>9.40%</td>
</tr>
<tr>
<td>Echinacea</td>
<td>$97,549,733</td>
<td>$81,921,867</td>
<td>19.10%</td>
</tr>
<tr>
<td>Chinese Herbs</td>
<td>$95,217,895</td>
<td>$86,870,940</td>
<td>9.60%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$30,875,960</td>
<td>$26,916,509</td>
<td>13.10%</td>
</tr>
<tr>
<td>Ivy Leaf</td>
<td>$29,287,771</td>
<td>$23,615,792</td>
<td>24.00%</td>
</tr>
<tr>
<td>Bee Products (Not Propolis)</td>
<td>$23,140,659</td>
<td>$23,075,486</td>
<td>0.30%</td>
</tr>
<tr>
<td>Menthol</td>
<td>$19,208,220</td>
<td>$20,501,264</td>
<td>-6.30%</td>
</tr>
</tbody>
</table>

### Energy Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taurine</td>
<td>$240,831,356</td>
<td>$245,908,027</td>
<td>-2.10%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$148,991,438</td>
<td>$144,518,720</td>
<td>3.10%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>$75,416,207</td>
<td>$61,084,665</td>
<td>23.50%</td>
</tr>
<tr>
<td>Creatine</td>
<td>$59,335,942</td>
<td>$52,993,041</td>
<td>12.00%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$50,003,359</td>
<td>$54,206,240</td>
<td>-7.80%</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>$44,841,342</td>
<td>$48,427,062</td>
<td>-7.80%</td>
</tr>
<tr>
<td>Protein - Animal (Multi)</td>
<td>$31,817,978</td>
<td>$24,243,191</td>
<td>31.20%</td>
</tr>
<tr>
<td>Green Teas &amp; Supplements</td>
<td>$16,790,437</td>
<td>$7,071,125</td>
<td>137.50%</td>
</tr>
<tr>
<td>Multivitamin (Women)</td>
<td>$16,571,094</td>
<td>$19,146,231</td>
<td>-13.40%</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>$12,698,972</td>
<td>$12,404,990</td>
<td>2.40%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)" Source: Conventional Multi-Outlet Channel (Powered by IRI)

Time period: 52 weeks ending November 4, 2018

Channel: U.S. conventional multi-outlet, comprising grocery, drug, Wal-Mart, mass, dollar, military, and club stores
Add some immune protection to your next supplement.

Glutathione is an essential component of the body's defense systems.* It protects cells from the damaging effects of oxidative stress and toxins and supports multiple immune processes.* Unfortunately, natural glutathione levels can become depleted through stress, poor diet and the aging process. Setria®, a unique tri-peptide form of glutathione, has a molecular structure that effectively increases glutathione blood levels when taken orally.* It's the only supplemental glutathione backed by a recently published human clinical trial that shows significant uptake of this critical nutrient.* Arm your consumers with a strong defense. Add vegetarian, allergen-free, GRAS Setria glutathione to your next immune supplement.

*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.
the Journal of the American College of Nutrition last year, found that subjects who supplemented with MagSRT for at least 30 days significantly improved their magnesium status. Last year, ingredient supplier Maypro Group (Purchase, NY) announced an \textit{ex vivo} study\textsuperscript{4} which found that a proprietary magnesium ingredient the company distributes, Sucrosomial, created by Alesco S.r.l., has a liposomal structure that improves magnesium absorption.

More ingredients, more products, more customers. It all points to an attractive future for this ingredient. Sullivan, Jr., also credits consumer word of mouth for helping to spread magnesium awareness, as both he and AIDP’s Ford say that magnesium’s benefits are often improvements consumers can actually feel. “I believe the steady growth of magnesium revenue makes it a trend rather than a fad,” says Sullivan, Jr.

\textbf{References}


2. Qureshi I. "Magnesium for muscle function and performance." \textit{Nutritional Outlook}, vol. 21, no. 7 (September 2018): 40-46

---

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
\textbf{Joint Health} & \textbf{Current Dollars} & \textbf{Year-Ago Dollars} & \textbf{\% Change} \\
\hline
Glucosamine-Chondroitin Combo & $134,831,955 & $146,872,671 & -8.20\% \\
Glucosamine & $39,210,284 & $40,934,172 & -4.20\% \\
Turmeric & $12,365,616 & $9,352,656 & 32.20\% \\
Hyaluronic Acid (HA) & $11,114,593 & $11,164,782 & -0.40\% \\
Boswellin or Boswellia & $10,120,299 & $14,534,899 & -30.40\% \\
Collagen Products & $7,088,527 & $9,504,014 & -25.40\% \\
Fish Oil Concentrate & $1,135,886 & $1,650,130 & -31.20\% \\
Krill Oil & $1,051,629 & $1,450,315 & -27.50\% \\
Cherry Fruit Supplements & $838,088 & $1,380,059 & -39.30\% \\
MSM & $318,226 & $379,967 & -16.20\% \\
\hline
\end{tabular}
\caption{Joint Health}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
\textbf{Sleep} & \textbf{Current Dollars} & \textbf{Year-Ago Dollars} & \textbf{\% Change} \\
\hline
Melatonin & $252,068,646 & $228,029,497 & 10.50\% \\
Valerian & $15,709,425 & $18,028,426 & -12.90\% \\
Specialty Remedies (Homeopathic) & $14,690,652 & $15,059,946 & -2.50\% \\
Ivy Leaf & $7,822,962 & $7,918,638 & -1.10\% \\
5-HTP & $2,994,891 & $2,108,682 & 42.00\% \\
ZMA Supplements & $1,447,541 & $528,563 & 173.90\% \\
GABA & $1,386,878 & $1,515,320 & -8.50\% \\
Chamomile & $1,192,185 & $1,005,455 & 18.60\% \\
Cough Syrups & $1,179,709 & $116,998 & 908.30\% \\
Bromelain & $797,931 & $1,438,194 & -44.50\% \\
\hline
\end{tabular}
\caption{Sleep}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
\textbf{Weight Loss} & \textbf{Current Dollars} & \textbf{Year-Ago Dollars} & \textbf{\% Change} \\
\hline
Protein - Animal (Multi) & $143,830,688 & $143,361,196 & 0.30\% \\
Protein - Animal (General) & $115,229,333 & $109,239,058 & 5.50\% \\
Protein - Animal & $70,645,881 & $62,130,694 & 13.70\% \\
Caffeine & $66,576,039 & $92,290,906 & -27.90\% \\
Protein - Animal (Casein) & $31,894,994 & $19,640,328 & 62.40\% \\
Green Teas & $25,390,203 & $29,314,083 & -13.40\% \\
Garcinia cambogia (HCA) & $23,613,052 & $38,805,583 & -39.20\% \\
Glucomannan & $23,069,046 & $18,795,150 & 22.70\% \\
Protein - Animal (Whey & Casein) & $22,045,812 & $21,792,536 & 1.20\% \\
Green Coffee Extract & $15,701,237 & $12,016,893 & 30.70\% \\
\hline
\end{tabular}
\caption{Weight Loss}
\end{table}

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: Conventional Multi-Outlet Channel (Powered by IRI)
Time period: 52 weeks ending November 4, 2018
Channel: U.S. conventional multi-outlet, comprising grocery, drug, Wal-Mart, mass, dollar, military, and club stores
500 BOTTLE MINIMUM ORDER!*

We Specialize in Capsule Jobs!

Custom Manufacturer of Nutraceutical Supplements

Pinnacle Labs International is a cGMP certified contract manufacturer, custom formulator, and contract packager for all your nutraceutical necessities.

CALL TODAY FOR YOUR FREE QUOTE:
1-800-600-4634

HIGHEST QUALITY—LOWEST PRICES—SATISFACTION GUARANTEED

Email Us Your Product Information: sales@pinnaclelabs.net
www.pinnaclelabs.net

Pinnacle Labs International, Inc., 284 Industry Way, Upland, CA 91786
*500 Bottle Minimum order does not apply if you are using any trademark ingredients in your formula.
Ingredients to Watch


**Turmeric**

Turmeric (*Curcuma longa*) continues to climb the sales charts. In 2017, turmeric ranked as the 5th-top-selling mainstream herbal supplement ingredient in the U.S., up from its 10th-place spot a year ago, according to the American Botanical Council’s latest *Herbal-Gram* Herb Market Report. In 2017, turmeric sales in the U.S. mainstream retail channel grew 46.7% over the previous year, roughly a $10.3 million increase, to over $32 million. And in the natural channel, where turmeric got its start, the ingredient remained the number-one-selling herbal ingredient, with sales growing 12.2% to over $50 million, according to the report.

Turmeric is established within the Indian traditional medicinal system of Ayurveda, but extensive research on turmeric’s active constituent, curcumin, has given the ingredient credibility among modern researchers and a wider mainstream audience as more curcumin supplements hit the market. “There are over 9,000 peer-reviewed articles published on turmeric, especially on curcumin and its wide range of health effects,” says Shaheen Majeed, president worldwide, Sabinsa (East Windsor, NJ), to Nutritional Outlook. “Acceptance by the medical community because of this research has undoubtedly contributed to curcumin’s remarkable popularity.”

Supplement applications are demonstrating greater versatility, giving consumers products that range from traditional herbal sup-

### Natural Channel (United States)

#### 25 Bestselling Ingredients across All Health Conditions

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$138,469,809</td>
<td>$144,946,512</td>
<td>-4.5%</td>
</tr>
<tr>
<td>Protein - Plant (Multi)</td>
<td>$71,684,185</td>
<td>$81,242,779</td>
<td>-11.8%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$65,169,664</td>
<td>$65,287,263</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$51,214,666</td>
<td>$51,096,762</td>
<td>0.2%</td>
</tr>
<tr>
<td>Multivitamin (Women)</td>
<td>$43,180,901</td>
<td>$42,385,904</td>
<td>1.9%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$40,731,662</td>
<td>$36,807,365</td>
<td>10.7%</td>
</tr>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$40,393,188</td>
<td>$8,377,750</td>
<td>382.1%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$37,804,420</td>
<td>$16,995,050</td>
<td>122.4%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$35,843,278</td>
<td>$30,895,050</td>
<td>16.0%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$28,051,630</td>
<td>$26,029,500</td>
<td>7.8%</td>
</tr>
<tr>
<td>Calcium-Magnesium Combinations</td>
<td>$26,156,415</td>
<td>$25,417,636</td>
<td>2.9%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$24,694,500</td>
<td>$21,850,138</td>
<td>13.0%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$21,208,306</td>
<td>$11,638,051</td>
<td>82.2%</td>
</tr>
<tr>
<td>Digestive Enzymes (Other)</td>
<td>$20,122,619</td>
<td>$19,853,282</td>
<td>1.4%</td>
</tr>
<tr>
<td>Multivitamin (Men)</td>
<td>$20,111,408</td>
<td>$19,578,897</td>
<td>2.7%</td>
</tr>
<tr>
<td>Protein - Animal (Whey)</td>
<td>$19,793,826</td>
<td>$21,759,928</td>
<td>-9.0%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$19,671,713</td>
<td>$18,994,174</td>
<td>3.6%</td>
</tr>
<tr>
<td>Grass (Wheat or Barley)</td>
<td>$19,123,432</td>
<td>$19,805,889</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Multivitamin (Adult)</td>
<td>$17,135,251</td>
<td>$18,405,003</td>
<td>-6.9%</td>
</tr>
<tr>
<td>Multivitamin (Children)</td>
<td>$16,714,225</td>
<td>$16,049,914</td>
<td>4.1%</td>
</tr>
<tr>
<td>Protein - Animal (General)</td>
<td>$16,314,650</td>
<td>$15,183,522</td>
<td>7.4%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$15,758,311</td>
<td>$15,131,310</td>
<td>4.1%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$14,087,567</td>
<td>$15,164,365</td>
<td>-7.1%</td>
</tr>
<tr>
<td>Aloe vera</td>
<td>$13,845,196</td>
<td>$13,849,249</td>
<td>0%</td>
</tr>
<tr>
<td>MCT (Medium-Chain Triglycerides)</td>
<td>$12,391,846</td>
<td>$5,880,231</td>
<td>110.7%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)  
Source: SPINSscan Natural  
Time period: 52 weeks ending November 4, 2018  
Channel: U.S. natural supermarkets, excluding Whole Foods Market

---

### Vitamin D

#### 10 BESTSELLING INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium-Magnesium Combinations</td>
<td>$22,755,546</td>
<td>$22,309,190</td>
<td>2.0%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$13,204,024</td>
<td>$11,907,319</td>
<td>10.9%</td>
</tr>
<tr>
<td>Calcium</td>
<td>$5,405,453</td>
<td>$5,305,767</td>
<td>1.9%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$3,480,629</td>
<td>$3,226,727</td>
<td>7.9%</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>$2,793,974</td>
<td>$2,581,610</td>
<td>8.2%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$2,254,582</td>
<td>$2,310,127</td>
<td>-2.4%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$1,375,079</td>
<td>$1,258,386</td>
<td>9.3%</td>
</tr>
<tr>
<td>Coral Calcium</td>
<td>$289,700</td>
<td>$296,172</td>
<td>-2.2%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$278,064</td>
<td>$280,205</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Vitamin A - D - K</td>
<td>$277,348</td>
<td>$147,337</td>
<td>88.2%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)  
Source: SPINSscan Natural  
Time period: 52 weeks ending November 4, 2018  
Channel: U.S. natural supermarkets, excluding Whole Foods Market

---

### Cardiovascular Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-Enzyme Q10</td>
<td>$9,296,766</td>
<td>$9,381,064</td>
<td>-0.9%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$7,730,688</td>
<td>$7,196,447</td>
<td>7.4%</td>
</tr>
<tr>
<td>Garlic</td>
<td>$3,771,977</td>
<td>$3,651,465</td>
<td>3.3%</td>
</tr>
<tr>
<td>Red Yeast Rice</td>
<td>$3,225,040</td>
<td>$3,290,644</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Co-Enzyme Q10 (Ubiquinol)</td>
<td>$2,711,860</td>
<td>$2,708,631</td>
<td>0.1%</td>
</tr>
<tr>
<td>Hawthorne</td>
<td>$2,404,066</td>
<td>$2,289,644</td>
<td>5.0%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$1,489,035</td>
<td>$1,230,036</td>
<td>21.1%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$1,402,796</td>
<td>$1,467,203</td>
<td>-4.4%</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>$1,088,122</td>
<td>$1,115,012</td>
<td>-2.4%</td>
</tr>
<tr>
<td>Krill Oil</td>
<td>$992,635</td>
<td>$1,188,904</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)  
Source: SPINSscan Natural  
Time period: 52 weeks ending November 4, 2018  
Channel: U.S. natural supermarkets, excluding Whole Foods Market
YOUR masking CONNECTION

TASTE COLLABORATIONS | Tailor-made solutions

We help our customers formulate with challenging ingredients by connecting them with the experts in taste enhancement and modulation: our dedicated flavorists and food scientists. With a direct line to these collaborators, you get individualized and immediate attention from the people who deliver preferred taste every day.

Formulation Assistance & Expertise  Health & Wellness applications laboratory  Regulatory Support & Knowledge

Get in touch with the experts in delivering preferred taste:
VIRGINIADARE.COM / 718-788-1776 / flavorinfo@virginiadare.com
Ingredients to Watch

Complements to functional beverages and shots. Supplement-grade curcumin dosage forms have advantages over food-grade turmeric. “As a food, turmeric supports your ojas (vital energy), and, being a bitter herb, it supports digestion, too; however, turmeric root powder as a food ingredient/spice doesn’t offer the same targeted support that a supplemental extract does,” explains Stacey Gillespie, Gaia Herbs’ director of product strategy. “The fat-soluble active components of turmeric, including its essential oils, need to pass the blood-brain barrier to offer neurological support as well as support for any of the other targeted areas.”

Combining turmeric’s importance in Ayurveda and the efficacy of modern turmeric supplements encourages health-minded consumers to incorporate turmeric and other Ayurvedic herbs into their lifestyles in a variety of ways. “Traditionally, consumers in the U.S. have preferred tablet and capsule forms, but increasingly, there is interest in alternative delivery forms like beverages, powder premixes, and ready-to-drink beverages,” says Majeed. “In some other countries, such as Japan, beverages are extremely common delivery formats, and we anticipate more of that in the U.S. To facilitate use of our Curcumin C3 Complex in beverages, we developed a water-soluble form, uC3 Clear.” Gaia Herbs sells its Turmeric Boost Uplift powder and Golden Milk, meant to mix

NATURAL CHANNEL
10 BESTSELLING INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Cognitive Health</th>
<th>Digestive Health</th>
<th>Energy Support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year-Ago Dollars</td>
<td>% Change</td>
<td>Current Dollars</td>
</tr>
<tr>
<td>Current Dollars</td>
<td></td>
<td></td>
<td>Current Dollars</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>$3,954,874</td>
<td>-0.4%</td>
<td>$121,466,428</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$3,536,677</td>
<td>9.8%</td>
<td>$18,603,853</td>
</tr>
<tr>
<td>Caprylic Acid</td>
<td>$2,918,471</td>
<td>162.9%</td>
<td>$3,547,746</td>
</tr>
<tr>
<td>MCT (Medium-Chain Triglycerides)</td>
<td>$2,575,033</td>
<td>712.4%</td>
<td>$2,971,719</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$2,226,227</td>
<td>-12.1%</td>
<td>$2,570,073</td>
</tr>
<tr>
<td>Mushrooms (Other)</td>
<td>$2,217,272</td>
<td>113.7%</td>
<td>$1,671,914</td>
</tr>
<tr>
<td>Phosphatidylserine</td>
<td>$2,226,227</td>
<td>-12.1%</td>
<td>$1,512,211</td>
</tr>
<tr>
<td>Oats (Oatstraw)</td>
<td>$1,957,798</td>
<td>23.3%</td>
<td>$1,388,933</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$1,562,451</td>
<td>3.3%</td>
<td>$1,562,451</td>
</tr>
<tr>
<td>Lecithin (Phosphatidylcholine)</td>
<td>$1,167,968</td>
<td>0.8%</td>
<td>$1,167,968</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Natural
Time period: 52 weeks ending November 4, 2018
Channel: U.S. natural supermarkets, excluding Whole Foods Market
Encapsulating More³
Custom Manufacturing · NutraStock® · Pharma

Captek Softgel International offers uncompromising manufacturing standards, extensive experience developing leading-edge products, and reliable customer service. And now we offer even MORE.

**Custom Manufacturing**
Captek is a leader in innovation. Our unique understanding of capsule integrity and ingredient interaction is why we are the choice for many leading nutraceutical companies.

**NutraStock®**
NutraStock® quality bulk stock nutraceuticals with over 200 products available on-demand with immediate delivery and competitive pricing.

**Captek | Pharma**
Captek Pharma, the newest division of Captek Softgel International offers a dedicated 21 CFR part 210/211 contract manufacturing facility to serve your pharmaceutical softgels needs.

To learn more about what a partnership with Captek holds for you, go to capteksoftgel.com and/or captekpharma.com
In liquid. “These alternative delivery formats have been very successful and well received,” says Gillespie. “Our Golden Milk product is the number-one-selling turmeric powder in the natural channel. In the case of our Golden Milk, in particular, people are choosing this product as part of their daily wellness plan in order to help them find a moment of mindfulness, while nourishing the body with health-promoting turmeric.”

While the top-selling turmeric products have been marketed for non-specific health conditions, according to HerbalGram, mainstream consumers are increasingly interested in condition-specific turmeric products. In terms of health focus, according to market researcher SPINS, in 2018 turmeric ingredient sales still dominated the pain and inflammation category, with sales in the U.S. remaining stable in the natural channel and increasing by 20.9% in the specialty foods channel in the 52 weeks ending November 4, 2018. In relation to inflammation and pain, turmeric also takes a top spot in the joint-health category in the U.S. conventional multioutlet channel and natural channels, with sales increasing by 32.2% and 12.2% respectively, according to SPINS.

As research into turmeric persists, the ingredient’s anti-inflammatory and antioxidant benefits translate to other areas as well. Recent research, for example, involves the microbiome. “A recent double-blind, randomized, placebo-controlled clinical study investigated the impact of curcuminoids on the gut microbiome in humans for two months,” says Majeed, pointing to the study done on Sabinsa’s ingredient. “Curcuminoids were found to have a unique role and effect on the gut microbiome by increasing the population of several species, which attribute the ‘prebiotic-like’ effects to suitable alterations of host physiology congenial to the growth of beneficial microbiota.”

