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FEATURES

22 2020 Ingredients to Watch
Eight ingredients to watch this year

54 2020 Flavor Trends
Experts predict 2020's hottest food and drink flavors.

68 Immune Support
What's made immune health a supplement market leader?

74 Blood Sugar Support
New studies and developments in the world of blood sugar

80 Equipment
Supplement equipment update: Faster, better, smarter

84 Contract Manufacturing
2020 supplement trends, according to contract manufacturers
UP FRONT

10  From the Editor

12  News
    New trade deal is good for industry, NPA says.

COLUMNS

14  Global Regulations
    Tariffs take their toll on the dietary supplement industry.

18  Market Report
    Supplement retailing in 2020

62  Market Report
    2019’s Biggest ingredient sales surprises

94  Last Bite
    Clean-label colors

RESOURCES

92  Advertiser Index

93  Classified

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Could NDIs Help FDA on CBD?

FDA has publicly said that at this point in time, it doesn’t have enough scientific data to determine whether hemp cannabidiol (CBD) is safe for human consumption.

In an online consumer update FDA posted last November, the agency outlined important unanswered questions surrounding CBD consumer products and consequences of use, such as effects of sustained use, effects on vulnerable populations such as pregnant women and children, effects on reproductive toxicity, and potentially dangerous interactions with other herbs. These questions need definitive answers, considering the growing number of consumers taking CBD products today.

What data exists on CBDs safety outside of the pharmaceutical realm? No one except FDA knows what information the agency already has in house. It’s possible that FDA is aware of some of the research happening in the CBD supplements space, but there could also be unpublished (and possibly enlightening) research companies have done that remain confidential. And this is frustrating to those hoping FDA will one day make CBD a legal supplement ingredient.

In January, a Congressional bill was introduced that would, if passed, designate CBD as a legal dietary supplement ingredient. (Turn to page 22 for more.) If this bill were to pass, it would do one important thing: it would make CBD subject to all of the regulations all other supplements face. CBD companies would, for instance, be required to submit a CBD new dietary ingredient (NDI) notification to FDA. NDI notifications require companies to submit evidence demonstrating “the basis on which the manufacturer or distributor has concluded that a dietary supplement containing a new dietary ingredient will reasonably be expected to be safe under the conditions of use recommended or suggested in the labeling.”

In short, CBD NDI notifications would give FDA additional safety information on CBD. “Not only would it give them information, but it would create incentives for companies to create that data,” adds Steve Mister, president and CEO, Council for Responsible Nutrition. “Right now, if you’re a supplement company, there is very little incentive to go out and do the safety research because if you try to go and get an NDI, your NDI is going to be rejected and sent back to you” because FDA deems CBD an illegal supplement ingredient.

Through the NDI process, CBD companies would have the option of requesting that some of the information they submit to FDA remain confidential. Currently, supplement companies choosing to submit safety information to FDA can only do so via public docket. Robert Durkin, of counsel at law firm Arnall Golden Gregory LLP, and former deputy director for FDA’s Office of Dietary Supplement Programs, says: “Information can be kept confidential during an NDI notification process. This would do two things: It would give companies that have invested time and money into developing data that they want to keep proprietary a chance to use it, and it would also give FDA a chance to see data and information that they might not otherwise get.”

Whatever it takes, industry stakeholders would like to see FDA move forward on evaluating CBDs safety. Says Durkin: “It’s time for FDA to shift from the data-gathering mode to the next phase.”

Attorney Kevin Bell, partner, also at Arnall Golden Gregory LLP, does caution that there could be blowback if FDA were to give CBD the fast-track in the NDI process, spurred by the cries for FDA oversight over CBD, thereby putting CBD ahead of the many ingredient notifications already submitted and currently awaiting NDI review by FDA. Bell says, “I can’t imagine the noise level, how high it would be, if CBD goes down the NDI track and then FDA starts enforcing NDIs for CBD—but hasn’t started doing it for dietary supplements…That would be upsetting.”

He adds: “I will tell you that I have clients who would be out of their minds if the FDA chose to jump the shark and start enforcing CBD NDIs without first doing what we all believe they have the right to do, right now, and enforce them on the NDIs that exist.”

Basically, although CBD is getting a lot of attention from everyone right now, including FDA, it shouldn’t distract the agency from doing what it already should be: issuing a finalized, revised NDI guidance and finally creating a clear, workable path for the NDI process and ramping up enforcement against those who don’t file NDIs. Of CBD, says Bell: “I don’t think that the popularity or just the fact of [CBD marketers] pushing these products out there should drive a bus past something the agency could do now and has been asked to do for many years, just because it’s CBD.”

Still, Bell acknowledges, whatever is going to be done to create a regulated and responsible market structure for CBD needs to happen “with a certain level of speed, because you can’t let this go on forever without doing anything...CBDs are going to permeate society in almost every type of market that we can think of.”

Jennifer Grebow
Editor-in-Chief

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New Trade Deal Good for Industry, NPA Says

The trilateral U.S.-Mexico-Canada Agreement (USMCA) on trade signed by President Trump on January 29, 2020, has positive implications for the natural products industry, says the Natural Products Association (NPA; Washington, DC). Natural products impacted for the better by the agreement include whey and other dairy-based products.

Under the USMCA, Canada will provide new tariff rate quotas (TRQs) exclusively to the United States on a range of dairy products. Specifically, TRQs for whey powder will increase to 689 metric tons (MT) for the first year, to reach 4,135 MT by the sixth year, then grow 1% for an additional four years. Whey's over-quota tariff will be eliminated at the end of 10 years. For products of natural milk constituents, TRQs will increase to 460 MT, to reach 2,760 MT by the sixth year, and grow 1% for an additional 13 years.

The agreement also calls for good regulatory practices from all three countries as well as regulatory alignment for products such as cosmetics.

“The Parties shall seek to collaborate to improve the alignment of their respective regulations and regulatory activities for cosmetic products through work in relevant international initiatives, as appropriate, such as those aimed at harmonization, as well as regional initiatives that support those international initiatives,” states Chapter 12, Article 12.B.4, of the USMCA.

Intellectual property protections are also strengthened under the agreement, says NPA. Largely resembling the provisions in the Trans-Pacific Partnership abandoned by the U.S. in 2016, the USMCA strengthens copyright and patent protections such as giving biologic drugs 10 years of data-exclusivity protection and lengthening the protection on copyright to the term of the author’s life plus 70 years. Canada’s domestic law currently only protects biologics for eight years, and its current copyright law only provides protection for the life of the author plus 50 years.

“Our commitment to protecting American jobs and growing the U.S. economy,” said Daniel Fabricant, PhD, president and CEO of NPA, in a press release. “This is a good deal for the small businesses that make up the majority of our industry and the millions of consumers who use nutritional supplements every day to support their healthy lifestyles. We applaud the Administration for reaching this deal and look forward to finding more ways to grow the economy and create jobs together.”

Bestselling Omega-3 Supplements Comply with Regulatory Requirements, GOED Finds

A recent study conducted by the Global Organization for EPA and DHA Omega-3s (GOED; Salt Lake City) tested the quality of 48 of the most widely sold EPA/DHA omega-3 supplements in the U.S. Quality was determined by testing the EPA/DHA content of the products and comparing it to the bottle’s label claims.

Results showed that of the 42 products with content declarations on the label, all complied with U.S. requirements by containing at least 80% of the labeled content. Of the 42 products, 40.5% (17 products) had an EPA/DHA content between 80% and 100% of the labeled content; 57.1% had between 100% and 110.4% of the labeled content; and 1% contained 138.7% of the labeled EPA/DHA content.

Products were also tested for adherence to oxidation parameters. This was challenging because no regulatory limits for primary or secondary oxidation quality exist in the U.S. for EPA/DHA supplements. However, based on strict industry and relevant pharmaceutical quality standards, 89.5% of the 48 tested products were found to be compliant.

While the results were positive overall, GOED acknowledges that there is still room for improvement. [1]
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Collateral damage is inevitable in war. That’s as true of an active shooting conflict as it is of the more metaphorical variety—like, for example, a trade war.

And by all accounts, a trade war is precisely what we’ve found ourselves in since the Trump administration began levying tariffs of as much as 50% and more on imports from friend and foe alike.

And that’s where the collateral damage comes in. For whether intended or not, one consequence of the White House’s trade policy has been upheaval in the pricing, supply chain, hiring, and investment decisions of businesses only tangentially involved in the disputes that sparked the tariff standoff in the first place—including those in the dietary supplement industry.

But you don’t have to explain this to James C. Griffiths, PhD, senior vice president, international and scientific affairs, Council for Responsible Nutrition (CRN; Washington, DC). He witnesses every day examples of how this “highly politicized staring contest” is rattling dietary supplement brands, and their consumers.

Caught in the China Net
“Everything is happening so fast that I’ve turned to my members watching specific tariff codes and ingredients to see if anything’s changing,” Griffiths says.

And while he concedes that he’s not privy to the tariffs’ full political backstory, and understands that concerns around technology transfer and intellectual property demand action, “I do think the situation has significantly affected our industry,” he says. “And I’m sure that every affected industry can find reasons why it doesn’t deserve to be caught up in this large net.”

How large a net is it? To take just one section—albeit one that could catch a whale—the Trump administration in July 2018 began imposing tariffs of 25% on $250 billion worth of imports from China, a critical source of raw materials for industries spanning electronics to pet care to, yes, nutrition.1

And because importers—not the offending countries—pay these taxes, that raised costs for dietary supplement manufacturers whose formulations rely on Chinese inputs; but perhaps as vexing, China retaliated by laying tariffs of its own on $110 billion of U.S. exports—exports that most surely included American dietary supplements.

Double Whammy
This is the perfect example of a trade-war double whammy, Griffiths believes. “China is important,” he points out. “So many of the raw materials and botanicals we’ve come to rely on come from China,” which has developed a sophisticated supply chain, with vetted farmers, processors, and vendors, over the years.

Indeed, in comments it filed with the Office of the United States Trade Representative in June 2019, the American Herbal Products Association (AHPA; Silver Spring, MD) noted that among the Chinese commodities subject to the tariff are many frequent fliers in dietary supplement and herbal products: pepper, fennel, ginger, black and green tea, kola nuts, chicory root, ginseng, and more.2

CRN, in comments to the U.S. Chamber of Commerce, adds that tariffs on Chinese Ginkgo biloba alone—which grows native in

BY KIMBERLY J. DECKER

This Means War
Tariffs take their toll on the dietary supplement industry.

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GLOBAL REGULATIONS

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the country—would raise the price that one of its member manufacturers pays for the ingredient by $1 million.1

Tit-for-Tat
Perhaps even more than these immediate costs, “It’s the retaliatory tariffs that scare me the most,” Griffiths says. After all, Chinese consumers have been demonstrating an increased appetite for American nutritional products—and an increased willingness to seek them out and pay for their high quality and reputation.

“So if these products are now getting a tit-for-tat retaliatory tariff,” Griffiths fears, “not only does it cost our producers more to import Chinese ingredients, but the finished products that go to China are now getting hit with a tariff that may make them more expensive than domestic products, and maybe even more than European or Australian ones. We’ll pay more dearly for raw materials, and we may lose more of those exports to China that we’ve come to depend on.”

Everyone Pays
In other words, everyone loses.

Wilson Lau, vice president of Nuherbs (San Leandro, CA), which supplies high-quality herbs sourced sustainably in China, can vouch personally that tariffs “impact our business and resources, both financially and in personnel commitments, as well as our customers,” he says.

“It’s impacting everyone’s cost of goods, whether you’re buying ingredients or finished products,” he continues. And don’t expect size to insulate you. “These tariffs and this trade war impact everyone from big companies to small—just differently.”

Because smaller companies may not import tariffed items directly, the fallout doesn’t hit their cash flow as much as it does direct importers. “Yet they have less ability to absorb the tariff-related premium on things they buy,” Lau notes. Meanwhile, though big importers are likely better able to absorb the tariffs or a portion of them, he continues, “they pay the toll on customs clearance, which can ding cash flow and finances.”

Ultimately, everyone will feel the trade war’s impact because we operate on a global economic stage. “Some sectors that don’t even import or export directly feel it,” Lau adds, “because our system is integrated in such a way that there are indirect effects on related businesses.”

And on consumers. As in China, “Higher ingredient costs mean that finished products cost more,” Lau points out. “For some consumers, that’s not a big deal; for others, it may mean they can no longer afford the products.”

Evolving Fast
As for next steps, companies in Griffiths’ orbit are evaluating their options on a case-by-case basis,” he says.

Many business leaders he’s spoken with plan to eat the added costs, should they be small enough to digest—“perhaps a percentage of a penny per tablet or bottle,” he says. But with some ingredients assuming an across-the-board 25% ad valorem tariff, the price increase may be too much to swallow—forcing other brands “to pass the cost along,” Griffiths says. “We already know that’s happening.”

While some manufacturers will reformulate products to circumvent tariffs, particularly if subject ingredients are easy to replace, others are petitioning the government to grant individual ingredients exclusion from the imposts. Yet after putting in petitions for six different ingredients, one company Griffiths is familiar with reported denial of all six requests. Upon looking into similar requests lodged by other supplement companies, Griffiths says, “To date I’ve found zero that have been granted an exclusion.”

Shifting Lines
So if the tariffs’ aim was to support stateside suppliers, they’ve missed their mark. Lau believes. For neither domestic nor Chinese industry wins here; rather, the spoils go to suppliers in, say, Mexico or Vietnam, where production may head. “It may also shift production and sourcing to countries not yet part of the current trade wars,” Lau adds.

Griffiths agrees. “I think everybody is looking to new suppliers, whether they’re in Southeast Asia, India, or other regions that can step up and provide the same quality and quantity of product—or they’re domestic suppliers hoping to reap some of the benefit.”

But are such domestic suppliers even out there? “I’d like to think so,” Griffiths says. “Otherwise, why are we doing this?”

If a vitamin manufacturer in the heartland has a solid game but has never been able to compete on price, he continues, “I’d like to think such a company has never had a better chance than right now to come out with a made-in-America ingredient that users can turn to. I just don’t know if enough of those manufacturers can jump into this space quickly, of if their ingredient won’t still be out of price range even with a 25% tariff on competitors’ ingredients.”

Diversify, Diversify, Diversify
“I don’t think tariffs or trade wars are beneficial if you believe in a global economy and free trade,” Lau declares. “However, if you want regionalization or even isolation, then they may help push us toward those goals.”

And by reallocating trade away from China to somewhere cheaper, the battle “may diversify the supply chain, but it doesn’t bring jobs back to the U.S.,” he says.

Which might be a tarnished silver lining in itself. As Griffiths sees it, “Our industry, for better or worse, has come to rely heavily on China, and now that we’re in this situation, everybody is realizing suddenly that that was probably a big mistake 20-plus years ago as those chains were developing.”

So yes, we should have diversified our supply chain then. “But now isn’t too late,” he continues. “You can begin to identify and qualify alternate suppliers, and provide sufficient business to keep those suppliers interested.” Not doing so, he believes, means “you’ve lost the opportunity of this ‘reset’ that everyone’s now forced to think about.”

Certain Times
The fact that supplement companies are having to plot sourcing shifts signals that industry leaders “don’t think this situation will end anytime soon,” Lau says. “It will change where investment occurs, the size of those investments, and a lot of planning because now we may have to produce in several countries to factor in multiple tariffs and market needs.”

And that’s why Lau is humbled not only by the trade war’s direct costs, but by “the damage that uncertainty causes.” Without predictability in where, how, or whom tariffs will strike next, “it’s hard to plan expansion, growth, and investing for the future.”
he says. “How do you forecast when there are so many moving parts? It will take longer to come to these decisions, and once you decide, the assumptions you relied on may no longer be valid.”

Take the case of a hypothetical American vitamin maker poised to capitalize on the price advantage that tariffs on Chinese goods bring. With every proposed truce or tariff reduction, that manufacturer will think twice about expanding to fill a gap that may soon disappear. “It can all change, literally, with a tweet overnight,” Griffiths says. “And if I’ve just started expansion or hiring, that can be catastrophic.”

Phasing Out
As it happens, the U.S. and China on January 15 signed a partial “Phase One” trade agreement dropping some ad valorem tariffs on Chinese ingredients from 15% to 7.5% beginning February 14. But the agreement still leaves other commodities under tariff—at least for now.3

So more work remains. If Lau had a seat at the negotiation table, he'd ask for “predictability and stability. Give industry a roadmap for what’s happening next and how we can plan. If you tell us there are going to be tariffs on Chinese goods indefinitely or for the next two years, we can use that information to make decisions. What we’re getting instead is uncertainty. Every day, it seems we get contradictory information from the previous day or week. Unpredictability hurts business.”

For his part, Griffiths wishes the tariffs were “more targeted to the sectors where trade really was out of fair balance”—information technology, say; not nutrition.

But until the tariffs are better targeted, supplement makers can’t hide under the covers. “If you want to stay in business, you’ve got to do something,” Griffiths advises. “Use that crystal ball, talk to your congressperson, and get some sense of where this is going in the near-, mid-, and long-term. And have a plan that addresses these disruptions. Prepare, diversify, and evolve.”

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.

References
As any health-and-wellness watcher knows, nothing about selling dietary supplements is simple—and it never was.

Just ask Robert (Bob) Sanders, executive vice president, home and healthcare practice leader, for market researcher IRI (Chicago).

“In the past, the supplement retail framework was always more complex than for, say, traditional OTC drugs,” he recalls. As recently as five to 10 years back, shoppers could choose from specialty stores like GNC and The Vitamin Shoppe; natural-food outlets; grocery, drug, and mass merchandisers; club stores; big boxes; convenience; and other brick-and-mortar channels—or they could go the “nontraditional” route with multi-level marketing (MLM), catalog and phone orders, and even sales in some enlightened doctors’ offices.

While they can still turn to all those options, today’s retailing landscape looks significantly flatter. (Thank you, ecommerce.)

But in no way does that mean that our job of selling supplements is any less dynamic, intricate, or, in some cases, hard to wrap our heads around. In fact, with cannabis dispensaries itching to make their presence felt, we may be in for further complexity ahead.

Yet those veteran industry watchers aren’t letting things faze them. As Sanders says, “There is substantial upside for supplements in the U.S. in the near-term.”

The State of Supplements Is Strong

If nothing else, the state of the supplement industry is strong. In fact, Sanders calls it “quite healthy,” pointing to estimated 2019 sales of almost $36 billion, per IRI Consumer and Shopper Insights Advantage (IRI CSIA) data. Even old-school brick-and-mortar belie rumors of its demise with a 4% CAGR from 2016 through 2019—twice the rate of the overall self-care industry.

“That makes it evident to us that consumers continue to exhibit high demand for supplements,” Sanders says, giving no small share of the credit to the take-charge stance that many consumers are adopting toward their health.

Indeed, he continues, “Across all ages, consumers are practicing more active prevention of disease and wellness maintenance.” And because supplements align more with their partiality to things “natural,” “simple,” and “clean,” consumers often prefer them to prescription pharmaceuticals and over-the-counter medicines alike.

Another Brick in the Wall

But when it comes to where consumers purchase their supplements, not all channels fare equally well.

Consider the brick-and-mortar scenario. Amongst outlets in that sector, dollar stores exhibit the briskest growth of 23%, per IRI data—“Price is the biggest factor here,” Sanders wagers—but from a comparatively small base of 2% of channel sales.
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Meanwhile, mass merchandise—Walmart included—“is doing just fine, thank you,” Sanders declares. At 6.3% growth versus a year ago, it’s “the best example of a big box,” he says, and represents the largest share of the brick-and-mortar pie. “Here, too,” he says, “price and selection are big factors.”

Although still growing, the drug channel’s mere 1.4% uptick indicates a loss of traction, Sanders suspects, as it “far underperforms the industry total of 4.3%.” The culprit? Again he blames prices—this time high ones, despite almost weekly promotions.

And grocery turned in growth of 3.6%, paralleling the industry average and outpacing drug. Notes Sanders, “This class of trade’s foot traffic is strong, given consumers’ willingness to still shop in-person for food.” At least for now.

All told, brick-and-mortar continues upward, with the conspicuous exception of the health, vitamin, and specialty sector, which sagged 3.9% over the prior year. For while such outlets offer consumers the advantage of education about their purchases, Sanders explains, “Once consumers gain that education and become knowledgeable and comfortable shopping for price and convenience, they can find it hard not to drift to other retail options.”

As far as Sanders is concerned, the reason is clear: convenience. “Certainly ecommerce is growing quickly and is about the same size as traditional brick-and-mortar,” he says. “And with respect to supplements, consumers can not only educate themselves about particular products or ingredients, but can read reviews and select products that suit them best—all from their phones.”

As for nontraditional channels—MLM, catalog sales, direct mail—while they’re decreasingly relevant to some shoppers, IRI’s qualitative research shows that they’re still relevant to others.

“When consumers find a product they like, that works for them, and is priced right, they’re fairly loyal,” Sanders points out, “which is why retail options like MLM still work today.” And with catalogues, “It’s hard to distinguish catalogue shopping by mail or phone from catalogue shopping that culminates in the catalogue’s online venue,” Sanders says. Adding yet more color to the picture of retailing complexity.

The Color of CBD

These days, however, the dominant hue in that picture may be green—from cannabis and its superstar cannabinoid, cannabidiol (CBD).

“The emerging hemp-derived CBD category has ignited renewed interest in natural products and helped introduce new consumers to natural-product retailers,” says Jesse Karagianes, vice president of sales, CV Sciences Inc. (San Diego). “With so much negative stigma around the current healthcare system, consumers are looking for alternatives for dealing with modern wellness concerns, and CBD provides a plant-based solution to life challenges like stress and sleep difficulties.”

The shift has industry on its toes, Sanders adds, because “if CBD proves to be a more-than-satisfactory substitute for consumers, it could curtail sales of legacy remedies.”

Combined data from IRI and BDS Analytics project that CBD could ride the coattails of widespread consumer acceptance and increased availability in general retail to a market value of $18 billion in 2024.

Yet while mainstreaming will open more channels and growth opportunities, for now and the near future, cannabis dispensary sales will be the leading indicator of CBD’s success. “Dispensaries will be where innovation is likely to occur first,” Sanders predicts, “and then products will likely find their way into the mass market.”

What will it take for that to happen? A clearer regulatory vision, for one. As Karagianes says, “General retail will start to see gains when federal regulators can agree on the appropriate path to bringing ingestible hemp-derived CBD products to the mainstream.” (Read more on page 22.)

Confidence will move the ball forward, too, he adds. “Credibility and trust are mainstays of successful retailers, and with more than 2,700 CBD brands now on the market, retailers have an obligation to thoroughly vet the CBD products on their shelves,” he says.

But no matter the sector, the secret sauce greasing supplement retailers’ success isn’t just being in the right place at the right time. “It’s more than that,” Sanders says. “They’re curating assortments that appeal to, and even delight, their shopper base. And they’re pricing these items along parameters of what consumers are willing to pay.” That’s as simple as it gets. 

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.
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CBD

Is 2020 the year FDA will finally make CBD a legal ingredient in dietary supplements and food? No one (but FDA) knows. And this is where we find ourselves yet again at the start of 2020 when it comes to hemp cannabidiol (CBD), today’s biggest ingredient disruptor: with many questions and few answers.

But first: What a year it’s been for CBD. Since President Trump signed the 2018 Farm Bill into law in December 2018, legalizing industrial hemp as an agricultural crop—with hemp defined as cannabis containing less than 0.3% tetrahydrocannabinol (THC) content—and removing it from Schedule I of the Controlled Substances Act, the CBD products market has exploded. Today, CBD is infused in everything from hair gel and toothpicks to personal lubricant, hand sanitizers, and even bed sheets.¹

Despite being sold on shelves and online, CBD dietary supplements and food are still not legal according to FDA. For dietary supplements, FDA’s primary reasoning for why CBD can’t be a legal dietary supplement ingredient is that before CBD was ever sold as a dietary supplement, it was first publicly researched as an investigational new drug (IND) by GW Pharmaceuticals. This means that, under the Federal Food, Drug, and Cosmetic Act’s “IND exclusion clause,” CBD is ineligible to meet the definition of a dietary supplement under the Act’s Section 201(ff)(3)(B)(i) and 201(ff)(3)(B)(ii).

Last year saw many try to get FDA to forge a legal pathway for CBD products. Last October, dietary supplement and natural product associations—the American Herbal Products Association (AHPA), the Council for Responsible Nutrition (CRN), the Consumer Healthcare Products Association (CHPA), and the United Natural Products Alliance (UNPA)—sent a joint letter asking Congress to create legislation to create a waiver for CBD under the definition of a dietary supplement (FD&C Act Section 201(ff)(3)) that would specifically authorize legal use of CBD in supplements. The Natural Products Association (NPA), meanwhile, was involved in pushing forth an amendment to a House spending bill last June that would have had FDA perform a Health Hazard Evaluation of CBD and ultimately set a safe usage level for consumers. The amendment language, which made it through the House bill, was unfortunately ultimately

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excluded in the version of the spending bill passed by the Senate.

Federal and state lawmakers, as well as state attorneys general, have also asked FDA to provide either more oversight over CBD, set a safe usage level, or to at least adopt a policy of enforcement discretion for CBD products. Notably, last September, Senate Majority Leader Mitch McConnell (R-KY) added report language to the 2020 spending bill to require FDA movement on CBD. The ultimate 2020 spending bill that President Trump signed last December requires that FDA, within 60 days, update Congress on its progress in developing a policy for enforcement discretion for CBD, and within 180 days, evaluate the market to determine the scope of CBD products that are mislabeled or making illegal claims.

But enforcement discretion does not make CBD legal in supplements; it merely means that FDA will exert discretion in how it enforces against CBD companies. And so the supplements industry is still seeking a true legal pathway forward for CBD.

The two potential pathways most commonly discussed are: 1) to somehow create a regulatory exception for CBD in Section 201(ff)(3) of the FD&C Act that would include CBD within the legal definition of a dietary supplement, or 2) to see the Secretary of the U.S. Department of Health and Human Services promulgate a new regulation for CBD specifically declaring CBD as both a legal dietary supplement and/or food ingredient.

This January, a newly proposed bill opted for the first pathway (carving out an exemption for CBD in the FD&C Act’s definition of a dietary supplement). Proposed by House Agriculture Committee Chairman Collin Peterson (D-MN), the bill would essentially ensure that the IND exclusion clause in Section 201(ff)(3)(B)(i) and 201(ff)(3)(B)(ii) does not pertain to CBD. For instance, under the text stating that a dietary supplement is not “an article authorized for investigation as a new drug...” Representative Peterson’s bill would add the phrase “other than hemp-derived cannabidiol or a hemp-derived cannabidiol containing substance.”

Whether this bill will pass is anyone’s guess. “What makes it really hard to say is [that] we are kicking off an election year,” says attorney Kevin Bell, partner, Arnall Golden Gregory LLP (AGG; Washington, DC). “If anything is going to get done with it, it would need to move faster than in a non-election year. At some point, you’re going to reach the middle of the year, and legislators—that’s not going to be what the focus is going to be on in an election year because you don’t know what’s going to change, not only from the general election, but also how that might affect committees and things like that.”

