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FEATURES

Healthy Product + Services Directory

27 Health Markets
Beauty
Blood Sugar Support
Bone Health
Brain Health
Digestive Health
Energy and Sleep
Heart Health
Immune Health
Joint Health
Sports Nutrition
Weight Management

72 Services
Manufacturing
Packaging
Equipment

85 Product + Services Company Profiles
UP FRONT

From the Editor

News
Pycnogenol supports erectile function in diabetes patients in recent study

COLUMNS

Global Regulations
The New Dietary Ingredient regulatory pathway in 2020

Ingredient Spotlight
Citrus flavonoids for blood sugar support

Last Bite
Beauty food

RESOURCES

Advertiser Index

Classified

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Nutritional Outlook's second annual Healthy Product + Services Directory issue takes stock of key influencers driving some of the nutraceutical market’s biggest health categories. One through line is that the nutraceutical customer continues to seek personalized products that better meet his or her health needs.

But what does personalization really mean—and what are the different degrees of personalization? In some health markets, for instance, personalization still very much falls along gender lines: men’s products catering to men, and women’s products specifically designed for female needs.

But in other markets, personalization is evolving into more of a genderless concept. That is, instead of designing products according to gender, product makers are instead focusing on developing products that solve a target health problem, regardless of gender.

One of the markets in which genderless marketing is really taking hold is the beauty market. In a Euromonitor International Market Research Blog published last September, blog author Olivia Stelmaszczyk wrote: “The beauty and personal care industry has a long-lasting history of differentiating products according to gender. However, due to changing consumer values that place less emphasis on distinct male-or-female characteristics and more emphasis on inclusivity, this traditional gendered approach is changing in the United States.” Unisex fragrances have already been on the beauty market for years, but Stelmaszczyk said genderless products are increasingly including everything from skincare and color cosmetic makeup to personal care products.

Euromonitor isn’t the only market researcher to call out this emerging trend. In a Mintel Blog post published last November, author Irina Ene, Mintel’s beauty innovation coverage manager, also highlighted the emergence of genderless beauty brands. One such brand, called Flaunt Body, offers skincare solutions for a problem both men and women face: ingrown hair. The company markets itself as “versatile, unisex, effortless skincare.” Another company Ene highlighted in her blog is a color cosmetic company called Depixym, which sells genderless color makeup, made “For Him. For Her. For Them.”

This approach to personalization—focusing on need state rather than gender—could be a bigger influence in the beauty industry moving forward. In a Mintel Blog on the topic of personalization and the future of beauty, author Roshida Khanom, associate director for Mintel Beauty & Personal Care, wrote: “Perceptions of the ‘beauty ideal’ based on age, skin, hair, or body shape are changing. Brands should focus on people’s behavior instead of simplifying complex human beings into a demographic. Consumers are more than just a ‘generation’, ‘age group’, or ‘gender’—they are individuals. Ultimately, beauty personalization should allow them to express their unique character, while offering clear benefits.”

In the beauty aisle at least, genderless beauty offers some tangible benefits. Where consumers are concerned, for instance, Euromonitor’s Stelmaszczyk said that genderless marketing can help female customers sidestep “the pink tax”—the theory that marketers can and often will charge higher prices for products marketed specifically to women, even though there is no material difference from lower-priced versions sold to men (such as pink razors).

Genderless marketing also provides benefits to companies, Stelmaszczyk said. “As a fiscal opportunity, a gender-neutral approach also widens a brand’s target audience and increases the potential for sales,” she wrote. Genderless marketing is increasingly embraced by newer generations of consumers, said Stelmaszczyk: “Another important factor contributing to the rise of genderless beauty products in the United States is changing consumer values related to gender, with Millennials, born between 1985 and 1994, and Generation Z, born between 1995 and 2009, driving these changes. Compared to their Baby Boomer parents, a subset of American Millennial families are seeking to rebalance traditional gender roles between mothers and fathers, husbands and wives, and partners and spouses, pursuing a lifestyle for their children that is less fraught with gender stereotypes.”

In the end, genderless beauty comes down to one thing, “prioritizing product functionality,” she wrote. And although genderless marketing may already be a part of some markets but not be right for others, all product marketers can at least agree that product functionality always comes first.