According to Gillespie, brain-health turmeric formulations are on the rise. “Research has shown there is a link in declining cognitive health and inflammation,” she says. “Turmeric extract is included in supplements for the brain because of this herb’s ability to help maintain a healthy inflammatory response. Curcumin, the

### Joint Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucosamine-Chondroitin Combo</td>
<td>$6,843,140</td>
<td>$7,049,745</td>
<td>-2.9%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$3,550,665</td>
<td>$3,164,961</td>
<td>12.2%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$3,422,380</td>
<td>$2,640,171</td>
<td>29.6%</td>
</tr>
<tr>
<td>Hyaluronic Acid (HA)</td>
<td>$3,345,893</td>
<td>$3,506,879</td>
<td>-4.6%</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>$2,346,914</td>
<td>$2,430,202</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$2,296,905</td>
<td>$2,240,163</td>
<td>2.5%</td>
</tr>
<tr>
<td>MSM</td>
<td>$1,873,593</td>
<td>$2,010,049</td>
<td>-6.8%</td>
</tr>
<tr>
<td>Proteolytic Enzymes</td>
<td>$1,586,090</td>
<td>$1,690,549</td>
<td>-6.2%</td>
</tr>
<tr>
<td>Boswellin or Boswellia</td>
<td>$1,518,304</td>
<td>$1,460,196</td>
<td>4.0%</td>
</tr>
<tr>
<td>Bromelain</td>
<td>$949,508</td>
<td>$1,017,315</td>
<td>-6.7%</td>
</tr>
</tbody>
</table>

### Mood Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium</td>
<td>$11,867,494</td>
<td>$11,250,671</td>
<td>5.5%</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>$7,197,192</td>
<td>$6,493,256</td>
<td>10.8%</td>
</tr>
<tr>
<td>Flower Essences</td>
<td>$4,673,588</td>
<td>$4,639,384</td>
<td>0.7%</td>
</tr>
<tr>
<td>Theanine</td>
<td>$3,084,879</td>
<td>$3,022,370</td>
<td>2.1%</td>
</tr>
<tr>
<td>GABA</td>
<td>$2,990,761</td>
<td>$2,769,399</td>
<td>8.0%</td>
</tr>
<tr>
<td>Holy Basil</td>
<td>$2,941,295</td>
<td>$3,087,859</td>
<td>-4.7%</td>
</tr>
<tr>
<td>Kava</td>
<td>$2,579,689</td>
<td>$2,507,400</td>
<td>2.9%</td>
</tr>
<tr>
<td>5-HTP</td>
<td>$2,186,694</td>
<td>$2,186,194</td>
<td>0%</td>
</tr>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$1,908,373</td>
<td>$1,826,874</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

### Pain & Inflammation Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turmeric</td>
<td>$30,293,822</td>
<td>$30,329,168</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Arnica (Homeopathic)</td>
<td>$9,789,471</td>
<td>$9,705,220</td>
<td>0.9%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$6,441,394</td>
<td>$6,517,973</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Homeopathic Remedy (Other)</td>
<td>$1,489,845</td>
<td>$1,311,848</td>
<td>13.6%</td>
</tr>
<tr>
<td>Cherry Fruit Supplements</td>
<td>$771,921</td>
<td>$805,476</td>
<td>-4.2%</td>
</tr>
<tr>
<td>Boswellin or Boswellia</td>
<td>$493,551</td>
<td>$396,955</td>
<td>24.3%</td>
</tr>
<tr>
<td>Collinsonia</td>
<td>$447,535</td>
<td>$418,151</td>
<td>7.0%</td>
</tr>
<tr>
<td>Willow Bark</td>
<td>$391,554</td>
<td>$353,677</td>
<td>10.7%</td>
</tr>
<tr>
<td>Homeopathic Cell Salts</td>
<td>$237,589</td>
<td>$227,417</td>
<td>4.5%</td>
</tr>
<tr>
<td>Butterbur</td>
<td>$224,207</td>
<td>$253,094</td>
<td>-11.4%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Natural
Time period: 52 weeks ending November 4, 2018
Channel: U.S. natural supermarkets, excluding Whole Foods Market
We Guarantee
Identity, Purity & Potency

Nutra Solutions USA is a NSF cGMP Manufacturer of premium dietary supplements, nutraceutical, sports nutrition, and functional nutritional products.

Request a FREE Quote

CALL 1-844-594-9333

Contract Manufacturing
Private Labeling
Turn-Key Services

Manufacturing Facility
1019 Grand Blvd
Deer Park NY, 11729
United States

Packaging Facility
1016 Grand Blvd
Deer Park NY, 11729
United States

Warehouse & Distribution
511 Commack Rd.
Deer Park NY, 11729
United States

1-844-594-9333
Service@nutrasolutionsusa.com
www.nutrasolutionsusa.com
primary active compound found in turmeric, is also known to cross the blood-brain barrier.”

Majeed agrees. “Curcumin has many beneficial effects for seniors, including neuroprotection,” he says. “Sabinsa is working with university researchers on conducting clinical trials on these lines.”

Reference
1. Peterson CT et al. “Curcumin C3 Complex had a positive influence on Bacteroidetes among others thus demonstrating for the first time in a human clinical study the beneficial effect of curcuminoids on gut microbiota population redistribution.” Journal of Evidence-Based Integrative Medicine, vol. 23 (2018): 1-8

Collagen
Beauty is something we all strive for whether one likes to admit it or not. Good skin and healthy hair are key ambitions driving consumers of all ages to collagen. Collagen has become an important ingredient dominating the nutricosmetic space. According to SPINS, in the hair, skin, and nail category, collagen ingredient sales increased by 28.4% to over $27 million in the conventional mult outlets channel in the 52 weeks ending November 4, 2018, while sales increased 93% in the natural channel to $139 million and 112% in the specialty food channel to $266,657.

Collagen has long been an important ingredient in the hair, skin, and nails category. “Nutricosmetics was a new, buzzy word used back in 2011, yet collagen has been used in the cosmeceutical industry since 1985,” explains Ann Marie Montgomery, vice president of Longevity by Nature/Joy of Health, owned by Certified Nutraceuticals (Pauma Valley, CA). However, a lot has changed since 1985, and even since 2011. The continued upward trajectory of this ingredient has a lot to do with innovation as some consumers move away from traditional supplements. Water-soluble, powdered collagen, for example, provides a great deal of convenience and even allows consumers to incorporate collagen in home-cooked meals.

Specialty Gourmet Channel (United States) 25 Bestselling Ingredients across All Health Conditions

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$10,081,663</td>
<td>$10,027,581</td>
<td>0.5%</td>
</tr>
<tr>
<td>Protein - Animal &amp; Plant Combo</td>
<td>$6,007,258</td>
<td>$6,262,944</td>
<td>-4.1%</td>
</tr>
<tr>
<td>Protein - Plant (Multi)</td>
<td>$5,421,863</td>
<td>$5,902,247</td>
<td>-8.1%</td>
</tr>
<tr>
<td>Protein - Animal (General)</td>
<td>$4,914,878</td>
<td>$4,987,878</td>
<td>-1.5%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$3,809,580</td>
<td>$3,860,722</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$3,313,615</td>
<td>$3,121,944</td>
<td>6.1%</td>
</tr>
<tr>
<td>Multivitamin (Women)</td>
<td>$3,064,986</td>
<td>$2,796,451</td>
<td>9.6%</td>
</tr>
<tr>
<td>Protein - Animal (Multi)</td>
<td>$2,720,330</td>
<td>$2,503,356</td>
<td>8.7%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>$2,380,206</td>
<td>$2,322,569</td>
<td>2.5%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$2,277,764</td>
<td>$1,803,301</td>
<td>26.3%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$2,004,586</td>
<td>$1,925,772</td>
<td>4.1%</td>
</tr>
<tr>
<td>Protein - Animal (Whey)</td>
<td>$1,965,668</td>
<td>$2,168,198</td>
<td>-9.3%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C Only)</td>
<td>$1,895,517</td>
<td>$1,823,956</td>
<td>3.9%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$1,655,462</td>
<td>$479,293</td>
<td>245.4%</td>
</tr>
<tr>
<td>Multivitamin (Children)</td>
<td>$1,516,852</td>
<td>$1,495,964</td>
<td>1.4%</td>
</tr>
<tr>
<td>Multivitamin (Men)</td>
<td>$1,454,667</td>
<td>$1,348,311</td>
<td>7.9%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$1,431,108</td>
<td>$1,268,024</td>
<td>12.9%</td>
</tr>
<tr>
<td>Unknown</td>
<td>$1,422,862</td>
<td>$963,550</td>
<td>47.7%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$1,402,789</td>
<td>$1,613,209</td>
<td>-13.0%</td>
</tr>
<tr>
<td>Multivitamin (Adult)</td>
<td>$1,359,947</td>
<td>$1,493,539</td>
<td>-8.9%</td>
</tr>
<tr>
<td>Melatonin</td>
<td>$1,324,206</td>
<td>$1,118,995</td>
<td>18.3%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$1,231,637</td>
<td>$1,175,672</td>
<td>4.8%</td>
</tr>
<tr>
<td>Calcium-Magnesium Combinations</td>
<td>$1,198,120</td>
<td>$1,165,645</td>
<td>2.8%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$1,192,990</td>
<td>$661,223</td>
<td>80.4%</td>
</tr>
<tr>
<td>Horehound</td>
<td>$1,175,650</td>
<td>$1,085,806</td>
<td>8.3%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Specialty Gourmet
Time period: 52 weeks ending November 4, 2018
Channel: U.S. specialty gourmet supermarkets

SPECIALTY GOURMET CHANNEL 10 BESTSELLING INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D</td>
<td>$1,188,737</td>
<td>$1,170,236</td>
<td>1.6%</td>
</tr>
<tr>
<td>Calcium-Magnesium Combinations</td>
<td>$1,021,878</td>
<td>$1,003,857</td>
<td>1.8%</td>
</tr>
<tr>
<td>Calcium</td>
<td>$787,798</td>
<td>$827,343</td>
<td>-4.8%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$257,757</td>
<td>$241,128</td>
<td>6.9%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$133,565</td>
<td>$132,529</td>
<td>0.8%</td>
</tr>
<tr>
<td>Multivitamin (Women)</td>
<td>$82,807</td>
<td>$77,623</td>
<td>6.7%</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>$78,656</td>
<td>$68,857</td>
<td>14.2%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$59,762</td>
<td>$49,312</td>
<td>21.2%</td>
</tr>
<tr>
<td>Vitamin A - D - K</td>
<td>$13,790</td>
<td>$2,474</td>
<td>457.4%</td>
</tr>
<tr>
<td>DHA Products</td>
<td>$13,087</td>
<td>$14,574</td>
<td>-8.9%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Specialty Gourmet
Time period: 52 weeks ending November 4, 2018
Channel: U.S. specialty gourmet supermarkets
In many ways, collagen has also become a high-end specialty ingredient. For example, the YouTheory supplements brand has partnered with high-end lifestyle e-retailer Goop to sell on-the-go collagen packets. This partnership is a good representation of the transition collagen is making, from targeting club-store achy joints and healthy-aging supplements to now being sought after as a luxury boutique beauty product. In December 2018, at a party in the Goop Gift Popup shop, YouTheory was even able to showcase its collagen in hot chocolate, cocktails, and cinnamon cupcakes baked by Candace Nelson, the founder of the trendy Sprinkles Cupcakes bakery chain. Collagen manufacturers are effectively tapping into social media, influencer marketing, and youth culture.

However, one should not ignore collagen’s athletic side. Joint health, while associated with aging, is at its core about mobility and fitness. A great deal of innovation happening in collagen is taking place in joint health—specifically sports nutrition and recovery—again reframing the ingredient to a younger audience.

There may be another reason to refocus collagen to sports nutrition; sales are falling for most ingredients in the joint-health category. This is particularly true in the conventional multoutlet channel, where SPINS saw nine of the top-ten-selling joint-health ingredients, including collagen, experienced a decline in sales in the 52 weeks ending November 4, 2018. In the natural channel, collagen in the joint-health category managed to increase in sales by 29.6%, while mainstays like glucosamine and chondroitin experienced a small decline in sales.

Casting a wider net only benefits collagen manufacturers, and they are actively formulating and conducting research to make the appropriate claims and attract brand owners.

“We are also still supplying towards beauty and the broad holistic purposes, but we see there is a big growth within sports nutrition,” explains Frank Engel, global marketing development manager for Rousselot (Mukwonago, WI). Rousselot recently conducted a double-blind, randomized, placebo-controlled trial on its Peptan collagen peptide ingredient to validate its use in sports recovery. The yet-to-be-published study found that men who supplemented with Peptan had significantly less perceived muscle soreness and faster recovery 48 hours after doing 150 drop jumps, when compared to placebo, the company says.

“Sports nutrition is getting more popular, and the group of people who want sports nutrition is broadening,” continues Engel, “including weekend warriors, for example—people who are not actually exercising for an...
Ingredients to Watch

SPECIALTY GOURMET CHANNEL
10 BESTSELLING INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$2,103,434</td>
<td>$1,907,208</td>
<td>10.3%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C Only)</td>
<td>$1,822,116</td>
<td>$1,761,205</td>
<td>3.5%</td>
</tr>
<tr>
<td>Horehound</td>
<td>$1,175,568</td>
<td>$1,085,587</td>
<td>8.3%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$1,133,705</td>
<td>$621,105</td>
<td>82.5%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$1,124,186</td>
<td>$1,093,190</td>
<td>2.8%</td>
</tr>
<tr>
<td>Chinese Herbs</td>
<td>$965,000</td>
<td>$908,617</td>
<td>6.2%</td>
</tr>
<tr>
<td>Echinacea</td>
<td>$728,725</td>
<td>$610,759</td>
<td>19.3%</td>
</tr>
<tr>
<td>Zinc</td>
<td>$328,870</td>
<td>$285,317</td>
<td>15.3%</td>
</tr>
<tr>
<td>Menthol</td>
<td>$311,387</td>
<td>$303,296</td>
<td>2.7%</td>
</tr>
<tr>
<td>Echinacea-Goldenseal Combo</td>
<td>$252,883</td>
<td>$242,838</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Specialty Gourmet
Time period: 52 weeks ending November 4, 2018
Channel: U.S. specialty gourmet supermarkets

Cold & Flu

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$2,103,434</td>
<td>$1,907,208</td>
<td>10.3%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C Only)</td>
<td>$1,822,116</td>
<td>$1,761,205</td>
<td>3.5%</td>
</tr>
<tr>
<td>Horehound</td>
<td>$1,175,568</td>
<td>$1,085,587</td>
<td>8.3%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$1,133,705</td>
<td>$621,105</td>
<td>82.5%</td>
</tr>
<tr>
<td>Vitamin C (Not Ester-C)</td>
<td>$1,124,186</td>
<td>$1,093,190</td>
<td>2.8%</td>
</tr>
<tr>
<td>Chinese Herbs</td>
<td>$965,000</td>
<td>$908,617</td>
<td>6.2%</td>
</tr>
<tr>
<td>Echinacea</td>
<td>$728,725</td>
<td>$610,759</td>
<td>19.3%</td>
</tr>
<tr>
<td>Zinc</td>
<td>$328,870</td>
<td>$285,317</td>
<td>15.3%</td>
</tr>
<tr>
<td>Menthol</td>
<td>$311,387</td>
<td>$303,296</td>
<td>2.7%</td>
</tr>
<tr>
<td>Echinacea-Goldenseal Combo</td>
<td>$252,883</td>
<td>$242,838</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

Digestive Health

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$8,937,112</td>
<td>$9,112,882</td>
<td>-1.9%</td>
</tr>
<tr>
<td>Digestive Enzymes (Other)</td>
<td>$624,582</td>
<td>$631,071</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Aloe vera</td>
<td>$483,690</td>
<td>$519,294</td>
<td>-6.9%</td>
</tr>
<tr>
<td>Fiber (Other)</td>
<td>$469,835</td>
<td>$450,084</td>
<td>4.4%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$430,406</td>
<td>$445,702</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Lactase</td>
<td>$292,148</td>
<td>$292,186</td>
<td>0%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$288,253</td>
<td>$251,693</td>
<td>14.5%</td>
</tr>
<tr>
<td>Papaya</td>
<td>$148,879</td>
<td>$142,663</td>
<td>4.4%</td>
</tr>
<tr>
<td>Charcoal</td>
<td>$122,989</td>
<td>$118,561</td>
<td>3.7%</td>
</tr>
<tr>
<td>Ginger</td>
<td>$108,733</td>
<td>$107,054</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Energy Support

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein - Plant (Multi)</td>
<td>$996,355</td>
<td>$1,003,626</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Taurine</td>
<td>$693,236</td>
<td>$761,817</td>
<td>-9.0%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>$499,405</td>
<td>$246,829</td>
<td>102.3%</td>
</tr>
<tr>
<td>Creatine</td>
<td>$927,811</td>
<td>$143,031</td>
<td>231.3%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$360,012</td>
<td>$373,065</td>
<td>-3.5%</td>
</tr>
<tr>
<td>Protein - Animal (Whey &amp; Milk)</td>
<td>$332,924</td>
<td>$309,716</td>
<td>7.5%</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>$317,468</td>
<td>$342,211</td>
<td>-7.2%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$293,563</td>
<td>$252,101</td>
<td>16.4%</td>
</tr>
<tr>
<td>Soy Foods</td>
<td>$223,013</td>
<td>$264,235</td>
<td>-15.6%</td>
</tr>
<tr>
<td>Multi-Minerals</td>
<td>$203,006</td>
<td>$92,594</td>
<td>119.2%</td>
</tr>
</tbody>
</table>

---

Lutein

Consumers are gleaming what the lutein industry has known for decades: that lutein is an essential nutrient for healthy vision and that lutein supplementation is important at every age. According to SPINS tracking, sales growth for lutein ingredients in the eye-health category (U.S. conventional multioutlet channel) outperformed growth of any other eye-health ingredients in that channel in the 52 weeks ending November 4, 2018, increasing 38.8% to more than $52 million in sales compared to $38 million a year ago. That growth is impressive, and it means that messaging about the importance of lutein—and about eye health supplementation overall—is taking effect mainstream. The overall eye-health supplement category—vitamins, supplements, herbs, and homeopathics—itself grew during that time frame (in the U.S. conventional multioutlet channel), increasing nearly 6% to $347 million.

Part of the messaging taking hold of consumers is that lutein can help protect the eye against blue-light damage—short-wavelength, high-frequency light emitted by, among other things, electronic screens—that leads to degenerative conditions such as age-related macular degeneration (AMD). The National Eye Institute at the U.S. National Institutes of Health projects that by 2050, the number of people in the U.S. with AMD will more than double from 2 million to 5.4 million. As phones, tablets, and monitors continue to command people in the U.S. more attention, these estimates will likely bode true.

Clearly, consumers are looking for eye health and blue-light protection, evidenced by the number of blue-light eye-health supplements (all featuring lutein) now on the market. From Twinlab’s Ocuguard Bluein line and Bausch and Lomb’s Ocuvite Blue Light supplement to Puritan’s Pride’s Lutein Blue Light Vision Guard, Quantum Health’s Digital Blue supplement, and Nature’s Bounty’s Lutein Blue supplement, companies see the opportunities here.
UC-II® undenatured type II collagen delivers clinically studied joint-health benefits. Lonza’s UC-II® provides consumers healthy mobility and joint comfort by working with the body’s natural repair mechanism. UC-II® undenatured type II collagen is proposed to work in the immune system to support joint health in one, 40 mg dose. Feel empowered in your own body, regardless of age or ability.

