Are Omega-3s Heart-Healthy?

Critics vocally question omega-3’s benefits for heart health, but will positive research prevail? p. 24
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*These statements have not been evaluated by the FDA*

Vidya Herbs Inc
1412 E. Valencia DR, Fullerton, CA 92831. Tel: 714 992 1288, Fax: 714 992 1289
Email: sales@vidyaherbs.com
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"No Synthetics” NDI Provision Is a Selling Point for “Natural” Firms

FDA’s new dietary ingredient (NDI) draft guidance is still fresh out the gate, and at October’s SupplySide West show, it was evident to me that the guidance is especially top of mind for suppliers of natural botanical ingredients, many of whom are now leveraging, as a selling point, the guidance’s stance barring synthetic botanicals as dietary ingredients.

The draft guidance says, “A substance that has been synthesized in a laboratory or factory has never been part of an herb or other botanical and, therefore, is not a dietary ingredient.” A number of firms I interviewed not only said that their natural ingredients were preferable to synthetic ones but also made a point of underlining the fact that FDA’s NDI draft guidance does not consider synthetic botanical ingredients to be dietary ingredients.

For instance, in discussing the growing problem of natural curcumin being spiked with synthetic curcumin, Anurag Pande, PhD, vice president of scientific affairs for curcumin supplier Sabinsa (East Windsor, NJ), told me that “[synthetic] curcumin can cause serious risks to health, and it is also illegal as per FDA’s [NDI] guidance documents and [the agency’s] longstanding position that a synthetic is not the same as a botanical.” (For more on curcumin spiking, turn to page 14.)

Natural-astaxanthin suppliers, too, mentioned the NDI draft guidance to me as they highlighted the differences between natural and synthetic astaxanthin. Joe Kuncewitch, national sales manager for natural-astaxanthin supplier AstaReal (Burlington, NJ), said, “Synthetic astaxanthin seems to fall under a gray area—that is, the jury is out as to whether it meets the criteria of being a dietary supplement ingredient within the scope of filing an NDI notification. It has approval for being a pigment in fish feed, but we’ve yet to see NDI notification for synthetic astaxanthin for human use in dietary supplements.”

These comments were striking to me because they exemplify how the NDI guidance serves as a selling tool for firms looking to contrast their ingredients with the competition. Here, I’m addressing the subject of synthetic-versus-natural strictly from a regulatory/marketing point of view. Kuncewitch, for instance, questioned whether synthetic-astaxanthin suppliers would be able to attain NDI status at all. "Could they get the NDI?" he asked. "This is the $64,000 question that may need to be answered."

For the record, not all synthetic-ingredient firms believe they need an NDI notification. DSM Nutritional Products (Parsippany, NJ), for instance, has for years maintained that its AstaSana nature-identical astaxanthin does not need an NDI notification in order to be used in dietary supplements. First, the firm says, AstaSana has self-affirmed GRAS affirmation (with plans to notify FDA, it added) at a dosage of up to 6 mg/day. FDA’s NDI guidance says that if an ingredient has GRAS standing, firms may be able to bypass NDI notification in order to use the ingredient in a dietary supplement. Secondly, DSM says that AstaSana is an approved color additive that has long been present in the food supply, and as part of the food supply, it qualifies for the FDA exemption that states that an NDI notification is not required if an ingredient “has been present in the food supply as an article used for food.” (AstaSana is fed to farmed fish, such as salmon, in order to impart a pink color. That fish is then eaten by humans and therefore, DSM says, enters the food supply.) Finally, the NDI draft guidance provides another possible exemption, stating that “a synthetic copy of a botanical ingredient may qualify as a dietary ingredient under section 201(ff)(1)(E) if the synthetic copy has been used as a lawfully marketed ingredient in the conventional food supply”—which, again, DSM argues AstaSana has been.

As such, Hugh Welsh, president of DSM North America, told me, “DSM does not plan to submit an NDI notification.” Moreover, he said, “DSM is not concerned about the comments regarding synthetic botanicals not being considered as dietary ingredients under section 201(ff)(1)(B).”

Still, in cases where natural ingredients compete with synthetic ingredients, I would expect to see more natural-ingredient firms striking a market position by embracing the NDI guidance’s “no synthetics” provision.

The subject of synthetic ingredients is always a controversial one in the natural products industry. On one hand, no one can deny that synthetic ingredients give people who lack access to adequate nutrition the ability to obtain critical, supplemental nutrients at a low price. But, from a marketing perspective, it will be interesting to see whether the NDI draft guidance becomes a point of contention between firms that make natural ingredients and firms that do not.

Jennifer Grebow
Editor-in-Chief
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New DNA Test Method Lets Probiotic Firms Test Multistrain Blends

Probiotic supplements often contain more than just one probiotic strain; most products today comprise a blend of multiple, beneficial strains. When it comes to verifying strain identity, most companies can and do have the ability to test individual bacterial strains before they are blended together in a finished product. But once those strains are mixed, testing becomes a lot more difficult.

The scientists at probiotic supplier Dupont Nutrition & Health (Wilmington, DE) say they have developed testing methodology that makes it easier to identify the bacterial strains in a multistrain blend.

According to Buffy Stahl, R&D Leader, Dupont, whom Nutritional Outlook interviewed at SupplySide West, current methods that can test multistrain blends are prohibitively expensive and time-consuming. For that reason, Stahl claimed, “It is not done, in fact. Once you’ve blended probiotics together—let’s say you blend four different strains together—current methodology does not allow you to test those four different components without quite a long time to release process. It is a very expensive, time-consuming process, and so there really is nobody in industry that’s testing the species after they’ve blended them together.”

In March of this year, authors of an mSphere study1 led by an FDA microbiologist wrote, “The methods currently used to identify microbes within dietary supplements are laborious and do not provide immediate identification to the species level when dealing with a mixed microbial community.” Instead, most of the testing done in industry today is “classic” microbiology and is performed on unblended strains, Stahl said.

In theory, if one were to use traditional microbiology to test a strain mixture, “you would blend all of those species and strains together, and then you would try to plate them out and pick single colonies and then test them individually,” she said.

Realistically, however, the microbiology approach is unwieldy when dealing with multiple strains. “If you have a formulation that contains millions, billions, of bacteria, and they have relative abundances that are different—meaning you might have one strain that’s present in an amount that’s a thousand times more than another strain—imagine how many different colonies you would have to pick in order to get the right results?” Stahl said. “So it’s very difficult to resolve using classic microbiology in that way, which is why I think there hasn’t been very good compliance on testing of blends.”

Firms instead direct their efforts to testing probiotic strains before they are blended. But not testing a finished product leaves room for gaps in quality and safety.

“People tend to test before they blend things together, which is perfectly acceptable,” Stahl said. But without “post-blending analysis, you can no longer check that you didn’t have cross-contamination, that what you added in your process didn’t influence [what’s in the final product], or whether you forgot to put an ingredient in,” she said. The mSphere authors noted that “errors in labeling accuracy due to the miscalculation of levels of bacteria or the proper taxonomic identification of bacterial species have been reported extensively worldwide.”

FDA Proposes Deep-Sequencing DNA Testing

The mSphere researchers aimed to find better methods for testing blends. They tested 10 commercial multistrain probiotic products using “next-generation whole-genome sequencing”—that is, deep-sequencing DNA testing. According to the researchers, deep-sequencing successfully identified both the types and amounts of bacteria present in a sample, as well as any undeclared microbial contaminants. But they acknowledged that the testing process “is still costly” and that it could potentially deliver results “within one week.”

And therein lies the problem for the dietary supplements industry. Even if probiotic manufacturers wanted to use deep-sequencing, this method may still be too slow and too expensive for industry to feasibly use in practice, Stahl said. “For manufacturers, it doesn’t allow us a lot of flexibility to release product quickly. So for identity testing, to use that kind of intensive, rather expensive test wasn’t very practical.”
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An “Intermediate” Solution
Instead, Dupont suggests manufacturers use a PGI-based test, which is a polymerase chain reaction or PCR-based method, that can turn out results in just one day. Stahl described it this way: “Right now we call it a PGI-based test, which is the genetic gene that we’re surveying for. It stands for phosphoglucone isomerase.”

As opposed to the deep-sequencing FDA test, Dupont is proposing this PGI-based method “as an industry-accepted intermediate,” Stahl said, “between the depth of information you can get with full genome metagenomic sequencing, like the FDA has published on, versus currently not testing whatsoever today.”

Even if this test method doesn’t go as “deep” as deep-sequencing, as an intermediate, it works, Stahl said, because “we have the resolution we need and we have a quick time to result that gives us a picture of all of the different species that are commonly formulated in probiotics.”

PGI testing is DNA testing, as is 16S rDNA sequencing, another type of DNA test commonly used for bacterial identification and pathogen testing. The difference between them is that PGI testing works on multistrain blends whereas 16S does not.

The 16S method tests for the 16S gene and “only works when you have individual, isolated strains,” Stahl said. “When you blend them together, it becomes a mixed picture, and the different strains are very difficult to differentiate. You get a mixed signal, so to speak.” Stahl said that 16S can only yield species-level identification, but it will not identify at the strain level. Comparatively, the PGI test “has better resolution” and “can actually determine not only the species but subspecies-level identification.”

Setting an Industry Standard
Stahl said that Dupont has so far tested the PGI method on 20 different probiotic species and strains. The company has already shared the test method with its customers, and Stahl said that Dupont has presented this test method to the USP for possible inclusion in the General Chapter for probiotics. According to USP’s public relations manager, Claudia Costabile, USP is working with several manufacturers on test methods for probiotic strains, both for foods and dietary supplements. Any new probiotic standards would be published in the Pharmacopeial Forum for public comment. If, down the line, testing labs begin using the PGI-based method, Stahl said they would be able to “pretty inexpenisively get the equipment necessary to run this test internally.”

By now, FDA and its Good Manufacturing Practices regulations have made clear that supplement firms are required by law to verify the identity of the ingredients in their products. The agency is also paying more attention to the issue of testing microbial blends. “As an industry, we need to have the proper methods to test multiple species in a blend,” Stahl said, “because this is how people are consuming things. Having a test available in order to get every component in the ingredient is really of primary importance for safety.”

Reference

Curcumin Suppliers “Guaranteeing” Natural Curcumin Is Not Synthetic by Using Carbon Dating
Curcumin is one of the most popular herbal supplements on the U.S. market today, evidenced by booming sales in both the natural and mainstream channels. According to the American Botanical Council’s annual HerbalGram herb-sales report, sales of turmeric (Curcuma longa), the Ayurvedic herb from which curcumin is extracted, grew 118% in the mainstream supplement channel in 2015, to $15.74 million. Sales in the natural channel were even higher, growing 32% in 2015 to reach $37.33 million. Consumer demand for curcumin is skyrocketing, but that demand comes at an unfortunate price—adulteration. More specifically, outliers are using synthetic curcumin to spike natural curcumin.