While some welcome the Peterson bill, the regulatory route it takes—having Congress dictate a narrow exemption for CBD supplements in the IND exclusion clause—isn’t necessarily most optimal, some say. “We would have preferred to see FDA do this on its own using that discretion that’s under 21 U.S.C. § 321(ff)(3),” says Steve Mister, president and CEO of the Council for Responsible Nutrition (CRN; Washington, DC). (Editor’s note: 21 U.S.C. § 321(ff)(3) is the same provision, but codified, as the FD&C Act’s 201(ff)(3) provision.) “That would have been the preferred way to market because then FDA would have more say in what the exclusion looks like. But given what we’re seeing out of FDA, which seems to be inaction, and the larger environment around it—all the things that are happening in the face of FDA’s inaction—we think this is a good alternative.”
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"I think [the Peterson bill] is interesting, but it's a little drastic," says Robert Durkin, of counsel, Arnall Golden Gregory LLP (AGG; Washington, DC). Durkin is the former deputy director for FDA's Office of Dietary Supplement Programs. "The agency could help the Secretary do basically the same thing if the Secretary were to promulgate a regulation...I think a better option would be for the Secretary to promulgate a regulation."

Why? "Well, what [a new regulation] does is it establishes a precedent and a paradigm for the agency to do this in the future if it has to," Durkin says. "They wouldn't have to wait for a legislative fix. And, it's really likely that CBD is not the only dietary ingredient to be affected like this. It's a solution that can be used in the future."

It's also important to note that, by only amending the definition of a dietary supplement, Rep. Peterson's bill would still not create a legal pathway for CBD in food, leaving a now quickly growing segment of the CBD market still illegal. "Food would still be in the same trap," Durkin says. But, say some, leaving CBD out of food might just be FDAs preference. "They'd much rather have this in dietary supplements than conventional food," he adds.

"I think FDA has some real concerns about [CBD in food] that make it different than supplements," says Mister. "Because supplements are, by definition, supposed to be pills, powders, concentrated liquids, capsules, things like that. By their very nature, they're not allowed to be presented as a food substitute. And so the very act of taking a supplement becomes very intentional."

He continues: "The problem they have with food is they're concerned about the cumulative effects of CBD if it's in everything—you know, you get up in the morning and you have a CBD-infused coffee, and then you have a CBD-laced bottle of water on your way to work, and then you have a CBD-infused brownie. Pretty soon, without realizing it, you're starting to get an awful lot of CBD into your system. That's, I think, what's problematic about food. It's very hard to do this in a way with food that you alert people to the potential dangers of overconsumption, and it's also hard to warn vulnerable populations away from it. If you don't want pregnant women using CBD, are they going to think about that when they're at the grocery store and they pick up cookies or coffee that has CBD in it? Whereas with a supplement, you can label that supplement in such a way that cautions people: Do not use this product if you're pregnant or nursing."

It's further important to note that if a bill like Rep. Pet.erson's passes and makes CBD a legal dietary ingredient, CBD would be subject to all of the regulations and enforcement that all other legal dietary ingredients face—for instance, adhering to the new dietary ingredient (NDI) process and safety data requirements, the current good manufacturing practices (cGMPs) law, as well as labeling compliance.

"Oh, absolutely," says Mister. "And I think that's something that some people don't understand, because they think that somehow it's exempting CBD from all of the regulatory framework, and that could not be more wrong. What it does is it simply says it meets the definition of a dietary ingredient, but before anybody can bring anything to market, it would still require that you meet all of the requirements for a dietary supplement...So it's not like a CBD supplement is going to get a free pass under this legislation, but what it does is it says, 'This is the swim lane for CBD.'"

Short of passage of the Peterson bill, could FDA take more action on sorting out CBD's legality in 2020? "It's hard to say," says AGG's Durkin. "I know that the agency never wanted to be put in this situation where this is dragged out for so long. I think an answer on CBD is long overdue, whether it comes from the agency in the form of regulations, or from the legislature in the form of a law. It's just hard to say when that's going to happen."

Although FDA has so far not changed its position on CBD's illegal supplement/food status, it is most definitely hearing all of the noise surrounding CBD. (In efforts to open communication, FDA hosted a public hearing last May to gather information on cannabis and cannabis-derived compounds.) Regarding enforcement, in 2019 the agency did issue more warning letters for violative CBD products it identified in the market. In 2019, it issued 22 warning letters, largely to blatantly violative companies, such as those making illegal disease claims.

FDA is facing a lot of pressure, not only from the new directives it faces from the 2020 spending bill, but more importantly from stakeholders and lawmakers to find a fix due to the mess that's growing around CBD—everything from companies selling questionable and potentially harmful products without oversight, to growing class action lawsuits over CBD and also the patchwork of state laws that are emerging as states try to take matters into their own hands to protect their own. Meanwhile, the CBD playing field remains uneven and unfair, as companies still cautiously abiding by FDAs legal stance are keeping out of the market.

"I do think that what's happening in the larger marketplace is creating some real strong pressures on FDA to do something," Mister says. "So, you have hemp farmers who are now growing hemp and finding that there's not a market for their product, and so the price for hemp has dropped because there's just not the marketplace because people can't put it in supplements; they can't put it in food. You've got these class action litigations that are really now impacting the industry...You've got states—and I would not underestimate the impact that is having—a number of states are jumping into this vacuum and saying, 'Well, we'll fill the void if FDAs not going to do anything. Some states are making it completely illegal; many other states are saying, 'We're going to allow CBD in our state, but we're going to put various kinds of restrictions or requirements on it.' So you have one state that says you have to have a QR code on the label; another says you have to register your product with the state; another says we want certain warnings on the label. That's going to put increasing pressure on FDA, because think about this: If they wait three years to do something, how are they ever going to roll back all of those state bills? You're going to have this crazy patchwork in addition to whatever FDA does. So, I think all these things are putting very strong pressure on Congress and FDA to do something, and to do it now."

Of Rep. Peterson's bill, says AGG's Bell, "if you can help try to lead or influence a horse to water, and that horse is the FDA, this is a good way to do that." He adds that "really, the primary purpose to put it out there was more to spread the idea of a recommendation and..."
potentially, hopefully, influence [FDA] by virtue of it coming from a member of Congress, or several members of Congress..."

How should companies proceed in these uncertain times? Beyond the possibility of receiving FDA warning letters, Mister advises, CBD companies should be even more concerned about ramped-up enforcement that could come from the FTC over fraud and misleading advertising. Already, the FTC has indicated that it is beginning to investigate CBD firms, and those FTC cases "will involve significant settlements of money," Mister says, and have "a lot more teeth than a warning letter. So that would be my bigger concern."

And, says AGG's Durkin, FDA could further enforce against CBD companies through the cGMP process. "I think the agency's priorities will remain committing their limited resources towards products that are making disease claims. After that, I think if products labeled to contain CBD are found during a routine [cGMP] inspection, I think we can expect the agency to insist that those products be removed from commerce or destroyed before they close that inspection. They're not gonna walk away from that anymore—not that I would say they ever have—but I don't think they're going to miss the opportunity to enforce the Act when they find this violation through day-to-day business."

We asked a few well-known supplement companies selling CBD or hemp extract products what advice they would give other CBD companies on how to try to stay out of trouble with FDA. Their advice mirrors advice one would give about any other kind of dietary supplement product.

"If you're selling CBD, there's no surefire way to avoid landing in hot water with the FDA, since their position is that it is not currently lawful to sell CBD products as dietary supplements," says Gene Bruno, MS, MHS, RH(AHG), senior director of product innovation for Twinlab. "That being said, it is also clear that they haven't take measures to shut down the sales of all such products currently on the market." His top advice to companies includes avoid making "outrageous, red-flag" disease-treatment claims; avoid using CBD isolates, "since indications are that when all is said and done, this material will be exclusively available to GW Pharmaceuticals as the major component of their prescription drug, Epidiolex;" and "If you really want to reduce risk, offer hemp extract products, not CBD products."

Stuart Tomc, vice president of human nutrition, CV Sciences (San Diego, CA), adds: "Companies should be following all of the applicable rules that are in place to protect consumers. For example, if a company is selling a dietary supplement, then the company's marketing surrounding the supplement should follow all dietary supplement rules. Those rules include having evidence that the level of CBD in their product is safe. The company's marketing messaging for the product should not make any unsubstantiated claims, the product should be made in a cGMP facility, and the company should be collecting and monitoring consumer complaints or adverse events."

"The biggest fear of all, for all involved—FDA, lawmakers, responsible CBD companies—is what were to happen if a consumer were to become ill or injured from a CBD product for reasons including that it was misbranded, adulterated, or otherwise dangerous."

"First and foremost is public health," says Daniel Fabricant, PhD, CEO and president of the Natural Products Association (NPA; Washington, DC). Fabricant has been vocal in urging FDA to determine a safe CBD usage level for consumers, also keeping in mind that CBD users today could include children or pregnant women.

"The CBD being sold in stores and online is made up of who-knows-what and comes from who-knows-where. If the FDA, on their own, or as mandated by Congress, doesn't act soon to set a safe level of consumption for CBD, then we are inviting another vaping-like crisis or worse."

He adds that he's "not sure of the delay by the agency to set even an interim level...[T]here's so much in the public domain, like the WHO document on CBD, that could be easily used as a starting point."

The Market
Short of regulatory clarity, expect the CBD market to continue the same extraordinary growth it saw in 2019 and even ramping up to last year. The journal HerbalGram, published by the American Botanical Council (Austin, TX), reported that by the end of 2018, CBD had skyrocketed to the top as the number-one top-selling herbal supplement in the U.S. natural channel, effectively pushing turmeric, the previous number-one natural seller since 2013, down to the number-two spot. CBD was the top-selling and the fastest-growing natural-channel ingredient that year, with sales reaching nearly $53 million and growing 332.8% from the previous year. The HerbalGram report stated: "According to SPINS, roughly 60% of the CBD products sold in the U.S. natural channel in 2018 were in the form of alcohol-free tinctures, followed by capsules and softgels. The vast majority of the CBD products were marketed for 'non-specific health focuses,' with mood support and sleep as the next most-popular uses."

2019 saw the same impressive growth for CBD in the U.S. natural channel, according to data provided by SPINS for this story. In the U.S. natural channel in 2019, CBD ranked as the number-two bestselling ingredient, growing 113% to $90 million in sales. (For more insights on CBD's cross-channel growth in 2019, turn to page 62.)

That growth looks set to continue, other developments notwithstanding. At last November's Council for Responsible Nutrition The Conference, market researcher and presenter IRI (Chicago) predicted that U.S. market sales of non-THC cannabinoids, including CBD, could reach $18 billion by 2024, including sales in the general retail supplement channel and in dispensaries—and not even capturing data from other retail outlets not tracked where CBD might be sold, such as in household stores or other types of retail stores—and largely driven not only by wider consumer acceptance of CBD but also growing availability.

During his presentation, IRI's Robert Sanders, executive vice president, healthcare and nutritional supplement practice leader, also pointed out that "a leading indicator for what's going to happen in the [mainstream] marketplace...will be driven in a large way by what's going on in dispensaries. So if dispensaries are doing things, you can expect that to be a rationale for other retail channels that want to do the same thing." He also said that dispensaries' share of the market will shrink as market share held by other retail outlets, including mass-market and grocery stores, grows. And, while CBD supplements are driving most of the CBD sales in traditional

NUTRITIONAL OUTLOOK  •  JANUARY/FEBRUARY 2020

27
retail outlets, moving forward, much of CBD’s growth will stem from edibles (food, candy, drinks) and topicals (beauty/skin products).

Already, CBD is being sold in mainstream national stores like CVS, Walgreens, Rite-Aid, Kroger, GNC, Ulta Beauty, Sephora, Bed Bath & Beyond, and clothing stores. Says CV Sciences’ Tomc, “Retailers are gaining confidence that CBD derived from agricultural hemp is here to stay,” although he adds that “conservative retailers...are standing on the sidelines.”

For the time being, many large CPG players will be waiting to engage until FDA makes CBD products legal. “I think the temptation may be too much for a few players, and they will get in, but I think most of your large CPG companies are just not going to wade into this area as long as there is uncertainty about whether it’s a legal product.” CRN’s Mister says.

He adds: “And that’s really unfortunate, because if you were to ask FDA, ‘What’s the kind of company you would like to see in this space?’...they would like to see big established companies that have very well-developed quality-control systems in place, that have a commitment to their consumers, and that are too big to get wrapped up in a lot of lawsuits. Those are the kinds of companies that are going to do it right, and instead, those are the ones that are sitting on the sidelines in many cases. And that’s exactly the kind of company that FDA would rather come in and take market share.”

And, indeed, the CBD market today is largely populated by smaller companies—including some new-to-business companies with little knowledge of dietary supplement best manufacturing practices or supplement regulation requirements.

“New brands have continued to enter the marketplace, typically with small companies not previously affiliated with the dietary supplement industry,” says Twinlab’s Bruno. “That’s not to say that existing supplement companies haven’t introduced CBD/hemp products—they have. It’s just that the sheer number of new brands are from the smaller companies.”

CV Sciences’ Tomc echoes this. “The dietary supplement market has been flooded with start-ups and new CBD brands that have migrated to the dietary supplement category. These companies are not familiar with dietary supplement regulations that are currently in place to protect consumers. Therefore, the market has been flooded with non-compliant products with claims that may not be allowed, or claims that may fail to meet specifications when tested.”

Opportunities are ripe for irresponsible CBD companies coming to market to make a quick profit with questionable products—and, in the process, risking the reputation of both the CBD market and the larger supplement market as a whole. An NPA poll conducted last year found that 47% of Americans would stop using CBD products if they or someone they knew got sick from using CBD. Fabricant points out.

“My biggest concern about the CBD supplements industry is irresponsible players,” Bruno says. “Unfortunately, many new brands to the industry aren’t necessarily planning on a long-term commitment and so are less concerned with following cGMPs, and more concerned with maximizing profits to the exclusion of all else. When I was at SupplySide West in 2019, I met someone with a brand who had illegal levels of THC in his product and was happy about it, since he figured it would get customers to keep buying the products.”

AGG’s Bell says, “The last few years when I’ve gone to SupplySide West and people come up and ask me questions about cannabis and CBD...you know, at some point in time, you look at what it’s starting to populate, these trade shows and conferences, and say, ‘90% of you people probably won’t make it. You won’t be here.’ You try to figure out how much of this is a quick buck versus the ones who are really serious about this.”

AGG’s Durkin: “There are some very good players making products that contain CBD, and although they’re violating the Act by doing that, they go through great efforts to make sure that they’re adhering to all other aspects of the Act in that they’re putting a quality product on the market. I don’t want to see those good players suffer because someone doesn’t put the same effort in and puts a product out there that causes harm.”

For better or for worse, Bruno also points out that for newer companies trying to enter the CBD market now, eventual market saturation will become an issue. “At this point in time, any new CBD brand wishing to enter the retail will likely have a hard time doing so. There are already more than 1500 such products, and unless you can differentiate your product in a major way, it won’t really be worth the effort to try and be a player. In my opinion, one viable approach is for a new CBD brand to focus on products that provide other cannabinoids besides just CBD.”

References

Elderberry
Elderberry (Sambucus nigra) continues to show enormous growth, solidifying its place as a major ingredient, particularly in the immune health category. According to SPINS, during the 52 weeks ending October 6, 2019, cross-channel sales growth of elderberry encompassing mainstream, natural, and specialty gourmet channels was 83.4%, for total sales of $113 million. Broken down by channel in terms of the 25 top-selling functional ingredients by dollar sales, elderberry ranked as the 10th best-selling ingredient in the natural channel and the 14th bestseller in the specialty gourmet channel, growing 32.6% and 57.8%, respectively.

Impressively, elderberry is capturing significant mainstream attention. In the conventional multioutlet channel, according to SPINS, elderberry continues to show impressive growth within the cold and flu category, rising in sales by a whopping 116% to nearly $63 million, while other ingredients in the category only showed modest growth or even decline. In fact, elderberry began its ascent in 2018, when SPINS data showed that...
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Ingredients to Watch

This is very positive and welcome news to ingredient suppliers, but increased demand also increases the need for a reliable and legitimate supply of elderberry. Adulteration is an emerging threat for popular herbal ingredients, and two elderberry ingredient suppliers, Artemis International (Fort Wayne, IN) and INS Farms (Purdy, MO), are taking steps to protect themselves and the rest of the supply chain.

Chris Tower, vice president of sales and business development for Artemis International, explains that his firm is actively monitoring the integrity of the supply chain because of what happened with a different, but similar, ingredient.

"Previously, this relative problem of adulteration has been well-identified and documented as threatening another unique and popular botanical extract, European bilberry (Vaccinium myrtillus), which similarly to European black elderberry (Sambucus nigra) is at risk of fraudulent economic adulteration by anthocyanin-rich extracts derived partly or entirely from a completely different plant species," explains Tower.

To raise awareness of the problem, Artemis, as a member of the American Botanical Council’s Botanical Adulterants Prevention Program (whose partners include the American Herbal Pharmacopoeia and the University of Mississippi’s National Center for Natural Products Research), collaborated with a number of other stakeholders in an effort to validate robust analytical tools available to industry as means to identify and protect against adulteration of European bilberry. Given elderberry’s rising popularity and the subsequent threat of adulteration, Artemis is taking similar measures to raise awareness and has given industry tools to authenticate their elderberry supply.

"Artemis and Iprona, among others, are actively engaged with country-specific pharmacopoeias, including the U.S. Pharmacopeia, as well as the American Botanical Council, NGOs, and certain third-party labs, in a goal of transferring and publishing validated species-identification tools to further protect European elderberry (Sambucus nigra) against adulteration," says Tower.

For its part, INS Farms, a supplier of North American elderberry, is participating in polyphenol fingerprinting and the Tru-ID certification to not steer people away from European [elderberry]. "We believe that the quality of European elderberry is as good or as equal to the American-grown elderberry. By purchasing European elderberry and growing American elderberry, we can help our customers with sourcing it as well in whatever form they need, such as frozen, concentrate, and powder."

Elderberry is a well-established immune health ingredient (turn to page 68 to read more on its role in immune health), and now a growing body of evidence is demonstrating the potential of elderberry as a prebiotic ingredient, too. For example, a 2012 in vitro study found that anthocyanins such as cyanidin-3-glucoside, a compound found in berries such as black elderberries, have a prebiotic effect, increasing the population of beneficial gut bacteria while also inhibiting the growth of detrimental bacteria.

More research is still necessary to better understand how elderberry functions as a prebiotic, but as the public interest in digestive health generally, and prebiotics specifically, continues to grow, brands will experiment with novel formulations. The definition of prebiotics is already evolving to make room for a broader range of ingredients.

"The Global Prebiotic Association defines prebiotics as a nutritional product and/or ingredient selectively utilized in the microflora producing health benefits," explains Melanie Bush, director of berry science for Artemis International. "Formerly, prebiotics were essentially limited to fibers that served as substrates for bacterial strains in the gut, but the category has been recognizing..."
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the prebiotic activity of other compounds like berry polyphenols for their ability to influence and modulate the presence of particular bacterial strains and result in health benefits.”

References

Melatonin
It’s no secret that many people today do not get the amount of sleep they need. Hectic lifestyles, demanding jobs, family responsibilities, and more drive us daily to perform better, harder, and faster, usually at the sacrifice of sleep and restoration. And this has sent us straight to the retail shelf to find support, sometimes in the form of natural sleep aids and dietary supplements.

At the Council for Responsible Nutrition’s (CRN; Washington, DC) annual conference in November 2019, market researcher IRI (Chicago) noted that the sleep and mood supplement category grew an impressive 16% in 2019 (in the 52 weeks ending August 11, 2019). Further insight provided to Nutritional Outlook from supplement brand Natrol, based on Nielsen Scantrack data, indicate that the sleep category comprising vitamins, minerals, and supplements (VMS) grew 31% over the past year, outpacing the 4% sales growth seen by the overall total VMS category.

Notably, the company points out, the sleep category is made up “almost entirely” of melatonin-based products.

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<td>Taurine</td>
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<tr>
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<tr>
<td>Calcium</td>
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<td>Glucosamine/Chondroitin Combo</td>
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<td>Multivitamin (Children)</td>
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<td>Psyllium</td>
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<td>Biotin</td>
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<td>Caffeine</td>
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<td>Multivitamin (Men)</td>
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<tr>
<td>Protein - Plant (Multi)</td>
<td>$159,686,879</td>
</tr>
<tr>
<td>Horehound</td>
<td>$149,227,282</td>
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</table>

<table>
<thead>
<tr>
<th>MULTIPLE OUTLET CHANNEL</th>
<th>TOP BESTSELLING INGREDIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bone Health</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ingredient</strong></td>
<td><strong>Current Dollars</strong></td>
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<tr>
<td>Vitamin D</td>
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<td>Calcium</td>
<td>$150,856,286</td>
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<td>Calcium/Magnesium Combo</td>
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<td>Vitamin K</td>
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<td>Vitamin A - D - K</td>
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<tr>
<td>Cranberry Supplements</td>
<td>$680,366</td>
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<tr>
<td>Multivitamin (Children)</td>
<td>$262,278</td>
</tr>
</tbody>
</table>

| **Cold & Flu**                    |                            |
| **Ingredient**                    | **Current Dollars** | **Year-Ago Dollars** | **% Change** |
| Vitamin C (not Ester-C)           | $244,674,883            | $230,610,504        | 6.1%         |
| Specialty Remedies (Homeopathic) | $237,249,495            | $239,151,052        | -0.8%        |
| Horehound                         | $149,223,449            | $148,076,388        | 0.9%         |
| Vitamin C (Ester-C only)          | $138,465,731            | $147,654,105        | -6.2%        |
| Echinacea                         | $103,318,757            | $97,674,163         | 5.8%         |
| Chinese Herbs                     | $82,345,008             | $95,199,142         | -13.5%       |
| Elderberry                        | $62,876,847             | $29,108,187         | 116.0%       |
| Ivy Leaf                          | $32,698,706             | $29,173,405         | 12.1%        |
| Bee Products (not Propolis)       | $23,736,639             | $23,030,975         | 3.1%         |
| Menthol                           | $19,841,013             | $19,589,489         | 1.3%         |

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: Conventional Multi-Outlet Channel (Powered by IRI)
Time period: 52 weeks ending October 6, 2019
Channel: U.S. conventional multi-outlet, comprising grocery, drug, Wal-Mart, mass, dollar, military, and club stores. (Excludes private-label brands.)
Looking at sales data for the past five years, David Hilton, Natrol’s director of research and development and regulatory affairs, says, “The melatonin growth rate has been well above category rates for some time and is accelerating. In fact, melatonin is now the second-largest segment behind probiotics in all of VMS.”

The sleep ingredients market reflects this growth for melatonin. SPINS reports that in a cross-channel ranking of the top-10 ingredients in terms of dollar change seen in 2019 (during the 52 weeks ending October 6, 2019), melatonin shot up from its previous #10 spot to the #2 spot based on the ingredient’s growth across the mainstream, natural, and specialty gourmet retail outlets combined. Across these channels, melatonin sales grew nearly 29%, from $285 million to $367 million. (For more insights on this cross-channel growth, turn to page 62.)

Most of melatonin’s activity is happening in the mainstream retail channel—giving it a broad consumer reach that many supplement ingredients strive to achieve. Breaking down the mainstream data further, SPINS reports for this story that in the mainstream channel alone, melatonin sales during the above time period grew 29.7% to $354 million in sales. Melatonin now reigns as the top-selling sleep ingredient in all three channels SPINS tracks (mainstream, natural, and specialty gourmet), with double-digit growth in each.

Why are consumers so drawn to melatonin? Is it the sheer fact that it’s the most well-known natural sleep aid?

Natrol’s Hilton says that is one reason—but there are others. “The reason melatonin is specifically increasing in popularity is tied to growing consumer confidence in melatonin’s effectiveness, and the powerful macro-trend of consumers looking for more natural and drug-free alternatives to help with their health needs.”

He continues: “The sleep solutions people turned to 10 and 20 years ago largely centered on medicating yourself to sleep with products like ZzzQuil, Tylenol PM, Benadryl, Ambien, and the like. Now, there is a different, drug-free trusted option, and people are excited to choose melatonin over other options.”

Consumers have good reason to be confident in melatonin, including its safety. Michael Grandner, PhD, MTR, associate professor of psychiatry, psychology, nutritional sciences, and medicine, and director of the Sleep & Health Research Program, at the University of Arizona (Tucson, AZ), says, “Melatonin, which is sold as a dietary supplement in the U.S., has more substantial research behind it compared to other compounds sold as supplements. There are thousands of scientific studies that have explored how melatonin works, and there is a good understanding of its use as a sleep aid. For this reason, and its relative safety compared to prescription medications, many people are turning to melatonin as an option that they perceive to be safer than the alternative.”

That doesn’t mean, however, that consumers really understand how melatonin works. In fact, Grandner says, many don’t understand how melatonin can improve sleep, nor how to use it most effectively. “Many people are not actually using melatonin optimally, even though many people are using it,” he states.

For instance, he says, a melatonin supplement’s efficacy is highly dependent on its dosage and timing (i.e., at what point during the day a consumer takes it). “Melatonin is not a treatment for insomnia,” Grandner says. “It is almost always ineffective for this. Also, melatonin is more of a clock-shifter than a sleep-inducer. It is a signal of nighttime to your body. If you give a dose in the middle of the day, it will have little effect since your body knows it’s not nighttime. If you give it at night, it also usually has little effect since your body already knows it’s nighttime. It is most effective at the transition points. A small amount of melatonin in the evening can make your clock shift earlier—getting sleepy a little earlier but also waking up earlier.” Basically, melatonin will cause you to get drowsy, but it is not sedating, he says.

Higher melatonin dosages are not always better, either, Grandner says, because melatonin is a hormone and not a drug. In fact, he says, smaller doses may be more effective.

Natrol’s Hilton says: “[I]t’s important to understand how melatonin works and when supplementation might be needed. Melatonin is naturally produced in the body to guide our ‘sleep-wake’ cycle. When the sun sets, darkness signals the brain to produce melatonin, telling our body it’s time to sleep. Melatonin levels stay elevated through the night to help keep us asleep. When the sun comes up, the light signals the brain to stop making melatonin, telling our body that it’s time to wake up. Changes in routine, seasonal time changes, and screen time before bed are some of the many things that can interrupt melatonin production and throw us off cycle. Melatonin supplements can help.”

Given all the interest in the sleep category, one might take a minute to wonder how other ingredients within the sleep set are performing. According to SPINS’s 2019 sleep-category numbers, sleep ingredients such as valerian are not seeing nearly the same level of sales that melatonin enjoys. The journal HerbalGram, published by the American Botanical Council (Austin, TX), reported in its latest annual Herb Market Report’ that in 2018, sales of valerian were $17 million in the
U.S. mainstream channel and $7 million in the U.S. natural channel. Those aren’t numbers to sneeze at, but they do demonstrate that, by comparison, melatonin is the sleep star by far.