Visit UC-II.com to learn more about the fastest-growing joint-health ingredient.*

ONCE-DAILY SMALL DOSE
THREE CLINICAL STUDIES
STUDIED IN HEALTHY, ACTIVE ADULTS
BENEFITS COMPARED TO GLUCOSAMINE + CHONDROITIN

THE FREEDOM FOR ACTIVE ADULTS TO REMAIN ACTIVE
“Interest in blue-light–blocking products is not slowing down,” says Ceci Snyder, MS, RD, global vision product manager for Kemin Human Nutrition & Health (Des Moines, IA), a supplier of ingredients including its flagship FloraGLO Lutein. Snyder notes that “Kemin is the author of a patent on how lutein blocks blue light, which our customers continue to find worthwhile,” and says that consumers connect with messages addressing symptoms they experience every day: digital eye strain and fatigue. “Concise messages work best to educate consumers quickly on labels or in social media,” she adds. “The eye health and lutein [categories] will continue to grow because of increasing awareness of blue light from digital devices and sunlight.”

Brian Appell, marketing manager for OmniActive Health Technologies (Morristown, NJ), says, “Consumers are making the connection between blue light and eye health.” He notes: “What’s interesting is that we’re seeing this interest across different demographics and lifestyles.” (Some of the blue-light supplements mentioned above, including Puritan’s Pride Lutein Vision Guard, Twinlab’s Blutein, and Nature’s Bounty’s Lutein Blue supplements, feature OmniActive’s Lutemax 2020 ingredient containing lutein, zeaxanthin, and meso-zeaxanthin.)

The consumer audience for lutein and blue-light supplements is expanding. Appell explains: “The lutein market was built primarily on a prevention model of supplementation that has catered to the 50+ age group. That demographic will continue to sustain lutein growth as the population ages; however, there’s a much broader consumer base that could accelerate growth.” Although most demand is still coming from the healthy-aging sector concerned about AMD, glaucoma, and cataracts, younger consumers are an untapped market, and products to this subset can be marketed differently.

“Younger generations are more interested in the immediate relief of eye issues related to digital device use, as well as optimizing their visual performance,” says Appell. Twinlab’s Ocuguard Blutein line includes a chewable supplement for, the product label says, “digital eye health for younger eyes.”

Snyder says: “Senior adults are more likely to receive eye doctor direction for an AREDS supplement.” (AREDS is the National Institutes of Health landmark Age-Related Eye Disease Study on AMD and supplementation. Kemin’s FloraGLO lutein was used in the study.) “Younger consumers, especially those who embrace a healthy lifestyle as a way of life, are eager to enhance their eye health. We know most consumers have no intention of giving up their phones, tablets, or computers, so the reasonable and easy option is to take lutein supplements for blue-light protection.”

“Marketers are taking note” of lutein, OmniActive’s Appell says, “and we are committed to continuing to raise awareness, now with an added emphasis on the ‘essentiality of lutein’, which will likely figure more prominently in products for infants to seniors and everyone in between.”

<table>
<thead>
<tr>
<th>SPECIALTY GOURMET CHANNEL 10 BESTSELLING INGREDIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hair &amp; Skin &amp; Nails</strong></td>
</tr>
<tr>
<td>Ingredient</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Biotin</td>
</tr>
<tr>
<td>Collagen Products</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
</tr>
<tr>
<td>Lysine</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
</tr>
<tr>
<td>Astaxanthin</td>
</tr>
<tr>
<td>Calendula (Homeopathic)</td>
</tr>
<tr>
<td>Alpha-Lipoic Acid</td>
</tr>
<tr>
<td>Homeopathic Remedy (Other)</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mood Support</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingredient</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Magnesium</td>
</tr>
<tr>
<td>Flower Essences</td>
</tr>
<tr>
<td>Ashwagandha</td>
</tr>
<tr>
<td>Kava</td>
</tr>
<tr>
<td>5-HTP</td>
</tr>
<tr>
<td>GABA</td>
</tr>
<tr>
<td>Holy Basil</td>
</tr>
<tr>
<td>Calcium-Magnesium Combinations</td>
</tr>
<tr>
<td>Theanine</td>
</tr>
<tr>
<td>St. John’s Wort</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Pain &amp; Inflammation Support</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingredient</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Turmeric</td>
</tr>
<tr>
<td>Arnica (Homeopathic)</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
</tr>
<tr>
<td>Homeopathic Remedy (Other)</td>
</tr>
<tr>
<td>Cider Vinegar Supplements</td>
</tr>
<tr>
<td>Arnica (Herbal)</td>
</tr>
<tr>
<td>Butterbur</td>
</tr>
<tr>
<td>Collinsonia</td>
</tr>
<tr>
<td>Cherry Fruit Supplements</td>
</tr>
<tr>
<td>Willow Bark</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Specialty Gourmet
Time period: 52 weeks ending November 4, 2018
Channel: U.S. specialty gourmet supermarkets
Eye health isn’t all that’s driving interest in lutein. There is also early interest in other lutein health benefits, including brain and skin health.

“Cognitive health is an exciting area of new research with FloraGLO Lutein,” Snyder says. She notes that the ingredient has been studied in four randomized, double-blind, placebo-controlled trials linking the ingredient to benefits such as improved visual memory, complex attention, and reasoning ability. In one such study, she adds, “The fact that improved cognitive function was observed in healthy, well-nourished young adults was noteworthy.”

OmniActive, meanwhile, has published studies showing that Lutemax 2020 supplementation resulted in higher levels of brain-derived neurotrophic factor (BDNF), a protein implicated in neuroplasticity and learning, memory, and cognition, and has also studied its effects on lowering stress-related cortisol levels. “We’re excited by the results of the research showing benefits associated with cognition, stress management, and even sleep, to name a few,” Appell says. “That research is making its way into consumer formulas,” he adds, predicting that “you’ll soon see more product launches that diverge from lutein’s traditional use as an eye supplement.”

Skin health is also an emerging lutein interest area. Both Kemin and OmniActive have studied their ingredients for this indication. Already, Nature’s Bounty offers its SkinElasticity nutricosmetic featuring FloraGLO lutein and vitamin A.

Lutein suppliers say 2018 was a good sales year for them, and they expect no different in 2019. Market researcher Euromonitor International forecasts global volume consumption of lutein ingredients to grow nearly 32% by 2022 (increasing from 1,195 tons in 2017 to 1,575 tons in 2022).

References

Adulteration Risk
Each year, there are ingredients and supplement categories at higher risk of adulteration. This year, those top of mind include:

YOUR ONLY CHOICE FOR CONTRACT MANUFACTURING

Find out why ADH Health Products has been a trusted source of quality supplements for three decades:

- Compliant with FDA and cGMP standards
- Distributes to more than 30 countries
- Offers a variety of delivery forms
- State-of-the-art facility
- Customer Service
- Packaging Solutions
- Fulfillment & Warehousing

ADH Health Products is your one-stop source that will exceed your contract manufacturing and private labeling needs.

Prime Source of Quality Vitamins, Minerals & Herbs

ADH Health Products, Inc.
Tel. 845-268-0027
Fax 845-268-2988
www.adhhealth.com
Ingredients to Watch

selective androgen receptor modulators (SARMS), phenibut, tianeptine, higenamine, and certain high-profile botanical ingredients.

SARMS are synthetic steroid-like drugs mimicking the effects of testosterone and showing up in bodybuilding products in recent years. In the U.S., SARMS are not permitted in dietary supplements. SARMS are also on FDA’s radar; the agency has warned the public about the hazards of SARMS, “including potential to increase the risk of heart attack or stroke and life-threatening reactions like liver damage,” and sent warning letters to companies illegally marketing SARMS-containing products as dietary supplements. In April 2018, then-U.S. Senator Orrin Hatch (R-UT), along with Senator Sheldon Whitehouse (D-RI), introduced the SARMS Control Act of 2018 to add SARMs to the U.S. Drug Enforcement Administration’s (DEA) Schedule III list so SARMS would be regulated like anabolic steroid drugs. Dietary supplement trade associations supported this move.

Trade associations also joined together in November 2018 to warn the industry about “phenibut,” another pharmaceutical appearing, illegally, in products marketed as brain-health dietary supplements. The drug, claimed to have cognitive benefits, can lead to many adverse side effects as well as addiction.

Tianeptine, a substance some companies are selling illegally as supplement products to treat opioid abuse, also hit the radar in November 2018 after FDA issued warning letters.

Last year, NSF International (Ann Arbor, MI) identified higenamine’s use in supplement products via a clinical study jointly conducted by NSF researchers, Harvard Medical School, and the National Institute for Public Health and the Environment in the Netherlands. As Nutritional Outlook reported in September 2018: “Higenamine is a stimulant found in plants that has not been approved as a drug by FDA. It is permitted in dietary supplements, however, when present as a constituent of botanicals because it was grandfathered in following the passage of the Dietary Supplement Health and Education Act of 1994 (DSHEA); however, WADA [the World Anti-Doping Agency] prohibited the ingredient from sport in 2017.” Higenamine’s health risks are not well understood, and there have been reports of drug trials in which subjects experienced increased heart rate and blood pressure after taking higenamine.

The NSF et al. researchers tested a selection of supplement products on the market, including weight-management, sports, and energy supplements, and detected higenamine in what they called “unpredictable and inaccurately labeled dosages”—a problem especially for athletes looking to avoid any exposure to WADA-banned substances.

“At NSF International, we share the industry concern about adulterants like SARMS, phenibut, tianeptine, and higenamine,” John Travis, senior research scientist, NSF International, tells Nutritional Outlook. FDA and dietary supplement industry leaders want to get unscrupulous companies and hazardous and illegal products off the market. FDA Commissioner Scott Gottlieb, MD, recently stated that the agency is reexamining its existing authority to police the dietary supplements market. In December 2018, Gottlieb gave a speech announcing that FDA has formed a new Dietary Supplement Working Group to evaluate how the agency is regulating the supplements market and whether or not the agency should seek “new authorities.” In his speech, Gottlieb underlined FDA’s concern about adulterants in the supplements market: “Some products marketed as dietary supplements contain dangerous and illegal ingredients, often without identifying them to consumers...We take seriously our obligation to protect consumers from all of these dangerous products.”

Adulteration in the botanicals market is always a concern. Adulteration happens in the botanicals market for reasons including supply chain shortages, the high cost of some botanical ingredients, and also the high volume of some ingredients, says Stefan Gafner, PhD, chief science officer for the American Botanical Council (ABC). Gafner is also technical director of the Botanical Adulterants Prevention Program (BAPP) and editor of the program’s Botanical Adulterants Monitor newsletter.

The Botanical Adulterants Prevention Program (BAPP) is a joint program of nonprofits ABC, the American Herbal Pharmacopoeia,
Train harder. Recover faster. Get the edge.

MyHMB® is unrivalled in its ability to accelerate recovery time after intense training sessions. HMB (scientifically known as beta-hydroxy-beta-methylbutyrate) improves recovery by simultaneously boosting muscle protein synthesis and decreasing muscle protein breakdown.

Supplementing with myHMB® has been shown to help build and maintain lean muscle mass, increase strength, improve both recovery time and body composition.

Learn more at www.myHMB.com

TSI Group Ltd. and Metabolic Technologies, Inc. believe in the power of synergy which is why we have combined expertise to create the highest quality, clinically substantiated, nutritional products that maximize and maintain active, healthy lifestyles for consumers. 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.
Ingredients to Watch

and the University of Mississippi’s National Center for Natural Products Research. It provides critical educational resources such as BAPP’s Botanical Adulterants Monitor newsletter, Adulterants Bulletins, and Laboratory Guidance Documents that help identify suitable analytical methods for detecting adulterants and authenticating botanical materials. Gafner says BAPP recently developed an “easy-to-understand” publication about these analytical techniques geared to sales and management professionals. In November 2018, BAPP participated in a workshop held at the Health & Nutrition Week event in Germany, titled “Adulteration and Fraud of Botanical and Natural Health Ingredients: Issues, Challenges, and Prevention Tools for the Industry.” (UBM, Nutritional Outlook’s publisher, ran this event as part of the Health Ingredients Europe trade show.)

BAPP has published 48 peer-reviewed publications so far. Over the past year alone, BAPP has shared adulteration information on a variety of botanical ingredients, including ashwagandha, maca, tea tree oil, saw palmetto berry and extract, cranberry, turmeric, boswellia resin, pomegranate, and ginkgo leaf extract.

Nutritional Outlook asked Gafner which botanical ingredients are at greatest risk of adulteration in 2019. He says: “Obviously we cannot answer this with certainty, but there are a few indicators that may point to an increased adulteration risk. Among those are supply chain shortages, high-cost botanical ingredients, and also high-volume ingredients. It is quite difficult to foresee where supply chain shortages may be an issue, since this depends on weather conditions, disease, and market success, among other factors. However, with regard to supply chain shortages, saw palmetto berry extracts could be affected by this, and possibly rhodiola root and root extracts. Other botanical ingredients that fall into this category are those that have seen a fairly dramatic increase in sales over the past years, such as extracts of turmeric, boswellia, ashwagandha, or elderberry.”

“Botanical ingredients where the raw material is relatively expensive, such as bilberry extract, cordyceps, or cranberry extracts with high contents of proanthocyanidins, are regularly among those where we see adulteration issues, just because of the financial incentive. The same is true for many essential oils. Ginkgo and turmeric are some of the high-volume commodities where adulteration has persisted,” Gafner concludes.

NSF’s Travis also highlights ginkgo concerns, noting that the U.S. Government Accountability Office issued a report last November, stating that in testing it had done on two ginkgo products, the products contained no actual Ginkgo biloba and had been adulterated with other “unknown, substitute” ingredients.

“With ginkgo, this continues to be a problem of intentional adulteration due to the financial advantage of adding cheaply sourced ingredients, despite all of the publicity it has received over the years,” Travis says. “Ginkgo will continue to be adulterated because of the tempting economic incentives driven by the use of cheaply sourced adulterant ingredients.”

Gafner says he’s “optimistic” that educating the public about adulteration will make a difference. He says, “With the raising awareness of the problems, I am optimistic that the picture will improve over the next year.”

BAPP is advising manufacturers what to do if raw materials are defective. Last year, BAPP released a draft of a standard operation procedure guideline called “Best Practices SOP for the Disposal/Destruction of Irreparably Defective Articles.” The SOPs advise companies when and how to destroy raw materials that are “irreparably defective” so that companies do not return irreparably defective ingredients to the supplier, who could then resell them to someone else. Mark Blumenthal, ABC’s founder and executive director and BAPP’s director, says that public comments on the draft SOPs are now in review. “Eventually, we hope to have a tentatively final or perhaps even final document to share with responsible members of the herb and dietary supplements industry (and other industries) in March.” Blumenthal says.

Michael Levin, founder of Health Business Strategies LLC, who was also the primary author of the SOPs and who is BAPP’s chief consultant on the SOPs, says that part of the review is related to potential language that could, ultimately, be included in contracts between a supplier and a buyer as a best practice. Levin calls this aspect “mission critical” and “at the very heart of this project.” He continues: “It defines the agreements between supply chain partners as they relate to quality, adulteration, dispute resolution, and the like. In contrast, the [current] draft SOP merely outlines a proposed procedure for implementing the legal agreements contained within the supply contract. Perhaps most importantly, and most relevant to your readers, the contract language mandates that if an ingredient/lot is irreparably defective and cannot be lawfully remediated for any use anywhere, that the parties agree to lawfully destroy that ingredient lot. This assures that this lot can never be resold into the supply chain. This is a vast improvement over the current situation.”

And back to the overall risk of adulteration in the market. NSF’s Travis says that, as in previous years, categories at highest risk remain the weight management, sports, and sexual enhancement markets. “Consumers have increased use of these products over the years, especially in the weight-loss category,” he says. “This has resulted in greater revenue for brands and provided an incentive for unscrupulous brands to adulterate their products with pharmaceuticals, untested stimulants, and other substances, which may not have any data to support safe use.”

Reference
Marine plants have an ocean of benefits and possibilities for your supplements, foods & beverages and cosmetics.

Seaweed compound properties have potential benefit on blood sugar and immune support including:

- **antidiabetic and diabetic management**
- **immunomodulators and stimulatory activities**

Contact us for a distributor near you and for sales, samples and technical support.

SeaPlus@acadian.ca        Toll Free: 1 800 575 9100
www.acadianseaplants.com
Market Report

2018’s Biggest Ingredient
Sales Surprises

BY KIMBERLY J. DECKER

As if anyone needed further convincing that 2018 was a year full of headlines, headaches, head fakes, and headscratchers, the gyrations of the vitamin, dietary supplement, and herbal products sector drive it home: You almost need a super-strength cognitive-energy tablet just to keep up with it all.

Or, as Kimberly Kawa, retail reporting analyst, SPINS LLC (Chicago), puts it with much greater subtlety, “A panoramic view of the supplement industry reveals some noteworthy findings.”

She can say that again. Over the past 12 months*, we’ve seen marquee ingredients shake in their shoes, strapping upstarts make their ascent, and the usual suspects continue to give consumers who trust them and brands that market them value. All of which is why we quizzed the experts at SPINS on the biggest—and most surprising—supplement sales stories of 2018. Read on to ride the ups and downs of the functional year that was.

*All sales numbers are courtesy of SPINS and cover the 52 weeks ending December 2, 2018. Statistics are derived from a cross-channel aggregate data pull of multi-outlet (MULO), natural, and specialty gourmet retailers of the total U.S. market, unless otherwise specified.

Protein

For protein, 2018 was the best of times, it was...Well, maybe it wasn’t the worst of times, but a softening of sales among some protein subcategories gives the lie to the notion that, as far as consumers are concerned, this macronutrient is invincible.

To wit, while sales of combined animal proteins had the highest absolute dollar growth among supplements and claimed the highest dollar share among functional ingredient values in supplements—up almost $54 million, or 9.1%, over last year, and capturing 4.7% of dollar share across channels—Kawa points to combined animal and plant proteins as one of 2018’s standout functional ingredients showing decline.

“These products hold a whopping 9.7% dollar share in VMS,” Kawa notes, using the acronym for vitamins, minerals, and supplements. “But that’s down from 10.2% dollar share in 2017,” she continues, adding that the...
CERTIFIED & RELIABLE
NON-GMO CORN-BASED INGREDIENTS

For more than 15 years, GPC has offered Non-GMO ingredients, using our own stringent traceability practices. And now to further our commitment in response to consumer demand for even more transparency and traceability, we participate with the Non-GMO Project to certify our Non-GMO ingredients. Contact GPC today.

GRAINPROCESSING.COM

Maltodextrin | Corn Syrup Solids | Food Starch | Alcohol

E-mail: food.sales@grainprocessing.com  Phone: 563.264.4265
© 2019 Grain Processing Corporation
majority of sales come from conventional MULO retailers. Yet even in innovation channels, which comprise natural and specialty gourmet retailers, combinations of plant protein showed the most decline in terms of absolute dollars: down almost $11 million, or 12.4%.

Then again, innovation channel sales of pea protein registered triple-digit growth—136.6%, to be precise—driven largely by powder protein supplements...

...So what lesson can we draw from all these ups and downs? "Reviewing the various protein values within these channels, there isn’t a black-and-white sales story along the animal-versus-plant lines," concedes Jessica Hochman, content strategist at SPINS. Maybe the best stance going forward is simply to keep an eye on this space.

Collagen

Dialing in on one protein in particular, Kawa notes that in 2016 SPINS singled out collagen "as a functional ingredient to keep on the radar with a mere $11 million in sales." And in 2018? "We’re seeing it go mainstream, with a cross-channel growth rate of 57.9% to $85.8 million in sales."

The reasons are elementary. Collagen, the most-abundant protein in the human body—composing some 25%-30% of our protein content—enjoys a stellar reputation in Asia as a beauty food, fueling healthy nails, hair, and skin. And while that reputation was already catching on stateside in 2016, "Collagen’s appeal has broadened," Kawa says, "and we’re now seeing a triple-digit growth rate for collagen products in the protein supplements and meal replacements category."

Credit collagen’s mild, neutral taste, reliable solubility, and all-around easygoing nature in formulation for its spread: Not only is it gaining traction in meal replacement beverages; consumers can now find collagen in everything from coffee to chocolate-coated pretzels.

Cannabidiol (CBD)

There’s a temptation to refer to the past 12 months as “high times” for cannabidiol (CBD), the news-making cannabinoid that saw some real upside in 2018. But given CBD’s non-psychotropic nature—in contrast to its cousin tetrahydrocannabinol (THC)—the times weren’t so much “high” as simply very promising.

Exhibit A: FDA in June approved an orally administered CBD solution called Epidiolex as a prescription treatment for seizures—the first time the agency put its imprimatur on an active pharmaceutical CBD product.