It’s the classic story of economic adulteration provoked by unbalanced supply and demand, said Mohamed M. Rafi, PhD, founder and CEO of curcumin supplier Bioactives American Corp. (Highland Park, NJ). According to Rafi, the problem with curcumin adulteration has been growing since around 2010 when there was a shortage in curcumin supply.

“Commercial production [of curcumin] remains centered in India, while product demand remains strongest in Europe and North America,” Rafi explained in a Bioactives American white paper discussing natural versus synthetic curcumin. “As such, supply can be somewhat uneven, with some shortages of available ingredient impacted not only by demand but by occasional poor harvests and variable quality. These supply issues have led to the growing problem of adulteration of the available curcumin supply.”

Anurag Pande, PhD, vice president of scientific affairs for curcumin supplier Sabinsa (East Windsor, NJ), indicates that the problem of curcumin spiking in the U.S. may be even more serious than many realize. According to Pande, “Sabinsa recently found that there is quite possibly a sizeable amount of adulteration from synthetic material in the curcumin market in the U.S. and some other parts of the world where such adulteration provoked by unbalanced supply and demand is not uncommon.”

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is curcumin offered at a very low price,” said Pande.

According to Rafi, synthetic curcumin may cost up to half as much as natural curcumin—for instance, $60/kg versus $120/kg. “The adulteration happens because a part of industry has not realized the risk of sourcing ingredients based on price alone,” Pande added.

If a company suspects curcumin may be adulterated, confirming that fact is no easy task, however, because many test methods, including DNA testing, cannot differentiate synthetic and natural curcumin. And that’s because adulterers have gotten very good at mimicking the real thing.

“Natural turmeric-derived samples usually contain a mixture of curcumin (about 75%–80%), demethoxycurcumin (about 15%–20%), and didemethoxycurcumin—also known as bisdemethoxycurcumin (below 5%),” Rafi explained in the Bioactives white paper. Together, these three curcuminoids comprise curcumin’s key active constituents. This standard mixture is commonly known in the industry as “curcumin 95%.”

When natural curcumin is tested using high-performance liquid chromatography (HPLC), these three curcuminoids register as specific peaks. The problem is that adulterers are now able to create synthetic curcumin that will also register these same three peaks.

“The synthetic adulteration unfortunately is difficult to find by regular analysis as it does not leave any chemical fingerprint which can be analyzed, neither can it be detected by a DNA test,” said Sabinsa’s Pande.

Instead, some curcumin suppliers are now turning to radiocarbon dating. Natural curcumin extracts contain carbon 14, a radioactive isotope of carbon. Plants naturally contain carbon 14 (also called radiocarbon) because it is part of the carbon dioxide that plants take in from the atmosphere during photosynthesis. Synthetic curcumin, which is created using petrochemicals/fossil fuel, does not contain carbon 14. Using carbon dating (C14 testing) via methods like accelerator mass spectrometry, analysts look for the presence of carbon 14 to confirm that an ingredient is, in fact, from a natural source.

Pande said that Sabinsa was the first company to begin testing curcumin using this method of carbon dating, which was developed by the University of Georgia’s Center for Applied Isotope Studies (Athens, GA).

“When Sabinsa found the possibility of synthetic adulteration in the market, we started looking for ways to ensure that our customers are not exposed to that risk,” he said. “We collaborated with the University of Georgia to find a solution. We also shared our finding with industry and our consumers to help educate about the possible risk, and we continue to raise the issue and caution industry.”

“We welcome other companies following Sabinsa’s lead to test their products by C14 and help weed out the problem of adulteration,” he added. Sabinsa said it is now using C14 testing on its entire range of Curcumin C3 Complex natural-curcumin products to guarantee that it’s natural.

Bioactives American is also using C14 testing. At SupplySide West, the company promoted its Curcuzen 95% natural curcumin ingredient. Rafi said the company guarantees that Curcuzen will always be authenticated using C14 testing. “Every batch of Curcuzen goes through the University of Georgia for C14 testing and will be 100% natural,” Rafi said.

Curcumin purchasers should consider using C14 testing if they aren’t already to determine whether the ingredient they are buying is 100% natural curcumin, or if it is synthetic or even a mixture of natural and synthetic curcumin (which C14 testing can also reveal). According to Sabinsa, several commercial labs have adopted the test method.

Beware Synthetic
What’s the harm in synthetic curcumin? As Rafi pointed out in the white paper, synthetic curcumin ingredients “have not been tested for safety and pharmacological activity.” And, he said, synthetic and natural curcumin “are not interchangeable for pharmacological activities”—meaning that the health benefits that science has so far ascribed to natural curcumin, including antioxidant and anti-inflammatory properties, cannot be attributed to synthetic curcumin as well. “Nature versus synthetic—the health benefits will be different,” he said.

More significantly, Rafi said, synthetic curcumin may actually be harmful. “When you do synthetic, a lot of toxic residues will be there, like benzene,” he said. “Benzene is very toxic, cancer causing. Then solvents. Natural curcumin will never use any harsh solvents. We use ethanol, ethyl acetate, acetone. These are the solvents that are used for natural extraction. We never use ethylene dichloride. But synthetic curcumin is completely from petrochemicals.”

In addition to synthetic curcumin’s unproven efficacy, Pande pointed out that there can be serious regulatory consequences to using synthetic curcumin. “[Synthetic] curcumin can cause serious risks to health, and it is also illegal as per FDA’s [new dietary ingredient] guidance documents and [the agency’s] longstanding position that a synthetic is not the same as a botanical. Further, it is a federal crime to expose the consumers to the risk of synthetic compounds, which have no safety studies.” FDA’s new dietary ingredient draft guidance, released on August 11, states that, “Under a plain reading of the FD&C Act, a synthetic copy of an herb or other botanical does not qualify as a dietary ingredient under section 201( ff)(1)(C) of the FD&C Act. As defined in the glossary, an herb or botanical includes only plants, algae, fungi, their exudates (secretions, such as sap or resin), and their physical parts. A substance that has been synthesized in a laboratory or factory has never been part of an herb or other botanical and, therefore, is not a dietary ingredient under section 201( ff)(1)(C) of the FD&C Act.”

Pande pointed out that Sabinsa has led the way by taking action against adulterers. “Sabinsa was the first and only supplier in the market to highlight the synthetic adulteration issue with regard to curcumin by initiating and publicizing several lawsuits against companies knowingly supplying synthetic versions but calling it natural. No other supplier, or trade association for that matter, has taken companies to court like Sabinsa has.” One of those companies is Bayir Extracts Private Ltd., an India-based firm against whom Sabinsa filed a criminal complaint in 2015, alleging that Bayir had “knowingly” supplied Sabinsa with curcumin that was 43% synthetic along with a forged Certificate of Analysis.
Vigilance Needed in Other Areas, Too

Guarding against curcumin adulteration also begins at the very start of the supply chain, said Timothée Olagne, business development manager and marketing director, nutrition and health, for Naturex (Avignon, France). Naturex supplies curcumin, too. Olagne said that Naturex is also aware of adulteration issues in the market. He said his firm has performed carbon testing to detect synthetics, although it does not perform the testing on a "systematic basis." But, said Olagne, the company is confident in the authenticity of its supply because it has a strong traceability system that reaches all the way back to where the turmeric is grown.

"Identification is not a one-way process," Olagne said. "There are different methods. I think traceability and controlling the source is another one." He added that "the customer that comes to Naturex, they are going there because they know that it’s from nature. So it’s not that we don’t know what’s happening in the world market. What we know is what we’re doing, and we have good traceability."

Working with a reputable ingredient supplier is key to guarding against adulteration, these suppliers said. "Marketing companies must be more careful choosing suppliers or at least test for source identity," Pande said. "Unfortunately, not all brands do their due diligence and thus end up having spurious curcumin in their product, risking the brand name, industry credibility, and consumer health all at the same time."

Consumers should also be on the lookout, Rafi said. "When you look at the pricing of the finished product, some companies are selling 60 curcumin capsules for $7. It’s not possible." The wide cost discrepancy on the market for finished curcumin supplements, which can range anywhere from $7–$60, already indicates there is a problem, he said.

The bottom line is that although consumers and supplement makers may be attracted to lower-priced curcumin, they should not operate on price alone. "It’s not possible to buy curcumin from India for less than $100/kg," Rafi said. "The price should be around $120–$130." If buyers start seeing prices in the $60 range, then they should be wary, he said.

Because ultimately, if a firm ends up facing the serious consequences of using synthetic curcumin, "one may ask if such cost savings was wise at all," Pande said.

Curcumin suppliers like Sabinsa and Bioactives are now intent on getting the message out about the risks of synthetic curcumin in order to protect their stake in the natural-curcumin industry. As Pande said, "the ultimate price of such product is paid by the whole industry in the form of lack of trust from consumers."

"It is a problem which the industry has to face on a united front," he said.
One CBD supplier says its supplements business is booming in the wake of the regulatory controversy surrounding hemp CBD, but are tougher days ahead?

By Michael Crane, Associate Editor

FDA may not recognize hemp cannabidiol (CBD) as a dietary supplement ingredient, but that hasn’t stopped the ingredient from shooting up the supplement sales charts. In fact, according to some, the many headlines on CBD’s shaky legal status on the supplements market may actually be helping sales. The question, though, is how much that growth can continue if the ingredient’s regulatory baggage continues to follow it.

Several supplement products containing hemp CBD, a non-psychoactive component of Cannabis sativa, have become the target of FDA scrutiny in recent years, including, most recently, warning letters the agency sent to eight companies marketing CBD foods and dietary supplements earlier this year. In FDA’s opinion, hemp CBD is excluded from the definition of a dietary supplement ingredient because of existing authorizations for investigational new drugs (INDs) containing CBD. Those IND authorizations, for GW Pharmaceuticals’ Sativex and Epidiolex drugs, were made public on November 26, 2007, and May 24, 2014, respectively. Although FDA says it would allow CBD supplements if it had evidence of such products being marketed prior to the IND dates, the agency concluded this was not the case and therefore CBD cannot be sold in foods or supplements.

In response, many within the hemp CBD supplements industry have challenged FDA’s timeline, claiming CBD was in fact marketed as a dietary supplement before the IND dates, the agency concluded this was not the case and therefore CBD cannot be sold in foods or supplements. That leaves us with the current standoff—a U.S. market where hemp CBD supplements are selling well in the face of FDA resistance. But going forward, will the regulatory controversy continue to be as favorable to CBD-supplement business?