Grandner shares additional thoughts on sleep-support ingredients beyond melatonin, which he says is to date the most well-studied sleep supplement ingredient.

“There are a number of nutrients that have been studied in relation to sleep. Nearly all, though, have very little data to support them. Most nutrients thought to be sleep-promoting have only been studied in mice, or, if there are human studies, these are often small and poorly controlled. Some nutrients, such as chamomile, actually have no real supporting research on effects in humans. Others, such as valerian, have relatively extensive human research, but these studies generally show only weak effects. Some compounds, like L-theanine, have been studied for their calming effects, but very little work has been done evaluating their role as an actual sleep-promoting compound. Currently, the research in this area is very preliminary, and although there are some compounds that have shown promise, there are no clear indications that there are specific nutrients that have strong and reliable effects on sleep.”

The search for sleep aids goes on nevertheless. The Centers for Disease Control and Prevention notes that one-third of U.S. adults report not getting the recommended amount of sleep. Moreover, says the CDC, “Not getting enough sleep is linked with many chronic diseases and conditions—such as type 2 diabetes, heart disease, obesity, and depression—that threaten our nation’s health.”

Andrea Wong, PhD, senior vice president, scientific and regulatory affairs, for the Council for Responsible Nutrition, says, “Lack of sleep is a common issue in the U.S., partially due to the busy lives many Americans are leading. With emerging research and increasing media attention, consumers are recognizing the importance of sleep and risks of not getting enough sleep. Dietary supplements to support relaxation and sleep, along with other healthy behaviors, can improve quality of sleep, thereby enhancing overall wellness.”

CRN’s latest Consumer Survey on Dietary Supplements in 2019 showed consumer usage of melatonin is up. In fact, 14% of all dietary supplement users surveyed in 2019 said they take melatonin. Wong reports that “overall, consumer usage of melatonin has increased by six percentage points over the last five years. Melatonin is most popular with supplement users aged 18-34, with 18% of users taking this ingredient in 2019. Usage in this age category has grown by 10 percentage points in the last five years.”

How are melatonin trends shaking out in the consumer products market? Market researcher Innova Market Insights reports that between 2014 and 2018, the global number of dietary supplements, foods, and beverages featuring melatonin grew at a 23.4% CAGR.

As the sleep market grows more sophisticated, a number of trends are happening. CRN’s Wong points to a few trends her association has noticed regarding melatonin supplements: 1) more blended-ingredient products are now incorporating melatonin, and 2) melatonin products are being offered in alternative delivery formats, such as gummies and powders, that expand usage to more users.

Grandner adds his observation: "Some areas where I have seen developments that are encouraging are the formulations of time-release
Draco Natural Products
Advanced Processing Technologies

Supercritical CO₂ Extraction & Fermentation Extraction

For Producing Specialized Nutrient Dense Bioactive Botanical Extract Ingredients
Draco Natural Products is well known for our legendary Full Spectrum pure water botanical extraction, which we use to create high quality botanical extract ingredients. We also use advanced processing technologies like Supercritical CO2 Extraction and Fermentation Extraction to push ingredient performance levels even higher, depending on the specific need. We can also combine any of these three extraction technologies, so that the properties of the ingredient fit or exceed your custom specifications, giving you a unique ingredient without dramatic increases in price. These are just a couple more reasons to choose Draco Natural Products for your next botanical product development project!

**Supercritical CO2 Extraction**

**Benefits of CO2 Extraction**
- For non-polar, lipophilic compounds – as a complement to water extraction
- Oxygen-free atmosphere to protect from oxidation
- No solvent residues of hydrocarbon solvent extractions (hexane, acetone, etc…)
- Better than cold pressed oils which exposes product to heat and oxidation
- Supercritical CO2 Extraction: cleaner and more eco-friendly than other solvents
- CO2 is nontoxic, non-flammable compared to toxic solvents hexane, toluene, acetone
- Customizable profile by changing temperatures and pressure

**Products from CO2 Extraction**
- Carotenoids, and aromatic compounds
- Lipophilic flavonoids and phenolics
- High purity oils with delicate omega 3 unsaturated fatty acids
- Other Lipophilics: carotenoids, terpenes, oil soluble vitamins, unsaturated oils, alkaloids
- Precious essential oils
- Flavor compounds
- Roasted peanut flavor aromatics

**Bioactives that extract well in CO2**
- Honokiol and magnolol from magnolia bark
- Gingerols and terpene oils from ginger
- Hops oils, alpha and beta acids
- Kavalactones from kava root
- Highly unsaturated fragile oils from pomegranate seed, sea buckthorn berry, flax seed, chia, borage, krill, and evening primrose
- Citral with brain bioactive effects from lemon balm (Melissa officinalis)
- Peppermint oils and Cinnamon oil
Benefits of Fermentation Extraction
- High purity bioactive compounds from living cells
- Increased bioavailability/water solubility of bioactives
- Enhanced taste, form, and function for foods
- Microbiological safety and improved keeping quality
- Unlocks plant cell walls and tightly held actives
- Transforms weakly soluble compounds into new biodynamic actives
- Higher levels of solubility and efficacy, according to numerous studies
- Organic acids such as malic acid, fumaric acid, citric acid, Krebs cycle intermediates available
- Helps provide quick energy substrates to the energy producing mitochondria of the cells
- Improves bioavailability and decreases toxicity
- Chelates (bonds with) essential minerals such as calcium, magnesium, zinc, copper
- High purity bioactives with potential for organic status (e.g. glycerin)

Benefits of Food Fermentation
- Almost any natural plant source can be fermented.
- Enhanced taste, form, and function for foods
- Fruits, vegetables, herbs, mushrooms, and seaweeds
- In foods, vitamin B content is increased.
- Improved protein digestibility and quality
- Improved microbiological safety and shelf life
- Sour and flavorful note is balanced with other flavors.

Multiple Processing Examples
- CO2 extracted fresh Yellow Ginger oil, water soluble ginger extract standardized to gingerols, fermented ginger fiber with probiotics
- H2O extracted, then Fermented/Enzyme treated Purple Sweet Potato liquid standardized to anthocyanins
- Purple Sweet Potato Fermented Vinegar (rich in deep red color pigments)
- H2O extracted Goji Berry (for immune and antioxidant polysaccharides); CO2 extracted Goji berries (standardized to Zeaxanthin for eye health support)
- CO2 extracted Sea Buckthorn Oil standardized to 520 mg of carotenoids per 100 g with H2O extracted Sea Buckthorn flavonoids.
- Pomegranate seed oil for skin and heart health, combined with ellagic acid from water extracted fruit for UV protection and skin health (inside out)
- Fermented flavor aromatics, umami sensational savory flavors (cravings) eg. fermented seaweed, fermented soy (tamari, miso),
- CO2 extract roasted peanut oil (addictive flavors for cookies, savory stir fry cuisines)
Get the right type of botanical extract ingredient for your product!

Making a choice of extraction technology depends on the desired physical properties and functional performance of the botanical ingredient you are ordering. At Draco, we utilize 3 extraction technologies (H2O, CO2, and Fermentation) to produce 3 forms of ingredient (powder, liquid and oil). Overlapping efficiencies keep prices in line for multiple processing.

What you would like the ingredient to do should drive the choice of processing technology, and we are here to help you find the optimal solution!

Multiple Processing Options:
• Pure H2O Extraction
• Supercritical CO2 Extraction
• Fermentation Extraction
• H2O and CO2
• H2O and Fermentation
• CO2 and Fermentation
• All Three

Legendary Draco Manufacturing
Draco Extract Ingredients are pure, clean, safe, and natural. They are nutrient dense, whole food extracts. They are Full Spectrum extracted in pure, natural water, resulting in a balanced, efficacious extract powder. We start with the whole plant, sustainably grown and harvested. No excipients or chemical solvents are used, which can leave residues, and/or inhibit complete extraction.

Draco’s unique Full Spectrum extraction efficiently breaks down cell walls using our organic pure water technology, freeing bioactives, and extracting a full spectrum of phytocompounds. Our extracts are never subjected to high heat which can damage important compounds. Due to our unique spray-drying process, our extracts are carrier-free. As discussed, we can also process with advanced supercritical CO2 extraction and/or biofermentation to produce special extracts with properties like active enzymes or high oil content, upon request.

We process our extracts in our own state-of-the-art 120,000 ft² processing facilities, which are Certified Organic to both USDA: NOP and European EEC/834 standards. Our facilities are certified to ISO9001:2015 and SQF superseding FSSC22000 under GFSI, and are compliant with USDA Food GMP 21CFR117, Dietary Supplement GMP 21CFR111, and HACCP plans. We are also Kosher 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, 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.
melatonin for use across the night [and] development of lower-dose products that may be more effective.”

We spoke to a couple of companies selling melatonin products to get their insights on where the market is heading.

Natrol has made a name for itself on the melatonin shelf, offering the ingredient in everything from gummies to fast-dissolve tablets that can be taken on the go without water. Like others, the company has found a new customer for melatonin: children. Last March, the company launched Natrol Kids Melatonin gummies and fast-dissolve supplements, especially designed for use in kids.

Children aged four to twelve need 10–12 hours of sleep per night, says Natrol’s Hilton; unfortunately, just like adults, children’s sleep quality is also compromised these days, for reasons including school and extra-curricular responsibilities, screen time, as well as social pressures. “An estimated 75% of school-aged children don’t get enough sleep, mostly due to environmental stimuli like screens, early school times, food sources, and busy schedules,” he says. “While healthy, consistent sleep for kids is one of the most important factors in children’s development, sleep problems are increasing among youth, causing challenges such as poor concentration, irritability, anxiety, and poor school performance.” Also, he points out, and as any parent knows, when children aren’t sleeping well, neither are their parents.

### 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>$133,768,734</td>
<td>$137,965,168</td>
<td>-3.0%</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>$35,343,468</td>
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<tr>
<td>Turmeric</td>
<td>$11,265,908</td>
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</tr>
<tr>
<td>Hyaluronic Acid (HA)</td>
<td>$8,993,842</td>
<td>$11,172,370</td>
<td>-19.5%</td>
</tr>
<tr>
<td>Boswellin or Boswellia</td>
<td>$8,940,355</td>
<td>$10,459,259</td>
<td>-14.5%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$7,409,679</td>
<td>$7,289,248</td>
<td>1.7%</td>
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<tr>
<td>Unknown</td>
<td>$3,708,945</td>
<td>$1,594,391</td>
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<tr>
<td>Bovine Cartilage</td>
<td>$1,326,962</td>
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<td>Fish Oil Concentrate</td>
<td>$1,042,385</td>
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<tr>
<td>Krill Oil</td>
<td>$782,313</td>
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### Sleep

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<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melatonin</td>
<td>$321,693,732</td>
<td>$254,446,810</td>
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</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$14,598,573</td>
<td>$14,778,318</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Valerian</td>
<td>$13,214,774</td>
<td>$15,921,226</td>
<td>-17.0%</td>
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<tr>
<td>Ivy Leaf</td>
<td>$8,076,277</td>
<td>$8,028,828</td>
<td>0.6%</td>
</tr>
<tr>
<td>5-HTP</td>
<td>$2,299,596</td>
<td>$3,081,376</td>
<td>-25.4%</td>
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<tr>
<td>Cough Syrups</td>
<td>$1,623,760</td>
<td>$1,074,100</td>
<td>51.2%</td>
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<td>ZMA Supplements</td>
<td>$1,353,978</td>
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<td>Chamomile</td>
<td>$1,169,859</td>
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<td>GABA</td>
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<tr>
<td>DHEA</td>
<td>$798,211</td>
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### Weight Loss

<table>
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<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein - Animal (Multi)</td>
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<td>$142,821,731</td>
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<tr>
<td>Protein - Animal (General)</td>
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<td>$114,684,197</td>
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<tr>
<td>Protein - Animal &amp; Plant Combo</td>
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<td>$70,491,507</td>
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<tr>
<td>Caffeine</td>
<td>$57,309,399</td>
<td>$68,381,760</td>
<td>-16.2%</td>
</tr>
<tr>
<td>Protein - Animal (Casein)</td>
<td>$32,688,097</td>
<td>$31,421,533</td>
<td>4.0%</td>
</tr>
<tr>
<td>Protein - Animal (Whey &amp; Casein)</td>
<td>$32,768,077</td>
<td>$31,421,533</td>
<td>4.0%</td>
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<tr>
<td>Protein - Animal (Whey)</td>
<td>$15,745,099</td>
<td>$15,467,700</td>
<td>1.8%</td>
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<td>Glucomannan</td>
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<tr>
<td>Green Teas &amp; Supplements</td>
<td>$19,954,531</td>
<td>$25,671,749</td>
<td>-22.3%</td>
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<tr>
<td>Cider Vinegar Supplements</td>
<td>$17,444,168</td>
<td>$14,115,312</td>
<td>23.6%</td>
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<tr>
<td>Protein - Animal (Whey)</td>
<td>$15,745,099</td>
<td>$15,467,700</td>
<td>1.8%</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 October 6, 2019  
Channel: U.S. conventional multi-outlet, comprising grocery, drug, Wal-Mart, mass, dollar, military, and club stores. (Excludes private-label brands.)
There have been some melatonin studies in children showing melatonin to be a safe, natural, effective, drug-free sleep aid for that population. Natrol specifically highlights a 2015 report published in the European Journal of Paediatric Neurology, whose researchers concluded: "No serious safety concerns have been attributed to melatonin use in children."

And, it’s key to point out that Natrol doesn’t necessarily recommend chronic adolescent melatonin use. "Importantly, Natrol proactively communicates [that] the approach that melatonin for children should be used for [is] occasionally, short term, and in conjunction with good sleep habits like consistent bedtime, regular sleep routine, no screen time 60 minutes before bed, and a quiet, dark, and cool bedroom environment, among others," says Hilton. "We will also advise to consult a healthcare professional." He says that pediatricians may recommend melatonin supplementation for children not sleeping well.

The children’s melatonin market is still developing, meaning there is room to grow. "The children’s sleep support category—when considered broadly to include all sleep aids—has been around a long time, but the use of melatonin in kids is newer than [in] adults so we can expect the trajectory of people’s awareness and usage of melatonin for kids to continue with rapid growth in the coming years," Hilton says.

Other companies are finding value in doing what CRN’s Wong highlighted: Creating unique ingredient blends including melatonin. One of those companies is Omega3 Innovations. The company produces Omega Restore, a dietary supplement comprising melatonin, omega-3 fish oil, and vitamin D, sold in travel-friendly, single-use glass vials.

While the supplement isn’t necessarily marketed as a sleep supplement specifically, company cofounder and CEO Bo Martinsen, MD, says, "We are seeing more consumer interest in the product for that reason. Just from 2018 to 2019, we saw Omega Restore sales increase by over 30% online, without significant marketing investments."

| Natural Channel (United States) 25 Bestselling Ingredients across All Health Conditions |
|-----------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| Ingredient                                   | Current Dollars   | Year-Ago Dollars  | % Change          |
| Probiotic Supplement                         | $131,862,184      | $140,418,716      | -6.1%             |
| Cannabidiol (CBD)                            | $90,003,342       | $42,261,654       | 113.0%            |
| Protein - Plant (Multi)                      | $64,702,491       | $75,450,193       | -14.2%            |
| Fish Oil Concentrate                         | $60,727,915       | $61,473,015       | -1.2%             |
| Collagen Products                            | $59,347,744       | $37,179,789       | 59.6%             |
| Turmeric                                     | $48,444,879       | $50,930,813       | -4.9%             |
| Multivitamin (Women)                         | $41,649,224       | $43,488,990       | -4.2%             |
| Magnesium                                    | $39,042,941       | $35,531,858       | 9.9%              |
| Specialty Remedies (Homeopathic)             | $38,399,317       | $40,714,096       | -5.7%             |
| Elderberry                                   | $28,654,603       | $21,614,599       | 32.6%             |
| Vitamin D                                    | $28,145,997       | $27,846,160       | 1.1%              |
| Calcium/Magnesium Combo                      | $25,862,456       | $25,853,054       | 0.0%              |
| Vitamin C (not Ester-C)                      | $25,251,028       | $24,505,655       | 3.0%              |
| Vitamin B Complex                            | $20,354,343       | $19,506,514       | 3.7%              |
| Protein - Animal (Whey)                      | $19,800,799       | $20,121,170       | -1.6%             |
| Digestive Enzymes (Other)                    | $19,672,357       | $20,154,849       | -2.4%             |
| Multivitamin (Men)                           | $19,594,625       | $20,145,522       | -2.7%             |
| Grass (Wheat or Barley)                      | $18,209,892       | $19,909,564       | -8.5%             |
| Multivitamin (Children)                      | $16,518,940       | $16,953,927       | -2.6%             |
| Multivitamin (Adult)                         | $15,945,759       | $17,071,604       | -6.6%             |
| Vitamin B12                                  | $15,869,514       | $15,724,262       | 0.9%              |
| MCT (Medium-Chain Triglycerides)             | $14,860,563       | $12,146,676       | 22.3%             |
| Protein - Animal (General)                   | $13,458,155       | $16,819,476       | -20.0%            |
| Ashwagandha                                  | $13,127,516       | $12,265,410       | 8.7%              |
| Aloe vera                                    | $12,647,245       | $13,836,826       | -8.6%             |

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Natural
Time period: 52 weeks ending October 6, 2019
Channel: U.S. natural supermarkets, excluding Whole Foods Market. (Excludes private-label brands.)

The children’s melatonin market is still developing, meaning there is room to grow. "The children’s sleep support category—when considered broadly to include all sleep aids—has been around a long time, but the use of melatonin in kids is newer than [in] adults so we can expect the trajectory of people’s awareness and usage of melatonin for kids to continue with rapid growth in the coming years," Hilton says.
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- Independent third-party audits
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Martinsen says the company chose to combine the ingredients in Omega Restore because “independent studies, as well as [our] own pilot trials, indicate that melatonin and omega-3 have a synergistic effect. Furthermore, research shows that the benefits of melatonin supplementation may depend on consumers having sufficient omega-3 content in their cells.”

Martinsen believes that interest in melatonin won’t end with an interest in sleep alone. “In my opinion, melatonin is more interesting as an anti-inflammatory or anxiolytic supplement than as a sleep regulator. We predict that in the future, melatonin will become part of mainstream cancer and/or peri-operative treatment as its impact on the microbiome becomes more well known.”

Grandner also says that melatonin is increasingly being studied for its anti-inflammatory potential, as well as for heart health.

That’s a look at the possible future for melatonin. As for today, given that our society doesn’t seem likely to begin slowing down any time soon, expect demand for melatonin and natural sleep aids in general to increase. Overall health is a growing goal for many consumers these days, and sleep quality is an important piece of that puzzle. Says Grandner: “Sleep is getting increased recognition in terms of its importance for health, mental well-being, cognitive functioning, and overall quality of life. As people are turning their attention to sleep, they are realizing that we live in a society that has taught us to devalue sleep. As a result, insufficient sleep, poor sleep quality, and sleep disorders are very common.”

For those marketing melatonin, Grandner provides one final caution: “As melatonin becomes more widely available, I have noticed that it has been used in a very wide range of products—many of which seem to make promises that they would be unlikely to deliver, especially based on their dose and delivery of melatonin.” Marketers beware.

**References**
2. “Sleep and Sleep Disorders.” Centers for Disease Control and Prevention website.

**MCTs**
Medium-chain triglycerides (MCTs) may not be the highest-grossing ingredient on the block, but they have seen pretty impressive growth in terms of dollar change over the past year. According to SPINS, during the 52 weeks ending October 6, 2019, MCT cross-channel sales growth—encompassing mainstream, natural, and specialty gourmet channels—was 95.8%, reaching $41.7 million. (For more insights on this cross-channel growth, turn to page 62.) In the natural channel alone, MCTs ranked among the channel’s bestselling ingredients, growing 22.3% over the previous year to $14.8 million.

MCTs are performing well in a number of specific market categories. Within the natural sales channel, MCTs were one of the 10 top-selling ingredients in the channel’s energy support and cognitive health categories, per SPINS; in the energy support category, MCT sales grew 19.2% over the previous year to nearly $3 million and in the cognitive health category grew 16.6% to nearly $3 million. Meanwhile, in the specialty gourmet channel, MCT sales grew 23.2% in the weight-loss category.

Much of the interest in MCTs centers on their ability to help the consumer sustain energy, says Nutiva CEO Steven Naccarato. “People [are] looking for an option for clean, sustained energy—whether that’s related to sports nutrition and among high-endurance athletes,
or for the average person incorporating MCTs in their daily nutrition routine," he explains. "MCTs are known to have many other benefits, like increased endurance, weight-loss management, and enhanced brain health and cognitive function, but we find that the biggest draw for people today is in MCTs’ ability to increase energy for any situation, as we’re always looking for cleaner replacements to caffeine."

When MCTs first hit the market, they were predominantly in liquid oil form. Now, MCTs have proliferated in a number of delivery formats to fit specific needs—and, in many cases, combined with other in-demand ingredients.

"As popularity for clean, plant-based fuel has grown, we’ve seen MCTs hit shelves in powder forms and infused in other types of products and foods, such as creamers," explains Naccarato. "We’re even seeing MCT products debut combined with other functional ingredients, such as collagen." Nutiva’s new Organic MCT Protein product is another example, blending plant-based protein with MCTs.

One of the advantages of MCTs is that MCTs are versatile, and consumers can create fun and interesting recipes that taste good and sustain their energy in very effective ways.

"Both MCT oils and powders are great for blending into smoothies, shakes, and other beverages like coffee," says Naccarato. "MCT-based products perform particularly well in coffee because the healthy fats slow down the absorption of caffeine, which results in more sustained energy."

He continues: "MCT oil and powder can also be used in recipes for an added boost of clean fuel, including in overnight oats, keto cups and fat balls, homemade peanut butter, and more. Lately, more flavored MCT powder products and MCT powders infused with other functional ingredients are hitting the market to appeal to a wider variety of tastes."

The soaring rise of the ketogenic diet has helped increase the use of MCT products because MCTs are seen as an efficient source of energy in the absence of carbohydrates.

"Because MCTs produce ketones when broken down by the liver, which are a natural source of clean energy that is used by the brain and body when carb intake is very low, keto dieters began consuming MCTs to support their lifestyles," explains Naccarato.

### Natural Channel

#### 10 Bestselling Ingredients

**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>Elderberry</td>
<td>$27,495,225</td>
<td>$20,690,061</td>
<td>32.9%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$16,449,036</td>
<td>$17,427,428</td>
<td>-5.6%</td>
</tr>
<tr>
<td>Echinacea</td>
<td>$9,336,558</td>
<td>$9,293,264</td>
<td>0.5%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C only)</td>
<td>$9,231,229</td>
<td>$10,636,214</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Colloidal Silver</td>
<td>$7,552,456</td>
<td>$7,797,723</td>
<td>-3.1%</td>
</tr>
<tr>
<td>Vitamin C (not Ester-C)</td>
<td>$5,781,781</td>
<td>$5,890,256</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Echinacea/Goldenseal Combo</td>
<td>$5,672,288</td>
<td>$5,734,973</td>
<td>-1.1%</td>
</tr>
<tr>
<td>Zinc</td>
<td>$2,678,040</td>
<td>$2,808,128</td>
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</tr>
<tr>
<td>Menthol</td>
<td>$1,920,293</td>
<td>$1,836,543</td>
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</tr>
<tr>
<td>Horehound</td>
<td>$1,868,990</td>
<td>$1,701,687</td>
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</table>

**Digestive Health**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
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<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$113,182,140</td>
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</tr>
<tr>
<td>Digestive Enzymes (Other)</td>
<td>$18,228,917</td>
<td>$18,645,028</td>
<td>-2.2%</td>
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<tr>
<td>Aloe vera</td>
<td>$7,257,408</td>
<td>$7,867,960</td>
<td>-7.8%</td>
</tr>
<tr>
<td>Psyllium</td>
<td>$3,840,359</td>
<td>$3,514,378</td>
<td>9.3%</td>
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<tr>
<td>Papaya</td>
<td>$3,203,077</td>
<td>$3,016,931</td>
<td>6.2%</td>
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<tr>
<td>Charcoal</td>
<td>$2,388,316</td>
<td>$2,604,551</td>
<td>-8.3%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$2,256,737</td>
<td>$2,579,459</td>
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<tr>
<td>Ginger</td>
<td>$1,690,008</td>
<td>$1,666,094</td>
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<tr>
<td>Licorice</td>
<td>$1,578,341</td>
<td>$1,650,653</td>
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<tr>
<td>Fiber (Other)</td>
<td>$1,513,552</td>
<td>$1,439,349</td>
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### 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>$13,271,212</td>
<td>$15,862,811</td>
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<tr>
<td>Multivitamin (Adult)</td>
<td>$5,474,769</td>
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<tr>
<td>Vitamin B Complex</td>
<td>$4,781,029</td>
<td>$4,593,733</td>
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</tr>
<tr>
<td>Multivitamin (Men)</td>
<td>$3,304,257</td>
<td>$3,038,515</td>
<td>8.7%</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>$2,982,849</td>
<td>$3,094,585</td>
<td>-3.6%</td>
</tr>
<tr>
<td>MCT (Medium-Chain Triglycerides)</td>
<td>$2,870,068</td>
<td>$2,408,246</td>
<td>19.2%</td>
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<tr>
<td>Multivitamin (Women)</td>
<td>$2,443,914</td>
<td>$1,588,173</td>
<td>53.9%</td>
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<tr>
<td>Grass (Wheat or Barley)</td>
<td>$2,288,905</td>
<td>$2,460,880</td>
<td>-7.0%</td>
</tr>
<tr>
<td>Iron</td>
<td>$1,993,462</td>
<td>$1,893,878</td>
<td>5.3%</td>
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<tr>
<td>Trace Minerals</td>
<td>$1,789,266</td>
<td>$1,764,682</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

### Hair, Skin, and Nails

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collagen Products</td>
<td>$19,541,325</td>
<td>$14,300,504</td>
<td>36.6%</td>
</tr>
<tr>
<td>Biotin</td>
<td>$5,574,922</td>
<td>$5,676,379</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$3,595,848</td>
<td>$3,612,002</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$1,664,783</td>
<td>$1,767,131</td>
<td>-5.8%</td>
</tr>
<tr>
<td>Lysine</td>
<td>$1,314,160</td>
<td>$1,318,093</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$1,043,812</td>
<td>$1,082,212</td>
<td>-3.5%</td>
</tr>
<tr>
<td>Calendula (Homeopathic)</td>
<td>$657,631</td>
<td>$681,578</td>
<td>-3.5%</td>
</tr>
<tr>
<td>Homeopathic Remedy (Other)</td>
<td>$559,823</td>
<td>$551,840</td>
<td>1.4%</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>$483,814</td>
<td>$487,889</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Keratin</td>
<td>$457,669</td>
<td>$702,267</td>
<td>-34.8%</td>
</tr>
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</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Natural
Time period: 52 weeks ending October 6, 2019
Channel: U.S. natural supermarkets, excluding Whole Foods Market. (Excludes private-label brands.)
Ingredients to Watch

While MCT demand has been predominantly for weight management and clean energy, the cognitive health benefits of MCTs are becoming more apparent—and a potential avenue of growth for MCTs. "The biggest potential for MCTs is certainly with cognitive function and brain health, as research continues to show that supplying the brain with extra ketones, a clean fuel produced when MCTs are broken down by the liver, is beneficial," says Naccarato.