Then on December 20, President Donald J. Trump signed the Agricultural Improvement Act of 2018—aka the Farm Bill—and with the stroke of his pen officially released industrial hemp to legal cultivation, also possibly releasing a new source from which to legally extract CBD.

And finally, consider that mounting scientific evidence continues to undergird CBD’s health benefits, which some say range from anxiety alleviation and analgesia to improved mental focus and a natural assault on inflammation.

No wonder, then, that CBD clinches SPINS’s number-five spot among functional ingredients in dollar growth across natural, specialty gourmet, and MULO channels. However, CBD’s truly impressive sales volumes appear in innovation channels, where it’s the top ingredient by dollar change—up a whopping 343.1%—and pulled in sales north of $44 million. “Numerous new brands featuring CBD entered the marketplace in these incubator channels this past year," Kawa says, "and we expect this number to continue to grow in 2019."
Magnesium

It was barely a year ago when this very publication listed magnesium among the mineral supplements it considered worth watching in 2018. And sure enough, current SPINS data vindicate that prediction, showing that in innovation channels, dollar sales of magnesium grew 15.8% last year, hitting a grand total of $37.5 million.

What are consumers getting from their investment? Research continues to support magnesium’s heart- and mental-health benefits, while emerging science shows that the mineral can enhance exercise performance. Indeed, virtually every metabolic and biochemical process in the body has some role for magnesium—which makes it somewhat shocking that, by some measures, as much as 80% of the U.S. population is deficient in it.

The upshot of that deficiency is that magnesium’s current sales growth barely scratches the surface of what it could bring in. As Kawa says, “Magnesium appears to be a growing trend in the innovation channels. We’ve noticed this ingredient expanding with innovative delivery methods, including gummies and transdermal applications in the body-care segment.”

Turmeric

The big news in turmeric this year wasn’t that it was a functional ingredient on the rise; yellow has been the new green, so to speak, for years now, particularly among the young, in-the-know, health-involved consumers who’ve made turmeric lattes coffeehouse staples and the Ayurvedic root as trendy as avocado toast.

Rather, says Kawa, the real story is that “while turmeric began as a trend in the natural space, it’s clearly gained mainstream appeal in supplement segments, up 18.9% cross-channel, with the majority of sales volume reporting in conventional MULO, and 32.6% growth,” vaulting it nearly to $92 million in 2018 sales.
Cider-Vinegar Supplements
Like turmeric—or protein, or collagen, or several other ingredients in this rundown—cider-vinegar supplements are no strangers to annual functional-ingredients-to-watch rosters. And in 2018, Kawa recalls, “We called out cider-vinegar supplements as a growing star. We reported 146.2% growth to $3.8 million in 2017, and in 2018 we see these supplements having grown 185.9% to $27.8 million, with most of the dollar share taking place in conventional MULO and with a continued trajectory for strong growth.”

Kawa finds it “interesting to note” that about one-third of the dollar share for cider-vinegar products comes from private-label lines. And, adds her colleague and SPINS natural insights analyst and writer, Michelle Gillespie, NTP, “More palatable capsules and tablets are far outperforming the traditional liquid delivery method.”

But cider vinegar’s utility, and popularity, has spread beyond the supplement category into the shower and salon, where a raft of apple cider vinegar, or ACV, haircare products contain the pectin, amino acids, and malic and acetic acids that purportedly strengthen, hydrate, and smooth hair.

Probiotics, Prebiotics, and Synbiotics
It’s worth remembering that not all year-end supplement sales surprises are good ones, for a notable decline in probiotic sales was surprising in a confounding way, “given the growing awareness of and interest in gut health and other health focuses connected to the microbiome,” Hochman says.

One explanation Hochman posits “may be that consumers are choosing to consume probiotics from sources outside of supplements, such as cultured foods or the multitude of other food and beverage products to which probiotics have been added with the development of shelf-stable strains.”

Regardless, despite probiotic supplements still accounting for the vast majority of sales volume among products with a pre- and probiotic label attribute, their dollar sales dropped 2.9%, or $21 million, in conventional MULO, and 6%, or $14 million, in innovation channels. Prebiotic supplements, for their part, remained relatively flat in innovation channels, but lost 13.1%, or $16 million, compared to year-ago sales, in conventional MULO.

Is there a bright spot amid the darkness? Hochman directs us to supplements combining both pre- and probiotics as "the area that
still shows year-over-year growth, pointing to promise in products that provide a more holistic, synbiotic approach.” In conventional MULO, growth for synbiotic supplements looks to be even stronger.

So while “the decline of probiotic supplements takes us by surprise at first, it’s worth noting that synbiotic supplements point to a different sales trajectory and may be a trend to watch in the years ahead,” Hochman concludes.

Multivitamins
A decline in dollar sales of 2.7%, or $12 million, for adult multivitamins is another worrisome “surprise” that SPINS tracked in 2018. However, says Hochman, “it’s worth taking a closer look at multivitamins in general.”

When one does, one sees that multivitamin sales are not in decline across the board, but only for those marketed to adults. And even there, the decline appears only in products marketed to the generic adult, rather than to adults of a specific gender.

“Multivitamins for adult women, adult men, children, and seniors are growing,” Hochman notes, “with adult men and adult women’s formulations showing the strongest growth.”

Namely, the adult men’s and adult women’s multivitamin subcategories saw dollar sales increase by 9% and 5.9%, for an upward change of almost $15 million and $24 million, respectively. As for children’s and seniors’ vitamins, their sales grew by 3.1% and 1.4%, or $7 million and $3 million, respectively. All of which offers more than enough silver lining to brighten any cloud hanging over adult multivitamins.

Kimberly J. Decker writes for the food and nutrition industries from her base in the San Francisco area, where she enjoys eating food as much as she does writing about it.
Which flavors are hot in 2019? Leading flavor houses gave Nutritional Outlook their predictions for which flavors consumers will be looking for in food and drinks in the coming year. As has been the case with Nutritional Outlook’s previous yearly forecasts, the macro trend for 2019 appears again to be a balance between flavors that consumers find familiar and comforting alongside flavors that satisfy their craving for a flavor adventure.

“Americans have begun to step out of their comfort zones with the thirst to explore authentic and unconventional taste experiences,” said flavor firm Kerry (Beloit, WI) in a recent press release announcing the company’s 2019 Taste Charts predicting 2019 trends. “There is also a unique balance between nostalgic taste and avantgarde experiences that consumers seek today.”

Here are some macro and micro trends formulators should keep in mind.

**Florals and Herbs**

Floral flavors have gained a following in recent years, and 2019 is no different. Firmenich (Geneva) has declared hibiscus as its 2019 Flavor of the Year “based on the growing appeal of florals in food and drink.”

“Hibiscus is a beautiful and tasty choice for 2019,” the company said in a press release, pointing to hibiscus’s appealing attributes, including its natural origin and “slightly tangy” profile. Firmenich points to global data from market researcher Mintel’s global consumer database indicating that the worldwide use of hibiscus in new food and beverage product launches has grown 300% since 2012. Hibiscus is becoming popular in yogurt, beer, tea, and chocolates, and is especially popular in the United States, Brazil, Mexico, and Denmark, with growth also happening in Spain and Italy.

Consumers are drawn to hibiscus for its many health benefits, says Firmenich, including its use in traditional medicine. “Hibiscus is more than just a pretty flower,” the company said. “Egyptians used hibiscus tea to lower body temperature and treat heart and nerve diseases. In African countries, the tea was used to treat cold symptoms, and pulp made from the leaves was applied to the skin to heal wounds. Recent studies show promise for both the tea and the hibiscus plant extract to lower blood pressure and cholesterol levels.”

Consumers looking for reduced-sugar beverages are also looking for flavors like hibiscus to replace sweetness and to “help deliver sensorial impact and provide interesting and novel taste experiences,” said Jeff Schmoyer, Firmenich’s vice president of global consumer insights, in the press release.

Currently, hibiscus’s most popular use has been as an infusion in beverages, but Firmenich expects applications to broaden. Fausto Carriles, a senior Firmenich flavorist in Latin America, pointed out that hibiscus has “a strong floral aroma,” alongside “a woody-astringent character” and “a subtle and delicate fruity undertone, even a hint of green like freshly cut mint leaves.” Hibiscus’s year-round appeal spans use in cold summer beverages to inclusion in “winter hot fruit punches,” Carriles added. Hibiscus is also popular in savory products. It is used in Mexican cuisine and ceviche applications and has been seen in savory foods such as enchiladas and dried hibiscus garlic chips, Firmenich says.

As mentioned, hibiscus also taps into a general growing appreciation for florals—driven, in part, by the visual appeal of florals, a powerful marketing tool. Of hibiscus,
Firmenich says, “No doubt their ‘Instagrammable’ nature has helped propel them onto the mainstage along with their floral friends: lavender, elderflower, rose, and violet.”

Firmenich calls hibiscus “unusual but approachable,” noting that it balances new experiences with comfort—qualities that are infinitely sought by today’s generation of shoppers. Firmenich even likens hibiscus’s qualities with those attributed to Pantone’s 2019 Color of the Year: “Living Coral.” Pantone describes Living Coral as “vibrant yet mellow, caramelized, joyful, and “nurturing color that appears in our natural surroundings and at the same time displays a lively presence within social media” and “provide[s] comfort.” The same can be said of hibiscus.

Flavor firm ADM (Erlanger, KY) says that the same consumer interests that drove Pantone to select Living Coral as its Flavor of the Year are also inspiring interest in a trend toward all flavors pink—from rose to rosé, the company says.

“Currently, pink is considered the height of sophistication—even dominating the fashion scene—since Living Coral, or vibrant living pink, has been announced as Pantone’s 2019 Color of the Year,” says Marie Wright, vice president and chief global flavorist, ADM WILD Flavors. “Products covering an expansive range of pink hues are popping up all over the globe. Because of this, we predict bright, vibrant ‘pink’ flavors will increase to match this trend. Pink flavors include rose, rosé wine, hibiscus, elderflower or berry, watermelon, pink grapefruit, rhubarb, and berries.”

For instance, Wright says, this past summer her company observed an increase in global rosé wines, champagnes, and sparkling wines, and, subsequently, an increase in rosé-flavored and -scented products. “Because of this, we predict bright, vibrant ‘pink’ flavors will increase to match this trend. Pink flavors include rose, rosé wine, hibiscus, elderflower or berry, watermelon, pink grapefruit, rhubarb, and berries.”

In the same vein, pink florals should do well in 2019, Wright says. “In 2019, we predict products will be blooming with the luscious flavors of rose, hibiscus, and elderflower. Oils, extracts, and petals are used to flavor dishes and food products across many categories. Rose and lavender (not so pink) flavors are finding their way into cookies, chocolate, ice cream, lattes, and alcoholic beverages.”

Lavender is also a key floral flavor pegged by Synergy Flavors (Wauconda, IL) for 2019. Synergy applications technologist Kayla Blanding says: “Going into 2019 and beyond, Synergy Flavors sees a bright future for lavender due to the fact that floral and botanical flavors continue to have widespread appeal.” She notes that while lavender alone hasn’t yet gone mainstream, “it pairs well with a variety of other flavors, including herbs, citrus, fruit, sweet flavors, and savory options as well.” In the culinary world, it’s still regarded as an artisanal flavor, appearing in stylish fare such as lavender lattes. Blanding notes that chefs and food manufacturers have put new twists on lavender, including “lavender smoke.” And, like Firmenich of hibiscus, she calls lavender “very Instagram-worthy.”

Comax Flavors (Melville, NY) is also firmly entrenched in the floral trend. Late last year, the company introduced its new Classic Floral Collection, representing the first flavor collection the company created in its new innovation center in Marlton, NJ. In a press release announcing the new collection, the company said, “Floral flavors are blooming and making their way into a variety of food and beverages. According to Technavio, the global floral flavors market is expected to grow at a CAGR of almost 10% during the period 2018-2022.” The Comax Classic Floral Collection includes: 1) honeysuckle (“mild sweet, fruity, citrus, and honeylike undertones’ suited to fruit and dairy desserts and sweet sauces), 2) jasmine (a “classic white floral with mild fruity, rosy, and tea-like undertones” suited for tea and savory Asian dishes), 3) lavender (“subtle hints of citrus, mint, and peppery-like nuances” that “pair well with berry flavors such as blueberry and spicy notes” and is used in beverages, cream desserts, and seafood), 4) lilac (“sweet fruity and spicy nuances,” “commonly used in jams/jellies and as a background note in savory meat dishes”), 5) orange blossom (“works well with savory meat dishes and traditional desserts”), and 6) rose (“with very subtle spicy nuances and honey accords” that are “versatile” in tea, syrups, jams, and sweet desserts).

Flavor firm Kerry also notes the “interesting rise” in floral and botanical flavors, highlighting rose as an emerging flavor in sweet products, alongside chamomile and saffron.

Finally, as interest in hemp grows, flavor firm Doehler GmbH (Darmstadt, Germany) notes that hemp’s flavor is finding a following of its own. “Hemp is regarded as one of the oldest plants known to mankind and is used in many diverse applications, as well as purely ornamentally,” the firm says. “The unmistakable spicy-sweet aroma of hemp is well on its way to taking one of the top positions in lists of trendy flavors.”

Fruits and Veggies

Fruit- and vegetable-derived flavors remain a classic and expansive palette for formulators. Flavor firms note a few standouts in 2019—some of which consumers may be less familiar with.

“Yuzu is a citrus fruit that is new to American consumers and generally very novel, but it has been making appearances across food and beverage categories more frequently as cultural influences and interest in diverse flavors increase,” says Synergy’s Blanding. Yuzu is grown in China and Tibet and is now seen in emerging categories like sparkling beverages, she says, adding that it “combines well with familiar and fruity flavors such as mint, apple, and lemon” and tastes like “a cross between grapefruit and lime.” In particular, Synergy predicts yuzu as a trending flavor in high-acid sports nutrition beverages.

Doehler also points to yuzu’s growing profile alongside newer citrus flavors the firm dubs “Citrus Fruits 2.0.” The firm says: “Besides the ‘classics’ and all-time favorites, such as orange, lemon, and lime, new and unusual citrus aromas are gradually
gaining in popularity. ‘Orange is no longer just an orange’—something more is needed. This is why ‘Citrus Fruits 2.0,’ [fruits] which are native to Asia, such as calamondin [also known as calamansi], kumquat, or yuzu, are impressing consumers with their exceptionally complex flavors that offer interesting and innovative options for food and beverage applications.”

Over in veggies, Synriise (Holzminden, Germany) calls kohlrabi, also known as “German turnip,” a ‘contender to be the next kale.” Emmanuel Laroche, vice president, marketing and consumer insights for Symrise, says kohlrabi “is sprouting up on menus across the U.S,” including in ice cream.

And even the most common flavors continue to hold court—including banana, says flavor firm Virginia Dare (Brooklyn, NY). “Banana is a familiar flavor, one that we expect to grow in 2019 as a way to upscale applications like ice cream, craft beers, smoothies, and more,” says Virginia Dare marketing and consumer insights manager Philip Caputo. “Because of its association with elegant desserts like bananas foster crème brûlée, banana cream pie, and banoffee pie, regular and caramelized banana is a flavor we anticipate seeing on more store shelves and menus.”

**Sweet, Savory, and Bitter**

Some flavors are pegged as standouts in the sweet and savory field in 2019.

In its 2019 Taste Charts, under emerging flavors for sweet products, Kerry credits the following as having a newer, growing presence: nectarine, florals (again, chamomile, rose, and saffron), basil, guava, savory flavors (miso, rosemary, sea salt, olive oil, bacon, cheese, and chamoy), ube, horchata, buttermilk, passion fruit, cola, smoke, ginger, chai, wasabi, agrodolce, and plum.

In salty snacks, these are trending, Kerry says: lemon, Thai curry, rosemary, pink pepper, sesame, pepperoni, chai, gochujang, truffle, seaweed, strawberry, piri piri, Korean BBQ, cranberry, basil, vanilla, maple, kimchi, cilantro, and ghee. And in savory products, Kerry predicts innovation with: finger limes, calamansi, karashi, baharat, chervil, nduja, sumac, galangal, sambal oelek, fish sauce, dukkah, nori, adobo, tahini, berbere, agrodolce, za’atar, togarashi, beer, and baguette.

Honey, maple, and molasses are also strong performers, firms say. Megan Byrnes, marketing representative for Gold Coast Ingredients (Commerce, CA), says: “At Gold Coast Ingredients, we predict we’ll see a more outstanding variety of honey-flavored products on the market in 2019. Honey flavor has become popular in its simple, pure form, caramelized, as well as used to complement other flavors”—for instance, she says, pistachio and honey, milk and honey, lemon and honey, and orange and honey.

Also, she adds, “Two other honey flavors to watch in 2019 are honeycomb candy flavor and chocolate honeycomb candy flavor.” Honeycomb candy remains a classic in Australia, New Zealand, and Europe, but Trent reports seeing more activity in the U.S, especially in flavored dairy, bakery, and nutraceutical applications.

###“Flavor companies are developing smoke-type flavors without any actual smoke,” says Gold Coast Ingredients’ Megan Byrnes.

Maple is also an up-and-comer. “Pumpkin spice has led the fall flavor conversation the past few years, but we’ve started to notice a considerable migration toward maple,” says Virginia Dare’s Caputo. "Consumption of maple syrup—and, resultingy, use of the flavor—has grown in both the United States and Canada in the past two years, and we expect this trend to continue with new flavored spirits, coffees, lemonades, and more.”

Molasses also shows promise, says Synergy Flavors. Blanding says: “Synergy Flavors continues to see a constant need for sweet brown flavors, and molasses is an inspiring flavor that has yet to see major market growth. That will soon be changing because, like burnt caramel, molasses has the potential to intrigue consumers. It is a flavor that many are familiar with, evoking warmth, nostalgia, and feelings of homemade goodness.” In addition, Blanding says, molasses connotes a natural, “pure” image, and, she says, serves as a natural sugar replacer because it has the lowest sugar content among sugarcane products.

And Gold Coast’s Byrnes says crème brûlée continues to be a popular sweet flavor. “We foresee crème brûlée as an innovative indulgent flavor in 2019,” she says. “Flavors that have sparked our attention are traditional crème brûlée, cinnamon crème brûlée, pumpkin crème brûlée, and toffee crème brûlée. Product developers have experimented with crème brûlée flavors in protein supplements, snack foods, oatmeal, ice cream, and other sweet applications.”

Meanwhile, Kerry predicts that nostalgic sweet flavors—snickerdoodle, cookie dough, and s’mores—will continue to inspire the sweet flavor toolbox.

Bitter flavors are also in vogue. Flavor firm Doehler points to interest in wormwood as a strong indication. “Bitter is the new sweet,” the company says. “Modern consumers are increasingly on the lookout for less sweet, more mature and sophisticated tastes, and the complex, bitter-herbal flavor profile of wormwood fulfills this demand perfectly. Besides its well-known use as one of the main flavoring ingredients in vermouth wine, wormwood can also be used to add taste to natural bitter drinks, alcoholic or non-alcoholic aperitifs, and a variety of other innovative concepts.”

###Smoked and Fermented

Increasingly, flavors in the smoked and fermented categories are finding more consumer fans.

Smoked flavors are becoming more sophisticated, Gold Coast’s Byrnes points out. “Keep an eye out for new and improved smoke-type flavors in 2019,” she says. “Subtle smoke flavor notes are added to both sweet and savory applications, such as nutrition bars and healthy snack mixes.”

Interestingly, she notes, Proposition 65 regulations regarding hazardous chemicals are driving fans of smoky flavors to seek out substitutes. “As a reaction to market demands, flavor companies are developing smoke-type flavors without any actual smoke,” she says. “Common smoke flavor profiles include hickory smoke and mesquite smoke, and we predict the smokeless
smoke flavor trend will escalate in 2019 with flavor profiles such as applewood, maplewood, and cherrywood smoke-type flavors. Oakwood, which offers a smoky flavor, is also seeing more activity, says Doehler. "Oakwood is characterised by rustic and slightly smoky notes, often with hints of vanilla and caramel," the company says. "Its exciting flavor is not just found in barreled spirits and fragrances for men, but is rapidly becoming a trendy ingredient in cocktails, adult teas, and barrique beverage concepts, as it creates new and exciting taste profiles. Oak aroma can also be found in foods such as fish and meat products, cheese, seasonings, sauces, etc., and adds a smoky and spicy flavor to them. It is certainly one of the most exciting flavors to keep an eye out for in the coming year."