Business Is Booming

While it might seem like hemp CBD supplements would be attracting negative public attention as a result of FDA warning letters citing the ingredient’s murky regulatory status, the controversy has actually been great for business, said Stuart Tomc, vice president of human nutrition for CBD oil supplier CV Sciences (Las Vegas). He explained that each time hemp CBD supplements made headlines, it presented an opportunity for the industry to get more exposure. With that in mind, is all publicity good publicity?

“Well, I don’t really like that adage,” Tomc told Nutritional Outlook at the SupplySide West trade show in October. “But I guess it’s a little true in this case.” He added that the recent media exposure for hemp CBD has helped CV Sciences get to the point where it is today—supplying CBD ingredients for products that can be found in around 800 health food stores.

Still, the regulatory controversy has been enough to keep some major retailers from picking up CBD supplement products, including Vitamin Shoppe, GNC, and Whole Foods, Tomc noted. That’s okay, for now, he said, because interest in CBD supplements is still building, and CV Sciences has managed to achieve success with smaller, independent retailers.

CV Sciences disagrees with FDA’s position that the CBD drug applications publicized by GW Pharmaceuticals predate marketing of CBD as a supplement or food product, but Tomc said FDA’s stance is also not an issue he’s incredibly concerned with.
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*Panahi Y, et al. Lipid-modifying effects of adjunctive therapy with curcuminoids-piperine combination in patients with metabolic syndrome: Results of a randomized controlled trial. Complement Ther Med (2014), Mashhad University of Medical Sciences

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For one, he argued that Sativex, the subject of the IND made public in 2007, contains both CBD and THC (tetrahydrocannabinoid, the psychoactive component of hemp). Therefore, he said, it is not a comparable formula to the hemp CBD found in most supplement products. With that objection and others to FDA’s CBD timeline, he believes the case will eventually make it to a jury, with a ruling that negates the IND preclusion against hemp CBD products marketed as dietary supplements.

An Uncertain Future
On the other hand, not everyone is so optimistic about the future of hemp CBD supplements. Marc S. Ullman, counsel at the New York–based law firm Rivkin Radler, said he is “concerned with the long-term prospects” of companies that continue to market hemp CBD products as dietary supplements. Ullman spoke on a panel titled “Channels of Trade for Consumption of Cannabis” as a part of the American Herbal Products Association’s (AHPA; Silver Spring, MD) Botanical Congress at SupplySide West.

“I have yet to see any company that continues to market CBD put forward any serious evidence that this ingredient was marketed as an article used in food prior to these IND applications,” Ullman told Nutritional Outlook. “Marketing of hemp stalk oil is not sufficient—the evidence must relate directly to CBD. Absent this evidence, I am not optimistic that there is a legal basis for overcoming FDA’s position.”

Nonetheless, he suggested there may be an alternative pathway for CBD supplements besides contesting the timeline of the INDs versus a history of marketing as a food or supplement. Instead, the industry could “undertake a serious effort to differentiate naturally occurring CBD from whatever it is that GW [Pharmaceuticals] is pursuing as a drug.”

Rebrand as Hemp Stalk Oil?
For companies willing to cede a little ground and give up the CBD name, there could be a third option: “Revise marketing to remove all reference to CBD and offer their products as hemp stalk oil,” Ullman explained. This would carry challenges of its own, such as finding proof that hemp stalk oil was marketed before the passage of the Dietary Supplement Health and Education Act (DSHEA) of October 1994, or submitting a New Dietary Ingredient notification for hemp stalk oil. But it might allow hemp supplement companies to sidestep the CBD controversy altogether.

Ullman added that while he has “concerns over the long-term viability of CBD products,” he has a “very optimistic” outlook for the future of hemp stalk oil products.

For more on the latest health research behind CBD, turn to page 54.
Sweet Spot

Consumer demand for natural and clean-label is driving natural sweeteners like stevia. But there’s still lots of opportunity for growth.

BY INNOVA MARKET INSIGHTS

Natural sweeteners have enjoyed a good amount of success so far, and, in large part, they have clean-labeling to thank for it. As consumers demand cleaner labels—shorter and more recognizable ingredient lists—they are also paying more attention to ingredient origins, as well as how natural ingredients truly are. This has had a radical and ongoing effect on ingredient use in the industry, with companies now seeking to use all-natural or predominantly natural formulations wherever possible.

In the sweeteners market, we’ve seen this preference for natural ingredients play out in the backlash against some non-caloric or low-calorie sweeteners perceived to be artificial. Opportunities now abound for natural sweeteners like agave, honey, monk fruit, cane juice, and, of course, the highest-profile natural sweetener of them all, stevia.

Stevia

Still, stevia’s penetration has not been as high as expected, despite ongoing regulatory approvals that were initially expected to cause something of a revolution in the sweetener’s use. Based on the product launches Innova Market Insights recorded in the 12 months ending June 2016, just over 1% of global food and drink launches featured stevia. The numbers are higher in the United States (but still modest), where launches featuring stevia sat at 3.2%.

While stevia-sweetened products are being introduced across a range of food and drink sectors, most of the launches were in soft drinks and sports nutrition products. In the United States, these categories together accounted for more than half (55%) of all U.S. product launches using stevia.

Stevia has also impacted the sugar and sweeteners market, where over 28% of introductions featured stevia, either alone or in combination with other ingredients. Still, these launch numbers are relatively low overall, indicating room for opportunity for further innovation.

Soft Drinks

In the 12 months ending June 2016, just under 13% of soft drink launches featured stevia. Stevia is now being used by some of the market’s leading players, most notably Coca-Cola (with Coca-Cola Life) and PepsiCo (with Pepsi True). As opposed to the classic, full-sugar or calorie-free diet sectors, both brands are targeting the lower- or mid-calorie soft-drink markets. Coca-Cola Life is now available in a range of countries, but it has also undergone a number of changes largely in response to a lack of consumer understanding of the mid-calorie concept. (In the U.S. cola category, for example, sales...
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of classic, full-calorie colas have remained relatively static in recent years, while sales of lower-calorie options have actually fallen.)

Instead, stevia’s usage has mainly come from other parts of the soft-drinks market, led by concentrates and mixers, which accounted for 29% of U.S. soft-drink launches featuring stevia in the 12 months ending June 2016, followed by flavored bottled water (21%), juices/juice drinks (just under 20%), iced tea (11.5%), and energy drinks (7%).

In general, soft drinks are trying to present an intrinsically healthy and natural image, so stevia still has room to play in this sector, including in blends with other natural and organic ingredients. And the work continues. New product development is rolling out from brands like Zevia zero-calorie sodas, Jones Stripped natural premium sodas with an organic agave/stevia sweetener blend, Honest Ginger Beer and H2O Water Enhancers with stevia sweeteners, and In the Raw reduced-calorie beverages with stevia.

Dairy
In the dairy sector, stevia usage is relatively low. Less than 4% of dairy launches in the 12 months ending June 2016 included stevia. There is, however, more substantial interest in stevia in the drinking yogurt/fermented beverages sub-category, where stevia was used in nearly one-third of introductions. There is also interest in the yogurt category, where stevia tends to be used in a sweetener blend rather than on its own.

Yoplait’s Yogurt & Juice blends, launched in the United States in 2015, use monk fruit and stevia as natural sweeteners. Chobani’s Simply 100 Greek yogurt range is sweetened with a blend of stevia, monk fruit, and evaporated cane juice. In early 2016, Chobani rolled out a new media campaign for the Simply 100 brand focusing on its all-natural credentials. It also introduced a new Simply 100 Crunch mix-in yogurt.

Opportunities Ahead
While stevia receives a lot of attention, it is not the only natural sweetener in town. Future opportunities lie in the increasing number of natural-sweetener blends, including stevia plus sugar, stevia plus erythritol, and blends with other natural sweeteners like honey, agave, and monk fruit. Stay tuned.

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Omega-3 fatty acids, specifically docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), are renowned for their therapeutic benefits for a broad range of bodily systems. Modern-day research has focused on some key health areas where supplementation can play a role, perhaps none larger than cardiovascular health.

Omega-3 fatty acids support the heart in numerous ways. First, these fatty acids are preferentially incorporated into cell membrane phospholipids, where they both influence signaling across membranes and preserve membrane fluidity. Omega-3s are also able to modulate the function of calcium and sodium membrane channels, and in doing so, promote anti-arrhythmic effects.

Omega-3 fatty acids also support heart health on several anti-inflammatory fronts, which means they may potentially prevent vascular damage that leads to atherosclerosis and endothelial dysfunction. For instance, omega-3s prevent the conversion of the omega-6 fatty acid, arachidonic acid, into pro-inflammatory eicosanoids. By substituting for arachidonic acid in cyclooxygenase (COX) and lipoxygenase (LOX) enzymes, omega-3s therefore decrease inflammation. In addition, omega-3s further promote anti-inflammation, including in vascular walls, by leading to the production of lipid mediators known as resolvins and protectins.

The Negative Current
Given these important attributes, it’s easy to see how DHA and EPA became broadly known as useful contributors to heart health. Yet, despite the fact that several published intervention studies and meta-analyses back the positive effects of omega-3 fats on cardiovascular health, controversy remains about their true value. Mainstream publications, including The New York Times and The Washington Post, have questioned the science behind omega-3s, basing their questions on recent reviews and meta-analyses showing neutral effects of omega-3s on cardiovascular disease prevention.
A recent report published by the Agency for Healthcare Research and Quality (a division of the U.S. Department of Health and Human Services) evaluated the effects of, and associations between, omega-3 fatty acid intake and cardiovascular disease outcomes, looking at factors such as blood lipids, blood pressure, risk of cardiovascular mortality, and development of cardiovascular events. The reviewers searched for published studies between 2002 and 2015 and chose 61 randomized controlled trials and 37 longitudinal observational studies to include in the analysis. While the researchers concluded that there was evidence of a benefit of omega-3 fats for raising HDL cholesterol, lowering triglycerides, and lowering the total cholesterol:HDL ratio, they also said there was weak evidence to show that omega-3s help to reduce all-cause mortality, blood pressure, and myocardial infarct. They also noted that higher marine omega-3 intake was associated with a small but significant increase in LDL (bad) cholesterol levels. In addition, in terms of stroke prevention and cardiovascular death, the randomized controlled trials found no protective effect of omega-3s. (Evidence from observational studies, however, did indicate potential benefits of omega-3 intake.)