Magnesium

Magnesium is the mineral that just keeps growing. Nutritional Outlook has included magnesium in its annual Ingredients to Watch projections for a few years running—and reasons are strong for highlighting magnesium again in 2020.

First, sales: SPINS reports that in the 52 weeks ending October 6, 2019, magnesium saw impressive sales growth that pushed the mineral, for the first time, to rank within the top-10 ingredients, in terms of dollar change, that SPINS tracks cross-channel (mainstream, natural, and specialty gourmet channels). Combining these channels, magnesium experienced double-digit sales growth last year of 11%, taking sales to $151 million by the period’s end. (For more insights on this cross-channel growth, turn to page 62.)

As many have predicted in years past, magnesium is set to overtake calcium as the mineral market’s superstar. Says Nick Dehnert, vice president of brand marketing for supplements company Nutranext, “The rapid growth of the magnesium category helped it recently surpass the size of the calcium category in the natural channel of trade, and we expect magnesium to continue its healthy growth trend as consumer awareness grows.”

Consumer interest in magnesium is on the rise. The Council for Responsible Nutrition’s (CRN; Washington, DC) latest Consumer Survey on Dietary Supplements, conducted on more than 2000 U.S. adults in August 2019, ranked magnesium as one of the top-10 ingredients U.S. consumers take. In the 2019 survey, 18% of supplement users surveyed said they take magnesium. In fact, says Andrea Wong, PhD, senior vice president of scientific and regulatory affairs for CRN, “According to CRN’s Consumer Survey on Dietary Supplements, consumer usage of magnesium supplements overall has increased over the last five years.”

Andrea Rosanoff, PhD, is an expert on magnesium research. As the director of research and science information outreach for the Center for Magnesium Education & Research LLC (CMER; Pahoa, HI; www.magnesiumeducation.com), Rosanoff has been studying magnesium for 35 years. Until recently, she says, magnesium “has been a very underevaluated and underwatched nutritional supplement.” (CMER, soon to be a nonprofit organization, comprises independent scholars whose mission is to promote nutritional-magnesium awareness and the peer-reviewed science behind magnesium.)

NATURAL 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>CoQ10</td>
<td>$8,880,778</td>
<td>$9,205,545</td>
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</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$5,670,960</td>
<td>$5,831,915</td>
<td>-2.8%</td>
</tr>
<tr>
<td>Garlic</td>
<td>$3,891,737</td>
<td>$3,698,260</td>
<td>5.2%</td>
</tr>
<tr>
<td>Red Yeast Rice</td>
<td>$3,230,373</td>
<td>$3,198,919</td>
<td>1.0%</td>
</tr>
<tr>
<td>CoQ10 (Ubiquinol)</td>
<td>$2,575,707</td>
<td>$2,663,193</td>
<td>-3.3%</td>
</tr>
<tr>
<td>Hawthorne</td>
<td>$2,472,491</td>
<td>$2,376,527</td>
<td>4.0%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$1,569,622</td>
<td>$1,454,069</td>
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</tr>
<tr>
<td>Vitamin B12</td>
<td>$1,370,263</td>
<td>$1,394,700</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>$1,176,751</td>
<td>$1,075,575</td>
<td>9.4%</td>
</tr>
<tr>
<td>Krill Oil</td>
<td>$910,060</td>
<td>$982,193</td>
<td>-7.3%</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>$12,494,393</td>
<td>$11,879,055</td>
<td>5.2%</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>$7,928,140</td>
<td>$7,258,481</td>
<td>9.2%</td>
</tr>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$4,867,934</td>
<td>$2,575,936</td>
<td>89.0%</td>
</tr>
<tr>
<td>Flower Essences</td>
<td>$4,563,821</td>
<td>$4,682,706</td>
<td>-2.5%</td>
</tr>
<tr>
<td>Theanine</td>
<td>$3,296,297</td>
<td>$3,094,993</td>
<td>6.5%</td>
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<tr>
<td>GABA</td>
<td>$2,986,054</td>
<td>$2,993,869</td>
<td>-0.3%</td>
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<tr>
<td>Holy Basil</td>
<td>$2,643,364</td>
<td>$2,989,393</td>
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<td>Kava</td>
<td>$2,340,332</td>
<td>$2,588,036</td>
<td>-9.6%</td>
</tr>
<tr>
<td>5-HTP</td>
<td>$2,090,474</td>
<td>$2,194,512</td>
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</tr>
<tr>
<td>Calcium/Magnesium Combo</td>
<td>$1,849,833</td>
<td>$1,887,022</td>
<td>-2.0%</td>
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</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Natural
Time period: 52 weeks ending October 6, 2019
Channel: U.S. natural supermarkets, excluding Whole Foods Market. (Excludes private-label brands.)
But while magnesium has been underrated in the past, she says, that is slowly changing. “I would say that in the last three to five years, people have come up to me and said, ‘Oh, I read about magnesium, and it’s really important,’ wanting to know a little bit more about it.” Interestingly, Rosanoff says, the dieticians that her Center speaks to are often less aware about the research and importance of magnesium—that, in fact, it is consumers who seem to be giving magnesium its boost. “It’s the consumer who seems to be interested in driving the desire for knowledge about magnesium,” she says.

Chalk that up to growing research and media attention on magnesium’s role in good health. Rosanoff says there is more than 50 years’ worth of research on magnesium by now. So, what does research show?

“Studies are revealing magnesium’s role in many body systems,” says Vanessa Pavey, ND, who is also an education scientist for supplements brand Life Extension. “Magnesium helps regulate heart muscle contraction and relaxes arterial smooth muscles to promote healthy blood flow. Magnesium aids in synaptic connections between neurons to support memory. It is also a cofactor for enzymes that regulate the neurotransmitters associated with mood. And, it is becoming common knowledge that magnesium supports more regular bowel movements.”

Given these benefits, it’s no surprise to see, per SPINS data, that magnesium sales were up in the following health supplement categories: digestive health (mainstream channel), brain health (natural channel), heart health (natural and specialty gourmet channels), mood (natural and specialty gourmet channels), and bone health (specialty gourmet channel). Magnesium is also linked to healthy blood sugar management.

Where is the scientific evidence for magnesium’s efficacy strongest?

Studies are long-reaching on magnesium’s benefits for heart health, especially its benefits for those suffering from high blood pressure. Rosanoff, who in 2003 co-authored a book called The Magnesium Factor together with her mentor, the late Mildred S. Seelig, MD, MPH, says that in the cardiovascular space, “the research is quite robust” on magnesium. And while pharmaceuticals and antihypertensive medications have taken over as treatments prescribed for heart disease and high blood pressure, Rosanoff says she believes that “the real cause of heart disease epidemic in the Western world and spreading globally is a low-magnesium diet.”

“The whole heart disease epidemic is the symptom...[T]hey have all these treatments for it, and we’ve been spending all this money on it, but there seems to be a reluctance to take a look and say that the core issue is really a low magnesium intake that happens chronically, and it’s happening to the entire population,” she adds. “What we are doing is treating the symptoms of what is in fact a nutritional deficiency in most cases—not all cases.” In 2016, CMER was instrumental in the submission of a qualified health claim petition to FDA linking magnesium to lowering blood pressure. The petition is still in review.

Stress management is also an evolving market for magnesium, reflecting consumers’ growing search for stress aids. And while the mental health research on magnesium is nowhere as robust as it is for heart health, Rosanoff says that magnesium “is crucial to optimizing how you face stress.” Because magnesium is involved in so many bodily reactions and even up to 80% of metabolism, “if you get low in magnesium, your reactions just can’t go as well as they optimally could,” she says.
Ingredients to Watch

“This is how basic magnesium is to life,” she points out, “and in some of these basic cellular metabolic reactions that make life run smoothly.”

Within the larger brain health category, magnesium supplementation and status is being investigated for everything ranging from neuroprotection, depression, and hyperactivity to Alzheimer’s and Parkinson’s disease. Pavey points to a 2016 study in older adults published in the Journal of Alzheimer’s Disease that found that supplementation with one bioavailable form of magnesium, magnesium L-threonate—the Magtein ingredient from AIDP; City of Industry, CA—helped to improve supplemented subjects’ “brain age” by more than nine years.1

Stress management is a growing market for dietary supplements and natural alternatives, and Bonnie Hilton Green, founder and CEO of magnesium supplements brand OMG! Nutrition, says that “stress and sleep are driving the interest to supplement with magnesium.” OMG! Nutrition utilizes the patented TRAACS form of chelated bioavailable magnesium from Balchem Corp’s (New Hampton, NY) Albion minerals line.

Dehnert from Nutranext, maker of Natural Vitality’s Natural Calm line of magnesium-containing supplements, says: “With stress levels rising for our consumers every year, we think this is the right area to focus on.”

“Magnesium is an all-natural solution,” OMG!’s Green says. “It calms your body and mind by activating the same neurotransmitters as prescription sleep aids—but magnesium is safe for everyday, long-time use.”

Indeed, says Rosanoff, “There’s very good evidence that oral magnesium is incredibly safe.”

That’s a good thing, given our general population’s underconsumption of magnesium from the diet. CRN’s Wong points out that the 2015-2020 Dietary Guidelines for Americans identified magnesium as a “shortfall nutrient.” USDA data from 2016 stated that 50% of Americans do not meet recommended levels of magnesium intake.

Making matters worse, the current RDA for magnesium may not be accurate because our population’s body weight has gone up, says Rosanoff. “We now know, and this is absolutely from recent research, that when you have a higher body weight, your magnesium requirement goes up.” Unfortunately, she says, current RDAs are built on a lower standard reference body weight. This means that our need for magnesium today may be even higher than what current RDAs reflect.

Why don’t we get enough magnesium in today’s diet? Many have reported a depletion of soil minerals as the culprit, but Rosanoff says it is actually something else that is impeding our ability to get as much magnesium as we used to from the food supply: the “huge” emphasis on high-yield food production, as well as food processing.

Each year, farmers set forth to grow plants that produce the highest crop yields. Because farmers are stretching their production from the same amount of soil (and nutrients in that soil), the level of nutrients, including magnesium, that we get in the food we eat is diminished. But even more so than that, Rosanoff says, current food processing strips out the magnesium that we’d otherwise get from good food. Up to 100% of the magnesium in oilseeds, for instance, which are otherwise good sources of magnesium, can be destroyed in food processing. Those oils are used to cook many of our processed foods. The same goes for sugar, where much of the magnesium is removed during processing.

Given all of this, says Rosanoff, it’s very difficult to get the magnesium your body desperately needs from the modern diet. Therefore, she says, “We’re lucky we have supplements.”

The supplements industry has an important role to play in the magnesium revolution that’s hopefully to come. Ingredient suppliers continue to churn out ingredient improvements (e.g., more bioavailable forms of the mineral, as well as easier-to-formulate-with options) and research.

Seeing the magnesium product wave that’s growing, magnesium brands are on the search for the best-quality raw materials (e.g., magnesium citrate versus oxide versus other options). These days,

### NATURAL CHANNEL 10 BESTSELLING INGREDIENTS

<table>
<thead>
<tr>
<th>Pain &amp; Inflammation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient</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>Cannabidiol (CBD)</td>
</tr>
<tr>
<td>Cherry Fruit Supplements</td>
</tr>
<tr>
<td>Boswellin or Boswellia</td>
</tr>
<tr>
<td>Collinsonia</td>
</tr>
<tr>
<td>Willow Bark</td>
</tr>
<tr>
<td>Homeopathic Cell Salts</td>
</tr>
</tbody>
</table>

### Sleep

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
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<td>$10,141,969</td>
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</tr>
<tr>
<td>Valerian</td>
<td>$5,117,324</td>
<td>$5,549,189</td>
<td>-7.8%</td>
</tr>
<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$2,232,303</td>
<td>$2,255,562</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$1,473,970</td>
<td>$1,377,044</td>
<td>7.5%</td>
</tr>
<tr>
<td>Amino Acids (Other)</td>
<td>$1,285,836</td>
<td>$1,382,107</td>
<td>-7.4%</td>
</tr>
<tr>
<td>Flower Essences</td>
<td>$1,183,071</td>
<td>$1,371,516</td>
<td>4.5%</td>
</tr>
<tr>
<td>5-HTP</td>
<td>$1,158,226</td>
<td>$1,075,215</td>
<td>7.7%</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>$696,929</td>
<td>$736,993</td>
<td>-4.5%</td>
</tr>
<tr>
<td>Passionflower</td>
<td>$660,868</td>
<td>$659,231</td>
<td>0.2%</td>
</tr>
<tr>
<td>Poppy</td>
<td>$618,020</td>
<td>$581,781</td>
<td>6.2%</td>
</tr>
</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics) Source: SPINSscan Natural Time period: 52 weeks ending October 6, 2019 Channel: U.S. natural supermarkets, excluding Whole Foods Market. (Excludes private-label brands.)
magnesium fortification can be gotten in everything from supplements (pills, gummies, etc.) and drink mixes to extended-release solutions. “Obstacles to supplementing with magnesium include large pills or poor-tasting powder, laxative effect, and low bioavailability,” OMG! Nutrition’s Green says. “Supplement manufacturers are working out ways to address these issues...”

“Magnesium supplements will be on the industry’s radar well beyond 2020,” says Nutranext’s Dehnert. “Much of the magnesium category today is commoditized, so the brands that will build category awareness and adoption successfully will do it through compelling and modern brands that educate consumers about magnesium benefits and deliver a great, holistic consumer experience.”

Pavey says: “As continued research becomes available for magnesium, I think we will begin to see new forms, advanced delivery systems, and more health-targeted formulas.”

“Since magnesium can support multiple body systems, it is likely people are interested in being proactive for overall body health.”

Magnesium is more than just a passing trend, says Green: “Short-term, fad solutions come and go, but magnesium is on the rise because it’s meeting the consumer’s demand for a natural solution to their everyday problems stemming from today’s hectic lifestyle.”

Collagen

Collagen encompasses a broad range of ingredients and categories. Collagen can be used in bone health, joint health, nutricosmetic, cosmetic, and even sports nutrition products. Considering the broad range of applications and potential customers, it should be of no surprise that collagen ingredients saw impressive sales growth in the last year. According to SPINS, collagen saw cross-channel (natural, specialty gourmet, and multi-outlet/mainstream channel) dollar growth of 82.7%, increasing $66 million to $147 million during the 52 weeks ending October 6, 2019.

Collagen saw the greatest sales growth in the natural and specialty gourmet channels— which SPINS terms “innovation channels”— where a great deal of product trends show up before going mainstream. In the natural channel, collagen ranked as the 5th bestselling ingredient overall, with 2019 sales growing 59.6% over the previous year to reach $59 million. Within specific product categories in the natural channel, collagen found itself in two of last year’s top-selling health arenas: bone health and hair/skin/nails. During that time, collagen sales in the natural channel grew 7.9% to $1.5 million in the bone health category and grew an impressive 36.6% to $19.5 million in the hair/skin/nails category. Meanwhile, over in the specialty gourmet channel, collagen sales increased 88.2% overall to $2.8 million last year. Within two of the specialty channel’s top-selling categories—bone health and hair/skin/nails—collagen also performed well.

While collagen did not make it to SPINS’s list of the top-25 selling mainstream ingredients, collagen was an impressive performer in some mainstream health categories. Within the top mainstream categories of bone health, joint health, and hair/skin/nails, collagen saw significant sales growth. Collagen saw the greatest growth in the bone health category, increasing by 82% to $2.9 million. In the joint health category, collagen sales stayed mostly the same, increasing by 1.7% to $7.4 million. And, once again, hair/skin/nails saw huge growth in the mainstream channel, increasing 54.8% to $42 million.

A common thread between all three channels is that collagen products are performing exceptionally well in the nutricosmetics space.

Why? “Consider that the baby boomer population is well into middle age, and Generation X has also entered their early middle years. As with these two generations, millennials have also demonstrated a significant interest in maintaining a healthy, youthful appearance,” explains Gene Bruno, senior director of product innovation for supplements brand Twinlab Consolidated Corp. “Collagen is well understood to help promote youthful-looking skin, and there is a great deal of media interest in the topic.”

Collagen has a number of advantages as an ingredient—one them being that it is easy to include in one’s diet in a number of ways. Collagen powder, for example, is easy to mix into foods and beverages. “Collagen powders are currently the most popular overall delivery form, although we’ve found that there are generational differences” in terms of buyer preference, Bruno explains. For instance, he says, collagen powders are most popular among women 25 or older who value convenience. Twinlab’s ReserveAge product, Collagen Booster, in capsules, tends to be preferred by women 35 or older—the reason being that it benefits not only the skin’s health but also the joints.”
The next big thing in consumer health? Fermentation. You're looking at EpiCor, the first-of-its-kind ingredient that taps the natural power of fermentation to deliver the robust immune support consumers demand. Join the movement. Harness the power of EpiCor to expand your product portfolio: epicoringredient.com

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The next big thing in consumer health? Fermentation. You’re looking at EpiCor, the first-of-its-kind ingredient that taps the natural power of fermentation to deliver the robust immune support consumers demand. Join the movement. Harness the power of EpiCor to expand your product portfolio: epicoringredient.com
Collagen also fits into a number of diets. "What we know is that diets such as keto and paleo are driving significant traffic searches on our site," says Bruno. "All of our collagen products are keto- and paleo-friendly, so it makes sense that people would incorporate it into their diets."

As a bone health ingredient, collagen is also well-suited for multi-ingredient formulations, allowing for a full spectrum of bone as well as joint health benefits. "Arguably, calcium and vitamin D are the top-selling bone health ingredients, while glucosamine and chondroitin are the top-selling joint health ingredients—although they are losing popularity in the marketplace," says Bruno. "What's cool about collagen is that this single ingredient has applications for both bone and joint health and can be used alongside of the aforementioned nutraceuticals, or used independently. Specific collagen peptides have been shown to promote bone mineral density and bone markers in postmenopausal women, while other collagen materials have demonstrated efficacy in supporting joint health and comfort."

**Ashwagandha**

You can say this about ashwagandha: It knows how to make a mainstream entrance. Last year, the ingredient surprised in an appearance on “Saturday Night Live” when guest star Gwyneth Paltrow made fun of the word *ashwagandha*, joking that ashwagandha originates from the “Black Panther” movie’s fictional nation of Wakanda. All jokes aside, ashwagandha’s SNL pop-culture turn would not have been possible were it not for the growing consumer awareness...
and interest in this Ayurvedic herb. Ashwagandha (Withania somnifera) has entered the mainstream consumer’s consciousness, putting it on our list of Ingredients to Watch in 2020.

Last year, the American Botanical Council’s journal HerbalGram reported in its annual Herb Market Report¹ that sales of ashwagandha back in 2018 grew in both the U.S. mainstream and natural retail channels. In the U.S. natural channel, ashwagandha was the 7th best-selling herbal supplement that year, growing 16.9% to $12.5 million.

Numbers provided for this story by SPINS show that sales of ashwagandha in the U.S. natural channel continued to grow in 2019—at 8.7% to $13.3 million in 2019, per the channels SPINS tracks. IRI (Chicago) also reported impressive sales growth for ashwagandha in 2019. During the November 2019 Council for Responsible Nutrition annual conference, the market researcher said, based on outlets it tracked, ashwagandha sales grew 66% to $7.3 million in the 52 weeks ending August 11, 2019.

Ashwagandha’s most exciting story to tell, however, may just be in the U.S. mainstream channel. HerbalGram reported that back in 2018, “strong” ashwagandha sales had pushed the ingredient to rank among the 40 top-selling ingredients in the U.S. mainstream channel for the first time. Ashwagandha hit the charts at #34, with mainstream sales growth of 166% in 2018 and total sales of nearly $7.5 million.

More consumers are learning about the benefits of ashwagandha. Said the HerbalGram report: ‘Ashwagandha has been one of the 40 top-selling ingredients in natural retail stores since 2015, but its appearance among the top-40 herbs in the mainstream channel in 2018 suggests more widespread familiarity among casual consumers of natural products. Mainstream ashwagandha sales in 2018 likely benefited from the continued popularity of ingredients traditionally used in Ayurveda, the primary traditional medical system of India.”

Bruce Brown, president of ashwagandha supplier Natreon Inc. (New Brunswick, NJ), says, “It is clear that ashwagandha is growing, and some would argue it is on the verge of becoming the next curcumin in the plant-based ingredient market. The broadening consumer appeal for ashwagandha, nootropics, and adaptogens is evident with evolving news stories, trending topics in social media, and culminating with innovative consumer brands launching products containing ashwagandha.”

Chris Kilham, Medicine Hunter, and brand ambassador for ashwagandha supplier Ixoreal Biomed (Los Angeles), says: ‘Ashwagandha has gained greater awareness among herbal customers over the past few years due to strong promotion. Though not as well known as [other adaptogens such as] Rhodiola rosea, Panax ginseng, and eleuthero, ashwagandha is coming on very strong and has risen in the popular herbs category...”

Consumers are connecting with one of ashwagandha’s best-known benefits: stress relief. As an adaptogenic herb, ashwagandha helps the body maintain homeostasis against physiological stressors. This ability is something modern consumers are just starting to learn about—despite the fact ashwagandha has been part of Ayurvedic medicine for thousands of years.

“While plant-based adaptogens are not new, consumer awareness of hormonal balance and stress as a condition which requires natural assistance has been relatively recent,” says Benny Antony, PhD, joint managing director for ashwagandha supplier Arjuna Natural Pvt. (Kerala, India). “The condition is not easily identified as such and because of that, it was not looked upon as a matter to address. However, once this awareness came, the industry was quick to look for tried-and-tested methods. Ayurveda, with its approach of holistic wellbeing, has always been familiar with adaptogens, even before they were called ‘adaptogens.’”

Brown adds: “The category of adaptogens has only recently gained consumer awareness, yet it has grown dramatically in a short period of time across numerous applications such as beverages and supplements as well as across channels such as natural, mass market, internet/social, and practitioner. The growth of the adaptogen category is primarily driven by consumer interest in products that support the body’s ability to balance naturally in response to everyday stressors (sleep, career and social pressure, etc.).”

Emerging interest is a good starting point, but it takes more to nurture an herb into the true market leader that ashwagandha could one day become. To achieve that, more consumers need to be convinced of ashwagandha’s benefits. This will require more modern research on ashwagandha—and it so happens that ashwagandha suppliers have taken the lead in investing in clinical research to explore all that their ingredients can do.

“The initial acceptance by the community of ashwagandha extracts [has] spurred more research to find more effective actives compatible to a modern world. It also encouraged companies to conduct more clinical trials,” says Michael Lelah, PhD, chief science officer, NutriScience Innovations LLC (Trumbull, CT). NutriScience is the exclusive North American supplier of Arjuna Natural’s ashwagandha ingredient Shoden.

Kilham says: “An ever-increasing body of science, coupled with repetition of benefits in as many venues as possible, will move ashwagandha even further along.” Mainstream media coverage of positive findings is also key, he adds.

What is modern research showing? Historically, ashwagandha research has focused on stress/focus/mood/sleep, muscle health, and sexual health.
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>Probiotic Supplement</td>
<td>$8,351,262</td>
<td>$9,038,149</td>
<td>-7.6%</td>
</tr>
<tr>
<td>Digestive Enzymes (Other)</td>
<td>$573,362</td>
<td>$584,274</td>
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</tr>
<tr>
<td>Fiber (Other)</td>
<td>$479,419</td>
<td>$468,283</td>
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</tr>
<tr>
<td>Aloe vera</td>
<td>$435,353</td>
<td>$475,176</td>
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</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$389,675</td>
<td>$435,429</td>
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</tr>
<tr>
<td>Psyllium</td>
<td>$326,517</td>
<td>$281,701</td>
<td>15.9%</td>
</tr>
<tr>
<td>Lactase</td>
<td>$316,783</td>
<td>$293,968</td>
<td>7.8%</td>
</tr>
<tr>
<td>Charcoal</td>
<td>$175,867</td>
<td>$122,642</td>
<td>43.4%</td>
</tr>
<tr>
<td>Protein - Plant (Multi)</td>
<td>$805,403</td>
<td>$991,213</td>
<td>-18.7%</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>$283,614</td>
<td>$320,015</td>
<td>-11.4%</td>
</tr>
<tr>
<td>Multi-Minerals</td>
<td>$253,577</td>
<td>$194,450</td>
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</tr>
<tr>
<td>Protein - Animal (Multi)</td>
<td>$134,885</td>
<td>$129,204</td>
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</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>$805,403</td>
<td>$991,213</td>
<td>-18.7%</td>
</tr>
<tr>
<td>Taurine</td>
<td>$736,150</td>
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<tr>
<td>Caffeine</td>
<td>$442,381</td>
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</tr>
<tr>
<td>Vitamin B12</td>
<td>$362,474</td>
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</tr>
<tr>
<td>Vitamin B Complex</td>
<td>$301,928</td>
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<tr>
<td>Tyrosine</td>
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</tr>
<tr>
<td>Soy Foods</td>
<td>$181,336</td>
<td>$216,329</td>
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<tr>
<td>Multivitamin (Men)</td>
<td>$136,133</td>
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<td>-4.4%</td>
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**Hair, Skin, and Nails**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>Year-Ago Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collagen Products</td>
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<tr>
<td>Biotin</td>
<td>$394,674</td>
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<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$125,164</td>
<td>$138,989</td>
<td>-9.9%</td>
</tr>
<tr>
<td>Horsetail (Silica)</td>
<td>$87,861</td>
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<td>-8.5%</td>
</tr>
<tr>
<td>Lysine</td>
<td>$77,152</td>
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<td>-2.2%</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>$50,990</td>
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<td>-4.5%</td>
</tr>
<tr>
<td>Calendula (Homeopathic)</td>
<td>$38,807</td>
<td>$39,641</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Alpha-Lipic Acid</td>
<td>$30,918</td>
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<td>-6.3%</td>
</tr>
<tr>
<td>Combination Oils (Supplements)</td>
<td>$30,164</td>
<td>$30,836</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>$19,351</td>
<td>$20,765</td>
<td>-6.8%</td>
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</tbody>
</table>

Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINSscan Specialty Gourmet
Time period: 52 weeks ending October 6, 2019
Channel: U.S. specialty gourmet supermarkets. (Excludes private-label brands.)