Jennifer Grebrow
Editor-in-Chief
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Pycnogenol Supports Erectile Function in Diabetes Patients

A recently published study¹ found that supplementation with French maritime pine bark extract (Pycnogenol from Horphag Research; Hoboken, NJ) supports erectile function and lipid profile in patients with diabetes mellitus. Erectile dysfunction (ED) may be considered an early diabetic complication because inflammation from the disease can result in vasoconstriction pathways and decreased nitric oxide availability in corpora cavernosa, resulting in ED.

In the randomized, blinded, placebo-controlled study, 53 patients with erectile dysfunction were divided into two groups (32 with diabetes and 21 without diabetes), each randomized to take either placebo or pine bark extract. Results showed the pine bark extract significantly improved erectile function by 45% in the group with diabetes, compared to 22% in the non-diabetes group. Supplementation also lowered total cholesterol by 20%, LDL cholesterol by 21%, and glycaemia by 22% in the diabetes group. The non-diabetes group also showed significant, but lower, reductions in total cholesterol and LDL cholesterol of 9% and 14%, respectively, but no significant reductions in glycaemia.

“Our results indicate that patients with erectile dysfunction and diabetes mellitus are more sensitive to the positive effect of Pycnogenol compared to non-diabetes mellitus erectile dysfunction patients,” state the authors. “In our recent work, we found elevated [levels of the] marker of endothelial dysfunction, endoglin, in our patients with diabetes mellitus compared to non-diabetes mellitus patients at the baseline, which positively correlated with glucose level. Pycnogenol decreased glucose levels in diabetes mellitus patients, and decreased glucose levels correlated with decreased endoglin.”

Reference

Socati Launches Private-Label Cannabinoid Products

Socati Corp. (Austin, TX) is launching a private-label division for its fully customizable portfolio of hemp-derived cannabinoid ingredients. The new private-label offering provides a concept-to-market partnership for both new and established brands looking to develop new hemp-derived products for the growing CBD market.

“With the creation of Socati’s private-label division, we’re able to provide an efficient route to market for those looking to introduce new hemp-infused products or improve existing product manufacturing processes,” said Socati CEO, Josh Epstein, in a press release. “It means brands and product innovators can respond quickly to changing consumer tastes and market trends, developing and launching high-specification, quality products at speed and scale without tying up their existing manufacturing capacity or setting up their own costly infrastructure.”

The customizable private-label products Socati offers now include crystalized flavored powder, gummies, tinctures, softgels, pressed tablets, and two-piece capsules. Socati’s Montana-based processing facility complies with Global Food Safety Initiative-recognized benchmarking requirements and adheres to Good Manufacturing Practice standards for manufacturing.

NextFerm, Soft Gel Technologies Launch New Astaxanthin Ingredient

NextFerm (Yokneam, Israel) and Soft Gel Technologies (Commerce, CA) are releasing a new astaxanthin derived from yeast fermentation called Astaferm. The ingredient is specifically designed for softgel applications and will be offered as ready-to-use softgels, with plans to release a special grade for gummies in the future.

“We’re very excited about the way the market is responding to our new approach and messaging, and the backing of a reputable contract manufacturer in Soft Gel means a lot to us,” said Elzaphan Hotam, CEO of NextFerm USA, in a press release. “The addition of a softgel application to our previous launch of gummies adds yet another important segment to our marketing efforts and our reach.”

“For us, we see a great opportunity to introduce a new and fresh approach to what was a completely generic and stagnant market until recently. Astaferm is a non-GMO, sustainable, and non-marine-sourced astaxanthin,” said Steve Holtby, president and CEO of Soft Gel Technologies Inc., in a press release. “This is a natural and effective product, which offers brands a simple way to differentiate themselves at a competitive price and without compromising on the highest quality standards.”

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EXPERIENCE THE BEAUTY FROM WITHIN
The 2011 publication of FDA’s draft guidance on new dietary ingredients (NDIs) caused an uproar in the supplement industry and raised a host of concerns, as previously discussed in this and other publications.1,2 In response to comments received on the 2011 draft guidance, in 2016 FDA issued a revised draft guidance with the aim of more fully answering questions, per their perspective, surrounding the New Dietary Ingredient notification (NDIN) process. The 2016 revised draft guidance greatly overlapped with the topics covered in the 2011 version but was nearly twice as long due to the more detailed explanations provided in the question-and-answer format.