Additionally, in a recent observational study led by Jinnie Rhee of the Harvard T.H. Chan School of Public Health (Boston, MA), researchers assessed the association between consumption of fish and long-chain omega-3 polyunsaturated fatty acids (PUFA), including α-linolenic acid and marine omega-3 fatty acids, and the incidence of cardiovascular disease in healthy women who were enrolled in the Women’s Health Study. This analysis included 22 years of follow-up data from 38,392 women without a prior history of cardiovascular disease. Researchers found no association between the intake of fish, α-linolenic acid, or marine fatty acids and the risk of major cardiovascular disease, nor any association with individual cardiovascular events such as myocardial infarction, stroke, and cardiovascular death in this cohort.

Furthermore, a Canadian review looking at the evidence from randomized controlled trials on the primary and secondary prevention of cardiovascular disease was also not wholly supportive of omega-3s. The review included eight intervention studies (enrolling more than 1,000 patients with at least a one-year follow-up), as well as two published meta-analyses of randomized controlled trials. In the five trials including patients with pre-existing cardiovascular disease, the reviewers found that only one trial demonstrated a reduction in the incidence of cardiovascular events; in the three trials looking at primary prevention with omega-3 fatty acids, only one trial demonstrated a minor reduction in major coronary events. Similarly, the two meta-analyses, which looked at secondary prevention in patients who have had a heart attack, concluded that omega-3 fatty acids do not further reduce the incidence of cardiovascular events as an adjunct to standard drug therapy. Based on their review, the authors concluded that there is currently a lack of evidence supporting routine omega-3 supplementation for either primary or secondary prevention of cardiovascular disease.

**Evidence in Favor of Omega-3s**

Juxtaposing these negative results, however, is a slew of positive research attesting to the benefits of omega-3 supplements for cardiovascular risk reduction.

For example, in a study led by Liana Del Gobbo from Stanford University School of Medicine (Stanford, CA), researchers pooled evidence from 19 cohort studies (17 of which were prospective trials) from 16 countries to assess the benefits of omega-3 fatty acids on
How does one reconcile the divergence between positive and negative studies on omega-3s for heart health?

coronary heart disease. The pooled analysis included 45,637 individuals without prevalent coronary heart disease, and the researchers analyzed the correlation of circulating and tissue biomarkers of omega-3 status with the incidence of total coronary heart disease, fatal coronary heart disease, and non-fatal myocardial infarction. They found that each standard deviation increase in the individual levels of EPA, DHA, and DPA (docosapentaenoic acid; another marine-derived omega-3 fatty acid) was associated with an approximately 9% lower risk of fatal coronary heart disease, while the sum of all three led to an 11% lower risk of fatal coronary heart disease. Furthermore, DPA levels (but not DHA or EPA levels) were associated with a significantly lower risk in the incidence of total coronary heart disease.

Italian researchers similarly found significant benefits in a meta-analysis of randomized placebo-controlled trials involving 11 studies administering at least 1 g/day of omega-3 fatty acids for one year or more to patients with existing cardiovascular disease. Overall, the trials included 15,348 individuals with a history of cardiovascular disease. While no statistically significant effects were seen for all-cause mortality or stroke incidence, the meta-analysis revealed strong protection against cardiac death, sudden death, and myocardial infarction, indicating that daily doses of omega-3 fatty acids above 1 g may be increasingly beneficial.

Furthermore, in a meta-analysis led by Luc Djoussé from Brigham and Women’s Hospital (Boston, MA), researchers looked at seven prospective studies to assess the impact of fish intake and omega-3 fatty acid intake relative to the incidence of heart failure. After analyzing the data from the identified studies (which in total included 176,441 individuals), the authors concluded that higher marine omega-3 intakes were associated with a significantly lower risk of heart failure.

Given positive evidence like this, in April 2015 the association the Global Organization for EPA and DHA Omega-3s (GOED; Salt Lake City) issued a statement summarizing the fact that 10 meta-analyses of gold-standard, randomized clinical trials published between 2006 and 2014 all showed significant effects of omega-3 consumption for reduced cardiac death risk. The range of risk reduction was impressive, varying between 9%–35%.

Of course, omega-3 fatty acids have been found to reduce additional risk factors for cardiovascular disease as well, including triglyceride levels and blood pressure.

**Triglyceride Reduction**

With regard to triglyceride reduction, a recent review indicated that omega-3 fatty acids (average dose of 4 g/day) consistently lowered triglycerides by a range of 25%-34% in placebo-controlled clinical trials.

In the United States, approximately 33% of the population has elevated triglyceride levels, which is considered an independent risk factor for cardiovascular disease. A current meta-analysis evaluated the effects of triglyceride-lowering on cardiovascular disease risk and found that lowered triglycerides are consistently associated with cardiovascular risk reductions, indicating a protective effect against cardiovascular events.

**Blood Pressure Reduction**

In terms of blood pressure, Anne Minihane and colleagues in the United Kingdom recently conducted a retrospective analysis of data from a multicenter, placebo-controlled randomized clinical trial. During the trial, healthy men and women consumed fish oil containing 0.7 g or 1.8 g of EPA plus DHA daily for eight weeks. In those adults with isolated systolic hypertension, the 0.7-g dose led to clinically meaningful reductions in blood pressure averaging 5 mm Hg. The authors indicated that this magnitude of blood pressure reduction in middle-aged individuals is associated with an approximate 20% reduction in the risk of cardiovascular disease.

Bo Yang and colleagues from Zhejiang University (Hangzhou, China) conducted a meta-analysis of eight prospective cohort studies involving 56,204 adults and found that higher circulating levels of long-chain omega-3 fatty acids (and DHA in particular) were significantly associated with a lower risk of elevated blood pressure, indicating that optimal intake of omega-3s could potentially serve as a primary means of preventing hypertension.

These findings are buttressed by an earlier meta-analysis of 70 randomized controlled trials, which indicated that supplementation with EPA and DHA led to significant reductions of systolic blood pressure, while higher doses (more than 2 g/day) also significantly reduced diastolic blood pressure.

High blood pressure is a leading cause of stroke, and decreases associated with consuming omega-3s could lead to clinically meaningful risk reductions in this area.
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Reconciling Current Findings

Research supports the benefits of omega-3 fatty acids for reducing several risk factors associated with cardiovascular disease. Why, then, do some researchers find potential discrepancies when analyzing the data, and, more importantly, how does one go about reconciling the divergence between positive and negative findings? Some experts have postulated several reasons for the seemingly disparate results.

Differences in study populations certainly may play a role. Factors—including genetics, ethnicity, and background dietary intake of omega-3 fatty acids—all may have an impact on findings. In comparing the results of long-term clinical trials of omega-3s in western countries (which have often had neutral findings) to results from Japanese trials (which generally have positive findings), Akira Seki-kawa of the University of Pittsburgh (Pittsburgh, PA) postulated that the doses used in the studies played a significant part and, importantly, that higher doses may be needed to ensure the greatest cardio-protective benefits. For example, the author, pointed out, dosages administered in the Japanese trials were generally higher than those in the western trials. In a recent trial in Japan showing a cardiovascular risk reduction of 19% with omega-3 fatty acid supplementation, the dose of omega-3 fatty acids given in the study was 1800 mg/day—this is in addition to the relatively high omega-3 dietary intake in the Japanese population of greater than 1,000 mg/day. By comparison, in western studies, the dose range was generally 300-900 mg of omega-3s per day, and the intake of omega-3s in western populations is generally less than 300 mg/day.

In recent intervention studies that have had neutral findings, another reason there may have been unfavorable results may be due to bioavailability issues associated with when the omega-3 supplements were administered. In a commentary on the discrepancies between recent intervention trials looking at cardiovascular risk reduction versus positive findings from epidemiologic studies, Clemens von Schacky from Ludwig-Maximilians-University (Munich, Germany) suggested that many of the intervention trials advised participants to consume their supplements with breakfast, which is often a low-fat meal. This
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could have significant impacts on omega-3 bioavailability because omega-3 absorption is dependent on the fat contained in foods and could partially explain the neutral findings. He advocated for new intervention trials to assess the real effect of omega-3s, keeping in mind the issue of bioavailability as well as controlling for the background dietary intake of study populations.

Jason Wu and Dariush Mozaffarian of the Harvard School of Public Health (Boston, MA) further speculated that another likely reason for neutral findings in recent studies versus older, positive trials may be the aggressive use of antihypertensive, lipid-lowering, and antiplatelet medications in later trials. Since many of the risk factors addressed overlapped between the effects of these medications and the effects of omega-3 fatty acids (reduction of blood pressure, blood lipids, and circulation benefits), any additional effects of omega-3 fatty acids could have been masked by drug therapy. Researchers in the field should take these and other factors into account as they design further intervention trials assessing the benefits of omega-3s for cardiovascular health.

**Plenty of Promise**

In spite of the mixed findings of some recent trials, omega-3 fatty acids clearly play a role in cardiovascular wellness due to their mechanism of action on cardiovascular health parameters. Epidemiological studies consistently have shown positive associations with omega-3 supplementation, and clinical trial evidence from studies conducted around the world speaks to the impressive effects of omega-3 fatty acids on heart and vascular health.

Additional research will continue to provide specific evidence to assess the magnitude of omega-3’s true benefits. In the meantime, as supplement users consider the low risk associated with omega-3 supplementation and the potential upside of promoting heart health, increasing dietary and supplemental intake should make sense. These important nutrients remain a prudent choice for improving health and well-being.

Irfan Qureshi, ND, is executive director, research and regulatory affairs, for Healthy Directions.

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**References**


7. Del Gobbo LC et al., "Ω-3 polyunsaturated fatty acid biomarkers and coronary heart disease: pooling project of 19 cohort studies," *JAMA Internal Medicine*, vol. 176, no. 8 (August 1, 2016): 1155–1166


13. Minihane AM et al., "Consumption of fish oil providing amounts of eicosapentaenoic acid and docosahexaenoic acid that can be obtained from the diet reduces blood pressure in adults with systolic hypertension: a retrospective analysis," *The Journal of Nutrition*, vol. 146, no. 3 (March 2016): 516–523


17. Sekikawa A et al., "Recent findings of long-chain n-3 polyunsaturated fatty acids (LCn-3 PUFAs) on atherosclerosis and coronary heart disease (CHD) contrasting studies in Western countries to Japan," *Trends in Cardiovascular Medicine*, vol. 25, no. 8 (November 2015): 717–723


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Dairy protein has made a big name for itself as an excellent source of protein. Many consumers now seek dairy protein after intense physical workouts in order to rebuild or retain muscle. But alternative uses, including for weight management, have hordes of consumers (beyond the dedicated athletes and gym goers) shopping for dairy protein, too. With an increasing consumer base, dairy protein is now formulated into dips, soups, snacks, and a host of other products.

In order for dairy protein to succeed mainstream, it must meet some key targets. Taste is one. Everyday consumers won’t necessarily settle for the chalky and sometimes bitter taste of dairy protein as is sometimes found in protein powders and beverages consumed by hardcore athletes.