Comax Flavors points to the continued growth of fermented flavors, including five spice kombucha, pickled beet and onion, and pickled peach. "Fermented and pickled foods and beverages are having a revival," said the company in a recent press release predicting flavor trends for 2019. "This renewed interest is driven by consumers gravitating towards probiotics and friendly bacteria that support digestive health coupled with consumers’ interest in bold tastes." Comax points to sales reports from market researcher SPINS showing that U.S. retail sales of refrigerated kombucha and other fermented beverages grew 37.4% to $556 million in 2017.

Around the World
Global flavors continue to make their mark stateside as consumers expand their taste horizons.

"I think the interest in global flavors will continue into 2019 and beyond," says Roger Lane, marketing manager, savory flavors, Sensient Technologies (Milwaukee, WI). "Consumers are simply too tuned in to what’s happening around the world for continued exploration not to happen."

"As Americans gain more familiarity and affinity for international taste, Moroccan, Mediterranean, and Asian flavors continue to grow, such as agrodolce, baharat, bagoong, and many more," says Soumya Nair, director of marketing insights for Kerry. “The variety of oriental flavors is in vogue,” says Doehler, highlighting trending flavors such as those from dates, figs, multifaceted spice blends, turmeric, and Moroccan mint. "Oriental flavors impress with their wonderful diversity of intensive taste profiles and can trigger positive associations, such as a holiday memory, as well as alternations of familiar flavors. With almost unlimited fields of application possible, such as instant noodles, table sauces, snack mixes, teas, or gin, these flavors are certainly worth keeping an eye on."

ADM, like Kerry, predicts that in 2019, "za’atar, a Middle Eastern blend of oregano,
Increasingly sophisticated consumer tastes are influencing how formulators work with regional flavors.

Flavors to Watch

Increasingly sophisticated consumer tastes are influencing how formulators work with regional flavors. "Kerry’s predictions forecast that 2019 will bring further specificity to the origin of flavors as ingredients as consumers seek tastes that delight, surprise, and excite them," Kerry said in its press release.

With specificity in mind, Sensient’s Lane says “hyper-regionalized” flavors are replacing more commonplace regional flavors. "For example," he says, "Asian flavors have been around for ages, but we’re seeing interest in Macanese cuisine surge. It’s the perfect fusion food as it combines influences from South America, Europe, and Asia."

As formulators put new flavors on consumers’ taste maps, marketing stories can also capitalize on the exotic background behind those ingredients. "Products that are created with ingredients that are traceable and have provenance claims can be the nudge that a casual browser needs to engage with a particular product," says Keera Perumbala, marketing associate, sweet and beverage flavors, Sensient Technologies. "A ‘Brazilian orange’ carries more appeal than an ‘orange.’"

Indian cuisine is a huge interest area, says Comax Flavors. "Over the last few years, we’ve seen Indian ingredients such as cardamom, coriander, curry, and garam masala emerge," said Catherine Armstrong, vice president of corporate communications, Comax Flavors, in a press release. "Comax thinks Indian food is ripe for the American palate,” she said. It inspired the company’s "Passage to India" flavor portfolio, which includes Indian vegetable curry, mango lassi, and masala spiced donut. These flavors are showing up in everything from savory products, dressings, and sauces to dairy, ice cream, plant-based applications, baked goods, and nutrition and performance products.

Virginia Dare also highlights India-inspired hybrid flavors. "This year, don’t be surprised to see consumers’ adventurous taste buds lead them to Indian-inspired flavors," says Caputo. "Consumers love pairing the familiar with the exotic, and Indian flavors are an area we see benefitting from this. Look for hybrid flavors like cardamom mocha, cardamom white chocolate, chai caramel, chai molasses, garum masala gingersnap, maple cumin, and maple curry spice blend."

Interest in Indian flavors is also driving the rise of marigold as a flavor, according to Symrise, which notes recent chef inspirations that include marigold syrup and muhammara with piquillo, almond, pomegranate, and marigold.

Japanese food continues to influence flavors here. Symrise’s Laroche calls shiso “more than just your sushi sidekick. It’s now being used as a flavor agent in dishes, drinks, and desserts.” Kerry’s Soumya Nair points to miso as a growing flavor trend. Russian cuisine and its focus on rich and hearty foods are also translating stateside, Symrise’s Laroche says.

Cultural fusion is also a big draw. For instance, "Both Japanese and Italian cuisine share common elements—most notably, an emphasis on seasonality and simplicity," Laroche says. Together, these flavors can be even better.

And even as consumers travel outside of their taste comfort zones, maintaining an element of the familiar is also a good idea. "While consumers do love to try new flavors and explore new cuisines, they do like a touch of the classic to be included to make it a bit more familiar," says Sensient’s Lane. "For example, Middle Eastern cuisine is blowing up, and the flavors themselves are actually fairly familiar, but taking those flavors and combining them with something like mayonnaise or ranch makes them more accessible to consumers." Also, he says, combining exotic cuisine flavors with product formats more familiar to consumers establishes a solid introduction path. He suggests: "Why not create a Korean-style burrito using ingredients found in typical Korean fare, but wrapped in a tortilla for a format everyone knows?"

Health Benefits

There are also flavors whose health appeal is perfectly in line with the general growing consumer interest in functional, healthy products. This is what has driven the rise of a superstar spice like turmeric.

"Over the past three years, functionality has grown steadily to gain mainstream presence across health, wellness, and indulgent product categories," says Kerry’s Nair. "We have closely followed the growth of turmeric, as it continues to move on an upward slope. Following closely, under the added-functionality benefit, are ashwagandha and holy basil, to name a few. The inclusion of these ingredients as a healthy addition is growing in consumer popularity."

Sensient’s Perumbala says, "The past decade has seen an increased focus on health and wellness dictating consumers’ lifestyle choices, particularly where it includes food and beverage. This is reflective in the increased
Botanical herbs and flavors that help consumers de-stress or give them more energy are also gaining fans, Perumbala says. Perumbala points to interest in “products taking advantage of natural energy and antioxidant sources, as we see more products with guayusa or yerba mate or elderberry extracts.”

Oats are a healthy ingredient that several flavor firms call out as a flavor to watch in 2019. Specifically: “Oat milk exploded in popularity in 2018 as an almond and soymilk alternative—a creamier alternative, according to devotees, including specialty-coffee consumers,” says Virginia Dare’s Caputo. “Considering this trend alongside the continued popularity of overnight oats and a general move toward increased fiber intake, we expected toasted oat to grow as a flavor in shakes, cereals, and more in 2019.” In its 2019 Taste Charts, Kerry also calls out oat milk as a growing alternative ingredient.

Coffee—particularly cold-brew coffee—continues to see heightened activity due to the healthy halo around coffee in general, says ADM’s Marie Wright. In addition, she says, “Red coffee cherries, or cascara, are also booming in consumption due to their ‘super-powers,’ and we predict an emergence of cascara-flavored products in 2019, especially in good-for-you products. Mushroom coffee is another global trend for 2019, spurred by the health benefits associated with mushrooms such as chaga or lion’s mane. We see this flavor emerging in 2019 with associated applications such as ready-to-drink beverages, cookies, and ice cream.” Also, she notes, coffee consumption is growing globally among younger consumers (13-18 years of age). These customers, she says, “prefer creamy and sweet coffee beverages such as shakes, smoothies, and twists on lattes. Coffee creamy flavors will continue to emerge in other products such as nutritional shakes, cookies, muffins, and ice cream.”

The Whole Package
Finally, in order for flavors, especially less familiar ones, to get a good reception from consumers, Sensient’s Perumbala reminds formulators to remember the importance of other attributes that contribute to a flavor’s appeal.

“We will continue to see products that are experiential in nature, engaging multiple senses at the same time,” Perumbala says. “Texture and visual impact play a big role in delivering these share-worthy experiences that the younger generation craves. Edgy flavors and bold colors turn ‘over the top’ into the new norm, and this is being emphasized in food and drinks with attention-grabbing ingredients that create sensations and elevate the consumption experience.”
Flu season 2017-18 was among the severest on record, per the U.S. Centers for Disease Control and Prevention. And thanks to an early start and doozy of a dominating strain—the dreaded H3N2—Influenza Battle 2018-19 is shaping up to be just as bad.

So aside from the usual measures like frequent handwashing, getting a flu vaccine, and avoiding crowds of sick and sniffl y people, what’s a prudent civilian to do to avoid falling prey to this year’s bug?

Develop a stronger immune system, that’s what. And with the right mix of science-backed supplements, doing so isn’t as far-fetched as it seems.

Science has long acknowledged the relationship between diet, nutrition, and immunity, and as contemporary researchers investigate its finer points, they’re vindicating a veritable pharmacopeia of substances that strengthen our inner defenses against the outside world.

That’s not just good news during cold and flu season, either; in our chronically “stressed-out” age, there’s never a bad time to improve immunity—or, in the case of supplement brands, to add immune-boosting ingredients to product lineups.

Immunity on the Mind
Consumers clearly have immunity on the mind. As Donald Cox, PhD, R&D director for Wellmune and GanedenBC30 at Kerry (Mayfield Heights, OH), observes, “Good immune health is the foundation of a high quality of life, and the cornerstone of the holistic approach to wellness that people today are seeking.” The upshot: “Immune health,” he declares, “is a large and growing market.”

Indeed, a 2016 Harvard Opinion Research Program study of 1,579 adults ranked immune health among the top-three reasons people sought supplements, besting heart disease and cholesterol, weight control, and digestion.

“These consumers are spending money on immune health, as well,” adds Emily Pankow Fritz, PhD, technical services manager, active wellness platform, Kemin (Des Moines, IA). In its December 2017 report, “Immune Health Supplements Market: Global Industry Analysis and Forecast 2017-2025,” Persistence Market Research estimated the value of the global immune-health supplement market at $14.4 billion in 2017, and with a predicted CAGR of 7%, that value looks likely to increase to $25 billion by 2025. “That’s growth of 73.6% in eight years,” Pankow notes.

Yet consumers don’t have to be fighting the flu—or aiming to avoid it—to benefit from immune-health supplements. As researchers at GlobalData reported in “Top Trends in Healthcare and OTC, 2017,” concerns about stress motivate fully 75% of...
DECADES OF WORLD-CLASS SCIENCE & MANUFACTURING AT YOUR FINGERTIPS

Put your trust in a contract manufacturer with the experience of building a world-class brand of its own. When you partner with Sabinsa, you benefit from the same science and production capabilities responsible for Sabinsa's unmatched reputation for quality.

sabinsamanufacturing.com

Fluid Bed Granulation • Tablet Pressing & Coating • Roll Compaction • Capsule Filling • Bi-Layer Tablets • Solid Dose Packaging

© 2018-2019 Sabinsa | UT: 801.465.8400 | manufacturing@sabinsa.com | Since 1988
shoppers who purchase OTC medication, dietary supplements, functional food and beverages, and sports nutrition products. And as Cox points out, “One of the most detrimental effects of stress includes the suppression of the immune system and, therefore, a greater risk of illness.”

**Something for Everyone**

Indeed, Cox emphasizes, “Young or old, stress affects us all.” So young and old can all benefit from some immune boosting.

“For parents of young children,” Cox notes, “keeping them well is a top concern because it’s not just the children’s health at stake, but that of the entire family.” Thus more parents are turning to immune-boosting functional foods, beverages, and supplements to “proactively support” their children’s health, he says.

Then there’s the senior sector, for whom immune protection has always been a heightened concern. As the United Nations’ 2015 World Population Aging report notes, the global population over aged 60 is expected to grow by 56% by 2030, “and products for Team Immunity. And those supplements need not be relegated to any single season. As Michini says, “People know that immune support isn’t just for wintertime. And they understand the broader concept that a healthy functioning immune system keeps them pretty healthy throughout the year. This is great news for brand marketers seeking to invest in creating immune-support products.”

**Agents of Immunity**

Fritz explains that the body recognizes “non-self” substances are referred to as pathogen-associated molecular patterns (PAMPs) and are detected by specialized surface receptors in immune cells,” she says. “Through binding and engulfing the 1,3-beta glucan, these specialized cell surface receptors induce signaling cascades that prime immune cells. The primed immune cells circulate in the body through the lymphatic system to areas where the immune system might be challenged, like the respiratory system.”

**Baker’s Yeast Beta-Glucan Ameliorates URTI Symptoms in Athletes**

Adding to the evidence supporting beta-glucans is another study published online in October 2018 showing that consumption of foods and drinks formulated with Wellmune, a natural proprietary baker’s yeast L3/1,6-beta glucan, is “a promising strategy” for reducing the severity and effect of URTI symptoms associated with intense exercise stress, says Cox.

In the double-blind, randomized, placebo-controlled parallel-design study, healthy adult participants in the 2017 Austin Marathon consumed either a ready-to-drink dairy beverage containing 250 mg of the ingredient or a macronutrient- and calorie-matched dairy beverage control for 45 days prior to the marathon, as well as on the day of and 45 days following. The researchers evaluated URTI occurrence and symptom severity and found that runners in the beta-glucan group experienced a 19% reduction in URTI symptom severity compared to placebo, missed fewer post-marathon workouts because of URTIs, and claimed a total of 10% fewer symptomatic days compared to the control.

When asked about the ingredient’s mechanism of action, Cox referenced the growing body of published, peer-reviewed clinical research indicating that the body absorbs the ingredient through the gut, whereupon macrophages in the digestive tract take it up and carry it to immune organs throughout the body. The macrophages break the ingredient into smaller fragments that bind neutrophils—“the most abundant immune cells in the body,” says Cox —then trigger a cascade of immune responses that support the immune system’s ability to resist viral activation overall,” says Sam Michini, vice president of marketing and strategy at Deerland.

Researchers tracked symptoms of upper-respiratory-tract infections (URTI) in endurance-trained subjects and found that over the trial’s 90-day duration, those supplementing with the beta-glucan ingredient— which comprises more than 50% algal-source 1,3-beta glucan and 20% protein—reported fewer sick days and URTI symptoms than those taking the placebo.

“Active individuals who participate in endurance exercise were recruited as subjects because intensive endurance exercise has been associated with altered innate immune function, resulting in the immune system not functioning optimally,” says Pankow Fritz. The study’s results indicate that the ingredient is “helping to support a healthy immune system,” even in athletes’ challenged bodies.

**Algal-Source Beta-Glucan and URTI Symptoms in Athletes**

Beta-glucans—polysaccharides found in the cell walls of cereals, bacteria, and fungi—have demonstrated immune-boosting properties, and a recent, not-yet-published randomized, double-blind, placebo-controlled clinical trial measured the immune effects on healthy, active subjects of a beta-glucan-containing whole-cell fermentate derived from the algae *Euglena gracilis* (trade-named BetaVia Complete and produced by Kemin). Researchers tracked symptoms of upper-respiratory-tract infections (URTI) in endurance-trained subjects and found that over the trial’s 90-day duration, those supplementing with the beta-glucan ingredient— which comprises more than 50% algal-source 1,3-beta glucan and 20% protein—reported fewer sick days and URTI symptoms than those taking the placebo.

“Active individuals who participate in endurance exercise were recruited as subjects because intensive endurance exercise has been associated with altered innate immune function, resulting in the immune system not functioning optimally,” says Pankow Fritz. The study’s results indicate that the ingredient is “helping to support a healthy immune system,” even in athletes’ challenged bodies.

**Ingredients in Action**

And this is where the right immune-boosting ingredients come in.

“There are effective supplements and natural remedies that help truncate a cold once symptoms first appear, and there are also highly effective supplements that support the immune system’s ability to resist viral activation overall,” says Sam Michini, vice president of marketing and strategy at Deerland.

As for how it affects its benefits, Pankow Fritz explains that the body recognizes the beta 1.3 glucan as being of “non-self” origin. “Non-self” substances are referred to as pathogen-associated molecular patterns (PAMPs) and are detected by specialized surface receptors in immune cells,” she says. “Through binding and engulfing the 1.3-beta glucan, these specialized cell surface receptors induce signaling cascades that prime immune cells. The primed immune cells circulate in the body through the lymphatic system to areas where the immune system might be challenged, like the respiratory system.”

**For parents of young children**,” Cox notes, “keeping them well is a top concern because it’s not just the children’s health at stake, but that of the entire family.” Thus more parents are turning to immune-boosting functional foods, beverages, and supplements to “proactively support” their children’s health, he says.

Then there’s the senior sector, for whom immune protection has always been a heightened concern. As the United Nations’ 2015 World Population Aging report notes, the global population over aged 60 is expected to grow by 56% by 2030, “and products with immune benefits for this group represent a prime opportunity,” says Cox.

Another opportunity lies in gyms and recreation centers across the nation. As John Deaton, PhD, vice president of science and technology, Deerland Probiotics & Enzymes (Kennesaw, GA), says, “We believe that an underserved population consists of athletes and fitness enthusiasts who tend to exercise or compete vigorously.”

That’s because vigorous activity depresses the body’s defenses, rendering active types vulnerable to infections that exploit suppressed mucosal and systemic immunity. Additionally,” Deaton says, “athletes who become overly fatigued tend to have altered circulating levels of pro- and anti-inflammatory cytokines. For example, higher circulating levels of tumor necrosis factor alpha, or TNF-α, were found in a study of elite male rowers.”

The downstream effects can run to missed training days and workouts, poorer performance, and unmet goals, so the desire among athletes to stay healthy from the start, Cox believes, “presents a clear opportunity for innovators of sports nutrition products with proven immune-health benefits.”

**Ingrediens in Action**

And this is where the right immune-boosting ingredients come in.

“There are effective supplements and natural remedies that help truncate a cold once symptoms first appear, and there are also highly effective supplements that support the immune system’s ability to resist viral activation overall,” says Sam Michini, vice president of marketing and strategy at Deerland.

And those supplements need not be relegated to any single season. As Michini says, “People know that immune support isn’t just for wintertime. And they understand the broader concept that a healthy functioning immune system keeps them pretty healthy throughout the year. This is great news for brand marketers seeking to invest in creating immune-support products.”

“Active individuals who participate in endurance exercise were recruited as subjects because intensive endurance exercise has been associated with altered innate immune function, resulting in the immune system not functioning optimally,” says Pankow Fritz. The study’s results indicate that the ingredient is “helping to support a healthy immune system,” even in athletes’ challenged bodies.
Blending **Quality** and **Value**

Ross builds the world’s finest Ribbon Blenders to support customers from Chicago to Shanghai. With five manufacturing plants in the U.S. alone, we can meet virtually any blending challenge, on any scale — and we can often deliver immediately from stock.

Engineered to exacting standards for applications from food to pharmaceuticals, in sizes from 1 to 500 cu.ft., Ross Ribbon Blenders also have the BEST prices anywhere. Complete control packages are available.

Try our free online Knowledge Base & Product Selector web app at mixers.com/web-app

www.mixers.com • 1-800-243-ROSS

Imagine the Possibilities
A 2016 Harvard Opinion Research Program study of 1,579 adults ranked immune health among the top-three reasons people sought supplements.

adds—and these primed neutrophils then “move more quickly to recognize and kill foreign challengers.”

**Bacillus subtilis Probiotic Enhances Immunity in Athletes**

“We’re understanding more clearly that no system works alone,” says Deaton. “And such is the case between the GI tract and the immune system.” Given that 80% of the immune system resides in the digestive tract—and given probiotics’ role in keeping the latter healthy—it should come as no surprise that probiotics are go-to immunity-enhancing supplements.

A study published in July 2018 once again demonstrated this—and like so many others lately, it used athletes’ immunity as the prism through which to view it. Twenty-five Division I male baseball players received either 1 billion CFU of a genome-sequenced probiotic strain of *Bacillus subtilis*—Deerland’s DE111—or a placebo in a double-blind, placebo-controlled randomized trial. Following 12 weeks of intense training, blood and salivary measures of the subjects’ immune markers and hormonal status taken both before and after showed significantly lower concentrations of TNF-α—an inflammatory marker—in the probiotic group than in those receiving the placebo.