In addition to studies on stress and anxiety, Arjuna Natural says it’s completed several studies on Shoden involving non-restorative sleep, exercise endurance, male vitality, immune health, and even animal health.

Isoreal is continuing research on its KSM-66 ashwagandha ingredient in the areas of energy, stamina, enhanced mental function, reduced stress, deeper sleep, enhanced immune function, endurance, and improved athletic performance, Kilham says.

Natreon’s research on its Sensoril ashwagandha ingredient includes studies on stress, sleep, focus, energy, muscular strength, and joint health, Brown says. The company is also performing emerging research in gut health and in women, whom he says might benefit from the mood, stress, and sleep benefits ashwagandha can provide in the face of menopause-related symptoms.

And this is only the beginning, companies say. Says Brown: “Standardized ashwagandha in today’s market has only begun to explore all the health benefits of consuming ashwagandha, including cognitive and adaptogenic benefits.”

NutriScience’s Lelah adds: “As an herb, ashwagandha is definitely a treasure house and could provide direct and indirect solutions to address various lifestyle conditions such as weight management, blood sugar support, etc., but [it] will take time to clinically study and unravel.”

As more research is done on ashwagandha and its various active constituents, ashwagandha will have potential to play in many health product markets, including in supplements, foods, and even beverages like coffee.

Sleep support is already a major opportunity—not only for ashwagandha but for the dietary supplements industry at large. Brown notes that ashwagandha, as part of Ayurveda, has been used to support healthy sleep habits for thousands of years. “Ashwagandha is seen as an innovation for the sleep category, which has been defined by melatonin,” he says. As the lesser-known sleep ingredient, ashwagandha is already benefitting from melatonin’s name recognition, Brown says, with Sensoril ashwagandha already being combined with melatonin in products on the sleep shelf. Arjuna’s Antony says that the sleep category is also now a big focus for his company.

There is also interest in combining ashwagandha with hemp cannabidiol (CBD). “As the CBD market continues to evolve and differentiate, we see ashwagandha becoming a common ingredient within CBD products,” Brown says.

Kilham says, “Ashwagandha fits into formulas very well, is naturally bolstered by the other adaptogens, and works with broad-spectrum botanicals like turmeric and CBD hemp oil.”

Finally, says Brown, “Several companies have begun to further explore the benefits of ashwagandha in combination with probiotics. Nature’s Way Fortify Daily Probiotic Mood & Stress is designed to promote digestive health through probiotics as well as support relaxation and a positive mood through the addition of 250 mg of Sensoril ashwagandha. The microbiome and the connection between the gut and brain is only beginning to be explored, and we expect to see continued innovation in the digestive health category for ashwagandha.”

All of this movement will further growth of the ashwagandha market. There is still lots of room to grow.
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“Ashwagandha may not be a household name, but it is getting there,” says Arjuna’s Antony. “One of the reasons for the growth of ashwagandha as an ingredient is the awareness that stress has effects across the entire body. The growing awareness of the need for a holistic approach to health is lifting the consumer segment up—and ashwagandha along with it.”

Of course, when an ingredient becomes popular, it also becomes vulnerable to economic adulteration, and here, companies making ashwagandha products should be wary of low-quality ingredients on the market. Unfortunately, says Kilham, not all are aware. Incentives for adulteration are ripe, he says. For instance, “Shortage of supply due to heavy rains last year will plague manufacturers this year.”

Making ashwagandha a household name will take commitment from all who buy and sell this ingredient to not only increase consumer awareness but to protect the integrity of the market. To that end, NutriScience’s Lelah warns, “We commonly see plain ashwagandha powder and low-active ingredients being marketed in the ashwagandha space, which apart from possibly only having a placebo effect also dents consumer confidence in all supplements.” He adds: “The ‘plain powder’ and low-active products are a concern in this area as there is no traceability. Also, once powdered, it would be very difficult to find adulterants.”

Brown emphasizes that the ashwagandha market needs to continue to invest in cultivating and sourcing the highest-quality ashwagandha plants possible.

Manufacturers must also help teach consumers about the importance of the active components in ashwagandha and their bioactivity. Lelah says, “Consumer education is a slow process,” he says. “Consumers do understand there are actives, but the ‘last mile’ enlightenment is challenging.”

“While ashwagandha has been around for thousands of years, it is still relatively new in the mainstream market,” says Arjuna’s Antony. “Consumers are just learning about its benefits, and they still have a lot to learn, as do manufacturers. As more research is conducted, ashwagandha will likely fit into new product categories, thus fueling more growth for the unique ingredient.”

Brown says: “Our belief is, we are just at the beginning of the journey for ashwagandha.”

Reference

Dietary Fiber/Prebiotics
Dietary fiber is an important category of ingredients because of the versatility it offers product formulators and the benefits fiber confers to consumers, whether in standalone dietary supplements or in functional foods and beverages. While fiber is not new to the marketplace, it was only recently that FDA established a legal definition for dietary fiber that allows a limited number of ingredients to carry this claim.

When FDA issued its 2016 Nutrition Facts Label final rule, it defined dietary fiber as “non-digestible soluble and insoluble carbohydrates (with 3 or more monomeric units), and lignin that are intrinsic...
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and intact in plants; isolated or synthetic non-digestible carbohydrates (with 3 or more monomeric units) determined by FDA to have physiological effects that are beneficial to human health. Among the ingredients that now meet the legal definition of **dietary fiber** are beta-glucan soluble fiber, psyllium husk, cellulose, guar gum, pectin, locust bean gum, hydroxypropyl methylcellulose, mixed plant cell wall fibers (a broad category that includes fibers like sugar cane fiber and apple fiber, among many others), arabinxylan, alginate, inulin and inulin-type fructans, high-amylose starch/resistant starch 2, galactooligosaccharide, polydextrose, and resistant maltodextrin/dextrin.

Well-established dietary fibers such as psyllium husk continue to perform well in the marketplace. According to SPINS, during the 52 weeks ending October 6, 2019, psyllium husk sales grew in a number of retail channels. It ranked among the top-25-selling functional ingredients in both the specialty gourmet and mainstream mult/outlet channels, grossing $1.3 million and $192 million, respectively, each at a growth rate of 6%. In the natural sales channel, psyllium is a top-selling digestive health ingredient, with $3.8 million in sales in that category, an increase of 9.3% over the previous year.

Taking a look at the specific health categories in which psyllium saw growth, in the specialty gourmet channel, psyllium performed well in both the digestive health category and the cardiovascular health category, growing in sales by 15.9% and 3%, respectively. In the mainstream mult/outlet channel, sales of psyllium in the cardiovascular category showed a modest increase of 0.5% to $142.5 million, while sales grew in the mainstream digestive health category by 39.7% to $35.8 million. Significantly, in both the mainstream and specialty gourmet channels’ cardiovascular health category, psyllium sales were second only to fish oil.

SPINS also tracked sales of “fiber,” though the specific fiber sources are unspecified. In the 52 weeks ending October 6, 2019, fiber sales in the natural channel’s digestive health category hit $1.5 million, while in the mainstream digestive health category, fiber sales hit $123.6 million. This constitutes a sales increase of 5.2% and a decrease of 3.6%, respectively. And while mainstream fiber sales fell, it’s notable that fiber in the mainstream digestive health category is still the second bestselling ingredient behind probiotics, which also experienced a modest decline.

Dietary fibers are diverse, and their versatility is the key to their continued success. Certain fibers can support not only digestive health and cardiovascular health, but also immune health and weight management, for instance. Currently, a rising star in the

<table>
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<tr>
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**SPECIALTY GOURMET CHANNEL 10 BESTSELLING INGREDIENTS**

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**Weight Loss**

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Data: Dietary supplements (Vitamins & Supplements and Herbs & Homeopathics)
Source: SPINS Scan Specialty Gourmet
Time period: 52 weeks ending October 6, 2019
Channel: U.S. specialty gourmet supermarkets. (Excludes private-label brands.)
world of dietary fiber is inulin, often derived from chicory root, which serves a number of important functions for product formulators. For example, inulin fiber, with its intrinsically sweet flavor, can be used to reduce sugar in products, while also providing the ideal texture to products.

While fiber claims are not new, versatile fibers like inulin that serve multiple functions will drive the category forward. "For consumers, [fiber content is] a reassuring wellness message, but for most it’s not a compelling reason to purchase," says Julian Mellentin, director of New Nutrition Business. "However, if you can combine 'more fiber' with the much-more-interesting-to-consumers message of 'less sugar,' then you are making a better consumer connection, and this is where inulin wins."

An extension of dietary fibers is prebiotics. Many dietary fibers, such as psyllium husk, galactooligosaccharides, and inulin, have prebiotic activity. Prebiotics are bit of a complicated topic. While consumers are slowly becoming more aware of the term prebiotic, from a regulatory standpoint the term prebiotic itself is still somewhat complicated because prebiotic does not have a legal definition.

While prebiotic has no legal definition from a regulatory body such as FDA, scientific literature defines a prebiotic as "a selectively fermented ingredient that allows specific changes, both in the composition and/or activity in the gastrointestinal microflora, that confer benefits."³

The influence of the gastrointestinal microflora on our health continues to compel researchers and product manufacturers to develop innovative products. Prior to prebiotics, probiotics dominated the conversation about gut microflora, but emerging research is pointing to the importance of incorporating prebiotics as well. Consequently, the term prebiotic has become a bit of an industry buzzword. How it translates to finished products and consumers may be another story, however.

Despite some manufacturers actively marketing their ingredients with the term prebiotic, consumer recognition may still take time. "The term prebiotic has long been a problem because of its similarity to probiotic," says Mellentin. "Hence, consumer understanding of prebiotics is low—perhaps [recognized by] just 10%-12% of Americans. That has grown slowly over the last 10 years, and the prebiotic supplements and small-but-growing social media attention will raise awareness, but the term will remain confined to the most health-aware consumers, who are at best 20%-25% of the U.S. population."

There is no doubt that prebiotic fibers are playing a large role in product formulation today, both in functional food as well as dietary supplements, but a concerted effort may be required by industry to educate mainstream consumers about prebiotics. Continued research and innovation will only bolster the category’s relevance.

References
2. Grebeye J. "FDA adds inulin and seven other fibers to legal dietary fiber definition." Nutritional Outlook. Published online June 15, 2018.
Which flavors should you be watching in 2020? Leading flavor houses gave Nutritional Outlook their predictions for which flavors consumers will be looking for in food, drinks, and dietary supplements.

Leading flavor themes for 2020 include a growing focus on nostalgic sweet flavors, sour and fermented flavors, and fruity flavors with a healthy halo. Regional influences also continue to entice the adventurous consumer.

The key is to remember that today’s consumers are embracing a broader range of flavors than ever before. “The everyday consumer now is very different and unpredictable,” says Keera Perumbala, marketing manager at Sensient Flavors (Hoffman Estates, IL). “They are athletes, wellness enthusiasts, vegans, connoisseurs, well-traveled, and aware. Food and beverage brands are constantly reinventing themselves in order to meet the needs of the future consumer. Unique flavor profiles combined with distinctive experiences are essential to a product’s success.”

Here are the flavors formulators should keep on their radar.

**Sweet**
Sweet flavors will always have a home with consumers. Food, drink, and supplement shoppers continue to find comfort not only in classic dessert themes but also confectionery flavors that bring back memories of childhood.

Gummy candy is one example of a nostalgic flavor now experiencing a revival, including in the ever-popular gummy dietary supplement. “One category of flavors to watch in 2020 is gummy candy flavors,” Megan Byrnes, marketing manager for flavor supplier Gold Coast Ingredients (Commerce, CA), tells Nutritional Outlook. “The nutraceutical industry has experienced an ongoing trend with sour, rainbow, peach, and fish-shaped gummy candy flavors. We predict more companies will add gummy candy flavors to their product range, as well as replicate the taste of alternative branded candies as well.”

Philip Caputo, marketing and consumer insights manager for flavors firm Virginia Dare (Brooklyn, NY), also points to a return of flavors reminiscent of “childhood bliss.” “In the indulgent-flavor space, childhood-inspired adult flavor hybrids are trending, as these profiles are associated with happiness, positive taste memories, and childhood bliss,” says Caputo. He notes that Virginia Dare’s own Forever Young flavor line includes options such as Candy Classics, Lemonade, Mocktail, Cereal Milk, Carnival, and Upscale Desserts. “The positive emotions associated with these flavors can positively affect mood, therefore increasing motivation, energy, and confidence—which makes them particularly intriguing opportunities for performance nutrition products,” he adds.

Cotton candy is another childhood favorite, says Byrnes. “In addition to gummy candy flavors, cotton candy has been reintroduced to the nutraceutical market through various beverage products,” she says. “Cotton candy has also been a trending ingredient in the dairy, bakery, and restaurant industries. We foresee an increasing number of cotton candy–flavored products hitting..."
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the market in 2020 with slight variations in flavor profiles. For example, watch out for flavors such as grape cotton candy, blue raspberry cotton candy, strawberry cotton candy, rainbow cotton candy, and unicorn cotton candy.

Popsicles are another throwback whose flavors consumers recently began embracing again, Byrnes adds. "Red-white-and-blue popsicle flavor landed on the trend list in 2019. We predict rainbow popsicle and other fruit popsicle flavors will start to appear on product labels in 2020."

Candy flavors aside, other youthful desserts also continue inspiring food, beverage, and supplement choices. Birthday cake, for instance, appeals as a flavor to those "with a sweet tooth looking for unique flavors that are youthful, fun, and celebratory," says flavor supplier Synergy Flavors (Wauconda, IL). This flavor is making its way into categories like sports nutrition, such as in protein bars.

Cookie dough remains popular, and 2020 will be no different, according to Comax Flavors (Melville, NY) in its 2020 flavor trend predictions. "Eating raw cookie dough is a nostalgic act, and thanks to pasteurization and heat treatment, 2017 was the breakout year for safe, edible raw cookie dough," the company said in a press release.

Cookie dough as a flavor continues to be popular with both adults and children, the company notes, with market research firm Technomic’s MenuMonitor reporting that cookie dough is experiencing 9% year-over-year growth on restaurant menus. With this in mind, Comax offers its So Doughlicious flavor range, which includes Birthday Cake Cookie Dough, Cold-Brew Coffee Cookie Dough, and S’mores Cookie Dough, all of which can be used in everything from dairy and ice cream to baked goods, nutrition and performance products, confections, nonalcoholic and alcoholic beverages, and beverage syrups.

Synergy Flavors likewise points to the success of "nostalgic" cookie dough flavors in the sports nutrition market, in products such as protein shakes and smoothies.

In fact, cookie flavors of all kinds continue to be popular. Comax notes that IRI data show that the cookie category increased 2.6% to reach $8.8 billion in the 52 weeks ending March 24, 2019.

Speculoos is one of those trending cookie flavors gaining mainstream prominence. The food industry has taken inspiration from this European spiced shortcrust biscuit for everything from cookie butters and truffles to ice cream. Synergy Flavors says speculoos is also promising in sports nutrition.

Another throwback, S’mores, continues to hold court as well. Synergy Flavors, for instance, points to its growth in categories like granola bars and even cereal.

Virginia Dare’s Caputo says marshmallow flavors in general continue to trend. "Following its upscaling in years past, we expect the marshmallow flavor to further expand," he predicts.

Gold Coast’s Byrnes agrees. "Nutraceutical consumers have also responded well to marshmallow flavors: toasted marshmallow, chocolate marshmallow, hot cocoa marshmallow, and even peanut butter marshmallow. We foresee a new marshmallow pairing in the near future—possibly caramel marshmallow?"

When it comes to sweet flavors, Caputo says, finding ways to update many of these classics is key. "Elevated classics—merging vanilla, cocoa, caramel, maple, banana, and other favorites with sophisticated flavor pairing—like vanilla tarragon blueberry, maple curry spice, vanilla anise and mint, and cocoa cardamom" will be an ongoing movement, he says. He adds: "Bet on banana as a star flavor: upscale banana breads, supplement powders, protein bars, and the fire treatments—caramelized, burnt, grilled, brown-buttered, and flambé."

"Sweet spices" are also finding usage occasions outside of traditional holidays, says Caputo. For instance, he points to spices that can be paired with other flavors like chocolate, vanilla, maple, and fruit. These can yield combinations such as Chai Apple Cider, Clementine Cardamom, Spiced Cranberry, Vanilla Anise, and Maple Cinnamon.

Cinnamon is also firmly in demand, says Byrnes. She describes cinnamon as "here to stay." Cinnamon-based flavors include snickerdoodle, churro, cinnamon bun, horchata, cinnamon children’s cereal, and cinnamon French toast.

Fruity
Fruity notes continue to play well with all consumers, including those who associate these flavors with health and wellness.

Firmenich Flavors (Geneva, Switzerland) named "classic blueberry" its 2020 Flavor of the Year, noting that "traditional is now trendy." In a press release, Firmenich Flavors’ president Emmanuel Butstraen commented: "What’s classic is new again. With blueberry, we celebrate a flavor that is timeless and enduring, but also increasingly relevant. Blueberry has been a beloved flavor for centuries in many markets, and today, with our increasing focus on health and wellness, blueberries are being rediscovered and growing to be one of the most relevant flavors in many categories."

Based on social media observations, the company says, blueberries are often seen as a leading nutrient in terms of healthfulness, and formulators are paying attention. Firmenich reports that blueberry’s use in food and beverages has grown consecutively since 2008, with USDA data showing that U.S. blueberry production has increased fivefold since 2007. As a flavor used in new product development, blueberry has grown 101% over the past 10 years globally, including in markets such as Middle East, Latin America, and Asia, per Mintel data. Firmenich also points to Mintel data showing blueberry’s growth in a wide range of food and drink categories, including baby food, snacks, special drinks, breakfast cereal, sports and energy drinks, and alcoholic drinks. Blueberries are now found in everything from products you’d expect to see in more surprising places like savory pizzas, grain bowls, meat dishes, and even noodles, Firmenich reports.

One of the reasons for blueberry’s success is that it not only works well alone but also pairs well with many other flavors, the company adds. “Classic blueberry is a fantastic flavor to work with because it’s robust and multifaceted,” said Eric Tang, flavorist, Firmenich, in the press release. “Blueberry has standout floral notes and distinct tanginess, with fresh green and sweet elements woven in. Besides the classic pairings you find with blueberry, I’m also drawn to pairing it with less obvious matches, such as black tea or habanero,” he added.

Blueberry’s blue color is also its key characteristic. Perhaps it’s no coincidence that Pantone’s 2020 Color of the Year is “classic blue.” Sensient Flavors’ Perumbala tells Nutritional Outlook, “Most industries draw inspiration from Pantone’s Color of the Year,
81% GROWTH OVER THE PAST 10 YEARS.

Any Questions?

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*Based on publisher’s own data.*
and the food industry is no different. We can expect already popular flavors such as berries to wear a shade of classic blue. Blue also is an unpredictable color in most food and beverage categories, which makes it an even more interesting choice to pique the interest of the experience-driven consumer. Sensient predicted the popularity of blue last year when we included a ‘Blue Velvet’ flavor in our ‘Trends to Taste’—our annual publication of consumer flavor trends to watch. The idea of a nondescript flavor that one has to guess is exciting to consumers, adding an experiential layer to the product.”

In general, a fruit’s color helps dictate its appeal, says flavor firm Döhler GmbH (Darmstadt, Germany). “Flavor trends are also influenced by color trends,” the company noted when talking about its 2020 flavor trend predictions and, in particular, a 2020 trend for fruit infusions and fruit tea infusions. “Particularly in spring and summer, expressive Pantone colors that promise both a fresh appearance and taste are very popular. Examples include colors such as scarlet red, which is in great demand for red fruit infusions and fruit tea infusions, while saffron delivers a fresh and fruity impression that can be supported by citrus fruits and chamomile infusions.”

The Plant-Based Halo
Consumers generally associate botanical, plant-based ingredients with functional health benefits. “Functional flavors will shape the category,” says Virginia Dare’s Caputo. “More specifically, the characterizing taste profiles from or inspired by highly functional ingredients, such as botanicals, spices, and healing herbs (e.g., turmeric, ginger, cinnamon, lavender, and honey), will grow in popularity alongside the increased emphasis on emerging health trends.” He adds: “We expect continued growth from botanical flavors, with more mainstream opportunities, paired with fruit in seltzers, cocktails, waters, fermented beverages, frozen desserts, and more.”

Sensient Flavors’ Perumbala says: “Herbs, florals, and spices in beverages add not only an exotic twist and culinary exploration, but also offer a health halo to products they are used in. Even alcoholic beverages are taking advantage of this transferred health halo. Pine, milk thistle, hibiscus, etc., are some such ingredients that you can expect to start seeing in the coming years.”

She reminds formulators: “Consumers are looking for fun flavors that also provide function. Think about the cult status turmeric, ginger, and the likes have reached. Ingredients such as turmeric provide not only flavor and function but also add an element of color, up- ping the visual appeal quotient. In the coming years, ingredients that are multifaceted will continue to be popular. Flavors such as purple tea are starting to show up in gourmet tea shops and niche products while flavors such as yerba mate can already be found on grocery shelves. Aside from being flavorful, purple tea imparts a beautiful purple shade to products along with the benefit of antioxidants.”

Formulators can also find success in introducing newer flavors to the plant mix. Plant-based proteins, for instance, can be elevated with unique botanical notes. Micah Greenhill, beverage and alcohol category manager for ADM Nutrition (Decatur, IL), says: “Associated with health and wellness, botanically infused products are often perceived as being healthier than traditional offerings. For example, a protein beverage infused with hibiscus is more appealing than a beverage without any obvious plant ingredients to today’s consumer. Consumers are actively seeking out foods and beverages that promote wellness, and this is a leading factor in the rise of botanical flavors.”

Döhler GmbH also notes that some of the botanical flavors it expects to become more popular have a regional story to tell. For instance, “With the Olympics and Paralympics taking place in Japan in 2020, we noticed an increase in consumer interest in Japanese products that are in line with a sporty, active feeling. As such, trends are expected to include matcha and teas in general; citrus fruits; and ume, a Japanese apricot.”

Organic ingredients also have a role to play, notes Döhler. “With consumers wanting to lead a healthy lifestyle, the importance of naturalness and organic quality will continue to grow.”

Sour and Fermented
Sour and fermented ingredients are also quite popular these days. “Tart, sour, and fermented flavors are gaining momentum in food and beverage products and will take off in 2020,” says flavor firm Flavorchem (Downers Grove, IL).

The Japanese citrus fruit yuzu is one example, Flavorchem says. “Yuzu is the perfect combination of adventurous and global flavor blending with the tart taste profile consumers are seeking,” the company notes, adding that it expects to see yuzu’s popularity grow in the U.S., where consumers and formulators “are looking to experiment with new citrus profiles and exotic flavors that offer the perception of sweetness without added sugar, syrups, or artificial sweeteners.” Yuzu is currently appearing as a flavor in everything from cookies and ice cream to gummies, Flavorchem says.

Synergy Flavors also predicts growing usage of yuzu and notes its use in categories such as matcha, sparkling water, and even desserts. Dragon fruit, also known as pitaya or strawberry pear, is also trending thanks to its sweet and sour flavor, and is being seen in everything from candies and gum to sorbet. Says Flavorchem: “The vibrantly pink fruit is also photo-friendly and is gaining widespread appeal through social media, especially Instagram. Dragon fruit is also a flavor that pairs well with other fruit flavors, including kiwi, pear, and strawberry. While the flavor has been seen in beverages in recent years, including Starbucks’s Dragon Drink, expect it to be more prominent in snacks, frozen desserts, and bakery items.”

Virginia Dare’s Caputo also heralds the “sophisticated sour” movement. “Along with bitter profiles, sour and tart profiles are soaring, including vinegars, fermented drinks, tonics, cocktails, beers, varietal citrus, sour berries, and more,” he tells Nutri- tional Outlook. “There’s still a lot of layering and opportunity to build complexity within the sour flavor category. Specific flavors include pomelo, grapefruit, cranberry, limoncello, and kombucha.”

Tart cherry is a flavor that Synergy Flavors says is starting to appear in food products and that has potential to go mainstream in the near future, particularly in the sports market. The company notes that the number of tart cherry product launches increased 87% between Q4 2017 and Q1 2018.
Tart cherry has already appeared as a flavor in products such as sports recovery drinks, chocolate bars, and cold-brew coffee.

Fermented flavors are likewise growing in demand. "A flavor and color trend that has captured the taste buds of American consumers in its own right, fermented foods are also part of a larger movement in the food and beverage industry toward natural ingredients that provide functional benefits," says Christopher Naese, vice president of business development for Florida Food Products (Eustis, FL), which supplies fermented vegetable products such as fermented beet, carrot, and mushroom juices and powder, for everything from sports nutrition beverages, supplement powders, and more. "As consumers eschew sweets and crave flavors commonly associated with fruits and vegetables, fermented ingredients have found a wider appeal, especially among consumers under the age of 40 who are seeking novel, multisensory food experiences."

Part of the growing appeal of fermented flavors relates to their authentic feel, Naese says. "The growing distaste for artificial colors, flavors, preservatives, and other additives commonly associated with fruits and vegetables, fermented ingredients have found a wider appeal, especially among consumers under the age of 40 who are seeking novel, multisensory food experiences."

Spicy
The spicy category continues to flourish, notes Jocelyn Foster, product manager, spice and herb flavor extracts, for ingredients supplier Kalsec (Kalamazoo, MI). "We recently conducted research that revealed that more than half of global consumers surveyed are eating spicier foods more often than they were just one year ago," she says. "We expect this growing interest in spice to drive demand for global flavors in 2020."

Consumers are drawn to spicy flavors from a range of cuisines. Harissa is one spice that has grown out of rising interest in Middle Eastern and African foods and flavors, she says. "Much like its predecessor, sriracha, harissa is a spicy blend of chili and garlic that is often used in a sauce or paste form. These familiar application options make harissa an easy foray into spicy flavors for consumers looking to blend a new spice with a familiar food."

Chimichurri, from Latin American cuisine, is another popular spice today. "With so many choices and new food and beverage options available, we are seeing many consumers flock back to familiar flavors and cuisines, especially those that offer familiarity with a flavor twist. One example of this is within the TexMex category, which is evolving to include more nuanced and specific flavors, including those from other Latin American regions such as Argentinian chimichurri," Foster says. "We predict this flavor will trend as consumers seek more authentic Latin American flavors that carry regional flair and authentic spicy flavors."

Finally, she points to the popularity of a specialty pepper, the hatch green chili. "Our 2019 hot and spicy research showed that consumers want to know more about the ingredients that give their foods heat and flavor, including an understanding of the pepper type and where it’s grown. Hatch green chili is a great example of this as it has such a distinct, fresh, green spicy flavor and is grown in the Southwestern United States. The story of its origin and flavor is one many consumers are just starting to learn."