“Taste is a top priority in food and beverage formulations,” says Terri Rexroat, vice president of U.S. trade services for the U.S. Dairy Export Council (Arlington, VA). “Consumers are less willing to choose between taste and nutrition, but rather they expect health and wellness products to pack a nutritional punch while being delicious.”

And so, dairy specialists around the world are in hot pursuit of better tasting and higher functioning dairy proteins. Breakthroughs within the last several years show just how much dairy, as we know it, is changing.

**Micellar Casein and Native Whey**

Of all the advances happening in dairy, ultrafiltration is perhaps most notable because it is changing the way that we consume milk’s proteins, casein and whey. Using highly sophisticated filtration technologies, dairy ingredient processors can separate, extract, and concentrate casein and whey more easily than ever before. The result is healthier, more functional, and less-processed dairy proteins.

Take casein. Using ultrafiltration (also referred to as microfiltration), processors can extract casein. When produced in this way, this casein is called micellar casein. Micellar casein is considered a very efficient dietary protein. According to experts at Ingredia Inc. (Wapakoneta, OH), micellar casein has high levels of branched-chain amino acids and essential amino acids, but it’s also a very slow-digesting protein thanks to the reduced use of processing that ultrafiltration makes possible.

The potential benefits of consuming micellar casein include rebuilding broken-down muscle after intense exercise, increased satiety (due to slow digestion of protein) for weight management, and potential use in avoiding malnutrition and sarcopenia because of micellar casein’s highly bio-available calcium.

Less processing also means it’s a highly soluble and mild-flavored protein, which can benefit food and beverage manufacturers.

The other component of milk protein from ultrafiltration is whey, which is also referred to as native whey. While ultrafiltered native whey is a nutritious protein much like traditional whey, native whey also comes with a host of functional benefits, including limited syneresis (resulting in a creamy mouthfeel for protein beverages), lighter color, and lower fat content. By forgoing the acid processing of traditional whey, native whey should also have a milder taste.

Although these protein ingredients have been around for some time, suppliers say that more consumers are now getting educated on their benefits.

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Milk Specialties Global (Eden Prairie, MN) is currently putting a lot of its emphasis on texture. Earlier this year, the company launched BARsoft, a dairy protein designed for soft texture and improved shelf life in high-protein bars. Company vice president and general manager Chris Baughman says that thanks to a proprietary, co-processed matrix of dairy proteins, BARsoft imparts an exceptional sensory experience alongside significantly reduced browning and hardening of bars over time. Browning can occur naturally in dairy protein products due to a number of environmental factors. If left unchecked, it can influence color, flavor, and other important qualities of finished bars.

Alternatively, Milk Specialties has also made available high-protein bar inclusions that promise crunchy and texturized dairy protein. These inclusions are currently available in chocolate and graham cracker flavors and can add up to 4 g of protein to a single bar.

**ORGANIC ON THE RISE**

Several ingredient suppliers say that organic formats are in high demand for both milk and dairy proteins. These companies are increasing their offerings of USDA organic-certified products.

Fonterra admits that organic milk prices are high because consumer demand is currently outpacing supply. Milk Specialties is promoting organic whey and milk proteins in both powder formulas and ready-to-drink formulas. And even though organic is front of mind for the company, a spokesperson for Milk Specialties says that other dairy qualifiers, including rBGH-free and lactose-free, are still of high interest to its customers.

**Eliminating Dairy Byproducts**

Because dairy proteins and other dairy products are usually made at the expense of byproducts, large-scale dairies and dairy ingredient manufacturers must figure out how to discard or repurpose their leftovers. Any efforts made towards greater efficiency and less waste can only improve a company’s image and its potential for continued business.

Fortunately for everyone, dairy companies are innovating their processes in order to recapture waste. Fonterra (Auckland, New Zealand), a multinational dairy cooperative, introduced a new milk powder plant this year that can turn dairy waste into fertilizer that gets irrigated onto neighboring farmland. In addition, an upgrade to one of Fonterra’s other production sites allows the company to double its capture of lactose.
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thus reducing waste and reliance on imported lactose. Milk powder, after all, must be standardized for lactose content.

Waste retrieval is an active practice for other companies, too. Hilmar Cheese Co. (Hilmar, CA), a supplier of cheese, whey protein, and other dairy ingredients, is using new technologies to recover almost 100% of its milk-derived water and redirect it to crop irrigation and landscaping.

Besides lactose and water, two especially common byproducts of dairy manufacture are acid whey (a byproduct of acidic dairy products, such as Greek yogurt) and lactic permeate (the liquid remaining after whey or milk is ultrafiltered). Large-scale dairies already have various ways of dealing with these byproducts, but one company went further, asking whether these byproducts could be done away with altogether.

Arla Foods Ingredients (Viby J, Denmark) believes it has the answer in a milk protein-based powder, HiYield, that enables firms to use 100% of milk during manufacturing, without creating any byproducts or waste. Firms simply add HiYield to milk at the beginning of the manufacturing process. “After this, production continues in the same way as it would in a normal, stirred-yogurt-making process,” says Torben Jensen, Arla’s category and application manager for fresh dairy products. The resulting dairy products will have the same taste, texture, and consistency that consumers are used to. Manufacturers, on the other hand, can enjoy higher output, reduced waste, and increased sales. Arla says HiYield is especially useful when making products like Greek yogurt, cream cheese, feta, mascarpone, ricotta, quark, and skyr.

Masking Whey Protein Flavor
Like most other food ingredients, dairy can be vulnerable to sensory changes during manufacturing and certain types of processing. In the case of whey protein, the most notable sensory change is usually flavor, which some experts describe as bitter notes reminiscent of cardboard. When the flavor of whey protein is unwanted in finished products, flavor masking can be helpful.

Unfortunately, flavors typically contain carbohydrates. Seeing this limitation in the industry, Glanbia Nutritional (Carlsbad, CA) earlier this year introduced EasyFlav, a flavor technology made for masking whey’s bitter flavor without adding extra carbohydrates. The breakthrough should be especially useful for protein hydrolysates, which Glanbia says are typically very bitter. It can list on product ingredient labels as “natural flavor.”

Whey Protein as Egg Replacement
Although whey protein is most popularly known as a high source of supplementary protein, whey protein’s functional properties give it dual purpose. If a manufacturer wants to avoid using eggs in baking, for instance, whey protein can partially or completely replace eggs without undesired consequences.

Hilmar Ingredients says that replacing eggs with whey protein in baked goods can yield products with equal appearance, springiness, chewiness, and color. The replacement of egg with whey protein can even lower cholesterol in some formulas. To meet the needs of a potentially eggless market—whether for cost, availability, or allergen reasons—Hilmar recently introduced Hilmar 7000, a whey protein concentrate made especially for the purpose of replacing eggs in baked foods and mixes.
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What happens when two market winners, brain health and sports nutrition, join forces?

BY MAUREEN KINGSLEY

When two powerhouse supplement categories come together, it’s a sight to behold. Take brain health and sports nutrition. These two behemoths are more often joining forces these days as smart marketers take the benefits of brain-health supplements to athletes.

“The brain-health category has grown very well over the years, and this new focus on athletic supplements is proof of that,” says Chase Hagerman, brand director for Chemi Nutra (White Bear Lake, MN), which supplies the ingredient AlphaSize alpha-glyceryl phosphoryl choline (A-GPC) both for brain-health and sports supplements.

“There is a growing need for cognitive products for sports,” confirms Avner Avis-sara, vice president, nutrition, at lipid-ingredients supplier Enzymotec (Migdal HaEmek, Israel). “Traditionally, the cognitive aspects of athletic performance were given very low attention.” But, he says, that’s changing these days “as the science of sport evolves [and] there is an increasing consumer awareness of the importance of cognitive supple-mentation for athletes.”

This marriage of brain-health and sports-nutrition ingredients is still relatively new, and Avis-sara points out that “there aren’t yet a lot of products to fulfill this need.” This also means, however, that a “great opportunity” exists for cognitive products in the sports market. “[Adding] cognitive claims to the basket of claims used by sports-nutrition brands can help those brands differentiate themselves from the crowd,” he points out.
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Where brain-wellness ingredients seem to best benefit athletes for now is in the areas of focus, mood, and sleep. Ingredients that are getting more play in sports nutrition are those that promote better focus and concentration; reduce feelings of distress, anxiety, and depression; and aid in sleep. Ingredients in the running include botanical extracts, but also proteins and lipid-based products.

### Brainy Plants

Researchers are continually investigating botanical extracts for potential brain-health benefits and are beginning to incorporate them into formulas for athletes. One such extract, PLX from ingredient supplier Monteloeder (Spain), is derived from the leaves of the lemon verbena plant (*Aloysia triphylla*). In a 2015 study, it showed the ability to help athletes both sleep and recover.

The small, double-blind study commissioned by Monteloeder and conducted by researchers at the University Miguel Hernandez of Elche in Spain found that athletes consuming 1.2 g of the PLX-brand extract per day for 21 days reported reduced levels of perceived fatigue and anxiety, slept for longer each night, and reported less muscle pain overall than the placebo group. Overall, researchers concluded, the group taking the daily extract reported a 44% improvement in quality of sleep over the course of the study.

“This is a compelling proposition for any athlete,” says the company’s global head of marketing, Fernando Cartagena. “By improving sleep patterns and reducing anxiety and fatigue, PLX also enhances the mental recovery that is essential for sporting success.”

The ingredient comprises a combination of antioxidants and anti-inflammatory components—including verbascoside, phenylpropanoids, and flavonoids (such as luteolin)—that “produce a powerful, synergistic effect,” Cartagena says. The ingredient can be worked into supplement formulations and functional beverages and shots, he adds.

Sabinsa (East Windsor, NJ) is another supplier offering botanical-based brain-related ingredients for sports and other supplements. Anurag Pande, PhD, the company’s vice president of scientific affairs, points specifically to Sabinsa’s Curcumin C3 Complex derived from turmeric (*Curcuma longa*). “This patented extract is standardized to 95% curcuminoids, which have benefits for cognitive health” in addition to benefits for joint and muscle health, Pande says.

Beyond reducing inflammation in body tissues and “attenuating muscle wasting, or cachexia, in certain injury conditions,” Curcumin C3 Complex can potentially boost psychological wellness, Pande says. The C3 Complex has shown benefits related to major depressive disorder (MDD), Pande adds, referencing a study published in 2014. The authors of this small but arguably intriguing study concluded that a “curcuminoids–pipperine combination is an effective addition to
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standard therapy for MDD and significantly improves the efficacy of treatment in alleviating depression symptoms.