“DE111 has been shown to crowd out *E. coli* and other undesirable strains, allowing for a proliferation of beneficial bacteria,” explains Michini. It binds to epithelial cells of the intestinal lining, where its propagation strengthens their barrier capacity. What’s more, it forms spores that protect against acidic conditions, allowing it to survive transit to the GI tract, where the environment is ripe for germination.

**Probiotic Blend Improves Responses to the Common Cold**

Another probiotic study publicized in 2018 looked specifically at how a combination of the patented probiotic strains *Lactobacillus plantarum* Heal9 and *Lactobacillus paracasei* 87002—brand-named Probi Defendum (Probi; Lund, Sweden)—might improve subjects’ responses to the common cold.

Conducted by Probi and involving 900 subjects over three winters, the randomized, double-blind, placebo-controlled human clinical trial—the company’s largest ever—found that subjects receiving one daily dose of the probiotic blend for 12 weeks during winter experienced fewer recurrent common colds. In subjects not suffering from common colds at all, supplementation still appeared to activate the immune system within two weeks of commencement. And during the study’s first winter, the probiotic group reported reduced overall severity of common cold symptoms relative to the placebo group.

In a press statement, Peter Nählstedt, CEO, Probi AB, notes that the company is “proud to conclude that our largest clinical trial so far has successfully confirmed earlier clinical results,” and adds that the rapid immune activation in subjects taking the probiotic indicates “an alert and resilient immune system.”

**Prebiotic Chicory Root Fiber Improves Immunity in Kindergarten-Aged Children**

“Acute infections, particularly in the winter season, are common in kindergarten children,” says Anke Sentko, vice president, regulatory affairs and nutrition communication, Beneo (Parsippany, NJ)—“increasing healthcare costs and workday losses for the caretaking parents.” Because prebiotic fibers support the healthy microbiota that, in turn, support immunity, “we continue to be excited about the benefits of prebiotic chicory root fibers” as immune-boosting ingredients, Sentko says.

A double-blind, placebo-controlled study published in July 2018 examined the effects of six-months-plus of daily supplementation with 6 g of prebiotic chicory root fiber (Beneo’s Orafti inulin) in 200 3- to 6-year-old children during the autumn and winter seasons. Among the study observations were increased gut levels of *Bifidobacteria* and *Lactobacillus*—both known to improve immune and gut health—as well as softer stools in a normal range and fewer incidences of febrile infections.

The results “demonstrated overall the prebiotic effect of the dedicated mixture of long-chain and shorter-chain chicory root fiber used,” Sentko says. “Previous studies have demonstrated a strengthening of the natural defense system in infants and children between birth and two years, but this is the first time this evidence has been established for this 3- to 6-year age group. This latest research highlights that the risk of acute infections can be reduced by incorporating chicory root fiber into the daily diets of children to strengthen their defenses and improve digestive health.”

**DHA-Rich Fish Oil Concentrate Boosts B-cell Activation in Obese Humans**

The long-chain omega-3 polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) enjoy a reputation as defenders of neural and cardiovascular health, but a human pilot study published in March 2018 used an *ex vivo* model of B-cell cytokines to show that a fish oil concentrate high in DHA, in particular, may modulate human B-cell activity in obese middle-aged subjects.

The linchpin may be DHA’s effects on inflammatory aspects of immunity, which have already been manifest in animal studies. That the fish oil provoked B-cell activation in humans is exciting, and the results suggest that DHA may uniquely contribute to immune function—holding promise for supplement brands and the public as the incidence of chronic inflammatory disease rises.

According to Steve Dillingham, global director, Organic Technologies’ AlaskOmega
Ingredients (Coshocton, OH), the study’s major sponsor: “This study adds to the body of knowledge that supplementation with a high-DHA fish oil concentrate can help support healthy immune systems in select populations. While this pilot study’s results are certainly encouraging, much more research in this area is warranted.”

**Echinacea Does It Again**

*Echinacea purpurea* is a genus of herbaceous flowering plants in the daisy family, and has seen widespread use for immune support in Europe and North America for generations. And, notes Moran Werner Saido, product manager, Frutarom Health Ltd. (Londerzeel, Belgium), “Echinacea extracts have shown antioxidant, antibacterial, antiviral, and antifungal properties.” The plant’s antitussive and bronchodilator effects were demonstrated in pharmacodynamics studies, as well.

A randomized, placebo-controlled trial conducted in 2011 found that three weeks of oral supplementation with 500 mg of Echishield, an extract of cold-pressed juice from freshly harvested *Echinacea purpurea* flowers that Frutarom markets, stimulated immune function and thus improved quality of life in healthy subjects suffering from a constant feeling of fatigue. Levels of immune cells like lymphocytes, CD4+ cells, and T-cells increased significantly more compared to baseline values, while they remained unchanged in the placebo group.

Among the constituents identified as potential actives are polysaccharides, glycoproteins, alkylamids, caffeic acid derivatives, volatile oils, and alkaloids, Werner Saido says, and experimental data suggest that the extract’s immunomodulatory activity owes to three possible mechanisms: activation of phagocytosis and stimulation of fibroblasts; increased respiratory activity; and increased leukocyte mobility. “The cellular evidence of immune stimulation seems to translate into benefits for human health, although not all clinical studies reported consistent results,” Werner Saido says.  

**References**

2. Townsend JR et al. “Effects of probiotic (*Bacillus subtilis* DE111) supplementation on immune function, hormonal status, and physical performance in Division I baseball players.” *Sports,* vol. 6, no. 3 (July 26, 2018): 70–79.

**Kimberly J. Decker writes for the food and nutrition industries from her base in the San Francisco area, where she enjoys eating food as much as she does writing about it.”**
Blood sugar–support supplements represent a growing opportunity for manufacturers and brands, with consumer demand increasing as high-glycemic diets have become a global norm. Nearly 1 in 10 Americans has diabetes, according to the Centers for Disease Control and Prevention, and nearly 30% of Americans can be classified as prediabetic. Consumers who prefer a natural alternative to prescription medications are driving growth in the blood sugar–support botanicals niche within the general, booming herbal supplements market, which overall grew by 8.5% in 2017 to $8 billion, according to an HerbalGram report.

As interest in botanicals as blood sugar managers grows, consumers and brands alike will look for high-quality evidence of their efficacy in this role. Which botanicals are standing out in the research? Here are some of the most promising botanical ingredients for blood sugar support.

Chinese Herbs Show Efficacy as Hypoglycemic Agents
A number of herbs used in traditional Chinese medicine are now showing promising results in clinical trials. Brien Quirk, the director of research and development for Draco Natural Products (San Jose, CA), says that one compound found in several traditional Chinese herbs is proving to be as effective as pharmaceuticals at lowering blood sugar. “Berberine is an alkaloid found in several herbs, including Coptis chinensis and Phellodendron amurense,” Quirk says. “In one clinical study, berberine was found to be as effective as metformin and showed a very potent antidiabetic effect.”

The study that Quirk references was a 2008 randomized clinical three-month trial that followed 36 Chinese adults between the ages of 25 and 75 who were recently diagnosed with type 2 diabetes. Participants were randomly assigned to receive either berberine or the pharmaceutical metformin, each taken in 500-mg doses three times a day. Participants were evaluated once per week for the first five weeks, and then once every four weeks until the end of the study.

The study authors measured participants’ blood glucose, serum insulin, C-peptide, plasma triglyceride, and cholesterol levels, as well as insulin resistance. Thirty-one participants completed the study. The berberine group (n=15) experienced a 36% drop in fasting blood glucose levels, relative to a 28% drop for the metformin group (n=16).

Seaweed Improves Blood Sugar in Clinical Trials
Research is now indicating that some of the best new blood sugar ingredients are botanicals that have a long history of use. Brown seaweed extract has shown impressive effects in recent human studies, particularly in complex cases.

Carol Cheow, CEO of Cactus Botanics (Irvine, CA), says that naturally occurring compounds in brown seaweed extract (fucoidan and fucoxanthin) are proving to be effective at improving blood sugar control. Cheow says that studies show improvements in participants who have a genetic predisposition to insulin resistance.

One randomized, single-blind clinical trial followed 60 normal-weight and obese Japanese adults between the ages of 30 and 77 years old for eight weeks. Participants self-administered either 1 mg (n=20) or 2 mg (n=20) of fucoxanthin-enriched akamoku oil or a placebo (n=20) once per day while maintaining their normal diet and exercise regimen.
The 2 mg/day group saw a statistically significant reduction in average blood glucose levels relative to the control group. The study authors concluded that this effect is dose-dependent, with larger doses having a larger effect.

“More studies have discovered that the furcocidion found in brown seaweed extract can prevent blood sugar spikes after a high-sugar meal,” Cheow says. “The extract reduces the absorption of sugar into the bloodstream.”

Brown seaweed extract may also have other properties that can promote blood sugar control. One clinical trial currently underway in Canada is examining the extract for its effects on other glucose metabolism markers.

**Research Validates Use of Traditional Botanicals**

Ancient cultures have been using botanicals in their systems of medicine for thousands of years, but now, research is proving the efficacy of some of these botanicals. Shaheen Majeed, president, worldwide, Sabinsa (East Windsor, NJ), says that botanicals like turmeric (*Curcuma longa*) are showing promising results when administered in the form of standardized extracts.

One recent randomized, double-blind, placebo-controlled clinical trial followed 118 subjects between the ages of 18 and 65 who had type 2 diabetes mellitus. Subjects were randomly assigned to receive a brand-name 500-mg curcuminoid/5-mg piperine supplement, or a placebo, twice per day for three months.

Participants’ overnight fasting blood glucose levels were taken at week 0 and week 12. The study authors also measured participants’ height, weight, and blood pressure. One-hundred subjects completed the trial.

After 12 weeks, the experimental group (n=50) saw statistically significant reductions in BMI and body weight (p < 0.001) relative to the control group (n=50). The experimental group also exhibited significant elevations in serum total antioxidant capacity and superoxide dismutase, as well as a significant reduction in serum malondialdehyde (p < 0.001).

The study authors concluded that curcuminoids are a safe and effective antioxidant supplement. Curcuminoids hold value as blood sugar–support ingredients because illnesses like diabetes are known to cause overproduction of superoxides in the mitochondria, which activates pathways that can cause complications in diabetes patients.

Other botanicals that show promise as blood sugar–support ingredients include fenugreek (*Trigonella foenum-graecum*) and kino heartwood, derived from the Indian Kino tree (*Pterocarpus marsupium*). Cheow says that fenugreek seeds are known to exhibit potent antioxidant, hypoglycemic, and nephroprotective activities, as well as serving as membrane stabilizers. Cheow points to a recent randomized, double-blind, placebo-controlled clinical trial demonstrating that Cactus Botanics’ branded fenugreek supplement, Fenfuro, significantly reduced fasting blood plasma and postprandial blood sugar levels in participants.

The trial followed 154 subjects between 25 and 60 years of age with type 2 diabetes for a period of 90 days. Participants received a daily dose of two 500-mg Fenfuro-brand fenugreek capsules (n=77) or a matching placebo (n=77). Fasting and postprandial plasma sugar levels were assessed at baseline and on days 30, 60, and 90. Relative to the placebo group, the experimental group saw statistically significant decreases in fasting plasma sugar levels and postprandial plasma sugar levels.

Majeed says that kino heartwood is also showing promise as a blood sugar ingredient. He cites the results of a randomized double-blind clinical trial on 349 diabetic subjects who received either 2 g of *Pterocarpus marsupium* (n=172) or 0.75 g of the antidiabetic drug tolbutamide (n=177) per day for the first four weeks, with doses increasing every four weeks during the course of the 36-week trial.

At the end of the trial, 86% of subjects in the kino heartwood group were maintaining blood glucose control, relative to 94% of the subjects in the tolbutamide group. The experimental group saw an average 4.3 mmol/L reduction in postprandial blood glucose levels over the course of the trial, relative to a 4.4 mmol/L reduction for the control group. These findings indicate that kino heartwood is about equally as effective as tolbutamide at maintaining stable blood glucose levels in people with diabetes.

**Goldenberry Is a Rising Star**

One promising ingredient to watch is goldenberry (*Physalis peruviana*). Ramon Luna, marketing coordinator for Ecuadorian Rainforest (Clifton, NJ), says that goldenberry is both nutritious and effective at controlling blood sugar.

“Polyphenols are now getting much attention thanks to a recent study on the nutrient’s effect on blood sugar,” Luna says. “Goldenberry is an antioxidant-packed superfruit that is also a very good source of polyphenols.”

Luna points to animal studies showing that polyphenols can promote natural blood sugar management. The human research, while promising, is still in its early stages.

In general, some epidemiological studies have shown that polyphenol intake is correlated with a lower risk of type 2 diabetes. One comprehensive literature review assessed several epidemiological and observational

---

**SEX DIFFERENCES IN EFFICACY?**

There may be a difference in the sexes when it comes to how certain blood sugar botanicals affect the body. A 2018 animal study by researchers at Louisiana State University found that tarragon (*Artemisia dracunculus*) and bitter melon (*Momordica charantia*) improved insulin sensitivity in male, but not female, mice. Also, human cross-sectional studies have already shown statistically significant sex differences in fasting blood glucose levels. More human research is needed to determine how blood sugar–support botanicals affect male and female subjects.
Blood Sugar Support

*As more studies emerge, expect consumers who are wary of pharmaceuticals to drive demand for blood sugar–support botanicals.*

studies, as well as multiple meta-analyses of randomized controlled trials. This literature review found that some compounds rich in polyphenols reduce fasting glucose and improved insulin sensitivity, though the available studies have small samples sizes or poor statistical analyses and therefore more research is required.

**Botanicals on the Rise**
A number of traditional botanical ingredients are gaining popularity as supplements for blood sugar support thanks to growing evidence of their efficacy. Meanwhile, continuing research is opening up possibilities for newer botanicals typically used for other purposes that may hold promise as blood health supplements. As more studies emerge, expect consumers who are wary of pharmaceuticals to drive demand for blood sugar–support botanicals.

**References**


Mike Straus is a freelance journalist living in Kelowna, Canada. He has written for publications including Canadian Chiropractor Magazine, UX Booth, and Iconic Concierge Vancouver.
Chromax® from Nutrition 21—Not all chromium is the same.

- Prop 65 compliance† independently verified
- Significant improvement in body composition
- Significant reduction in carbohydrate cravings and appetite
- Significant reduction in caloric intake

Additional claims available supporting:

- Energy
- Mood
- Metabolism
- Cognition
- Lean Body Mass

More than 2x reduction in carbohydrate cravings and 1.8x reduction in appetite vs. placebo††

Average caloric intake reduced by 374 calories per day†††

Learn more at Nutrition21.com or email info@nutrition21.com.
You could argue that the dietary supplement industry has undergone more transformation in the past decade than in the preceding four combined. And we’re not just talking about the usual shifts in regulation and legislation, either: the empowered consumer, social media, novel retail models, and the relentless march of technology have all turned ours into a very different business than the one our predecessors built.

That being the case, contemporary dietary supplement processing equipment has to be an entirely different animal, as well. That’s the only way it can keep up with the needs—and hurdles—confronting contemporary supplement makers.

Challenges Ahead

“Today’s dietary supplement industry faces challenges on several fronts,” observes Andrew Pietrangelo, president, North America, Antares Vision (Mount Laurel, NJ). “Consumers are increasingly turning to alternative healthcare solutions, fueling market growth and expectations of authenticity, product quality, and safety. No longer do one-size-fits-all tablets or capsules meet growing e-commerce and retail buyer demands, either. Supplement formats are expanding from powders and liquids to gummies, softgels, and functional foods.”

All of this makes it incumbent on manufacturers, and their equipment, to increase production while also remaining nimble, maintaining brand integrity, and staying alert for the next change coming down the pike.

Getting Technological

More likely than not, that change will emerge from the introduction of new technology, which continues to reshape every aspect of supplement production, from how we blend ingredients to how we keep records.

“Our operations are definitely becoming more paperless, and we’re relying on integrated software programs—like Deacom and Redzone—for storing critical documentation that, historically, has been recorded as hard copies,” notes Steve Holtby, president and CEO, Soft Gel Technologies Inc. (Commerce, CA).

Smarter systems have also made machinery faster and easier to operate, Holtby adds. “For instance, optical inspection systems have almost entirely removed the human element from the equation, inspecting up to 300,000 capsules per hour,” he says. This ups productivity and reduces cross-contamination risk while, in the case of Holtby’s company’s operation, allowing it to inspect every softgel that comes off the line for color, area, width, length, and symmetry or shape—“providing consistent quality 24/7.”

To Each His Own

On the demand side, Tim Saarinen, chief operating officer, Maruho Hatsujyo Innovations (MHI; Norwell, MA), predicts that computer technologies may yield “more customized products based on specific consumer needs,” he says.

“While it’s a utopian vision now, one could imagine a time when each individual would have their own profile of dietary supplements and wellness products based on computer models using AI and machine learning,” Saarinen continues. With the costs of tooling going down at the same time that ease of changeover is trending up, industry will thus be well placed to “provide more customization of products while maintaining acceptable price points for the consumer.”

Revenge of the Robots

The fact that Saarinen sees a role for AI—artificial intelligence—in industry’s evolution is no sci-fi fantasy. AI, as well as robots, are already at work.
Standardized to 3 proven bioactives, Sensoril® is the trusted and original holistic ashwagandha extract.

Only one Ashwagandha extract uses traditional Ayurvedic wisdom to combine root and leaf from the Withania somnifera plant for a patented combination that delivers three beneficial bioactives—Withanolide glycosides, Withaferin A, and Oligosaccharides—for enhanced wellness. Formulate your next successful supplement, food or beverage with clinically proven and patented Sensoril Ashwagandha.

Contact Natreon directly and we’ll help you reach your zen.

Learn about Sensoril at natreoninc.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.
“Robotics are in use today to automate many feeding processes for blister packaging applications, and are likely to become more common for a variety of products,” Saarinen says. “This will make manufacturing more efficient, along with optimized package design.”

Chris Siegele, senior specialist, Omega Design Corp. (Exton, PA), foresees machines gathering data and performing their own analytics not only to predict problems before they happen, but to schedule maintenance and “call for human, or even robot, intervention when needed,” he says. Indeed, he continues, “Where appropriate, there will be an increase in ‘cobots’ working alongside operators capable of programming them as needed.”

Which, for those inclined toward dystopic visions of HAL 9000, should come as some relief. After all, says Tyson Witte, president, The Witte Company (Washington, NJ), “While AI and new technology may provide new levels of efficiency in the manufacture of foods and supplements, a human element will still be required to inspect and verify cleanliness to prevent cross-contamination.” We haven’t been written out of the story, yet.

Here’s a sampling of recent supplement production equipment launches that prove the future is now.

**Greater Efficiency in Tablet and Capsule Inspection**

To adapt to tablet and capsule size and format changes, Antares Vision has developed a tablet and capsule vision-inspection machine with a key advantage: it needs fewer format change parts.

“The advantages of using fewer vision inspection machine format change parts are greater efficiency in adapting to varied product configurations, increased production volume, cost savings with less equipment to purchase, and expanded market reach,” Pietrangelo says.

Named the TCI Tablets & Capsules Inspector, the technology is an automatic standalone machine designed to inspect a range of oral solid-dose products at a high throughput with accuracy up to 50 μm.

The company has also answered the need for heightened quality control and transparency across the product lifecycle via a traceability and inspection software platform that offers users full product insight from raw material to shelf, making the data available through a smartphone scan.

“Automating ‘Safety 4.0’ in product transparency has augmented consumer confidence, simplified brand management, and increased competitiveness in the marketplace,” Pietrangelo says.

**Bringing Continuous Fluidized-Bed Spray Agglomeration Down to Size**

“For years, we’ve been observing a trend toward customer-specific products—i.e., products with defined properties as a unique selling proposition,” says Hendrik Schreier, sales manager, process technology, food/feed/fine chemicals, Glatt Ingenieurtechnik (Binzen, Germany). “The functionality must be very strongly adapted to the particular application: it’s often very complex and specific, with some spray-drying processes reaching the limits of their capabilities.”

In response, the company launched in spring 2018 its GF ModFlex system for continuous fluidized-bed spray agglomeration.

“The compact, modular system based on a hygienic design now makes it possible to use our proven fluidized-bed technology even in the smallest of spaces and for production capacities in the range of 200 to 3,000 kg/hour,”
Schreier says, "Users benefit from unlimited flexibility, all with low investment and operating costs."