Flavorchem points out cardamom, which is described as having a spicy, minty, and citrusy flavor, as a growing trend. "As spices traditionally used in ethnic cuisine become..."
more mainstream in the United States, except for a rise in the usage of cardamom in nontraditional applications. Cardamom is popular both in Middle Eastern and Indian dishes, so the flavor is becoming more acceptable to American palates, especially Millennials and Gen Zers, the company says. “Its broad appeal covers a wide range of savory and sweet applications, including indulgent baked goods.” Cardamom has been included in everything from granola and cookies to ice cream, the company adds.

Turmeric, the superstar spice, is still going strong. While the ingredient has already appeared in products such as ice cream and supplements, it is also a growing anti-inflammatory ingredient in categories like sports nutrition and protein drinks, says Synergy Flavors.

Coffee and Tea
Coffee is a flavor that never goes out of style. “Trending flavors that will continue to thrive in the nutrition industry include the coffee flavor range such as caramel coffee, vanilla latte, mocha, cappuccino, cold-brew coffee, and espresso,” says Gold Coast Ingredients’ Byrnes. Coffee flavors are being incorporated in numerous ways, says Virginia Dare’s Caputo, including in “upscale canned coffee cocktails and spiked lattes, whether dairy- or plant-based.” He adds that “Cream liqueurs, a related category, have been making noise on our radar. More sophisticated flavors are expected from fruit and cream to coffee-inspired drinks to unique flavors like cocoa cardamom.”

Döhler GmbH says that cold-brew cocoa infusions are also of interest alongside demand for cold-brew coffee, for both alcoholic and nonalcoholic beverages as well as dairy and dairy-free applications.

And over in the tea category, matcha remains popular, with 520% growth in matcha-flavored products over the last four years, says Synergy Flavors. Matcha is not only making appearances in foods like ice cream and dairy alternative drinks, but also in nutrition bars and protein drinks, and is a promising ingredient in sports nutrition.

Savory and Smoked
Meat-alternative products give consumers the experience of eating meat, and meat-inspired flavors are also influencing formulators. Says Gold Coast’s Byrnes, “On the savory side of the nutrition industry, 2019 was the year for meatless ground beef. As the market introduces new alternative meatless products such as meatless hotdogs, sausage links, and ground sausage for pizza toppings, this opens doors for innovative vegetarian sausage flavors in 2020: Italian sausage, hot link, bratwurst, smoked sausage, and more.”

Smoky flavors are also creating more nuanced options, whether they be sweet or savory. Virginia Dare’s Caputo points to “lightly flavored and hinted flavors—e.g., toasted, brûléed, smoked, barrel-aged, creamed, and spiced.”

Regional Influences
Regional flavors continue to fascinate. “Regional connections are often reminiscent of destinations that evoke certain feelings and imagery, and manufacturers can use that to their advantage to create products that stand out on the grocery store shelf,” says ADM Nutrition’s Greenhill. Take tropical flavors. “Over the past few years, we’ve seen tropical flavors really take off, particularly in the beverage category,” he says. “This is because tropical flavor profiles are recognized by consumers as light and refreshing. As flavored and hard seltzers have gained popularity, tropical flavors have paved a path for the rise of authentic, regionally inspired flavors. For example, Valencia orange and Sicilian lemon fit the tropical flavor profile consumers already know and love, but the addition of a region or location adds an authenticity that simply orange flavor or lemon flavor doesn’t evoke. Today’s consumers have so many options when it comes to food and beverages that flavors with exotic connotations will continue to trend as manufacturers look to distinguish their offerings from competitors.”

Asian flavors are a big influencer. Citing research from Foodable, Comax Flavors notes that Asian flavors on menus at fast-casual restaurants have increased nearly 30% year over year. Much of the demand for Asian flavors comes from younger consumers.

And Synergy Flavors says that mochi, a pounded rice cake from Japan, is a flavor that is newly emerging in sports nutrition. Sustainability
Finally, it’s no secret that more consumers are looking for more sustainable options in foods and beverages—flavors included. “As sustainability and environmentally conscious offerings have become a key focus in the industry, sustainably sourced flavors are expected to rise in demand to meet consumer expectations,” says ADM Nutrition’s Greenhill. “The demand for sustainably sourced ingredients is driving suppliers to reexamine their supply chains and make changes that have a positive impact on the environment. ADM, for instance, highlights its sustainable supply of vanilla and mint.

Earth-inspired flavors are also something to watch, says Virginia Dare’s Caputo. “We anticipate future growth in flavor profiles that are inspired by or celebrate the earth and other natural elements, bringing awareness to climate change, loss of species, and sustainability. Earthy flavors (e.g., mushroom, beet, fig, teas, turmeric, pine, and herbs) and flavors or products inspired by earth’s natural phenomena (e.g., ice cream mudslides, chocolate lavaflow cake, pop-rock earthquake shakes, chocolate-covered cherry magma, and layers-of-the-earth cake) are parts of this projected trend.”

Flavors: An Emotional Connection
Above all, the role of flavors in the future will be to connect with consumers on an emotional level. Jeffrey Schmoyer, vice president of global insights for Firmenich, noted in the company’s press release that there has been a “significant shift in the food industry toward more intentional and emotional design.”

For instance, he said, “Consumers are more inclined to try something unfamiliar to them, such as kombucha or a cashew yogurt, if it’s flavored in a way they can connect with on an emotional level.”

Likewise, says Kalsec’s Foster, “In 2020, we anticipate many of the broader flavor trends will be driven by a growing desire among consumers to understand more about the ingredients in their foods and where those ingredients are sourced. This desire is connected to broader trends of storytelling and transparency as consumers seek to connect more closely with the world around them and consume foods that resonate with them and their own personal values.”

60 JANUARY/FEBRUARY 2020 • NUTRITIONAL OUTLOOK
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As storytelling creatures, we humans are always seeing through lines and lessons in even the most random events and accumulations of data. So it is that we look back on the year that was for dietary supplement ingredient sales and try to make sense of what happened—better to prepare for the 365 days to come. What messages can we glean from the trends seen last year?

“When looking across mainstream and innovation channels, we see a lot of commonality among top-growing functional ingredients,” reflects Kimberly Kawa, wellness product specialist for market researcher SPINS LLC (Chicago). “Those that appeal to both natural and conventional shoppers—protein, collagen, elderberry, magnesium, MCTs, CBD—parallel broader industry trends and give us insight into current consumer wellness priorities.”

Guess you could call it a “healthy” market for wellness products.

To draw a finer bead on just how well the top wellness products are doing—and to take the temperature of those under the weather—we steeped ourselves in SPINS’s data. Ahead is a brief snapshot of 2019’s winners and losers.

*All sales numbers are courtesy of SPINS and cover the 52 weeks ending October 6, 2019. “Cross channel” reflects a combined data pull of mainstream mult outlet (MULO), natural, and specialty gourmet retailers in the total U.S. market, unless otherwise specified. “Innovation channel” refers to the natural and specialty gourmet segments combined.

**Cannabidiol (CBD)**
Judging by the numbers—heck, judging by the pure buzz—CBD might as well stand for “cannot be deterred.”

Of course, CBD actually stands for hemp cannabidiol—but you probably already knew that, given that this non-psychoactive phyto-cannabinoid found in Cannabis plants is once again one of the hottest ingredients around.

“CBD and hemp derivatives have been the highlight of the year in the supplement industry, with seemingly plentiful potential across multiple segments, including therapeutic topicals, pet wellness products, and the functional beverage set, just to name a few,” Kawa says.

Combining sales from both mainstream channels and innovation channels (natural and specialty gourmet), CBD witnessed triple-digit growth over the 52-week tracking period, shooting up 161.4% from...
an initial value of $44.3 million in October 2018 to $115.8 million by October 2019.

And while increased distribution likely accounted for some of that growth, consumer fascination with CBD—and buy-in of its purported benefits—no doubt helped.

As for which CBD products consumers are buying, alcohol-free tinctures reported the highest cross-channel dollar sales in the human supplements category, clocking in at $59.2 million and 127.7% growth. Next in line were softgel and capsule products, at $15.7 million and $10.4 million in respective dollar sales. CBD’s popularity contributed to innovation-channel gains for supplement oils, Kawa adds. And while multi-ingredient formulations highlighting CBD content accounted for $31.5 million in total CBD sales, single-ingredient CBD supplements generated more than twice that: $64.6 million.

“Compared to a year ago,” Kawa says, “melatonin went from 10th place to 2nd in terms of total dollar change, gaining 28.8% from $285.4 million [in 2018] to $367.7 million [in 2019].”

As hormone- and sleep-support supplementation pull in more converts, expect melatonin to appear in novel delivery formats, including liquid sprays, drink mixes, lotions—even transdermal patches.²

**Medium-Chain Triglycerides (MCTs)**

Somewhere out there, a grandparent is telling her grandchild that there once was a time when people avoided fat because they believed it was “bad for you.”

Hard to imagine, right? With all the fat-friendly, carb-phobic diets making news these days, fat—or at least some fats—are donning healthy halos.

That’s been the case with medium-chain triglycerides, or MCTs. Fats commonly sourced from tropical palm and coconut plants, MCTs and their medium-chain fatty acids boast a devoted following among athletes and bodybuilders as well as those trying to lose weight. Why? Studies suggest MCTs enhance immunity, boost

### 2019’S GROWTH DRIVERS

#### CROSS-CHANNEL (Mainstream + Natural + Specialty)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein - Animal (Multi)</td>
<td>$775,230,723</td>
<td>15.1%</td>
</tr>
<tr>
<td>Melatonin</td>
<td>$367,677,767</td>
<td>28.8%</td>
</tr>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$115,834,347</td>
<td>161.4%</td>
</tr>
<tr>
<td>Collagen Products</td>
<td>$147,171,370</td>
<td>82.7%</td>
</tr>
<tr>
<td>Elderberry</td>
<td>$113,251,092</td>
<td>83.4%</td>
</tr>
<tr>
<td>Misc Supplements (Other)</td>
<td>$136,144,741</td>
<td>18.0%</td>
</tr>
<tr>
<td>MCT (Medium-Chain Triglycerides)</td>
<td>$41,767,445</td>
<td>95.8%</td>
</tr>
<tr>
<td>Vitamin C (not Ester-C)</td>
<td>$373,260,971</td>
<td>4.4%</td>
</tr>
<tr>
<td>Protein - Plant (Multi)</td>
<td>$229,083,837</td>
<td>7.1%</td>
</tr>
<tr>
<td>Magnesium</td>
<td>$151,111,936</td>
<td>11.0%</td>
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#### INNOVATION CHANNEL (Natural + Specialty)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabidiol (CBD)</td>
<td>$91,440,046</td>
<td>113.5%</td>
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<tr>
<td>Collagen Products</td>
<td>$62,215,493</td>
<td>60.8%</td>
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<tr>
<td>Elderberry</td>
<td>$30,522,896</td>
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<tr>
<td>Magnesium</td>
<td>$40,513,260</td>
<td>9.8%</td>
</tr>
<tr>
<td>MCT (Medium-Chain Triglycerides)</td>
<td>$15,345,395</td>
<td>22.4%</td>
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<tr>
<td>Protein - Plant (Pea)</td>
<td>$10,993,681</td>
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<tr>
<td>Multi-Minerals</td>
<td>$11,851,766</td>
<td>20.3%</td>
</tr>
<tr>
<td>Mushrooms (Other)</td>
<td>$9,587,521</td>
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<tr>
<td>Multivitamin (Senior)</td>
<td>$13,543,035</td>
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<tr>
<td>Melatonin</td>
<td>$13,993,898</td>
<td>10.3%</td>
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</tbody>
</table>

Terms: “Cross channel” = a combined data pull of mainstream multioutlet (MULO - powered by IRI), natural (SPINSscan Natural), and specialty gourmet (SPINSscan Specialty Gourmet) retailers in the total U.S. market. “Innovation channel” = the natural and specialty gourmet segments combined (not mainstream).
endurance, and jumpstart the body’s oxidation of stored fat. With further evidence pointing at benefits vis-à-vis cognitive support, nutrient absorption, and more, these functional fats are on a roll.

SPINS data reflect “impressive growth” for MCTs over the past 52 weeks, Kawa says, noting that they rank 7th by dollar change cross-channel (a jump of 95.8% to $41.8 million) and 5th in innovation channels (a dollar change of 22.4% to $15.3 million).

“This ingredient has gained more attention lately due to its broad appeal among sports enthusiasts and its inclusion in the more recently popular keto diet,” Kawa notes. Where MCTs go next will be a topic for discussion in 2020.

Multi-Sourced Plant-Based Protein

Consumers are so besotted with protein that it no longer makes sense to track its sales monolithically. Far more insightful is getting a granular reading of which types of protein are doing well, and with whom.

Thanks to such a granular reading, plant-based proteins derived from multiple sources have now entered the top-10 rank of SPINS’s cross-channel growth-driver ingredients, “reporting noteworthy mainstream gains,” Kawa says. More specifically, growth of 7.1% in the past 52 weeks took multi-sourced plant-based proteins to the #9 spot on this list, representing $229 million in sales during the year.

This rise in the ranks should come as no surprise in light of the fact that “plant-based” and “protein” are both each bona-fide health-and-wellness phenomena in their own right; combine the two and you have the basis for product innovation, a lifestyle-nutrition movement, and an opportunity for brands and retailers to change how consumers eat, drink, and supplement.

The mainstream appeal of plant-based proteins “makes a broader connection to increasing consumer interest in adding more plant-based products to their shopping carts,” Kawa says. The upshot: Watch this space.

Magnesium

Move over, turmeric; it’s magnesium’s turn in the spotlight.

Sound harsh? It may be. But SPINS data show that the humble mineral magnesium replaced trendy turmeric in the 10th spot in the firm’s cross-channel list of top functional ingredients by dollar change.

### 2019’S DECLINERS

**CROSS-CHANNEL (Mainstream + Natural + Specialty)**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>% Change</th>
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</thead>
<tbody>
<tr>
<td>Probiotic Supplement</td>
<td>$890,123,892</td>
<td>-3.7%</td>
</tr>
<tr>
<td>Protein (Animal &amp; Plant Combo)</td>
<td>$1,399,831,242</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Multivitamin (Adult)</td>
<td>$362,200,801</td>
<td>-5.5%</td>
</tr>
<tr>
<td>Fish Oil Concentrate</td>
<td>$330,794,217</td>
<td>-5.5%</td>
</tr>
<tr>
<td>Protein (Animal – Whey &amp; Casein)</td>
<td>$59,065,528</td>
<td>-20.4%</td>
</tr>
<tr>
<td>Protein (Animal – Whey &amp; Milk)</td>
<td>$43,831,969</td>
<td>-24.0%</td>
</tr>
<tr>
<td>Chinese Herbs</td>
<td>$85,792,285</td>
<td>-13.2%</td>
</tr>
<tr>
<td>Protein (Animal – Whey)</td>
<td>$270,705,196</td>
<td>-4.5%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C only)</td>
<td>$154,284,239</td>
<td>-7.2%</td>
</tr>
<tr>
<td>Green Teas &amp; Supplements</td>
<td>$36,725,619</td>
<td>-24.6%</td>
</tr>
<tr>
<td>Garcinia cambogia (HCA)</td>
<td>$17,669,870</td>
<td>-35.0%</td>
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**INNOVATION CHANNEL (Natural + Specialty)**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Current Dollars</th>
<th>% Change</th>
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</thead>
<tbody>
<tr>
<td>Protein (Plant – Multi)</td>
<td>$69,396,958</td>
<td>-14.2%</td>
</tr>
<tr>
<td>Probiotic Supplement</td>
<td>$141,307,757</td>
<td>-6.1%</td>
</tr>
<tr>
<td>Protein (Animal – General)</td>
<td>$17,880,234</td>
<td>-18.3%</td>
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<tr>
<td>Specialty Remedies (Homeopathic)</td>
<td>$41,545,389</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Turmeric</td>
<td>$50,593,701</td>
<td>-4.4%</td>
</tr>
<tr>
<td>Multivitamin (Women)</td>
<td>$44,578,164</td>
<td>-4.2%</td>
</tr>
<tr>
<td>Grass (Wheat or Barley)</td>
<td>$18,838,707</td>
<td>-8.9%</td>
</tr>
<tr>
<td>Flaxseed and/or Oil</td>
<td>$13,791,468</td>
<td>-10.8%</td>
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<tr>
<td>Coconut Oil</td>
<td>$3,130,811</td>
<td>-33.0%</td>
</tr>
<tr>
<td>Vitamin C (Ester-C only)</td>
<td>$12,845,991</td>
<td>-10.0%</td>
</tr>
<tr>
<td>Yerba mate</td>
<td>$851,129</td>
<td>-61.4%</td>
</tr>
</tbody>
</table>

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That’s not to say that turmeric is nowheresville; it still reported 1.8% growth, up from $140.8 million to $143.3 million over the 52 weeks tracked.

But magnesium growth is multiplying by double digits, clocking in at 11.0% and increasing sales from $136.1 million to $151.1 million.

"Magnesium supplements are doing well in SPINS's innovation channels, as well," Kawa adds, "coming in 4th in the rankings by dollar change," with 9.8% growth to $40.5 million in that segment.

The drivers behind magnesium’s growth are plenty: This fourth-most-abundant mineral in the body serves as a cofactor in biochemical reactions, playing a role in everything from protein synthesis, nerve function, and blood-glucose control to blood-pressure regulation, energy production, and the synthesis of DNA, RNA, and the antioxidant glutathione.3

Probiotics
Thanks to widespread interest in digestive health, it’s no longer a social faux pas to discuss the gut’s goings-on amongst polite company.

So you’d think that with gut health now acceptable dinner conversation, and with research on the microbiome drawing yet more attention to the intestinal tract, probiotics would be enjoying a real sales surge. But you’d be wrong.

Although probiotic supplements still top SPINS's list of digestive-health ingredients across natural, specialty, and MULO channels, they chalked up a loss in overall mainstream and innovation channels over the 52-week period, falling 3.7% from $924 million to $890 million.

"In analyzing recent industry news, it may be the case that other microbiome- and gut-support supplements are taking the spotlight from probiotics—most notably prebiotics," Kawa notes. Digestive enzymes, flaxseed—even ginger, magnesium, and charcoal—may also be stealing some of probiotics' thunder.

Fish Oil
Capitalizing on today’s public embrace of healthful fats, omega-3 fatty acids continue to attract attention—and to generate sales. But not all sources of these good-for-you oils are feeling the same love.

Consider that omega-3-rich fish oil experienced the fourth-biggest cross-channel decline among ingredients in SPINS's analysis, with sales dropping 5.5% from $350 million to $331 million over the past year. And while krill oil—another source of long-chain omega-3 fatty acids—didn’t appear on the list of top-10 declining ingredients, it, too, continues to see slower sales, just as it had in 2018.

"Are consumers turning to other anti-inflammatory oils—perhaps plant-based sources?" Kawa asks. After all, black seed continues growing in mainstream channels, she says, and may even be adding distribution, as triple-digit growth in MULO of 136.7% suggests.

Moreover, notes SPINS's content strategist, Jessica Hochman, "I might point to growing interest in algae-based essential fatty acids in the future." With the passion for all things plant-based apparently reaching the omega-3 space, she may well be right.

Green Tea Supplements
Green tea has so much going for it: an august tradition, a "natural" reputation, a compelling story, and a list of bioactive components, including catechin and flavonoid antioxidants, that may improve everything from the heart and brain health to the waistline.

But one thing green tea supplements didn’t have going for them in 2019 were rising sales, as the category landed on SPINS's top-10 list of cross-channel decliners for the first time, with a double-digit drop of 24.6% taking sales from $27.2 million to $17.7 million during the year.

The decline makes a certain sense to Kawa, who notes that the primary health focus attributed to green tea supplements is weight loss, "which reports a decline in this set," she says. "Also of note is the fact that weight-loss-focused supplements report slight declines overall across channels."

But green tea isn’t all dried up yet. It still landed on the list of consumers’ top-10 supplements in the Council for Responsible Nutrition’s (CRN; Washington, DC) latest annual survey, with 19% of supplement users claiming to use it.4
Honorable Mention:
Elderberry and Medicinal Mushrooms

Not every functional ingredient can reach the top tier of growth drivers. But that needn’t mean that 1) their sales are in decline, nor 2) they don’t merit mention as potential inductees onto upcoming lists of ingredient movers and shakers.

Exhibits A and B: elderberry and medicinal mushrooms, both of which Hochman calls out for future consideration.

“I expect to see continued growth for elderberry, especially in mainstream retail, as more consumers look to herbal and botanical ingredients to support immune health,” Hochman says. Adding to elderberry’s advantage is its accessibility, as it’s both palatable to adults and kids and versatile in formulations.

As for ’shrooms, Hochman’s keeping her eye on continued growth among “medicinal” varieties—especially in innovation channels—“as more research brings their properties into popular health-and-wellness discourse.”

Kimberly J. Decker writes for the food and nutrition industries from her base in the San Francisco area.

References
Immune Support

Immune health isn’t merely of interest to consumers; it is one of the top five reasons why they take dietary supplements today, period. According to the Council for Responsible Nutrition’s latest Consumer Survey on Dietary Supplements, published last fall, immune health is one of the top reasons consumers surveyed said they take supplements, alongside reasons like energy, healthy aging, filling nutrient gaps, and staying well overall. In the survey conducted on more than 2000 U.S. adults in 2019, 27% of those who use dietary supplements cited immune health as a reason they take supplements.

Market numbers also reflect this interest. According to market researcher IRI (Chicago), dollar sales in the immune health supplement category grew 12% in 2019 over the previous year.

Another consumer survey conducted by Kerry International (Beloit, WA) also saw high interest in immune health. “We asked consumers to choose five options from a list of 13 health areas and rank them in order of importance. Nearly two-thirds (63%) chose immune system support, ahead of healthy bones and joints, good digestive health, energy levels, and heart health support,” says John Quilter, vice president and general manager, ProActive Health, for Kerry International. Demand for immune support products is particularly high in Asia—specifically China, where 50% of survey respondents said they had used an immune health product in the previous six months, while 29% said they would consider doing so in the future.

So what does this mean if you’re an immune health product company? “This means that immune health markets are increasingly competitive,” Quilter says. “The best way to stand out is to use scientifically substantiated, well-recognized ingredients that can complement and enhance your brand.”

A number of brands are hard at work doing just that, choosing suppliers investing in research and helping manufacturers develop products that are not only efficacious but also encourage use and enticement through innovative delivery formats beyond traditional dietary supplements. Not only that, but ingredient suppliers and researchers are exploring the various pathways by which ingredients can support immune health—particularly, the way ingredients interact with the gut to impart immune benefits.

Herbal Stars

Some of the best-performing herbs on the market are popular ingredients for immune health products, perhaps an indication of the immune health category’s overall strength. For example, according to figures from SPINS reported by the American Botanical Council’s HerbalGram journal in its annual Herb Market Report in September 2019, the bestselling herbs in the U.S. mainstream mult/outlet channel in 2018 were horehound and echinacea.1 Total 2018 sales of horehound, the #1 bestselling herb in the U.S. mainstream mult/outlet channel per the HerbalGram report, hit nearly $147 million that year. Echinacea, meanwhile, ranked as the #2 bestselling mainstream herb, growing to $110 million in sales in 2018.

Immune health is now a significant leader in the supplements space.

BY SEBASTIAN KRAWIEC, ASSOCIATE EDITOR

BEYOND HEALTHY

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Aside from those two market giants, perhaps the most impressive sales growth among herbs in the immune health space in 2018 went to elderberry. According to the *Nutritional Outlook* report, in 2018 elderberry grew 138.4% in sales to nearly $51 million in the mainstream channel, and grew 93.9% to $25 million in the natural channel, making elderberry the #4 top-selling herb in the mainstream channel and the #3 top-selling herb in the natural channel in 2018. Pretty impressive.

Elderberry’s star continued to rise in 2019, too. In recent numbers provided to *Nutritional Outlook* by SPINS, cross-channel sales (mainstream, natural, and specialty retailers) of elderberry grew 83.4% in the 52 weeks ending October 6, 2019, to total sales of $113 million. In the mainstream multioutlet channel alone during that period, elderberry grew in sales by 116% to nearly $63 million.

Elderberry, which has a long history of traditional usage, experienced a surge of popularity after a particularly intense flu season in 2018 that saw a shortage of over-the-counter flu medicines, leaving natural remedies like elderberry to fill the void.2 Consequently, more consumers became aware of the ingredient and learned more about its benefits. While a number of factors led to elderberry’s rise in popularity, Devon Bennett, CEO of North American elderberry supplier INS Farms (Purdy, MO), believes that elderberry is more than a trend and is here to stay. “Elderberry will become a lifestyle ingredient, with more research and science to follow,” Bennett predicts.

Elderberry already has some research under its belt, which gave the ingredient more clout during the severe 2017-2018 flu season. For example, the most significant study to date, using a branded elderberry extract from Artemis International (Fort Wayne, IN) called ElderCraft, was conducted in travelers over a 21-month period in 2013-2014 by the School of Pharmacy at Griffith University (Queensland, Australia).3 “This has become the highly reviewed and trusted study,” says Chris Tower, vice president of sales and business development for Artemis. “Results of the study revealed ElderCraft demonstrated a significant reduction in cold duration and symptoms in air-travelers, resulting in 50% fewer cold episodes, 33% shorter illness duration, 50% fewer symptoms, and 33% less severe symptoms.”

He adds: “Notably, the 2016 Tiralongo study on ElderCraft was published one year in advance of what later proved to be a particularly severe and long flu season (2017-2018), with ER doctors and general practitioners on record supporting the use of elderberry, and social media further drawing increased attention to elderberry as a supplemental frontline treatment for flu and colds.”

The benefits of elderberry are attributed to the anthocyanins found in the berries. Anthocyanins are the black pigments that give the black elderberry its color. “Studies have indicated that European black elderberry can effectively boost the body’s natural immune response by way of cytokine stimulation to ‘ready the soldiers’ for fighting off pathogens,” explains Melanie Bush, director of berry science for Artemis.

Bush adds that the polysaccharides present in the fruit—but which are often stripped away during extraction—may also provide antiviral benefits. “Artemis International’s ElderCraft extract is uniquely produced without the use of harsh chemical solvents, thus retaining the polysaccharides along with concentrating the important flavonoid activities, making a truly superior and efficacious immune supporting ingredient,” she says.

Being a fruit, elderberry lends itself to a variety of applications. “We see the greatest opportunity for elderberry in both traditional supplements and food and beverage—both growing markets with consumers seeking a way to preempt sick days and/or a visit to the doctor,” says Leslie Gallo, president of Artemis.

Alternative delivery formats, previously reserved for children, now apply to the larger population of adults experiencing pill fatigue, and elderberry fits in nicely with many of these. “Traditional supplements are not so ‘traditional’—not your grandmother’s pills and tablets—as gummy delivery continues to lead the pack, with liquid supplements close behind,” Gallo says. “Confection delivery (i.e., lozenges, lollipops), infusions, as well as shots, powder sticks, and chewables are growing in popularity.”