One finished-product brand marketing a curcumin-based supplement to athletes is Integrated Therapeutics. Its Theracurcumin HP supplement contains a "highly bioavailable, water-dispersible turmeric," with the company’s director of clinical affairs, Corey Schuller, noting that curcumin "provides promising basic science evidence in both active and recovering athletes.”

A second Integrated Therapeutics cognitive supplement for athletes, Cortisol Manager, includes such botanicals as ashwagandha (Withania somnifera), L-theanine, and magnolia. "Excessive cortisol production, as seen in many athletes, especially those who are overtraining, affects cognitive performance," Schuller explains. The product is described as "a unique stress-hormone stabilizer that helps reduce tension and promote sleep, [which is] vital to recovery and energy restoration.” Both of the company’s products bear the “NSF Certified for Sport” seal, which means that NSF screens them for more than 165 substances banned by most major athletic organizations, as well as for undeclared ingredients.

Drawing from the green chiretta plant native to Sri Lanka and India is HP Ingredients’ (Bradenton, FL) NeuroActin, a patent-pending and proprietary extract of Andrographis paniculata, standardized to andrographolide, 14-deoxyandrographolide, and neoandrographolide, says company CEO Annie Eng. Eng says the company launched NeuroActin for the brain-health category in response to two animal studies on green chiretta that “collectively demonstrated five mechanisms of action: canonical and non-canonical Wnt signaling, GSK-3β inhibition, tau hyperphosphorylation reduction, induction of postsynaptic proteins and synaptic function, and neurogenesis stimulation.” According to Eng, pending further study, these cognitive-health effects could potentially stretch into physical ones. "When a physically fit individual is also able to focus, he or she will likely be able to succeed in the fitness goal of the day, or the performance,” she says.

Rounding out the group of botanicals currently garnering attention for their potential for providing cognitive benefits within a sports-and-fitness context is the algae species Haematococcus pluvialis, specifically revered for its rich astaxanthin content. Joe Kuncewitch, national sales manager for astaxanthin supplier AstaReal Inc. (Burlington, NJ), explains, “The brain is prone to oxidation and inflammation, which can negatively impact the mental part of physical play. Our astaxanthin, from Haematococcus pluvialis, has been clinically studied for brain health and has been shown to exert several key benefits,” including mental quickness, multitasking, memory, and faster learning in senior subjects, he says. "And more seniors are engaged in physical fitness and sport than ever before.”

**Protein for Relaxation and Sleep Support**

During physical activity, mental focus and high cognitive performance are advantageous. During downtime and at night, when the body repairs itself and recovers, relaxation and sleep are key.

To that end, a patented hydrolysate of milk proteins developed by Pharmachem Laboratories Inc. (Kearny, NJ) contains a bioactive peptide with relaxing properties that regulates stress naturally, reports senior director of new product development Mitch Skop. This ingredient, called Lactium, has applications for athletes, Skop says, because "several research studies show it not only helps support healthy sleep, it also improves hand-eye coordination and reduces time to recharge.”

In the newest of these studies, performed on mice and published in *Behavioural Brain Research*, Lactium was shown to facilitate and promote sleep “with no or minimal sedative properties,” Skop reports. "Lactium naturally enhances sleep without the groggy side effects that can be attributed to drugs, thereby positioning Lactium as an ideal sleep aid for natural products marketers,” he says, particularly those whose reach extends into athletic supplements.
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Looking to Lipids

Building on phosphatidylserine’s (PS) association with cognitive benefits, lipids-based ingredients supplier Enzymotec offers EnzySport, a formulation for increased stamina and faster recovery based on the supplier’s proprietary Sharp PS soy-based ingredient, which is “already well established in the cognitive-health category,” says president and CEO Ariel Katz. The ingredient is marketed as potentially “improving focus and decision making, as well as the perception of improved general well-being,” which are “of utmost performance for those dealing with sports,” adds Avisara.

Avisara points to all of Enzymotec’s PS products, including “a novel grade” combined with omega-3, as “opening opportunities in a wide range of applications and target markets,” including sports supplements.

And as for Chemi Nutra, the company says this about AlphaSize on its website: “AlphaSize A-GPC has interesting utility in ‘mind-to-muscle’ sports nutrition formulations, where it acts to optimize muscular power output, sharpen agility, and also delay mental fatigue. This is due to its action involving motor-unit activation of muscle fibers and subsequent muscle contraction, as well as due to its mental-sharpness benefits.”

As a brain-health ingredient, A-GPC is an important dietary source of choline, one of the key neurotransmitters for brain and memory function. Last year, Chemi Nutra announced a double-blind, placebo-controlled crossover study published in the *Journal of the International Society of Sports Nutrition* that found that 600 mg of AlphaSize daily for six days improved lower-body muscle strength in subjects (13 college-aged males).

The subjects underwent lower- and upper-body strength tests. Researchers found that the subjects’ strength improved significantly during lower-body testing. (In the upper-body test, the improvement in strength was not statistically significant, which the researchers said may be due to a high variability of upper-body strength among the subjects that may have limited statistical power.)

The effects on lower-body strength are promising, the researchers wrote. “The results of the study suggest that A-GPC is effective at increasing lower-body force production after six days of supplementation. Given that, in many sports, it is understood that a very small change in performance, often times less than 2%, can significantly affect outcomes, it is important to note that the six days of A-GPC resulted in greater than a 3% increase in lower-body isometric strength.”

The scientists posited that A-GPC’s effects on strength may be due to increasing bioavailable choline. A-GPC is converted to phosphatidylcholine, a precursor to choline, and choline in turn is converted to acetylcholine, a key neurotransmitter. According to Chemi Nutra, “Exhaustive and repeated exercise can compromise motor neuron activity at the neuromuscular junction, and it is believed that motor neurons cannot manufacture and release acetylcholine fast enough to maintain transmission of the action potential from the motor neurons to the muscles.” By boosting acetylcholine synthesis, a supplement like A-GPC may help counter the “signaling fatigue” that often contributes to muscular fatigue and loss of strength, as well as muscle performance, because acetylcholine helps control speed of muscle contraction.

This is the first test to study the effects of A-GPC directly on isometric strength. The researchers suggested that further studies, including in vitro testing, be done to “demonstrate that A-GPC has the potential to augment neurotransmitter levels in motor neurons.”

Chemi Nutra funded the study. “Chemi Nutra continues to explore how its branded, patented, AlphaSize alpha-glycerol phosphoryl choline (A-GPC) can improve exercise performance, by focusing on its powerful role in facilitating explosive power output, speeding up reaction time, improving jumping ability, improving eye-hand coordination, and, of course, improving all cognitive measures—focus, memory, learning, and recall,” said Scott Hagerman, president of Chemi Nutra, in a press release.

**Finding Opportunity at the Crossroads of Physical and Cognitive Wellness**

The United States is seeing an aging but active population combined with growing public interest in both mental wellness and physical fitness. It is also seeing a sports-nutrition industry that has grown 67% in the past five years (from roughly $4.4 billion to $7.4 billion, according to analysis from Euro monitor). The time seems right for marketing cognitive-health ingredients to the athletic- and fitness-supplements industry, and for highlighting the mental elements of exercise and athletic performance to supplement consumers.

Brands that can successfully find and capitalize on the overlap between brain health, physical fitness, and athletic performance will perhaps be best positioned to benefit from current trends.

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**References**


Natreon, Inc. is an 18-year-old company located in New Jersey with a state of the art R&D facility in Kolkata, India, and is focused on developing and marketing Ayurvedic ingredients backed by extensive research, multiple clinical & safety studies, and intellectual property.
A nutritional supplement is only as good as its delivery vehicle. While ingredients and formulations might be of high quality and value, if they’re not delivered in a way that protects them from degradation and appeals to the consumer, that supplement is not, ultimately, worth much.

Indeed, “dosage forms for delivery of ingredients can make as big a difference in consumer satisfaction as the ingredients themselves,” confirms Missy Lowery, senior manager, marketing, Capsugel (Greenwood, SC). “Delivery forms can maximize the chance of achieving the most benefits from ingredients, too,” she adds.

Fortunately, supplement brands have a wide selection of delivery systems from which to choose, and the companies supplying those systems continue to innovate and respond to consumer interests and demand.

Among the myriad delivery formats on offer—including tablets, gummies, melts, shots, chews, sprays, and more—capsules and softgels remain useful, reliable, and economic options, providing quality-protection to the formulations they contain and benefits to the consumer. Increasingly, capsule and softgel suppliers are developing varieties appealing to vegetarian, non-GMO, gluten-free, and “clean” lifestyles and that add value in the forms of increased supplement bioavailability and targeted release.

Effective, Protective, Targeted
Capsules and softgels, while perhaps not as trendy as their gummy, liquid-shot, or inhalable counterparts, remain economical, effective, and beneficial choices for supplement brands—and for good reasons. Both hard capsules and softgels can mask the bitter, pungent, or otherwise off-putting flavors and odors of such ingredients as marine oils (particularly krill oil) or herbs (such as valerian root and garlic), and, in most cases, they can do so without the addition of artificial ingredients or flavors.

A second advantage offered by both hard capsules and softgels is protection from oxidation or spoilage of the encapsulated ingredients. Supplier Catalent Pharma Solutions (Somerset, N.J.) points to softgels’ lack of headspace or air pocket as the primary mechanism by which oxidation is eliminated or reduced, while supplier Capsugel attributes the protection afforded by hard capsules to that format’s low permeability.

Beyond these benefits, capsules and softgels can be customized and refined to add value through improved digestibility, controlled bioavailability, quick or controlled release of ingredients, and improved palatability.

Catalent Pharma Solutions, for instance, has developed a dispersion technology for softgels based on “food-approved surfactants and flavor-masking and antioxidant ingredients to create a small-droplet supplement dispersion that can be encapsulated in a softgel—a dosage form preferred by consumers,” says June Lin, global marketing director, consumer health softgel, Catalent.

Enteric coatings can prevent softgels from dissolving in the stomach, thereby assisting in releasing ingredients directly into the intestines where “absorption is more effective,” Lin says. For krill oil and omega-3 oils in particular, she adds, “this can further minimize any issues with reflux and make products more palatable for a wider population.”

Softgels can also deliver ingredients in a way marketers may not have considered before. Namely, they can be a “delivery system wherein the softgel tip can be twisted off to deliver contents by spreading on food or adding to drinks,” Lin explains, with potential applications in supplements for pediatric or geriatric populations, for which swallowing pills can be difficult.
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Continued innovation keeps capsules and softgels a smart choice, even in the face of more trendy delivery forms.

Vegetarian and Clean

Trends in delivery format are currently following vegetarian, non-GMO, and “clean” lifestyle trends, report Catalent, Capsugel, and Robinson Pharma Inc. (Santa Ana, CA).