How does it stack up against the previous generation of equipment? "The comparison may be a little weird," Schreier concedes, "but think of it as driving a small car that’s technically in line with the luxury class and yet meets the latest environmental standards."

As with the company’s current fluid-bed systems, the new compact concept comprises several process gas chambers, an integrated WIP system, Atex conformity, and a plate filter. And users can have it up-and-running in a snap: 12 days. "The incredibly short and impressive installation time is achievable because all components are preinstalled and preconfigured," Schreier says. "Simply plug and produce."

### New Technologies for Efficiency, Flexibility, and Cost Savings

The equipment developers at MHI introduced two new products in 2018. The big debut was a low-cost, deep-draw blister packaging machine—the EAGLE-Omni—that can execute everything from manual prototyping to fully automated operation, allowing for "seamless development and production, combined with rapid, low-cost prototyping," Saarinen says.

The 40-mm forming depth option gives nutrition brands flexibility in producing less-traditional formats like gummies, not to mention lotions, devices, and other emerging delivery platforms. And with tooling costs a fraction of those associated with legacy tooling sets, and turnaround times measured in days, not weeks, "new packages can be tested for barrier, stability, and durability while having approved packages available for consumer marketing evaluation," Saarinen adds.

In addition to its new packaging machine, MHI has also unveiled prototyping services that deploy 3D printing technology for either the prototyping itself or to produce the appropriate tooling. "This allows a few packages to be made for R&D or marketing purposes at a fraction of the cost of traditional tooling," Saarinen says.

### Making Speed Affordable

"Packaging lines are always confronting issues of speed and uptime," Siegele says. "And packaging line speeds have been constrained by the cost of faster, more reliable equipment." To move things along, so to speak, Omega Design debuted its IMPACT Series in 2018, aiming "to provide our traditional quality at a significantly lower price on many models," Siegele says.

Consider the Econo Pouch Feeder, which Siegele describes as a portable, cost-effective, non-pneumatic pouch inserter that can feed up to 150 desiccant or oxygen-scavenging pouches per minute into all manner of packages: bottles, trays, diagnostic kits, and more.

Its patent-applied-for (PAF) dispensing head uses a stepper motor to cut pouches from a strip quickly and accurately. An operator can then load a pouch desiccant reel onto the machine's spindle and feed the desiccant strip into the dispensing head. The automatic feeder cuts the pouch desiccants from their strip, dispenses

---

Inflammation, C-reactive protein (hsCRP), levels of uric acid, and lipoprotein(a) are all indices to consider. In clinical studies, Gugulipid® was shown to significantly benefit the combination of all these factors. Antioxidant rich foods such as healthful berries, red wine, and an Ayurvedic medicinal preparation for cardiovascular wellness, Drakashava, contain stilbenol compounds such as resveratrol (concentrated in Resvenox®) and pterostilbene (the biomarker in Silbinol®), that target inflammation, sugar and lipid metabolism.*

HEART HEALTHY…
MADE NATURALLY

Natural Products Expo West
BOOTH #3505
MARCH 7-9, 2019
ANAHEIM, CA, USA

Inflammation, C-reactive protein (hsCRP), levels of uric acid, and lipoprotein(a) are all indices to consider. In clinical studies, Gugulipid® was shown to significantly benefit the combination of all these factors. Antioxidant rich foods such as healthful berries, red wine, and an Ayurvedic medicinal preparation for cardiovascular wellness, Drakashava, contain stilbenol compounds such as resveratrol (concentrated in Resvenox®) and pterostilbene (the biomarker in Silbinol®), that target inflammation, sugar and lipid metabolism.*

---

SABINSA
sabinsa.com | gugulipid.com
resvenox.com | silbinol.com


*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, mitigate or prevent any disease.
the desired quantity, and verifies that the desiccants exit the dispensing head.

The all-electric feeder—which sports an anodized aluminum frame, slim line dispensing head, and integrated color touch screen HMI—requires no air and can perform single or multiple pouch drops per container. What’s more, it can accommodate pouches from all major manufacturers, Siegele says.

Preventing Cross-Contamination, and Easing Cleanup

“More processors are paying close attention to consumer demand for healthier snacks with ingredients like nuts and seeds for high protein, and for supplements derived from nuts and seeds,” notes Witte. But nuts and seeds are major cross-contamination red flags, especially in processing gluten-free products, he says.

To avoid contamination crises, some processors go to great expense investing in separate, dedicated gluten-free processing lines. But the design of Witte’s cleanable fluid-bed dryers—rolled out in 2017—allows full access to the machines’ interiors for ready disassembly, cleaning, and inspection in minutes. The result: “Processors are able to process traditional and gluten-free products on the same equipment without significant concern for cross-contamination,” Witte says.

The company also designs drying systems that permit pasteurization without excessive heat, better to protect product quality and prevent degradation in process, Witte adds. And CIP components can be fitted onto the dryers, making for a clean, lean operation.

A single operator can quickly access the machine’s interior without tools. The company’s signature C-clamps open to release the exhaust cover from the conveying surface, after which an optional electric hoist can automatically raise the cover to expose the dryer deck and hold it in place during cleaning and visual inspection. Full cleaning runs 10 to 20 minutes, rendering product changeover easy and contaminant removal verifiable and documentable.

“Most other process equipment can be difficult to clean,” Witte says. “But when it comes to food safety and contamination preventions, there’s no substitute for being able to visually inspect the process and confirm the cleanliness.”

New Tech Improves Double Planetary Mixers

Charles Ross & Son Company (Hauppauge, NY) is known for its mixing systems, and 2018 saw several new options
7–9 May 2019
Palexpo, Geneva

Shaping the food industry for optimal health through science and innovation

Register now — save €150

vitafoods.eu.com
Equipment

drop, including two 150-gallon double-planetary mixers (Model DPM-150) with patented high-viscosity “HV” blades, interchangeable jacketed vessels, electrohydraulic lift, recipe controls with data logger, and an all-stainless-steel, sanitary, dust-tight design.

The company’s double-planetary mixers comprise two identical blades that move in a planetary motion—rotating on their own axes around a common axis. Thirty-six revolutions pass the two blades through every point in the product zone, making physical contact with the whole batch. And the blades’ kneading action when mixing high-viscosity products above 2 million centipoise allows them to turn over thick, sticky, and putty-like materials, smoothing consistency, breaking up agglomerates, and making the machines preferred options in many industries.

The new DPM mixers cater to customer-specific process and application requirements, the company claims in a press release, and represent a “level of technology and customization that is rarely seen in the industry at this size.”

Kimberly J. Decker writes for the food and nutrition industries from her base in the San Francisco area, where she enjoys eating food as much as she does writing about it.”
WE ARE THE MINERAL PEOPLE

SAFE • PROVEN • EFFECTIVE

Our 60 years of mineral knowledge and a patented chelation process have made Albion the most trusted brand of pure chelated minerals available.

• Superior Absorption
• Gentle on the Gi Track
• Complete Mineral Nutrition

• GRAS/Kosher/Halal/Non-GMO Certified
• Hypoallergenic/ Vegan and Vegetarian Friendly

Disclaimer: 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.

LEARN MORE
CALL 1-800-453-2406
ALBIONMINERALS.COM
Joint Effort

How are contract manufacturers dealing with increased scrutiny and demands for traceability, transparency, and quality control?

BY JENNIFER GREBOW, EDITOR-IN-CHIEF

As demand grows for higher levels of traceability, transparency, and quality control, dietary supplement and food/beverage manufacturers are feeling the heat—as are the contract manufacturers they work with, as the pursuit of quality extends across the supply chain. We spoke to companies about the challenges and opportunities contract manufacturers face in this new era.

Nutritional Outlook: Is scrutiny of the dietary supplements market increasing? Can you contrast how much higher or lower this scrutiny appeared to be in 2018, or what you expect to see in 2019, compared to years past? Where is this scrutiny coming from?

Justin Bath, President of Biovation Labs LLC (Salt Lake City, UT): Yes, scrutiny is increasing from almost every angle—from regulators who are pushing for more visibility into ingredients and production processes, to customers who are pushing for more transparency in what is in these products and what the products will do for them. In past years, there hasn’t been the media attention given to the general industry. Previously, any issues weren’t turned into headline news, but now the media has really started to make criticism and such much more visible. This, in turn, makes customers more aware, which creates more pressure on government and regulators to get involved—which then increases media attention, creating a continuous loop of higher scrutiny. I believe it started with regulation becoming more organized, which provided a baseline to measure what is considered good and bad. From there, the media loves a good story; the more potentially critical the story is, the better the headline. This creates more customer attention, which then turns into more political pressure. It is a continual loop that will grow as the industry and its reach grows and matures.

Is this scrutiny of the industry justified? As a whole, does the dietary supplements industry need to increase its quality control?

Eugene Ung, CEO of Best Formulations (City of Industry, CA): We believe the scrutiny is justified given that the products we manufacture are ingested by millions of people every day throughout the world, and people are taking these dietary supplement products to help improve their health, so there is an implied promise and trust of the brand/manufacturer that the customer has. As a whole, the dietary supplement industry has increased its quality control, but there is a wide range of companies who have robust quality systems, who have minimal quality control, and everything in between. The industry needs to continue to improve in this area to maintain the trust of the consumer.

Justin Bath: Yes and no. Most of the players in the industry are doing a great job of providing safe and effective products. However, with growth comes less honest people who are not as altruistic in their goals. Some of these players make the scrutiny justified. Also, as the industry grows and impacts more people’s lives, it is natural that it would gain more attention from regulators, who have the difficult job of ensuring consumers have access to safe and effective products.

Just like any innovative industry, as products become more complex, they require a more structured environment to grow. Our industry is no different. Growth cannot come without an enhanced ability to produce complex products that meet customer expectations. While I believe most of the players in the industry take quality control extremely
seriously, we should take every opportunity to ensure everything we do provides for the best and safest product possible.

Rui Yang, Chief Strategy Officer, Sirio Pharma (Shantou, Guangdong, China): We have certainly seen higher scrutiny from regulators and customers, but I don’t think it’s a case of “being justified.” Rather, the industry is ensuring it provides the best quality we can. Most contract development and manufacturing organizations, certainly those selling into Europe and the United States, have embraced this. For instance, at Sirio, we have an open-door policy and operate in a permanent state of inspection readiness. It’s not enough to simply want to pass an inspection or audit; what you need is a year-round quality culture running through the company. Over the next few years, transparency is going to become increasingly important, and we expect to see more visits from FDA as well as other international certification agencies and customers.

Paul Hwang, Vice President of Quality and Regulatory, Captek Softgel International (Cerritos, CA): As an industry, we have a responsibility to keep our consumers’ safety and protection a priority as we put forth products that our consumers are ingesting for health and wellness. As a whole, many in the industry are quality-minded and have such as priority; however, a few bad actors could taint/distort such reflection of the industry. Therefore, as an industry, we have the need for continued vigilance, self-regulation, and holding ourselves to increasing standards.

Christen Davis, Director of Quality, and Randy Flick, Quality Assurance Manager; Lonza Consumer Health & Nutrition (Basel, Switzerland): Yes, we’ve certainly seen increased levels of scrutiny from multiple channels throughout the supply chain, particularly from regulators such as FDA. In turn, we’ve seen a drive for some of our customers to become more sophisticated in their quality metrics and quality processes. Many of our customers are also looking to us to support them in navigating the changing landscape, and as such we’ve also seen increased levels of scrutiny from these customers to help them do so.

The dietary supplements industry as a whole is constantly evolving, and the players in the industry understand their place in the healthcare continuum to support consumer health and wellbeing. They also understand that adhering to regulations and doing things the right way is essential—indeed, there is often a great deal of internal scrutiny within companies to ensure that they meet these regulatory requirements. Despite this, it is important that the dietary supplements industry remains agile and continues to adapt to the changing consumer and regulatory demands.

What should the role of the contract manufacturer be in achieving better quality control? Also, how should responsibility for quality control be spread throughout the supply chain?

Justin Bath: The contract manufacturer plays a central role in quality control, as they can ensure the product being produced meets the standards they are seeking to obtain. Everyone has a role [in responsibility for quality control], from the farmer growing the plants to the processing plants turning the plants and minerals into raw materials. It is essential that each piece in the chain be accountable for producing safe products. Finally, the company having the products produced also has the responsibility of holding the manufacturer to the highest standards by working to ensure they understand the product they are producing and how the end consumer is using it.

Paul Hwang: Captek Softgel International understands that the role of a contract manufacturer is to be a true partner with the product marketer. This partnership is one of clear and aligned understanding of the product and respective roles and responsibilities of parties, leading to appropriate establishment, manufacture and quality control through the supply chain. Upon such establishment, the contract manufacturer is then
“Having an understanding of expectations throughout the supply chain is critical to achieving better quality control,” says Eugene Ung, Best Formulations.

Visiting the contract manufacturing organization site to view the facilities, meet the people, and understand the quality systems in place is invaluable in helping to be confident that the products they are developing meet the fit, form, and finish that they and their consumers expect. This is where Lonza has been able to stand out in the consumer health landscape: we’ve evolved to be able to offer not just a service but also a consultative approach, particularly for the growing number of virtual companies on the market today, which often have little experience in setting up quality systems. We now play a dual role to make sure that we are manufacturing high-quality products with the best output for the consumer. We also collaborate with brand owners to help ensure that they are equipped to be successful regardless of their requirements, whether this is setting up stability programs for products or understanding the documentation required by FDA and other regulatory authorities.

How are contract manufacturers collaborating more closely with customers, raw-material suppliers, testing labs, etc., to achieve higher levels of quality control?

Paul Hwang: Captek Softgel International works closely with customers, raw-material suppliers, testing labs, and all points along the supply chain to achieve true partner status. We take great care to internalize the scope and clarity of the product, requirements, specifications, roles, and responsibilities—all of which lead to more effective quality-control systems throughout the process.

Eugene Ung: A quality agreement between the contract manufacturer and customer is a key starting point to achieve higher levels of quality control. The quality agreement typically will specify who is responsible for what (i.e., who sets the finished-product specifications, who sets the raw-material specifications, who will be testing for what, etc.) so that the expectations are clear. Then it will be up to the contract manufacturer and customer to ensure that they play their respective roles.

Rui Yang: In addition to strictly complying with the requirements of laws and regulations, we also consider the customer’s perspective—in particular, looking at factors that concern our customers or have potential impact on product quality, especially during product development and production. These include having comprehensive requirements and control over the selection of raw materials and suppliers, as well as production. For instance, we will evaluate each raw-material vendor for compliance and qualify each ingredient through tests, including tests for identity, pesticide residues, microbials, and heavy metals. If the materials do not conform to established specifications, they are immediately rejected and replaced. Upon validating the vendor, we will then approve the supplier and continue to actively maintain communication with the supplier to make sure they have a robust track record of delivering safe products. Then, after two years, Sirio requalifies every supplier. Meanwhile, each raw material and finished product can be traced for each client.

Justin Bath: First, by being more selective of who we do business with, and second by selecting customers who have the same standards for the final product quality. It is essential that all the partners in the supply chain have the same goals and attention to detail. Once everyone is on the same page as to the requirements, it makes producing the product much easier.

Christen Davis and Randy Flick: Contract manufacturers can contribute to improved quality control by helping to streamline the process; for instance, having certified supplier programs and being a certified vendor enables brand owners to utilize quality systems that are already inherent in the contract manufacturing organization to avoid duplication of testing and other activities. For this reason, selecting the right contract manufacturing organization is essential—not only from an innovation perspective but also for ensuring quality.
Justin Bath: Yes, audit frequency is increasing, as is audit duration. The FDA is spending more time making sure the cGMP processes are being followed, and it is being less understanding of any noncompliance.

Paul Hwang: The trend in the number of audits by customers has been continuously increasing, and we’ve seen it dramatically more pronounced within the last decade. However, with the industry’s collective effort for self-regulation, and to establish and align to “industry” standards, this trend appears to be leveling off with customers. That said, the FDA’s audits are consistently increasing.

Christen Davis and Randy Flick: Understanding the needs of our customers and raw-material suppliers plays an integral role in defining quality-control measures. For this reason, while we have certainly seen an increase in the length, number, and scope of audits, both from customers and FDA, we also very much welcome them for the constructive feedback they provide. It enables us to make sure that we continue to improve our understanding of the regulations and industry standards, and ensure that both our customers and the team at Lonza are equipped for future FDA audits. We also work with our customers to conduct gap analyses as required, helping to make sure they are also meeting current regulatory standards in the United States and other countries as appropriate.

Furthermore, we work by creating a relationship with our customers to deliver premium products to the market—Lonza’s work with our customer, Ritual, for example, saw us support them to refine raw-material suppliers, modify formulations, and improve ingredient quality in order to better deliver the end product to consumers, with greater transparency and traceability. This is also true throughout the entire supply chain and the wider consumer health and nutrition space; we are seeing more and more brand owners wanting to understand where a product came from, which is why we believe it is essential to have strong working relationships with raw-material suppliers.

Ongoing collaboration with customers also helps contract manufacturers to become flexible enough to create products that are globally compliant to quickly meet customer needs. This harmonization not only helps to fulfill what customers need today, but also helps anticipate what they need tomorrow and supports them to help grow their business globally.

How have contract manufacturers personally seen increased demands for traceability, transparency, and quality control affect their business practices?

Justin Bath: We are required to have better processes, better documentation, and are required to be more educated on all aspects of production. We must be more selective on the type of customers we bring on and the type of products we produce. Today, even marketing language can cause problems for the manufacturer. It is essential that we work with customers who really understand and work to produce the highest-quality products possible.

Rui Yang: One of the primary actions contract manufacturers must undergo is implementing an appropriate and robust quality-assurance infrastructure and being prepared for future changes. So quality, traceability, and transparency approaches should not “affect” business practices; they should be integral and ingrained in everything we do. For instance, we currently employ over 65 people in our quality-assurance team dedicated to on-site monitoring, product release, change deviation, system certification, etc. They oversee all parts of production and sourcing, working closely with the production side and sourcing departments.

It is also important to have strict protocols for incoming, in-process, and finished-product testing. For example, incoming raw materials need to be assessed using validated test methods. Then, during the production process, each batch will go through routine checks to ensure they are fully documented. Once finished, products will undergo release testing and batch record examination.

In what ways is the increasingly global supply chain putting additional demands and requirements on contract manufacturers?

Justin Bath: It is requiring more testing, better vendor qualification processes, and tighter relationships with vendors that can meet the necessary standards. All of this brings with it more cost and longer lead times. It also comes with a positive: better processes, more efficient manufacturing plants, and better educated employees. I do not see this as a bad thing for business long-term, because it will work to separate the high-quality producers from those who are just looking to make a quick buck.

Paul Hwang: The increasingly global supply chain introduces more complexity; an increasing need for continued vigilance and quality control, and a stronger bias for thoroughly qualified and well-established suppliers who have demonstrated quality track records. Also, respectively, there are increasing regulatory requirements to drive tighter controls on such globalized supply chain.

Christen Davis and Randy Flick: We’re seeing more and more customers looking to manufacture and distribute products globally; however, many countries across the world enforce strict regulatory restrictions that must be navigated and adhered to. While manufacturing products that take these restrictions into consideration is a way for our customers to meet local regulatory requirements, creating formulations that are compliant with regulations in multiple countries is a much more cost-effective solution. It also enables contract manufacturers to be more reactive to market needs and adapt to opportunities across the globe. Furthermore, we support our customers in the safety and security of global shipping with a Transportation Security Adminis-
Rui Yang: Globalization has two elements when it comes to contract manufacturers. On the one hand, it means we are sourcing ingredients from wider sources with associated distribution complexity, but it also means we have to maintain a wider range of regulatory certifications and standards. So, in addition to testing the ingredients from each of our suppliers to ensure they are in line with regulations as well as our own standards, which are often at a higher standard than those outlined by regulators, we are also maintaining over 10 internationally recognized certifications. These include UL NPA, GMP, ISO 9001 by SGS, and TGA certifications. Most importantly, our facilities are FDA registered. All of this means that supply chain controls and quality assurance are absolutely at the heart of any global contract development and manufacturing organization’s operations, from ingredients through to final products. We simply could not do business in multiple markets without a centralized quality-assurance approach.