**Through the Gut**

The way manufacturers are using elderberry is changing as well, says Gallo. For example, in beverages, while it’s not unusual for manufacturers to utilize elderberry for flavor or color, typically its use as an ingredient with functional benefits had been less common. Now, however, use of elderberry as a functional immune support ingredient has gained greater consideration. “We are fielding more inquiries for beverages, most notably in the hot and cold tea markets, in addition to elderberry as a prebiotic in the pre-/probiotic beverage market,” explains Gallo.

The relationship between immune and digestive health is gradually coming to light as research continues on pre- and probiotics. The potential prebiotic nature of elderberry provides a synergistic opportunity to finish product formulation. Research is exploring how flavonoids such as the anthocyanins found in elderberry interact with the gut microbiome.4

“There are several ways that polyphenols from berries and the gut interact with each other. One way is that the berries have been shown to exert prebiotic-like activity and influence the overall composition of the microflora of the gut,” explains Bush. “There have been several studies evaluating this concept. For example, in 2011, a six-week consumption of a wild blueberry drink in human volunteers significantly increased *Bifidobacteria* strains compared to a placebo. These particular types of bacteria are beneficial to the host, demonstrating the ability of the berries to positively modulate the composition of the intestinal microbiota, just as conventional prebiotics do.”

“Berries can play a role through both diet and supplementation, as they are full of fiber when eaten fresh, and also concentrated extract ingredients can contribute flavonoids that have been scientifically shown to support gut health,” she adds.

INS Farms also sees the potential of elderberry in the prebiotic space, recently partnering with Taiyo International (Minneapolis, MN) to combine its Elder Pure elderberry juice powder with Taiyo’s Sunfiber partially hydrolyzed guar gum to create Elder Pure...
Winning the Sports Nutrition Game

Learn about trends, hot ingredients, and formulations that are driving the sports nutrition category.

The concept of food as fuel—an idea long embraced by athletes—is becoming mainstream as more consumers practice healthier living and conscious consumption. This new generation of sports nutrition consumers is seeking solutions that support their active lifestyle yet are still reflective of broader market trends. *Nutritional Outlook* sat down with Pam Stauffer, global marketing programs manager at Cargill, to explore how brands can muscle into the booming sports nutrition market with products that address consumers’ attitudes toward protein, sugar, and more.

**Nutritional Outlook:** What are the big trends driving the sports nutrition market in the coming year?

**Stauffer:** While initially developed to aid performance and recovery in elite athletes, the principles of sports nutrition have gained favor among a much broader audience. The core users are still there, but they’ve been joined by a broad group of consumers seeking healthy, active lifestyles. They run the gamut—from ordinary sports enthusiasts to active seniors.

For brands, addressing the performance needs of this diverse audience has its challenges—and it’s certainly different from the core sports nutrition consumer. After all, the recovery needs of a triathlete or marathoner are significantly different from those of the typical weekend warrior.

On the ingredients side, protein continues to rule—approximately 80 percent of sports nutrition products are protein-based. What’s changing are the different types of proteins. Soy and whey still have their place, but there is an interest in other plant-based proteins such as pea protein. This trend reflects an overall market that is more discerning than ever, as consumers increasingly seek out products that are non-GMO, vegan, gluten- and soy-free, and certified organic.

Of course, protein isn’t the only consideration. Gone are the days when sports nutrition products focused solely on performance-enhancing ingredients with little regard for taste—with greater mainstream appeal comes higher expectations for flavor, texture, and mouthfeel. What makes these demands especially challenging is, simultaneously, we’re also tracking increased concern over sugar content and artificial sweeteners.

Over half of sports nutrition shoppers look for low-sugar options, according to data from Packaged Facts. But reducing sugar not only impacts sweetness, it impacts texture, color, and mouthfeel. While today’s sports-minded consumers are looking for healthy ingredients and nutrition content, few are willing to sacrifice taste.

**Nutritional Outlook:** How can product developers keep sugar levels in check and still satisfy consumers’ sensory expectations?

**Stauffer:** Added sugar in sports nutrition products is still top-of-mind for many consumers. As I mentioned, a lot of these products come with high levels of protein, and at those levels, it’s common to experience challenges with flavor. To compensate, product developers have historically relied on generous amounts of sugar in their formulations. But today, more consumers are seeking to reduce sugar in their diets.
Research from Mintel suggests that nearly half of shoppers who use sports nutrition products avoid offerings that are high in sugar, which aligns with trends across food and beverage categories and speaks to the broadening appeal of the sports nutrition category.

Fortunately, label-friendly, zero-calorie sweeteners such as stevia can deliver the sweetness without the sugar. In 2018, sports nutrition products accounted for 21 percent of all new product launches with stevia, according to data from Innova.

Several factors have contributed to stevia’s rise, including the dramatic improvement in sweetness quality seen in options such as Cargill’s ViaTech® stevia leaf extract and EverSweet™ stevia sweetener. While ViaTech stevia leaf extract is designed to reduce sugar content up to 70 percent, EverSweet, made via fermentation, enables up to 100 percent sugar replacement.

**Nutritional Outlook: As they’re formulating reduced-sugar products, what should product developers keep in mind?**

**Stauffer:** At Cargill, we always start by understanding a brand’s identity, their sugar-reduction goals, and the taste expectations of its core consumers. For an existing brand, we might suggest blending stevia with erythritol to match the existing flavor profile. A new-to-the-world product might give us more flexibility in development.

Sugar reduction can be complicated; however, working with Cargill gives product developers access to our deep technical knowledge and expertise. We’ve been working with stevia sweeteners since 2008 and have logged more than 300,000 hours studying the stevia leaf. That expertise can reduce product development time.

**Nutritional Outlook: Protein has long been an important component of many sports nutrition products. Is that still the case today?**

**Stauffer:** In general, protein remains a huge draw in the sports nutrition space, because consumers associate it with an array of positives—supporting muscle health, weight management, satiety, athletic performance, recovery, and more. Little wonder it continues to drive sales in the sports nutrition category.

Soy and whey protein remain widely popular in formulations, but alternative plant-based proteins, such as pea and rice, offer an opportunity for formulators to craft sports nutrition products with compelling stories that tap into other trending attributes.

Pea protein, in particular, is enjoying a surge in use. It is label-friendly and offers nutritional and functional benefits, too. It’s well-suited for many sports nutrition applications, including beverages, bars, powders, snacks, and dairy alternatives.

**Nutritional Outlook: What are some of the challenges when formulating products with higher protein levels?**

**Stauffer:** As sports nutrition products have moved mainstream, taste has become a critical factor in formulations. Proteins—especially at ultra-high inclusion levels—can create a host of flavor issues. As a result, it’s important to select the best-tasting options, and keep in mind that even proteins from the same botanical source can have very different flavor profiles.

This understanding was a key driver in our partnership with PURIS™. While most pea proteins create flavor issues, PURIS pea protein is different—it’s sourced from non-GMO yellow pea varieties that are specially selected to minimize the off-flavors normally attributed to pulses.

Also, formulators need to keep in mind that not all proteins are equal. Some, like soy and whey, are complete proteins, and they contain all the essential amino acids in just the right amounts. Others, like pea protein, may need to be blended with another protein to make a protein-content claim.

**Nutritional Outlook: How important is clean-label formulation?**

**Stauffer:** Sports nutrition is a category where consumers have higher expectations and are checking labels. In fact, Mintel research suggests that 64 percent of consumers who use sports nutrition products always read the ingredient list before buying a new product. That means familiar ingredients are important, so stevia sweeteners, plant proteins, etc., fit well with consumers’ expectations.

When it comes to texturizers, stabilizers, and emulsifiers, formulating label-friendly products can be especially tricky. However, Cargill has options for product developers’ functional needs that fit with consumers’ expectations. Ingredients such as pectin, starches, chicory root fiber, and lecithin all offer functional benefits yet are familiar to consumers.

**Nutritional Outlook: What’s next for the category—where do the opportunities lie?**

**Stauffer:** The sports nutrition category no longer caters solely to elite athletes and bodybuilders. Today, everyone—from your neighbor to your grandmother—is looking for an efficient way to fuel up for fitness, follow dietary and activity guidelines, and maintain a healthier lifestyle.

This broadening appeal spells opportunity—by 2022, the global sports nutrition market will reach $24 billion, according to Euromonitor International. However, savvy marketers will need to deliver products that offer real athletic performance benefits yet are still attuned to key mainstream trends, including label-friendly formulation, the surging interest in plant proteins, and consumers’ desires for low- and no-sugar products.

Finally, and perhaps most importantly, as sports nutrition products have moved mainstream, taste has become a critical factor in formulations. If a product doesn’t taste great, it doesn’t matter how nutritious it is. Creating products that check all those boxes isn’t always easy, but partnering with a knowledgeable ingredient supplier like Cargill can help brands muscle their way into this growing market.
Elderberry Prebiotic Juice Powder. "Sunfiber currently has over 180 published studies, and we are excited to be involved in an exclusive relationship with them with our convention-

al and organic elderberry ingredients," says INS's Bennett. Research on how the combi-

ned product will support immune health is in the works.

Elderberry is not the only herb with pre-

biotic potential. Take echinacea. A recent review published in Biomolecules investigat-
ed the potential relationship between the immunomodulatory and antiviral activity of echinacea and its inulin-type fructan (ITF) content.6 ITFs are prebiotic compounds that the authors of the study say may act as signaling molecules and antioxidants. Ac-

cording to the review, echinacea has been shown in research to have antiviral activity against viruses such as human and avian influenza viruses, H3N2-type IV, H1N1-type IV, herpes simplex, and rhinoviruses, and re-

versed virus-induced pro-inflammatory re-

sponses. While researchers already studied the way echinacea’s phenolic compounds and alka-

mides activate immunomodulatory path-

ways, the role of ITFs in echinacea are less understood.

The immune health benefits of ITFs in echinacea can be inferred based on research of other ingredients. For example, ITFs derived from ingredients such as the traditional Japanese herbal medicine (Chikuyo–Sekko–To) and chicory have antiviral properties that could be attributed to the enhanced produc-

tion of nitric oxide, which is a viral replication inhibitor. Fructans from aged and fresh garlic have also shown capacity to activate mac-

rophages and subsequently phagocytosis in combination with a release of nitric oxide, write the authors.

The immune health benefits of probiotic compounds alone are becoming more evi-

dent. Another study recently published in the Journal of Nutrition found that inulin-type fructans from chicory root fiber not only supported digestive health but also reduced the severity of illness.7 In the study, children between the ages of 3 and 6 were given ei-

era placebo or a dose of 6 g per day of chic-

ory root fiber for six months. Results showed that compared to placebo, supplementation with the fiber softened stool and reduced the number of fevers that required medical attention. Subjects taking the fiber also saw a higher count of beneficial bacteria, such as Bifidobacterium and Lactobacillus.

Aside from prebiotic ingredients, a num-

ber of other established immune health in-

gredients are also known to operate by way of the digestive tract. For example, Wellmune from Kerry International, a proprietary yeast beta-1,3/1,6-glucan substantiated by over a dozen published, peer-reviewed clinical studies, supports immune health by modu-

lating the gut.

"Traditional supplements are not so 'traditional’— not your grandmother’s pills and tablets," says Artemis’s Leslie Gallo.

writes the authors.

"In terms of its mechanism of action, [Wellmune] enters the body through the gut, where macrophages break it down into smaller fragments that bind to neutrophils, the most abundant immune cells in the body," explains Kerry’s Quilter. "Primed by Well-

mune, the neutrophils move more quickly to recognize and kill foreign challengers.

Another firm, Kemin Industries (Des Moinnes, IA), released a proprietary strain of Euglena gracilis, a nutrient-rich algae with greater than 50% 1.3-beta-glucan content, called BetaVia Complete. In an unpublished study conducted by the firm, the ingredient was found to significantly reduce symptoms of upper respiratory tract infections (URTI). Healthy adult subjects taking 375 mg/day of BetaVia Complete for 90 days experienced 70% fewer URTI symptoms, four fewer sick days, and 10 fewer URTI symptoms days.

A similar, but different, ingredient from Embria Health Sciences (Ankeny, IA) called EpiCor is a whole-food fermentate comprising proteins, fibers, polyphenols, vita-

mins, amino acids, beta-glucans, and other beneficial metabolites that work together to support immune health. In two random-

ized, double-blinded, placebo-controlled trials conducted by Embria Health on both vaccinated and unvaccinated subjects, Epi-

Cor was found to significantly reduce cold and flu symptoms over the course of 90 days.8,9 In another study, EpiCor was found to significantly reduce gastrointestinal discomfort and constipation through the modulation of the gut microbiome.10

While the popularity of probiotics contin-

ues, and interest in probiotics grows, EpiCor may open the doors to a related ingredient category called postbiotics (metabolic by-products of probiotic bacteria).

"Postbiotics have the potential to disrupt the digestive health category. Made through fermentation, postbiotics contain bioactive compounds and metabolites that can convey a health benefit," says Justin Green, director of scientific affairs for Embria Health. "Our ingredient EpiCor, a whole-food fermentate, is a postbiotic ingredient with clinical studies showing that it supports immune health and has emerging science that suggests it may positively modulate gut microbiota. With a clinically tested dosage of 500 mg, EpiCor can easily be formulated into cap-

sules and tablets for gut microbiota support formulations."

Until postbiotics gain more traction, probi-

otics continue to be reliable and in-demand immune health ingredients. According to Kerry, consumers are increasingly aware of the connection between gut health and immune health, both of which are at play when it comes to probiotics. "In our survey, we found that 46% of consumers recognize that probiotics can support the immune system," says Quilter.

Kerry’s proprietary probiotic ingredient, Ganeden BC30, was recently found to support immune health in school-aged children. In the study, 80 healthy children were given either the probiotic in a flavored water or placebo for 12 weeks.11 Results showed that supplementation with the probiotic significantly decreased the incidence of upper respiratory tract infection symptoms, including nasal congestion, bloody nasal mucus, itchy nose, and hoarseness, as well as decreasing the duration of a number of symptoms, including hoarseness, red eyes, headache, and fatigue.
Besides these impressive results, the study also demonstrated an effective delivery format in the form of a flavored beverage, highlighting an opportunity for product formulators—one that is currently underexploited.

"One example of the exciting, and often untapped, potential of immune health ingredients is the kids’ beverage category," says Quilter. "Despite the fact that immune support is one of the health benefits parents are most likely to seek for their kids, immune system claims were found on only 2% of children’s food and drink products launched globally between 2012 and 2017. Furthermore, the global drive to reduce added sugar and artificial ingredients means many beverages could use a ‘halo polish.’ The enrichment of products with functional benefits—for example, for immunity—can help increase the appeal of kids’ drinks in the eyes of parents."

Children are always vulnerable to illness and therefore an important demographic to consider targeting. Parents need easier and effective ways to deliver immune health benefits to their children.

Another area ripe with opportunity is sports nutrition. Athletes, even the casual sort, are also vulnerable to illness and immune stressors due to exertion, and, if attending a gym, from exposure to other patrons who might be sick. ‘A recent survey in the UK found that 37% of consumers would buy a sports drink that supported their immune system,’ says Quilter, citing a Mintel survey.

Another vulnerable population is older adults, which Kaneka Probiotics (Newark, CA) targets with its Floradapt Longevity product formulation. This formular combines two patented strains of Lactobacillus plantarum (KABP-031 and -032) with specific vitamins and minerals, including folic acid, pyridoxine, cyanocobalamin, ascorbic acid, zinc, selenium, and retinol.

“Our original premise is based on the fact that human gut microbiota composition changes as we age, which translates into effects on an individual’s quality of life,” explains Sid Shastri, MSc. Kaneka’s director of product development and marketing. “Additionally, it’s known that nutritional status also changes with age. As people become older, they can secrete less acids, nutrient uptake into the body declines, diet quality typically declines—all resulting in suboptimal nutritional status.”

One study published in 2011 found that the patented strains used in this formula at two different doses increased the concentration of cells that modulate the immune system.12 In 50 elderly subjects, a dose of 5 billion CFU consumed over 12 weeks increased the percentage of T-suppressor and natural killer cells, while a lower dose of 500 million CFU increased T-helper lymphocytes, B lymphocytes, and antigen-presenting cells. Supplementation with probiotics also significantly decreased the concentration of the inflammatory cytokine TGF-Beta 1. Mortality was also significantly lower in the probiotic groups compared to placebo.

Another study published in 2012 randomized 60 immunized subjects between the ages of 65 and 85 to receive two different doses of the patented probiotic or placebo for three months.13 Results showed that supplementation with the probiotics increased the levels of influenza-specific IgA and IgG antibodies, improving the response of the influenza vaccine.

"This market has a high potential as"—according to the U.S. Census Bureau—"the population trends in the U.S. indicate that by 2030, the number of elderly people will be greater than the number of children for the first time in U.S. history," says Shastri. "Furthermore, we are monitoring the latest aging research, which has revealed that the microbiota in centenarians (models of extreme age) had high capacity for central metabolism, especially glycolysis and fermentation to short-chain fatty acids (SCFAs). This 2019 research14 proposes a strong impact of gut microbiota on human health.”

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One of the most significant health concerns on consumers' minds is blood sugar. According to FMCG Gurus’ 2019 Global & Regional Active Nutrition Survey of 26,000 respondents, 44% of consumers are aware or very aware of their sugar consumption. Excess sugar, the survey found, is more concerning for consumers than fat content and even total calories.

Consumers are cutting back on sugar and are looking for clinically validated ingredients that can help regulate and stabilize their blood sugar levels. Here are some of the most recent studies and innovations in the blood sugar management space.

Low-GI Sweeteners

Increased consumer awareness around the health dangers of added sugar is creating demand for a new generation of sweeteners that can check off multiple boxes. While product taste is still a significant concern, several brands are switching to new generation of sweetening agents that score low on the glycemic index while also providing other functional benefits.

Beneo (Morris Plains, NJ) says that functional prebiotic fibers such as inulin, derived from chicory root, are ideally suited to act as low-GI sweeteners. Beneo notes that both inulin and oligofructose, a sugar replacer also derived from chicory root, offer a mildly sweet taste but have a lower caloric content than other sugars, producing a smaller glycemic response than traditional sugar. These fibers do not metabolize once inside the body and therefore do not cause a blood sugar spike. Additionally, both of these fibers have the added benefit of improving digestion.

Beneo’s branded Palatinose ingredient, a form of slow-digesting isomaltulose derived

MULBERRY LEAVES REDUCE GI OF CARBOHYDRATE

In a randomized, open-label crossover trial, a mulberry leaf extract reduced the glycemic index of maltose, sucrose, maltodextrin, and glucose in 15 healthy volunteers following carbohydrate intake. The trial found that mulberry leaf extract reduced the GIs of maltose by 53% and sucrose by 33%. This preliminary trial has some important limitations, such as the absence of a placebo group and small sample sizes, but could be a foundation for future research.

Reference
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from sucrose, is another functional sweetener with a lot to offer the healthy blood sugar space.

A 2017 randomized, double-blind controlled crossover trial2,3 partially funded by Beneo examined the effects of Palatinose on 20 healthy Chinese men between the ages of 21 and 40. Participants were assigned to either a low-GI diet supplemented with Palatinose (n=10) or a high-GI diet supplemented with sucrose (n=10). All participants wore a glucose monitor for the duration of the trial, with readings occurring once every five minutes for 42 hours. The trial found that Palatinose successfully modulated the glycemic response. The Palatinose group also showed an increase in fat oxidation and carbohydrate oxidation relative to the sucrose group.

Other sweeteners, such as stevia, are also enabling attractive claims. Cargill (Minneapolis, MN) recently added a new stevia sweetener to its portfolio of products. Andy Ohmes, global director of high-intensity sweeteners, says that Cargill’s zero-calorie EverSweet Reb M/Reb D stevia sweetener delivers a more rounded taste profile than other stevia sweeteners, without a licorice aftertaste, enabling it to act as a total sugar replacer.

“This dramatic step forward in sweetener technology enables up to 100% sugar replacement,” Ohmes says. “EverSweet has no calories and no effect on blood glucose levels, making it well-suited for individuals with diabetes.”

Allulose is another sweetening ingredient that is rapidly gaining popularity thanks to its low glycemic index. Kirstie Canene-Adams, PhD, is senior scientist for global nutrition at Tate & Lyle (London) and the author of a recently published Tate & Lyle white paper, “Innovative Ingredients to Address Glycaemic Response.”

Canene-Adams says that there is good clinical evidence that allulose does not raise blood glucose levels or insulin levels in either healthy individuals or people with type 2 diabetes. Tate & Lyle’s branded Dolcia Prima allulose product is also exempt from FDA’s “sugars” and “added sugars” label requirements as a result of an April 2019 FDA decision—adding to its attractiveness to food formulators.

**Citrus Ingredients**

Compounds found in citrus fruits are also showing promise for blood sugar support in various studies. One such compound, eriocitrin, is a glycoside commonly found in lemons that appears to regulate blood sugar levels by improving insulin sensitivity. Rob Brewster, president of Ingredients by Nature (Montclair, CA), says early studies show that his company’s branded eriocitrin ingredient Eriomin can help maintain healthy blood glucose levels via multiple avenues.

“Eriomin is a proprietary blend that supports normal insulin sensitivity, increases antioxidant activity, and manages a healthy inflammation response,” Brewster says. “Our first randomized, double-blind, placebo-controlled study tested three different doses on low- to mid-risk prediabetic individuals and showed that Eriomin was able to successfully address all three areas of focus.”

The results of a follow-up trial4 on Eriomin were published in 2019. The study followed 103 prediabetic patients between the ages of 39 and 59. Participants were divided into four parallel groups and received either 200, 400, or 800 mg of Eriomin per day, or a placebo, for 12 weeks. Participants were assessed for biochemical, metabolic, inflammatory, hepatic, and renal markers of hyperglycemia at baseline and at weeks 4, 8, and 12.

This trial found that supplementation with Eriomin-branded eriocitrin resulted in a 4%-6% decrease in fasting blood glucose after 12 weeks, while subjects in the control group saw a 1% increase in fasting blood glucose levels. Eriocitrin supplementation also caused a 6%-8% reduction in insulin resistance, while the placebo group saw an approximately 1% increase in insulin resistance.

Another promising citrus ingredient with blood sugar benefits is bergamot (Citrus bergamia) extract. HP Ingredients’ (Bradenton, FL) branded bergamot extract complex, Bergamonte, has been shown to reduce concentrations of the hormones ghrelin and leptin and, ultimately, support healthy blood sugar levels. In one HP Ingredients trial whose data was provided to Nutritional Outlook, a 650-mg daily dose of Bergamonte reduced ghrelin levels by 6.9% after 90 days.

Another randomized, double-blind, placebo-controlled trial5 tracked the effects of another brand-name bergamot polyphenol extract, from Herbal and Antioxidant Derivatives S.r.l. (Bianco, Italy), on fasting glucose and body mass in 52 obese male and female metabolic syndrome patients between 40 and 80 years of age. Participants received either 650 mg (n=17) or 1,300 mg (n=18) of the bergamot extract, or a matching placebo (n=17), per day for 90 days. Forty-five subjects completed the trial. The researchers found that the ingredient improved subjects’ sensitivity to insulin, leptin, and ghrelin; reduced fasting glucose; and induced weight loss in a dose-dependent fashion.

**Seaweed**

A new study by Italian researchers demonstrated the efficacy of a seaweed extract blend on improving insulin sensitivity and reducing inflammation.
The study, a randomized, double-blind, placebo-controlled clinical trial conducted at the University of Pavia in Italy, followed 65 prediabetic Caucasian men and women over the age of 18 who had a fasting plasma glucose level between 100 mg/dL and 126 mg/dL. All participants were given a controlled-energy diet (50% carbohydrates, 30% fat, 20% protein) designed to produce a 600 kcal daily deficit and were instructed to ride a stationary bike in 20-30 minute sessions three to four times per week. Participants also received a supplement containing Innovactiv’s (Rimouski, QC, Canada) branded InSea2 ingredient containing Ascophyllum nodosum, Fucus vesiculosus, and chromium picolinate (n=34), or a matching placebo (n=31), three times per day for six months. Participants were assessed via an oral glucose tolerance test at baseline, at three months, and at six months. After six months, the experimental group saw a statistically significant reduction in fasting glucose levels compared to the placebo group.

CHROMIUM INGREDIENTS BOOST SUGAR METABOLISM

Materials provided to Nutritional Outlook by Nutrition 21 (Purchase, NY) demonstrate that the company’s Chromax brand of chromium picolinate improves both blood sugar metabolism and carbohydrate metabolism, while simultaneously improving insulin sensitivity. One 2018 literature review concluded that chromium picolinate also assists with weight loss while preserving lean body mass.

Another randomized placebo-controlled trial on Lonza’s (Basel, Switzerland) own chromium ingredient, ChromeMate, found that chromium improved markers of oxidative stress in diabetics.

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Consumers are cutting back on sugar and looking for clinically validated ingredients that can help regulate and stabilize their blood sugar levels.

Growth Need for Support
Blood sugar support ingredients are showing promising results, with new ingredient research opening up avenues for brands that aim to capitalize on increased consumer awareness around sugar. Sweeteners, citrus ingredients, carb controllers, and other products are quickly gaining a new depth of clinical support thanks to high-quality trials. As more companies invest in research to prove the effects of blood sugar ingredients, and as more consumers look for ways to minimize the impacts of excess sugar on their health, expect this arena to present more opportunities for new brands and new ingredients.

Mike Straus is a freelance writer living in Kelowna, Canada. He has written for publications including Canadian Chiropractor, Grow Opportunity, and Massage Therapy Canada.

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Today’s dietary supplement manufacturers have enough on their plates already. On top of new ingredient technologies, regulations, nutrition research, and the inscrutable supplement shopper, do they really want to worry about upgrading their supplement-manufacturing equipment?

Perhaps they should, because those upgrades may help them manage their other stressors that much more easily. What’s more, not taking advantage of the latest equipment benefits will almost surely hold supplement brands back.

That’s certainly been Stan Matthews’ observation. “Nutritional manufacturers are challenged with equipment performance downtime, product yield, and producing quality product, among other things,” says the processing division sales manager for MG America (Fairfield, NJ). Fortunately, makers of supplement manufacturing equipment keep coming up with new solutions.

Stay Flexible

Frederick Murray, president, KORSCH America Inc. (South Easton, MA), also understands the hurdles that supplement manufacturers have to clear these days. “Key issues include challenging material flow and compression characteristics, batch-to-batch variability of raw materials, and increased pressure to achieve higher overall operating efficiency,” he observes. “This includes the need to run products faster without sacrificing quality, and the requirement to execute fast changeovers to minimize downtime. There’s an increasing trend to produce multilayer tablet formats, too, which requires a highly flexible equipment platform.”

That’s a tall order. And indeed, shifting preferences in delivery formats are a recurring theme in today’s dietary supplement space. Notes Anand Rajan, head of sales, North America, ACG Engineering (Piscataway, NJ), “We’ve recently observed the resurgence of liquid-filled capsules as a platform for new-product development—a segment that’s still primarily catered to by softgels. Customers who want to combine multiple ingredients into a single dose now turn to liquid-fill and combination fill-in hard capsules as a preferred platform.”