“One of the main trends in the supplements market,” explains Catalent’s Lin, “is consumer demand for all-natural and animal-free formulations.” She also points to increasing consumer demand for foods and food supplements that are “produced without genetically modified organisms [GMOs], hormones, or artificial ingredients. This is in addition to the growing number of people interested in following a vegetarian-based diet, with several non-vegetarian markets looking for animal-free supplements” as well, she says.

To meet these market demands, Catalent developed Vegicaps: plant-based softgel shells from carrageenan that are free of both GMO ingredients and animal derivatives. “Supplement products based on this technology are compatible with the consumer demand for all-natural products” as well as requirements for gluten-free, vegetarian, and low-sugar lifestyles, Lin says, while retaining the advantages of the standard softgel: easy to swallow, odor-free, and taste-free. Vegicaps are also biodegradable and available in various colors, shapes, sizes, and clarities.

Capsugel’s Lowery confirms growing demand for vegetarian, all-natural, non-GMO, and “clean” delivery formats for encapsulating supplement formulations meeting those same requirements. What’s more, she says, “Vegetarian capsules offer additional specific benefits. Because of their lower moisture content, vegetarian capsules are ideal for encapsulating hygroscopic ingredients that absorb or attract moisture from the air, especially botanicals, botanical extracts, and probiotics.”

She continues, “Some vegetarian capsules offer acid-resistant properties in the shell that protect ingredients like probiotics, enzymes, and amino acids from stomach acids and open closer to the intestines where the ingredients work better—no external coating required.” The company’s Vcaps and Vcaps Plus vegetarian capsules feature low moisture levels down to 3% (for manufacturers who can control the relative humidity in their manufacturing environment), and its DRcaps vegetarian capsules incorporate “unique acid-resistant polymer properties” that slow disintegration after swallowing.

A fourth “highly original vegetarian capsule technology” offered by Capsugel, called DUOCAPS, “addresses the complicated delivery issues of combining a prebiotic-probiotic supplement,” Lowery explains. “Both ingredients can be delivered at different intervals via a capsule-within-a-capsule technology” that provides both a “synergistic digestive effect and moisture protection to prevent early activation of the probiotic.” Both capsules, the inner and outer, are made from plant-based HPMC.

The company’s Licaps nitrogen-flushed, hermetically sealed capsules—designed to protect the stability and quality of liquids prone to oxygen-related degradation—are also available in a vegetarian version.

Likewise, Robinson Pharma, which describes vegetarian and vegan softgel products as “an upward spiraling growth trend,” recently announced an expansion to six softgel machines solely dedicated to vegetarian softgel production, to achieve what it called in a press release “one of the largest capacities and fastest turnaround times in the industry for vegetarian softgels.” The company recently expanded production capacity to “3 billion vegetarian softgels per year to meet demand.” According to the company, its vegetarian softgels feature improved softness and appearance, ranging from bright colors to more subtle, translucent finishes. Robinson says it recently developed a “unique vegan multi-vitamin” in softgel form that contains more than 20 vitamins, minerals, and nutrients in one dosage.

Capsules and Softgels Maintain a Place in Supplement Delivery

Continued innovation and added value keep capsules and softgels a smart choice for supplement brands, even in the face of more trendy delivery forms. Particularly for ingredients with low stability, strong odor, and vulnerability to oxidation, and for formulations requiring a particular type of release (quick, controlled, or delayed), capsules and softgels remain a smart option.

Following general lifestyle trends, developments in capsule and softgel delivery include plenty of plant-derived options, non-GMO options, low- or no-sugar options, gluten-free options, and all-natural options. Supplement brands keeping abreast of lifestyle trends and choosing their delivery forms accordingly are well-positioned to successfully keep up with consumer expectations.

Maureen Kingsley is a freelance writer, editor, and proofreader based in Los Angeles. She covers a variety of industries, including medical technology, food-ingredient manufacturing, and cinematography.
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FAST SOLUBILITY
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CARRIER FREE
Five lesser-known botanicals haven’t achieved widespread global use yet, but their moment in supplements could be just around the corner.

BY ROBBY GARDNER

Herbal supplements expose consumers to the bountiful supply of botanical ingredients found all across the world. And while the supplements industry has been able to capitalize on an ever-growing roster of botanicals, there remains a large swath of plant ingredients that have yet to reach their full market potential.

Here is a glimpse of just a few botanical ingredients that haven’t achieved widespread global use yet, but could well be on their way as companies and researchers continue to validate these ingredients in clinical settings.

Saffron

Although saffron (Crocus sativus; pictured above) is best known as a spice, mounting research suggests there are benefits from consuming saffron other than its taste. This year alone, clinical trials linked saffron consumption to relief from anxiety, depression, mild cognitive impairment, and even UV skin damage.1–4 These results corroborate those of numerous previous studies.

If and when saffron becomes a popular dietary supplement, manufacturers and marketers may have to grapple with saffron’s high price. Or maybe not. Though saffron is said to be the world’s most expensive spice because it’s made out of hand-picked saffron stigmas, saffron dietary supplements, on the other hand, might be able to incorporate saffron petals, too. According to HerbalGram’s latest feature, saffron’s lesser-researched petals are now backed by at least a few clinical trials—including research on depression—where they have been used in final saffron extract formulas. A saffron extract made from stigma and petal would inevitably be less expensive than one using stigmas alone. All the while, interested parties, such as Iran, the leading producer of saffron, are researching how to improve yields.5

Copalchi

The bark of a Central American tree known as copalchi (Hintonia latiflora) is sometimes regarded for its use in diabetes management. Notably, Harrus Pharma Curarina GmbH (Munich, Germany) sells copalchi bark extract under the brand name Sucontral and has performed much of the existing copalchi research on its own. Still, other research is available and ongoing, including two recent studies from outside sources on diabetes factors.6–7

What makes copalchi bark special is exactly how it’s used in diabetes management. Whereas many botanicals are used for the purpose of directly lowering blood glucose within hours after use, copalchi seems to instead influence insulin sensitivity and, over time, glycated haemoglobin (HBA1C).

In particular, if saffron continues to show promise in cognitive health, some experts believe it could steal dietary supplement shares from St. John’s wort, which is widely used for anxiety and depression but carries a risk of drug interactions.

Kanna

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traditionally referred to as kanna (*Sceletium tortuosum*) may have the characteristics for dietary supplement success.

Early research on kanna, conducted with the branded ingredient Zembrin, suggests kanna users exhibit improvements in coping with stress, sleeping, and executive functioning.8,9 Researchers have also gone so far as to say that kanna may one day prove useful against dementia from Alzheimer’s disease. While there isn’t a very large market for the ingredient at this time, ongoing research and the few companies that do cultivate and market kanna could pave the way for a bright future.

For what it’s worth, South African tribes people have been reported to bury and thus ferment this succulent before use, but this may not be a part of current industrial processing methods.

**Chuchuhuasi**

Another bark, chuchuhuasi (*Maytenus krukovii*) is believed to possess pain-relieving qualities, and its use for such purposes in the Peruvian Amazon is not new or rare. Medicine hunter Chris Kilham says that the public harvest and sale of chuchuhuasi bark is commonplace there, and chuchuhuasi can even be found in combination remedies with cat’s claw (*Uncaria tomentosa*), often as cold and hot beverages.10

Although limited, published studies on chuchuhuasi suggest potential consumption benefits ranging from antioxidant and anti-inflammatory activity to immune system support and the aforementioned pain relief. In an animal study, chuchuhuasi was found to be comparable to ibuprofen in providing pain relief.11

According to Kilham, chuchuhuasi has a long history of use, with two alkaloids being some of its more notable active compounds.

**Black Cumin**

A Middle Eastern seed has potential for success in the dietary supplements market because of its unique oil. That seed is black cumin (*Nigella sativa*), and its history dates back to Muhammad, who once reportedly said that black cumin cures everything but death. Research on black cumin has increased, especially concerning the seed oil’s constituent of thymoquinone (TQ). A host of studies on the seed oil and/or TQ draw connections to their potential for providing humans with respiratory relief, cardiac support, and maybe even cancer prevention.12
Herbs/Botanicals

While black cumin already enjoys fame for its spice, a steady supply of ground-seed powders and concentrated oils might not be that far away in its future.

Robby Gardner is the former associate editor of Nutritional Outlook magazine.

References


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Hemp CBD

NEW FRONTIERS for Hemp CBD

Despite FDA’s strong language against hemp cannabidiol (CBD), sales and demand for the controversial cannabinoid are skyrocketing. Here are five CBD health applications now under study.

BY ROBBY GARDNER

Can products that contain cannabidiol (CBD), a non-psychoactive variety of Cannabis sativa, be sold as dietary supplements? The short answer is “no,” at least according to FDA’s webpage1, “FDA and Marijuana: Questions and Answers,” where the agency states that CBD products are excluded from the dietary supplement definition because of existing authorizations for cannabis as an investigational new drug (IND). FDA’s justification for that position on CBD raises a few additional questions, however. (Turn to page 18 for more on this.) Surprisingly, none of this has stopped CBD demand from skyrocketing, according to CBD firms. The controversial cannabinoid is now appearing in proprietary oils, energy drinks, and cocktails, among other new markets. On top of that, steady traction behind hemp in food products is only helping CBD’s cause.

CBD companies continue to introduce new products to an ever-increasing consumer base. And if you look at the following research on CBD effects in various health conditions, that consumer base could be poised to grow even bigger in the years to come.

Psychosis and Schizophrenia
Although CBD has been established as a non-psychoactive component of cannabis, its anti-psychotic effect is less understood but of equal interest. Preliminary data and case reports suggest that CBD, as an anti-psychotic compound, may be helpful in psychosis and schizophrenia management.2-4

Research is still needed to fully elucidate how CBD interacts with portions of the brain responsible for psychotic events, but early data and indications of fewer side effects than antipsychotic drugs should provide reason to consider CBD for such health purposes. Furthermore, some experts are concerned that psychiatric patients can develop resistance to pharmaceutical antipsychotics—an effect that hasn’t yet been observed with CBD.

Alzheimer’s Disease
Because CBD has demonstrated neuroprotective and anti-inflammatory properties, researchers have speculated (for years, now) that CBD may be useful in protecting brain tissues, thereby reducing risk of Alzheimer’s disease or curbing...
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IT'S IN THE DETAILS.
further cognitive degradation. In recent years, animal models have shown reduced memory impairment in mice supplementing with CBD—even among mice whose genes have been altered to serve as models of Alzheimer’s disease.

As researchers advocate for greater attention to CBD for this purpose, it will be interesting to see how studies progress towards evaluating CBD’s effect on Alzheimer’s disease in human populations.