How have you seen quality control change among the raw-material suppliers your company works with?

Justin Bath: They are having to be more diligent in their testing process and in who they purchase from. Small changes now make a big difference.

Paul Hwang: Captek Softgel International has seen quality control change among the raw-material suppliers, with increased awareness of regulatory requirements and now-commonplace testing. We’ve also seen an increase in documentation (both quality and quantity), as well as quicker adoption and willingness to completion. In general, there is an energized investment in quality control: technical, internal capability, and certification.

Rui Yang: Thankfully not so much, as we have benefited from working with suppliers with high existing standards, but we are gaining increasingly detailed documented support.

Justin Bath: We believe quality control starts with the inception of the product and its formulation. This causes us to be much more selective of the type of customers we work with. We will not work with customers who don’t care about the quality of their products and are looking for the cheapest solutions possible. It is important that the formulation of the product be well thought out and that the customer requesting the product have a desire to produce a quality product. That drives everything for us. If you can start with a high-quality formulation and a customer that wants to produce a high-quality product, the rest of the process falls into place. We follow strict documentation and traceability controls already, and we are consistently audited by third-party certification partners. Everything starts with the paradigm of the formulator and the customer having high standards.

Paul Hwang: Captek Softgel International has a long history of continuous investment and improvement in documentation, third-party certifications, and testing and manufacturing capabilities—both in quantity and quality. We adhere to the principles of due diligence and transparency.
Any Questions?

For over 20 years, *Nutritional Outlook* has remained the #1 publication in the North American nutraceuticals market. Our brand provides you with innovative content, reliable products and services and unlimited ways to reach your potential customers across the world!

*Based on publisher’s own data.*
Justin Bath: The price of testing impacts the price of the product, but literally everything is affected by these demands. Working with suppliers who have the right documentation adds to the price of the raw material, which increases the cost of the product. With that said, I believe that running a high-quality process also helps bring down the cost. If an operation is set up to efficiently run its process, traceability and transparency can and should be built into the process, and it can bring down many of the costs of operations. So, while the price can be impacted, in a negative way, there are also a lot of positive benefits we get out of it, because the process has been carefully engineered and structured to ensure high levels of consistency and efficiency. I strongly believe that quality control facilitates a highly productive manufacturing environment and long-term profitability.

Rui Yang: We are constantly looking at ways to improve transparency for our partners and provide visibility through the entire supply chain. For example, for each raw material, we assign a specific material code that allows Sirio to trace it back to the supplier during an audit or product recall. Sirio also retains samples of each raw material and finished product for one year after the product’s expiration date. Batch records are maintained for three years from the expiration date.

One of the major advantages we have at Sirio is that we also have an independently certified, state-of-the-art analytical center, which has a broad range of capabilities, including high-performance liquid chromatography, gas chromatography, gas chromatography–mass spectrometry, inductively coupled plasma mass spectrometry, liquid chromatography–mass spectrometry, atomic absorption spectroscopy, and infrared spectroscopy testing, just to name a few. This means that we have long been able to validate each and every batch of finished product and raw material and have extensive experience in transferring and developing custom test methods.

Justin Bath: They can impact how quality control works, and can make the quality-control process more complicated, but not always. I would say the rule of thumb would be that the more complex the ingredient or delivery form is to manufacture, the more important it is to develop a quality-control process that can identify weaknesses in product quality.

Christen Davis and Randy Flick: With customers becoming more sophisticated and increasingly demanding transparency and traceability throughout the supply chain, contract manufacturers must adapt to become more diligent—this will not only help to ensure security of the supply and the safety and quality of the product, but will also help contract manufacturers navigate the challenges presented by new delivery forms and difficult-to-work-with ingredients. This is especially important with the growing prominence of custom products in the consumer space; when working with custom products, preparation and strong foundations are key. For this reason, we have expanded our science and innovation expertise within our quality-control department so our customers have confidence in our capabilities. Additionally, Lonza’s heritage as an engineering company allows us to be very innovative and responsive not only to customer needs, but also to the changing regulatory landscape. Lonza is committed to making the necessary investments to ensure that the products we create are safe, compliant with global regulations, and provide the transparency and traceability that suppliers, brand owners, and consumers expect.

How have contract manufacturers personally seen increased demands for traceability, transparency, and quality control affect the price of doing business?

Rui Yang: Put simply, building quality should never be viewed as a cost, as it helps maintain the most precious commodity amongst consumers and customers: trust. Yes, purely in terms of margin, there are costs, but good practices reduce risk and protect the customer’s brand. Brand reputation is priceless for customers, and once destroyed, it cannot be recovered. Therefore, the increased cost is akin to protection for customers, like “insurance” for product quality, which is very worthwhile indeed.

Do demands for newer kinds of delivery forms or difficult-to-work-with ingredients make quality control more difficult?

Justin Bath: It is all in the process. I believe technology, if implemented correctly, can really help. Also, having the right people managing the process is key. A high-quality manager with the right experience can really make complex quality-control measures very efficient. [Contract manufacturers maintain their cost margins on production, efficiency, or even sustainability] by choosing the right customers who understand the importance of product quality and who have the right attitude toward the required balance between cost and quality.

In what ways might contract manufacturers see ROI regarding any measures they take to increase traceability, quality control, testing, etc.?

Justin Bath: To do traceability and quality control right, it must be built directly into the process. ROI comes from reducing the number of touchpoints a product must go through, or from not having to take back product that is out of spec and reworking it—or even worse, having to recall product because it is unfit for sale or has caused harm to someone. In the end, doing something right the first time generates a positive ROI, and that is the real end goal of traceability, quality control, and testing programs: putting out the best product with the least number of touchpoints and completing a product right the first time.

How can contract manufacturers increase quality-control measures while still remaining profitable? How can contract manufacturers maintain their cost margins on production, efficiency, or even sustainability?

Justin Bath: The importance of product quality and who managing the right customers who understand the importance of product quality and who have the right attitude toward the required balance between cost and quality.

Rui Yang: One of the major advantages we have at Sirio is that we also have an independently certified, state-of-the-art analytical center, which has a broad range of capabilities, including high-performance liquid chromatography, gas chromatography, gas chromatography–mass spectrometry, inductively coupled plasma mass spectrometry, liquid chromatography–mass spectrometry, atomic absorption spectroscopy, and infrared spectroscopy testing, just to name a few. This means that we have long been able to validate each and every batch of finished product and raw material and have extensive experience in transferring and developing custom test methods.
Justin Bath: For the most part, the right customers understand the longer lead times. The challenge is in finding how to produce the highest-quality product while still hitting the cost requirements customers have. Experienced customers usually have the right attitude from the beginning because they know what the raw materials in the formulations cost. The challenge is in educating newcomers who do not have the experience and who have expectations that are not in line with reality. Sometimes we can realign these expectations, and sometimes we cannot.

Rui Yang: Although most customers understand that increasing quality controls usually result in higher costs, longer lead times, etc., it takes some work to persuade them to accept such changes. It is presumed that contract manufacturers should already have reliable quality system. In our case, Sirio is very open with our customers. We built our quality systems over a longer period of time, so the impact to price and lead time has been minimal. In addition, our customers appreciate the fact that Sirio originally started as a pharmaceutical manufacturer, so it has a depth of experience establishing and maintaining the highest level of quality controls.

Paul Hwang: By developing a true partnership and defining well-established roles and responsibilities early on, we can leverage respective systems and SOPs for management of problems or recalls. This level of partnership also permits collaborative training and practice (e.g. mock recall—joint, wherein carried out through supply chain) and gives us the ability to timely and effectively address and resolve any such issues.

Justin Bath: Like most difficult things in this world, honest, open communication is always the best approach. If the worst-case scenario like a recall becomes a reality, we find that the best way to approach it is through having an honest and open communication channel with the customer, and working closely to define the problems, with an unwavering focus on the solution.
<table>
<thead>
<tr>
<th>Page(s)</th>
<th>Company Name</th>
<th>Website or E-mail</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>Acadian Seaplants</td>
<td><a href="http://www.acadianseaplants.com">www.acadianseaplants.com</a></td>
<td>800/575-9100</td>
</tr>
<tr>
<td>37</td>
<td>ADH Health Products</td>
<td><a href="http://www.adhhealth.com">www.adhhealth.com</a></td>
<td>845/268-0027</td>
</tr>
<tr>
<td>45</td>
<td>AIDP Inc.</td>
<td><a href="http://www.aidp.com">www.aidp.com</a></td>
<td>866/262-6699</td>
</tr>
<tr>
<td>71</td>
<td>Albion Laboratories Inc.</td>
<td><a href="http://www.albionminerals.com">www.albionminerals.com</a></td>
<td>801/773-4631</td>
</tr>
<tr>
<td>53</td>
<td>Arista Industries Inc.</td>
<td><a href="http://www.aristaindustries.com">www.aristaindustries.com</a></td>
<td>203/761-1009</td>
</tr>
<tr>
<td>11</td>
<td>Balchem Corp.</td>
<td><a href="http://www.balchem.com">www.balchem.com</a></td>
<td>845/326-5600</td>
</tr>
<tr>
<td>51</td>
<td>Best Formulations</td>
<td><a href="http://www.bestformulations.com">www.bestformulations.com</a></td>
<td>626/912-9998</td>
</tr>
<tr>
<td>15</td>
<td>Capsugel</td>
<td><a href="http://www.capsugel.com">www.capsugel.com</a></td>
<td>888/783-6361</td>
</tr>
<tr>
<td>29</td>
<td>Captek Softgel International Inc.</td>
<td><a href="http://www.capteksoftgel.com">www.capteksoftgel.com</a></td>
<td>800/638-6883</td>
</tr>
<tr>
<td>5</td>
<td>Cepham Inc.</td>
<td><a href="http://www.cepham.com">www.cepham.com</a></td>
<td>201/255-6011</td>
</tr>
<tr>
<td>33</td>
<td>Evolva</td>
<td><a href="http://www.veriteresveratrol.com">www.veriteresveratrol.com</a></td>
<td>800/250-1032</td>
</tr>
<tr>
<td>BC</td>
<td>GMP Laboratories of America Inc.</td>
<td><a href="http://www.gmplabs.com">www.gmplabs.com</a></td>
<td>714/630-2467</td>
</tr>
<tr>
<td>13</td>
<td>Gold Coast Ingredients Inc.</td>
<td><a href="http://www.goldcoastinc.com">www.goldcoastinc.com</a></td>
<td>323/724-8935</td>
</tr>
<tr>
<td>43</td>
<td>Grain Processing Corp.</td>
<td><a href="http://www.grainprocessing.com">www.grainprocessing.com</a></td>
<td>563/264-4265</td>
</tr>
<tr>
<td>9</td>
<td>Jiaherb Inc.</td>
<td><a href="http://www.jiaherb.com">www.jiaherb.com</a></td>
<td>973/439-6869</td>
</tr>
<tr>
<td>3</td>
<td>KEB Nutraceutical</td>
<td><a href="http://www.kebnutra.com">www.kebnutra.com</a></td>
<td>714/990-8830</td>
</tr>
<tr>
<td>23</td>
<td>Kyowa Hakko USA Inc.</td>
<td><a href="http://www.kyowa-usa.com">www.kyowa-usa.com</a></td>
<td>212/319-5353</td>
</tr>
<tr>
<td>35</td>
<td>Lonza Group</td>
<td><a href="http://www.lonza.com">www.lonza.com</a></td>
<td>888/403-8772</td>
</tr>
<tr>
<td>65</td>
<td>Natreon Inc.</td>
<td><a href="http://www.natreoninc.com">www.natreoninc.com</a></td>
<td>732/296-1080</td>
</tr>
<tr>
<td>70</td>
<td>NatureLab Corp.</td>
<td><a href="http://www.naturelabusa.com">www.naturelabusa.com</a></td>
<td>972/417-3000</td>
</tr>
<tr>
<td>IFC.</td>
<td>NSF International</td>
<td><a href="http://www.nsf.org">www.nsf.org</a></td>
<td>734/827-6856</td>
</tr>
<tr>
<td>31</td>
<td>NutraSolutions USA</td>
<td><a href="http://www.nutrasolutions.com">www.nutrasolutions.com</a></td>
<td>631/392-1900</td>
</tr>
<tr>
<td>63</td>
<td>Nutrition 21</td>
<td><a href="http://www.nutrition21.com">www.nutrition21.com</a></td>
<td>914/701-4500</td>
</tr>
<tr>
<td>IBC</td>
<td>Orgenetics Inc.</td>
<td><a href="http://www.orgenetics.com">www.orgenetics.com</a></td>
<td>714/575-0005</td>
</tr>
<tr>
<td>47</td>
<td>Overnight Labels Inc.</td>
<td><a href="http://www.overnightlabels.com">www.overnightlabels.com</a></td>
<td>800/472-5753</td>
</tr>
<tr>
<td>Page(s)</td>
<td>Company Name</td>
<td>Website or E-mail</td>
<td>Phone Number</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------</td>
<td>------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>73</td>
<td>PAT Vitamins</td>
<td><a href="http://www.patvitamins.com">www.patvitamins.com</a></td>
<td>626/810-8886</td>
</tr>
<tr>
<td>25</td>
<td>Pinnacle Labs.</td>
<td><a href="http://www.pinnaclelabs.net">www.pinnaclelabs.net</a></td>
<td>800/600-4634</td>
</tr>
<tr>
<td>57</td>
<td>Ross, Charles &amp; Son Co.</td>
<td><a href="http://www.mixers.com">www.mixers.com</a></td>
<td>800/243-7677</td>
</tr>
<tr>
<td>Cover, 55, 67</td>
<td>SABINS SA Corp.</td>
<td><a href="http://www.sabinsa.com">www.sabinsa.com</a></td>
<td>732/777-1111</td>
</tr>
<tr>
<td>21</td>
<td>Soft Gel Technologies Inc.</td>
<td><a href="http://www.soft-gel.com">www.soft-gel.com</a></td>
<td>800/360-7484</td>
</tr>
<tr>
<td>39</td>
<td>TSI Health Sciences</td>
<td><a href="http://www.tsiinc.com">www.tsiinc.com</a></td>
<td>877/549-9123</td>
</tr>
<tr>
<td>59</td>
<td>Vesta Ingredients Inc.</td>
<td><a href="http://www.vestaingredients.com">www.vestaingredients.com</a></td>
<td>888/558-3782</td>
</tr>
<tr>
<td>6</td>
<td>Vidya Herbs Pvt. Ltd.</td>
<td><a href="http://www.vidyaherbs.com">www.vidyaherbs.com</a></td>
<td>732/784-1587</td>
</tr>
<tr>
<td>27</td>
<td>Virginia Dare.</td>
<td><a href="http://www.virginiadare.com">www.virginiadare.com</a></td>
<td>718/788-1776</td>
</tr>
<tr>
<td>69</td>
<td>Vitafoods</td>
<td><a href="http://www.vitafoods.eu.com">www.vitafoods.eu.com</a></td>
<td>44 (0) 20 7017 6297</td>
</tr>
</tbody>
</table>

Content Licensing for Every Marketing Strategy

Logo Licensing | Reprints | Eprints | Plaques

Marketing solutions fit for:
- Outdoor
- Direct Mail
- Print Advertising
- Tradeshow/POP Displays
- Social Media
- Radio & Television

Leverage branded content from Nutritional Outlook to create a more powerful and sophisticated statement about your product, service, or company in your next marketing campaign. Contact Wright’s Media to find out more about how we can customize your acknowledgements and recognitions to enhance your marketing strategies.

For more information, call Wright’s Media at 877.652.5295 or visit our website at www.wrightsmedia.com

Content Licensing for Every Marketing Strategy
Three Cheers for Chicory!

Chicory root fiber’s versatility and health halo benefit a variety of food and beverage applications.

BY SEBASTIAN KRAWIEC, ASSOCIATE EDITOR

In June 2018, FDA included inulin and inulin-type fructans within the agency’s new legal definition for dietary fiber, which was established alongside the agency’s revisions to the Nutrition Facts panel. Chicory root fiber is not a new ingredient, but nonetheless underwent an extensive scientific review by FDA—during which time food formulators were left on the edge of their seats to find out whether inulin, a dominant dietary fiber found in chicory root, would ultimately be approved as a dietary fiber in food.

“We were never really too disheartened by the process; we were always confident in the outcome because inulin is essentially the most studied dietary fiber,” says Taylor Halstead, product line manager, specialty carbohydrates, for Cargill (Minneapolis, MN). “Obviously, the timing for food manufacturers became stressful,” he adds. Manufacturers did have reason for concern considering both the versatility of chicory root fiber in food production as well as the valuable fiber claims it affords.

Versatility

A variety of trends have driven the use of chicory root fiber in food and beverage applications. One of those significant trends is sugar reduction. Here, chicory root fiber can assist with sugar reduction by helping with flavor and texture.

“For example, in cereal bars Beneo’s prebiotic chicory root fiber adds fiber and also contributes to digestive health while helping to reduce sugar and calories. Additionally, chicory root fiber acts as a humectant, helping bars and other products remain soft over time.”

Cargill’s Halstead points out that chicory root fiber is seen in today’s trendiest foods—such as ketogenic and Paleo—as much as it is in more traditional foods. “You can use it as a replacement for sugar...because it contributes to browning and crumb development and doesn’t really impact the texture or density of the baked good negatively, compared to other sources of fiber.”

Chicory root fiber is also used as a masking agent to balance undesirable off-notes coming from high-intensity sweeteners. Peters explains that oligofructose provides flavor masking, while inulin is ideal for body and creamy mouthfeel in functional beverages such as meal replacements, coffee drinks, smoothies, and shakes.

And in the area of fat reduction, chicory root fiber again demonstrates its versatility. “Long-chain inulin is a very effective fat mimetic and it has some gelling properties that lend itself to applications as a texturant, enhancing creaminess, so it is used in a lot of low-fat or reduced-fat applications,” explains Halstead.

Fiber Claims

Chicory root’s fiber and prebiotic properties offer important health benefits to consumers. Chicory root fiber has been shown in research to support digestive health, bone health, and energy, explains Peters.

“For a healthy and prevention-oriented diet, a dietary fiber intake of 25 to 38 g/day is recommended,” he explains. “But actual intake is still far below this recommendation. The uniqueness of chicory root fibers is that they make it incredibly easy to combine health benefits with great technical performance,’ marrying chicory fiber’s high solubility, mildly sweet taste, and texture properties with high fiber intake.

There is also label appeal. “Consistently using a botanical origin name like ‘chicory root fiber,’ and also using the word fiber in the description of that ingredient, is perceived as more healthful to the consumer,” says Halstead. “Using fiber is a great way to communicate the benefits.” Plus, he says, with its non-GMO and gluten-free attributes, chicory root fiber is “compatible with a number of the label claims that customers want to make to begin with.”

And what of highlighting chicory fiber’s prebiotic properties and their role in maintaining a healthy microbiome? On that front, manufacturers are still figuring out how to best communicate the benefits of prebiotics on their labels. “One out of two consumers associate prebiotics with being good for digestion, while two of three do so for probiotics,” says Peters.

Halstead says that while awareness is growing, understanding of prebiotics is still limited among consumers, which is why manufacturers are learning how to communicate these benefits more effectively. “We get more and more questions about prebiotics, how to communicate it. We know that there is a desire from consumers to understand more about the microbiome and how that ties back to the overall sense of health and wellness,” he says.
Certified Organic & All Natural
Vitamins/Minerals/Antioxidants
+ co-factors & co-nutrients
from Organic fruits/vegetables-botanicals

Vertically integrated, sustainable, and transparent supply chain

Farming → Manufacturing → QA/QC → Distribution

www.supplychain.organic
GMP Laboratories of America, Inc.

Custom Contract Manufacturer of Quality Supplements

Excellent Service • High Quality • Prompt Turnaround

Best in Class Contract Manufacturing. Best in Class Service.

GMP Labs® is your best choice for manufacturing dietary supplements and homeopathic drug products:

- Tablet Compression • Hard Shell Encapsulation
- Powdered and Liquid Drink Blends • Bottles • Jars

International Clientele

- Canada
- Saudi Arabia
- U.A.E.
- Japan
- Hong Kong
- Korea
- Vietnam
- Malaysia
- Singapore
- UK
- EU
- Brazil

Call us at:
(714) 630-2467
www.gmplabs.com