This might yield configurations like pellet/beads with liquids, tablets in liquid, and capsules in capsules, he continues. “These novel, customized oral dosage solutions are definitely going to be part of a larger innovation trend coming from the nutritional industry.”

The Fourth Dimension

As will customized nutrition itself. “The supplement industry must cater to a more health-conscious society seeking more personalized products to meet individual needs,” Rajan predicts. And industry 4.0 will help them do it.

“Industry 4.0 is quickly emerging, and
leveraging technology is key to future success,” he says.

By “industry 4.0,” Rajan refers to the emerging phenomenon of “smart” machines and even “smarter” factories, where equipment is wirelessly networked and automation, data analysis—even cloud computing and artificial intelligence—take production to a new level of sophistication.

Case in point: Murray notes that his company’s machines feature Smart Industry 4.0 capability and a completely redesigned human-machine interface that gives operators access to online help, including manuals, electrical schematics, assembly drawings, procedures and support videos—all right at the machine.

“Based on the latest Allen-Bradley ControlLogix PLC,” Murray says, “our control system offers a remote troubleshooting capability, and full network connectivity for domain login, batch data, product recipe library, and OPC transfer-of-process parameters to a SCADA or iHistorian.” In other words, the machine hardware can talk to computer software, collecting and analyzing real-time data better to optimize production.

Supplements of the Future
The implications for supplement manufacturing are tantalizing. “Linking the reams of data generated by wearables and other devices to craft custom products in a factory of the future run by AI and inductive automation to provide consumers safe and effective supplements is where industry is heading,” Rajan declares.

There will be complexity along the way, of course—“We expect to see a robust debate about data privacy and ethical technology,” Rajan concedes—but he thinks the result will be “a much more innovative range of customizable and efficacious supplements.”

See what a little equipment upgrading can do?

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

Meeting Today’s Needs
KORSCH’s XL 400® and XT 600 machines are geared—literally—to meeting the challenges facing supplement manufacturers today, Murray says.

How? For one, they offer “specific technical advantages,” including longer filling lengths to ensure precise tablet weight control even at high press speeds, and an “innovative dwell bar design that maintains pressure on the tablet between the pre- and main compression station,” he notes.

Both models boast a fast-change design with an exchangeable turret and the ability to make single and bilayer tablets on the same machine.

In particular, the XL 400® model includes an integrated electrical cabinet, torque drive, and fully sealed design “with the inherent capability to produce single-layer, bilayer, and tri-layer tablet formats on the same machine platform,” Murray notes.

And for its part, the XT 600 earns its keep as “a high-speed, high-volume workhorse with single- and bilayer capability, with all our key design advantages in an economical machine platform,” he says.

No More Mix-and-Match
“Traditionally,” MG America’s Matthews says, “capsule filling has necessitated different dosing disks depending on specific fill weights.” His company recently debuted a new design system for its Alterna 70N Tamping Pin Capsule Filler that lets manufacturers use only one dosing disk per capsule size, irrespective of the dose.

Called the EXTRUDOR, the technology eliminates what Matthews describes as the “mix-and-match approach,” simplifying...
the capsule-filling process while improving dosing accuracy and fill-weight consistency, all thanks to its use of a redesigned dosing container and dosing disk “for excellent product layer uniformity.”

“Another advantage of the new EXTRUDOR system is less product waste—a result of a ‘capping’ concept that maintains the powder inside the dosing disk and dosing container,” he continues. “This greatly diminishes powder loss, improves yields, and reduces cleanup time and preventative maintenance costs.” The system promises increased flexibility and smaller parts, too.

The Alterna 70N Tamping Pin Capsule Filler itself features a touchscreen operator-machine interface “for easy control of all machine functions,” Matthews continues. Capable of producing up to 70,000 capsules per hour, the machine has a tamping pin and can handle capsules ranging in size from 00 to 5, DB, elongated.

“Free-From” the Fuss

“Free-from” formulation is the name of the game almost everywhere these days: foods, beverages, cosmetics, and, yes, dietary supplements.

“But with the market trending toward vegan, non-GMO, and additive-free supplements,” ACG Engineering’s Rajan notes, “this poses a unique challenge to manufacturing.”

Namely, manufacturers increasingly granulate supplement ingredients before compression or encapsulation to eliminate the need for additives and achieve better throughputs. “While this approach is capital-intensive initially,” Rajan says, “it provides greater flexibility in the manufacturing and blending of various nutritional supplements.”

His company recently made material changes to its machines’ turrets, increasing their surface hardness to withstand highly abrasive natural supplements. “We’ve also developed pressure rollers with specific hardness targets on compression machines to improve tool life,” he continues, “and we’ve added more intuitive and operator-friendly software that effortlessly cuts setup and changeover times. These advances help industry meet its goals of keeping operational and capital costs low while improving throughput.”

Green Rush

As more supplement brands dip their toes into the cannabis pond, equipment manufacturers are getting a jump on the idiosyncrasies of cannabis production by designing machinery to address the challenges unique to cannabis components like CBD (cannabidiol) and THC (tetrahydrocannabinol).

ACG has angled two of its Fluidocap capsule fillers to cannabis products. The Fluidocap 1000 can tackle cannabis-capsule filling, closing, and band-sealing in one semiautomatic unit, while the Fluidocap 70 capsule filler is robust enough to handle the often oily consistency of cannabis-based liquids. Ideal for filling everything from pastes and suspension to thixotropics and hot melts, the Fluidocap 70 can also accommodate formulation viscosities from 10 to 80,000 cps.

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.
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If you want to know what’s trending, ask a contract manufacturer. Contract manufacturers are in the trenches making products day in and day out for dietary supplement brands, giving them a valuable look at what some truly innovative brands are doing. And while they can’t divulge brand secrets, they can often provide an overall look at what’s trending based on what’s being made in their facilities as well as based on their own market tracking and overview.

So, what trends are contract manufacturers seeing this year?

Nutritional Outlook: Can you pinpoint a few topline product trends your company expects to see grow in the coming year? Also, are there specific health product markets you expect will be especially active in 2020?

Doug Brown, Sales and Marketing Director, Americas, Sirio Pharma [U.S. and China]: “The biggest trend we continue to see is an acceleration in demand for plant-based products globally—it’s the product class that will define the market in 2020. In addition to this, customers are also looking to work with contract providers that can help them work across the broadest spectrum of delivery systems. We can help them move their entire catalogs to plant-based products. More generally, we are also seeing the desire for greater numbers of ‘low sugar’ or ‘no sugar’ products. In terms of contract services, customers are often looking for more strategic partners that they can work with across the globe, delivering in multiple markets and continents.”

Vincent Tricarico, Vice President, Contract Manufacturing, NutraScience Labs (Farmingdale, NY): “We expect the popularity of clean flavor systems for powders to continue in 2020. We’ve also seen more brands successfully enter the beauty-from-within and sports nutrition categories in 2019, and there’s no sign of that trend slowing down over the next 12 months. The primary reason why these brands are doing so well is because they’ve learned to successfully leverage social media platforms, specifically Instagram. Lastly, sleep and memory products should continue to thrive next year.”

Bart Child, Senior Vice President, Commercial Development, Nellson (Anaheim, CA): “Consumers are more conscious than ever about what they eat and understand the connection between nutrition and overall health and wellness and are seeking products to meet specific dietary needs. Of current interest are products that deliver specific functional benefits: brain, eye, cardiovascular, and mitochondrial health. Serving a wide range of consumer markets (sports performance, active nutrition, wellness, weight management, and medical nutrition) allows us to see how trends can vary in definition and appeal depending on the different consumer within each market segment. For example, the trend in products promoting brain health can vary depending on the category: 1) Sports nutrition: for sports and active nutrition cognitive health products for focus, concentration, learning, memory, and reaction time, 2) Weight management: products supporting weight loss might include nootropics by working to improve focus and energy and enhance mood and motivation, 3) Aging population: mental focus, mental alertness, boost of energy.”

Tim Chiprich, Vice President, Product Development, CAPTEK Softgel International (Cerritos, CA): “The trends that CAPTEK will target are hemp products/CBD due to the increasing demand. Beauty products are growing in demand, and CAPTEK will focus on growing both ingestible supplements and topical single-use cosmetics. CAPTEK has been working on new dosage forms for probiotics in addition to the traditional two-piece hard-shell capsules. Finally, clean-label products that use whole-food matrix ingredients will be heavily integrated in CAPTEK’s focus.”

Adam Ishaq, Sales Manager, GMP Laboratories of America Inc. (Anaheim, CA): “One of the biggest product trends we expect to see in 2020 is a continued increase in customized nutrition for consumers based on their diet,
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“Gummies undoubtedly remain a very hot product in both the U.S. and Europe,” says Sirio’s Doug Brown. “But what we are now seeing is a wider breadth of ingredients used and consumer types buying these products.”

Mark LeDoux, CEO, Natural Alternatives International (Carlsbad, CA): “I think that the primary trends will be to provide products with adequate scientific support to address condition-specific issues. Recent court rulings have indicated the bias for substantiation is in favor of obtaining a significant scientific consensus through randomized controlled clinical studies involving adequate and sufficient numbers of subjects for evaluation. I also think that the probiotic space is going to face challenges as well based on viability of cultures presented to consumers. Based on the research we have seen, lyophilized cultures not presented in protected and refrigerated packaging may be the subject of concern of both consumers and the plaintiff’s bar.

With the current explosion of all things cannabidiol and the emergence of litigation at the class action level against companies producing edible products containing CBD, this will most likely be the most closely watched component of the industry. That said, I also think that products that address healthy aging, restful sleep, improved digestion and elimination, improved vision, and other significant health concerns of joint and muscle discomfort are going to continue to achieve wide acceptance—assuming they deliver to the consumer positive results.”

Steve Holtby, President and CEO, Soft Gel Technologies Inc. (Los Angeles, CA): “Consumers look for bioavailability, potency, and purity as key factors in their supplement purchases. Another trend is that consumers want ‘natural’ supplements—those without fillers or chemicals, products made with natural and/or hypoallergenic ingredients, and gentle/buffered formulations. Many avoid supplements with artificial colors/flavors. Whole-food supplements are a growing segment in this supplement category. Some of the top health conditions for which consumers will seek products targeted to improve their quality of life include: healthy aging, anti-inflammatory, energy, sexual vitality, weight loss, sleep aids, and anti-anxiety.”

Maxine Weber, Global Director of Marketing, Health and Wellness, Ashland (Wilmington, DE): “There is a growing interest in crossover formats—so, for example, beauty benefits delivered in a beverage format, or a weight-management product delivered in a topical application. I think the desire is to broaden the delivery format of the nutraceutical to be as easy to incorporate into [a consumer’s] daily routine as possible. For example, we make Phase 2 extract, which helps reduce absorption of carbohydrates. We have a customer who put Phase 2 into a stick pack with savory flavors so that its customers could just sprinkle the product onto their pasta or rice. So now, this application feels more like a seasoning than a supplement.

From our personal care colleagues, we know that the beauty customers are looking for beauty-from-within solutions. We recently created a beauty-from-within drink, which includes collagen and our GPM biotin. Customers were so enthusiastic about it, we will be sharing this same demo with our European colleagues at INCOS, a personal care tradeshow in Europe in March.”

Vincent Tricarico: “We expect to continue to see high demand for clean flavor systems for powders and vegetarian two-piece capsules.”
Bart Child: "Formats that deliver on-the-go convenience and portability are maintaining their popularity. In the bar market, formats appealing to this trend are bites and mini bars. Bites and mini bars today go beyond convenience and shareability; they deliver on portion control—in-between meal snacks or calorie counting. Convenience for powders (ready-to-mix) means portability and single serving sizes. Sticks packs and sachets offer single-use portions that are portable and ready to use."

Adam Ishaq: "We expect to see a continued growth in requests for powder drink mixes. It seems to be a large trend that people want supplements they can add to their daily coffee or smoothies."

Eugene Ung: "Powders in stick packs seem to have strong demand as brands are trying to incorporate their products into the daily lives of the consumer. The traditional softgels and hard-shell capsules will remain staples."

Steve Holtby: "As a softgel contract manufacturer, we’re a ‘legacy’ format manufacturer, so all of our projects fall into that one delivery format. According to Nutrition Business Journal estimates comparing 2013 to 2018, alternative and novel delivery formats—including powders, effervescent products, and gummies—are up 12%.” (Source: NBJ Summit State of the Industry Presentation, July 2019)

Barri Sigvertsen: "While it is likely that innovative delivery formats will continue to emerge, consumers essentially want solutions that are convenient and easy to consume. 2019 research commissioned by Lonza showed that capsules remain the preferred dosage form of choice for 42% of U.S. consumers thanks to their convenient, versatile, and easy-to-swallow properties. (Reference: Natural Marketing Institute SORD study, US; 2019.) We also expect to see continued growth in 2020 for CBD/hemp products in softgels due to its ideal dosage form, its availability in vegetarian softgels, and ease of use. In addition, CAPTEK expects to see growth in single-use cosmetic products in vegetarian softgel dosages that both look attractive and don’t have unpleasant odors.

Tim Chiprich: "CAPTEK Softgel International has witnessed increased requests for various delivery formats, and we expect to see continued growth in 2020 for CBD/hemp products in softgels due to its ideal dosage form, its availability in vegetarian softgels, and ease of use. In addition, CAPTEK expects to see growth in single-use cosmetic products in vegetarian softgel dosages that both look attractive and don’t have unpleasant odors."
We are also developing chewable softgels that act as an alternative to gummies and allow a higher payload of active ingredients than with gummies.”

Mark LeDoux: “Products that require special care to protect against moisture, ultraviolet light exposure, or excess heat are driving the need for more protective packaging that is recyclable and environmentally responsible. Portability for daily use is also going to see increased demand as is convenience of use.”

Vincent Tricarico: “While I wouldn’t categorize it as being ‘novel’ so much these days, all of the industry data we’ve reviewed suggest that gummy vitamins will continue to gain traction as manufacturing becomes more consistent, lead times become more manageable, and consumer demand for this dose form continues to increase.”

Eugene Ung: “The demand for gummies continues to be strong. We’re also seeing increased requests for chewable softgels because, for certain ingredients and applications, chewable softgels may be able to deliver a higher dosage of the active.”

Adam Ishaq: “We expect to see a growth in chewable products, whether those are chewable flavored tablets or soft-chew products. We also have seen a continued increase in requests for sachet/stick packs for powdered delivery forms.”

Mark LeDoux: “The rapid growth of ‘soft-chew’ gummy-based dosage forms is probably going to slow down, and on a value proposition alone, I believe that capsules and tablets will see a resurgence of growth given the cost disparities between these dosage forms.”

Doug Brown: “Gummies undoubtedly remain a very hot product both in the U.S. and Europe. But what we are now seeing is a wider breadth of ingredients used and consumer types buying these products. Probiotics continue to trend strongly, and we are also seeing a noticeable uptick in demand for prebiotic and synbiotic formulations. This combination with the gummy format pairs a newer type of on-trend product with the fastest-growing delivery form. The result has been a surge in demand from consumers.”

Tim Chiprich: “CAPTEK Softgel International expects increased requests in 2020 for the following novel delivery formats: 1) Probiotics in softgel dosage form with new technologies allowing the encapsulation of non-spore forms of probiotics. 2) More whole-food ingredients that can replace traditional supplement excipients. 3) Flavored supplements that use natural flavors to mask the odor of supplements.”

Maxine Weber: “In general, we see trends for portability, increased convenience, and novel sensory experiences. In the fall, we launched a new product, StableFizz effervescent base, which delivers these consumer benefits with an exciting benefit to the manufacturer. This innovative delivery system provides effervescence for sachets, tablets, or powdered beverages without requiring special humidity controls or packaging. We used the collective knowledge of our formulation scientists with the expertise of our manufacturing engineers to create this novel granulation. We have been thrilled with the level of interest this product has generated. You might say that customers are bubbling over with excitement.”

Bart Child: “We expect to see more requests for powdered stick pack products that are single-use, single-dose, and do not require water—just open the stick pack and pour into your mouth. This is a great option for delivering a very specific dose of a functional ingredient. For example, a single dose of lutein for eye health can bedispersed right onto the tongue—no water, bottle, or shaker needed.”

Steve Holthy: “Finished-product manufacturers strive to provide consumers with dietary supplements that offer optimum health and value. In order to achieve these two goals, the appropriate delivery system must be selected. Of course, when determining whether to formulate in a tablet, capsule, or softgel, consumer preference for vegetarian ingredients, pill size, and dosing compliance are important issues to ponder. However, the dosage form chosen will have a significant impact on bioavailability and should be one of the major considerations when selecting a particular delivery system. Supplement effectiveness is highly dependent on how the nutrients are delivered to the body (i.e., bioavailability).”

Dietary supplements come in many forms, including tablets, capsules, powders, energy bars, and liquids. The Federal Food, Drug, and Cosmetic Act clearly states that a dietary supplement is intended for ingestion and may not resemble a food or meal replacement.”

Mark LeDoux: “Products with new dietary ingredient (NDI) ‘acknowledgement’ (AKL) status [and] products that have undergone the rigorous of double-blind crossover controlled studies and which may have received patents would be my bet.”

Vincent Tricarico: “Less will continue to be more in 2020. For example, demand for collagen products was white-hot in 2019, and there’s no reason to believe that it will slow down next year. We also expect to see more demand for unflavored protein.”

Adam Ishaq: “Collagen seems to be an ingredient that will stay in 2020, as we are constantly receiving requests for collagen products from finished-product brands with a variety of product lines.”

Bart Child: “Ingredients from natural sources that provide a variety of functional benefits, such as adaptogens and nootropics.”

Eugene Ung: “[Ingredients that are] similar to the topline trends: collagen, turmeric, CBD, vitamin D, biotin, essential oils.”

Maxine Weber: “In addition to some novel delivery formats, the bulk of the nutraceutical market is still in tablet form. We see demand for updating tablet formulations such as ability to make organic claims, reducing
tablet size, and eliminating undesirable ingredients. With our expertise in tablet formulation, we created several ingredients to help our customers address these needs. Our new Aquarius TiO2 Free coating provides excellent color and coverage without the use of titanium dioxide. We also have introduced Nutrapress binder, which is a binder for organic supplements.

Tim Chiprich: “CAPTEK Softgel International maintains over 3,000 different active raw materials in house at any given time, from over 300 different vendors. The trending ingredients we anticipate for 2020 include: 1) Natural colorants that are stable and attractive, 2) Natural cosmetic ingredients, both ingestible and topical, and 3) Natural flavors that truly mask the odor of supplements without being overpowering.”

Barri Sigvertsen: “Evolving consumer preferences are driving greater demand for more natural, sustainable ingredients with cleaner labels that are science-backed, support a healthy lifestyle, and meet transparency and traceability ideals. For this reason, we expect that ingredients that speak to the demand for more values-based supplement products, like Lonza’s innovative, vegan MuscleGuard formula, to resonate more and more with consumers in 2020. The new MuscleGuard formulation comprises a unique blend of four ingredients derived from vegan sources. Clinical research identified that this powerful combination can support significant muscle health benefits, including a 63% increase in muscle strength, mass, and activity in a clinical study on older people to support consumers’ sports and exercise aspirations. (Reference: Bellamine et al., Nutr Metab, 2017)

Furthermore, sports nutrition solutions that also align with other major trends, such as the boom of marine ingredients—like our Oceanix marine phytoplankton—offer added value for those seeking products with natural and clean-label credentials to support sports performance. The Oceanix brand delivers high concentrations of superoxide dismutase (SOD), a highly active antioxidant enzyme that helps to protect against oxidative stress during exercise. We also anticipate that UC-II undenatured type II collagen will continue to rise in prominence as consumers increasingly search for solutions that support longer-term joint health and mobility.

Doug Brown: “What is really driving the market are new, innovative combinations of ingredients. For example, omega-3 and probiotics individually remain high-demand ingredients, but the combination of the two opens up an innovative new solution pathway for consumers. With new capabilities, there is a great deal of excitement in being able to bring these together for new formulations. Sirio has a number of patents for this technology, and we have really led the market here in delivering new formulations with stable shelf lives and good levels of probiotic activity. In fact, we are only just beginning to explore all the potential here. It’s very much an area to watch closely in 2020.”

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Nutritional Outlook: Are there any specific packaging or labeling trends you expect to be especially popular in 2020?

Mark LeDoux: “Under the new [FDA Nutrition Facts] labeling guidelines and further requirements of the Food Safety Modernization Act, I believe transparency will be the mantra of the day. The deployment of ‘proprietary blends’ is probably going to decline substantially given the desire of consumers to know precisely what they are buying.”

Tim Chiprich: “Due to ever-increasing requests from our clients for packaging support, CAPTEK Softgel International has expanded our bottling service offerings. Several packaging and/or labeling trends we expect to grow in 2020 include packaging that protects the product if delivered by mail-order, new Supplement Facts regulations that will stimulate new reformulations and new label designs, and masking the odor of supplements using natural flavors that truly block the bad smells that build up in the headspace of bottles.”

Eugene Ung: “Aside from the revised labeling guidelines that went into effect on January 1, 2020, clean label utilizing natural, non-GMO, organic ingredients, and minimal excipients, will continue to be popular. Sustainable packaging options are also key areas of opportunities not only for brands to differentiate themselves, but also make a positive impact on the environment. We expect (and hope) to see additional options in this area.”

Adam Ishaq: “We expect to see more and more finished-product brands using environmentally friendly packaging.”

Vincent Tricarico: “As is the case with ingredients, less will be more when it comes to nutraceutical packaging and labeling trends in 2020. Clean- and simple-looking labels with a matte finish will unquestionably stand out on a product shelf. We also believe there will be a transition away from traditional bottles and more demand for gusset bags, sachets, and packets. Consumers these days tend to purchase products from companies/brands that place a priority on sustainability and reducing their footprint—even if it means spending a few extra dollars.”

Nutritional Outlook: Which are the biggest concerns your company will be keeping its eye on in 2020?

Eugene Ung: “The biggest concern might be FDA and CBD from the perspective of growth opportunities for the industry. The trade war and ‘Trump tariffs’ continue to impact many companies.”

Adam Ishaq: “As we source global ingredients, we are always concerned that tariffs or any restriction to trade may create a rapid increase in cost of raw materials which we have to pass on to our customers.”

Vincent Tricarico: “We need to keep an eye on the trade negotiations and how restrictions and plant closures in other parts of the world will impact supply. A successful manufacturing partner will have the experience to meet the needs of its customers while keeping most of the noise hidden below the surface. Additionally, many of us in the industry are anxious to see what Congress and the FDA decide to do with CBD.”

Barri Sigverson: “As ever, our in-house regulatory department will be closely monitoring changes in the evolving regulatory landscape to ensure compliance at all stages of product development, from R&D through to quality control. We will also follow with interest as consumers and customers alike become more and more attuned to protecting the planet, and we will work closely with our supplier network to ensure we are able to deliver the transparency they desire.”
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<td>Trividia Manufacturing Solutions</td>
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Clean Competitors

Clean-label colors have limitations, but suppliers are overcoming them.

BY SEBASTIAN KRAWIEC, ASSOCIATE EDITOR

Clean-label colors made from natural ingredients are in demand, making their way into a number of products, including dietary supplements, beverages, and food. While a great deal of innovation has occurred to get clean-label color performance on par with non-clean-label counterparts, challenges still remain.

Clearing Clean-Label Hurdles

The importance of color quality cannot be understated. Visual beauty strongly influences a customer's purchasing decision when debating whether to buy a supplement, food, or drink. Clean-label colors can struggle to match the aesthetics and durability of conventional colors. But where there is a will, there is a way.

“The increase in demand [for clean-label colors] has prompted a wave of innovation that has eradicated some of the formulation issues of the past, including lackluster options, limited shelf life, and processing instability,” says Andrew Wheeler, vice president of corporate marketing at Van Drunen Farms (Momence, IL). “Colors were previously dull and muted, and could only be used in a handful of applications.”

When organic colors were introduced, their lack of strength either had to be accepted—or formulators would have to increase the dosage, increasing the costs of raw materials.

The first step to improving color quality in a finished product is improving the quality of the raw materials. “By optimizing our raw materials through agronomy and extraction methods, Diana Food has managed to provide the market with high color strength references that are brighter and more stable than previous organic color solutions,” says Teresa Kilgore, category manager, sweet and beverage, North America, for Diana Food (Hashbrouck Heights, NJ).

Certain colors, such as greens and reds, have their challenges. For example, in Europe greens are traditionally accomplished with copper chlorophyllin or blends containing safflower, Kilgore explains. While chlorophyllin is non-synthetic by European standards, in the U.S. it is only approved for use in powdered citrus beverages, and safflower is not permitted for use as a color additive in the U.S. “For the U.S., we have developed blends containing spirulina and yellow carrot juice concentrate,” she says. “These are both bright and stable color solutions which consumers expect with the clean label they want.”

Beet and cranberry are now being utilized to achieve red colors. “More innovation in red colors is coming, as [red] is the color used in plant-based meat applications,” says Wheeler.

Antiochyanins can be used to create a range of pinks and reds in low-pH applications such as beverages and candies, says Kilgore—but in higher-pH applications, anthocyanins come out bluer and more purple. “We offer red beet for these applications, but this is not without problems, as red beet is not very heat or light stable,” she says.

Blends are also helpful in these cases, she adds. “For these more complex applications, we offer a stabilized beet which uses a unique blend of fruit concentrates that helps maintain the shade in harsher applications,” Kilgore explains. “Another challenge of low-pH applications is the shade of the single-source anthocyanin does not meet the target shade. For this, we formulate specific blends using other juices and concentrates to adjust to the target shade.”

Clean-label colors also face regulatory challenges, despite their connotation as being more natural and the safer options. “If the FDA does not or has not yet officially authorized a color as safe for use, it is considered unsafe and cannot be used, even if it comes from a natural source,” explains Wheeler. “It is possible to submit a new color for approval from the FDA, but it should be noted that it is essential for the color to be authorized for every category of product it will be used within, whether it is food, supplement, cosmetic, or a different category.”

Nor can a product containing natural colors be labeled as “no artificial colors,” adds Wheeler, because they are still deemed to contain color additives by FDA and other regulatory bodies. This is unfortunate given the negative connotation of artificial flavors among consumers. The lack of harmonized color-additive regulations globally also poses a challenge for commerce, says Kilgore. “Although Diana Food has a wide range of clean-label colors, the lack of harmonized regulations can limit our offerings depending upon the country of sale,” she explains.

She remains optimistic. “We believe the continuous demand to eliminate synthetic substances will result in increasing industry petitions for new colors derived from natural sources,” says Kilgore. “And this will create a more robust and harmonized framework for the food industry.”

Given the amount of progress already achieved, the industry will continue to innovate as regulators catch up to the clean-label color marketplace.
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