### Pediatric Inflammatory Bowel Disease

With cognitive health at the center of CBD research, there’s still potential for CBD’s influence on human health to go further. In particular, researchers at the University of Colorado with gastrointestinal and pediatric specialties have decided it’s time to start discussing cannabis use in relation to pediatric inflammatory bowel disease (IBD). Although not directly mentioning cannabidiol, researchers stated in the *Journal of Pediatric Gastroenterology and Nutrition* that cannabis may have both beneficial and harmful effects in children with IBD, based on their experience in interacting with such patients. However, current federal legislation does limit researchers’ ability to conduct related research in this area.

### Skin Health

Skin creams containing hemp oil are performing well in a few studies, and not necessarily because of their omega fatty acid content. At least one study has found regular industrial hemp oil may reduce sebum and erythema (reddening of the skin). Another recent independent study found that a CBD-rich cream, developed by CannaCeuticals, improves self-reports of skin appearance in 100% of subjects. Impress with the results, a North American marketing company named Laguna Blends recently signed a letter of intent to acquire the cosmetic hemp brand.

With potential starting to show for hemp in skin health, the cosmetics category represents a whole new market to exploit. Reassuringly, the creation of a diverse range of hemp-rich emulsions appears quite possible under the right conditions.

### References

2. Fakhoury M et al., “Could cannabidiol be used as an alternative to antipsychotics?” *Journal of Psychiatric Research*, vol. 80 (September 2016): 14–21

Robby Gardner is the former associate editor of *Nutritional Outlook* magazine.
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Emerging research on probiotics continues to demonstrate that the benefits of healthy bacteria extend far beyond immune and GI health.

BY IRFAN QURESHI

The balance between beneficial bacteria and yeast and harmful bacteria and yeast in the gastrointestinal (GI) tract dictates not only good GI health, but good health overall. When these powerful microbial forces are out of balance, it can lead to poor health and even disease. Luckily, probiotic dietary supplements (beneficial bacteria and yeast) can help restore this balance and tip the scale back toward good health.

While probiotics primarily impact GI health, their effects don’t stop there. Take immune health. Because more than 70% of our immune system resides in the gut, it’s easy to see why probiotics have such a large influence on immune function.

Ongoing studies suggest that the benefits of probiotics extend far beyond immune and GI health. Science is only scratching the surface of the potential benefits these healthy bugs may impart on systems throughout the body. Some of the areas of probiotic science currently being explored include cognitive function and mental health, dental health, skin health, and heart function.

Mood and Depression
Probiotic species are increasingly being investigated for potential impacts on brain health, including mental health (mood, behavior, etc.). Researchers are now beginning to talk about the existence of a microbiota-gut-brain axis, linking the role of the gut flora with cognitive function.1

A recent placebo-controlled evaluation led by Laura Steenbergen from Leiden University (Leiden, The Netherlands) investigated the impact of probiotic supplements on cognitive reactivity to sad mood.2 In the four-week study, 40 healthy young adults without mood disorder were randomized to twice-daily dosages of a placebo or a probiotic supplement consisting of 2.5 billion colony forming units (CFU). The probiotic supplement contained a mixture of the following bacterial strains: Bifidobacterium bifidum W23, B. lactis W52, Lactobacillus acidophilus W37, L. brevis W63, L. casei W56, L. salivarius W24, and Lactococcus lactis (W19 and W58). Pre- and post-study, the participants filled out a questionnaire that aimed to evaluate cognitive reactivity to sad mood and symptoms of depression and anxiety; in other words, the questionnaire attempted to assess a person’s vulnerability to depression.

Compared to placebo subjects, the participants taking the probiotic supplement scored significantly lower on cognitive reactivity to depression and exhibited less aggressive and ruminative thoughts in response to sad mood. While further studies are needed to confirm these benefits, the findings of the current study are promising and show that probiotics may not only influence brain health; they could play a role in preventing depression and anxiety.

Dental Health
Dental caries, or tooth decay, are a common public health issue affecting millions worldwide. Tooth decay in early life can lead to the complete destruction of teeth and cause infections, pain, and nutritional deficiencies—and even contribute to speech and learning
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difficulties. Probiotic bacteria are thought to help prevent tooth decay by correcting imbalances in oral bacteria.

A recent study in children aged 2-3 from 16 nursery schools in Chile assessed the benefits of supplementing with a probiotic species, with the goal of preventing tooth decay. Researchers from the University of Chile (Santiago, Chile) randomized 261 children to consume daily (on weekdays) either standard milk or 150 ml of milk containing the probiotic *Lactobacillus rhamnosus* SP1 (10^7 CFU/ml). The duration of the study was 10 months.

The prevalence of dental caries decreased in the probiotic group versus those consuming standard milk. The percentage of new individuals who developed caries was 9.7% in the probiotic group and 24.3% in the control group, a statistically significant difference. Within each group, the development of new cavities over the 10-month period averaged 1.13 in the probiotic-supplemented milk group versus 1.75 in the standard milk group. These findings suggest a substantial benefit of probiotic bacteria in helping to reduce the development of dental caries in young children.

**Acne and Skin Health**

Probiotic supplements can benefit skin health as well by improving the regulation of bodily systems that support healthy skin.

In those with acne, specifically, irregular insulin signaling and overall insulin function are thought to contribute to the progression of skin lesions. A double-blind, placebo-controlled pilot study investigated the benefits of the probiotic *Lactobacillus rhamnosus* SP1 for acne lesions as well as insulin-signaling pathways. Led by Gabriella Fabbrocini of the University of Naples Federico II (Naples, Italy), researchers asked 20 adults with acne to consume a liquid supplement containing *Lactobacillus rhamnosus* SP1 (3 billion CFU/day), or a placebo, for 12 weeks. Two genetic markers of insulin signaling in skin—insulin-like growth factor 1 (IGF1) and forkhead box protein O1 (FOXO1)—were evaluated before and after probiotic treatment.

Probiotic supplementation resulted in significant improvements in both markers, indicating normalized insulin signaling.
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in skin. Treatment with the probiotic also improved physician ratings of acne lesions compared to placebo.

Heart Function
Over the past decade, probiotics have been increasingly studied for potential benefits for blood lipid metabolism. It is thought that probiotic bacteria and their metabolites can interact with genes, affecting the expression of proteins involved in the regulation of blood lipid levels. In addition, increased overall inflammation due to imbalances in intestinal flora may also adversely affect heart health. But researchers believe that probiotics may shore up heart health by normalizing intestinal flora and thereby impacting the expression of inflammatory cytokines and other chemicals related to inflammation.

An interesting Brazilian study led by Annelise Costanza of Federal Fluminense University (Niteroi, Brazil) looked at the impact of supplementation with the probiotic yeast *Saccharomyces boulardii* in heart-failure patients. The placebo-controlled trial was conducted on 20 outpatients who had experienced heart failure (NYHA class II or III, signifying moderate heart failure) with a left ventricular ejection fraction <50%. These subjects were asked to consume 1000 mg per day of *S. boulardii*, or a placebo, for three months. Drug treatments for heart failure were left unchanged.

Supplementation with the yeast probiotic was found to significantly improve total cholesterol, uric acid levels, left atrial diameter, and left ventricular ejection fraction. Furthermore, high-sensitivity C-reactive protein (hsCRP), a marker of inflammation, was reduced compared to placebo. Thus, supplementation was found to improve heart function, to favorably affect total cholesterol levels, and to reduce inflammation, all important factors for heart health.

References
4. Fabbrocini G et al., "Supplementation with *Lactobacillus rhamnosus* SP1 normalises skin expression of genes implicated in insulin signalling and improves adult acne," Beneficial Microbes. Published online September 6, 2016.
Flint Families Need Our Help

You’ve likely seen the news coverage – Flint’s change of water source in 2014 to the Flint River corroded plumbing, allowing lead to leach into tap water. With an estimated $1.5 billion price tag and 30-year time frame for pipe replacement, there simply is no quick or easy fix. But for affected adults and children, life goes on.

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It's one of the first things consumers notice about a food or beverage product: color. But with clean-label demand spreading across the market, colors are increasingly about more than just what meets the eye. Natural colors are now a purchasing priority for an enormous chunk of the U.S. consumer base, and brands big and small are taking notice.

In a 2016 online survey conducted by the International Food Information Council, 31% of U.S. consumers said they were trying to consume more products made with natural colors, while 43% said they were trying to limit or avoid artificial colors. Meanwhile, Kraft, Mars, Taco Bell, Campbell Soup, and more have all committed to removing artificial colors from their products in the past year or two.

Which product types, then, present the greatest opportunities for natural colors?

Millennial Moms Lead the Charge
One of the most promising segments for natural colors is kid-centric products, explained Catherine Adams Hutt, PhD, chief science and regulatory officer for Sloan Trends (Aubrey, TX), who presented on the natural colors market at the SupplySide West trade show in October. She shared recent Mintel data indicating that 43% of millennial mothers are interested in products carrying “free from artificial color” claims, compared to just about one-third of U.S. consumers overall.

“Moms are the number-one market that’s really going to react to that movement away from artificial [colors] and to natural colors,” Hutt said. That’s why kid-oriented categories, such as confectionery and dairy products, are perfect fits for natural colors. Megan Jacobs, market specialist for colors firm D.D. Williamson (DDW; Louisville, KY), noted that both of these categories are already taking off.

“Colorants supplier Lycored (Be’er Sheva, Israel) has also found in its own consumer research that ‘millennial moms place huge importance on natural colors in dairy,’ said Christiane Lippert, head of marketing for Lycored’s food division. Confectionery products are another obvious market, Lippert added, as are fruit snacks and other products aimed at children.

Cereals, Seasonings, and More
Elsewhere in the market, the shift from artificial to natural is “happening across the board,” Lippert said. In particular, she pointed to cereals and dairy overall as some of the biggest expected growth areas, as well as colorful flavored waters, due to the “expected naturality and cleansing positioning of that category.”

Sloan’s Hutt also found cereals to be one of the most promising categories for natural colors, with consumer data released by the Food Marketing Institute suggesting consumers are most conscientious in seeking out ingredients they perceive as beneficial at the beginning of the day. She also pegged dairy products, frozen foods, pet foods, dietary supplements, baked goods, and snacks as strong potential markets.

And while many cereal giants have begun moving toward natural colors already, such as Kellogg’s and General Mills, plenty of snack brands are still relying on synthetic colors, according to DDW’s Jacobs. That makes snacks an especially promising segment for growth. DDW has also been looking toward seasonings made with natural colors. And beverages, with their transparent packaging and wide variety of product types, remain a hugely important category for the colorants market, Jacobs added.

Natural colors’ biggest opportunities likely lie in kid-centric products, cereals, and snacks.

BY MICHAEL CRANE, ASSOCIATE EDITOR
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