Now, more than three years later, the guidance has not been finalized, and most industry concerns regarding the draft guidance remain. So where are we now in 2020? As we look ahead, it is unclear whether finalization of the guidance is near, and we suspect that challenges surrounding the future regulatory status of hot-topic ingredient hemp cannabidiol (CBD) for use in foods and supplements will further affect FDA’s timeline.

2019, a Year in Review: FDA Meetings on Master Files, Synthetic Ingredients, and More

In the first half of 2019, FDA held private meetings with industry as well as hosted a public meeting on May 16, 2019, to discuss the NDIN process. Comments from the public meeting were heavily skewed to calls for FDA to incentivize industry compliance with the NDIN requirements by enforcing existing regulations and developing a master file program which would allow companies who had invested time and money in the required testing for a successful NDIN submission to protect that investment.

Under a master file system, Company A would submit an NDIN for a dietary ingredient. Company A could then license the use of its safety data to Company B, a company wishing to use the same ingredient from the manufacturing method specified in Company A’s NDIN. Company B might need to do its own studies to expand the application of the NDIN master file for new doses or new combinations of ingredients, but it could rely, at least in part, on data in the NDIN master file. This system would provide for some intellectual property protection for Company A, while enabling multiple companies to take advantage of the same master file.

Other public comments have called on FDA to reconsider its stance on synthetic dietary ingredients. Per the latest draft guidance, FDA only recognizes as dietary ingredients synthetic forms of vitamins and amino acids—and no other synthetic ingredients. The agency does not seem to think that there were any synthetic versions of botanical constituents on the market prior to the cut-off date. Many speakers at FDA’s May 16, 2019, public meeting also suggested reconsideration of the meaning of “chemically altered” and “manufacturing change” as mentioned in FDA’s draft guidance. The guidance states that ingredients that were previously the subject of a submitted NDIN but that have been chemically altered or altered due to a manufacturing change might require submission of a new NDIN. Due to numerous technological advancements that occurred over the 17 years between passage of the Dietary Supplement Health and Education Act of 1994 (DSHEA) and FDA’s 2011 first attempt at a draft guidance on NDINs, many have questioned whether a change in manufacture should really require a new NDIN—or simply a demonstration of equivalence to a prior NDIN. This issue could also be addressed by a master file system.

Where Are We Now? Recent NDIN Activity

Evaluating the current status of the most recent NDIN submissions proves challenging, since FDA’s Submitted 75-Day Premarket Notifications for New Dietary Ingredients webpage was last updated on May 15, 2019. According to the list of NDINs submitted from 1995 to the present, available as a downloadable spreadsheet, there have been at least
135 NDINs submitted to FDA for review since January 1, 2017. Of these submissions:

- 21% (n=28) of NDINs received an acknowledgment letter from FDA
- 70% (n=94) of NDINs received a response letter indicating that the NDIN did not meet one or more of the requirements outlined in the Federal Food, Drug, and Cosmetic Act (FD&C Act)
- 10% (n=13) of NDINs received a response letter from FDA, but have not been made publicly available on FDA’s digital docket website.

Lessons Learned
The relatively high number of NDINs which failed to obtain a successful nod from FDA—an acknowledgement letter—makes the situation seem especially bleak for those currently considering introducing an NDI into the marketplace. However, a closer look at the unsuccessful submissions provides valuable insight in identifying pathways toward a successful submission.

Why Did 70% of the NDINs Fail?
A review of the “rejection” response letters issued by FDA indicates that the NDINs rejected did not meet FDA’s requirements in at least one of six general categories: 1) definition of an NDI; 2) specifications and manufacturing process; 3) history of use; 4) intake assessment; 5) safety-in-use; and 6) full-text references. Approximately 53% (n=50) of the unsuccessful NDINs did not meet two or more of these requirements. For some, these failures were more procedural in nature—i.e., the submission package contained incomplete references. However, there were instances where significant deficiencies in the submission were identified, though there were a few instances where FDA disagreed with the notifier’s conclusion of safety of the new dietary ingredient.

Here, we can take a deeper look at why some of these NDINs did not meet FDA’s bar.

1. Does the ingredient meet FDA’s definition of a dietary ingredient?
In 39 response letters, FDA noted that the ingredient defined in the NDIN submission did not meet the definition of a dietary ingredient under 21 U.S.C. § 321(ff) and stated:

A dietary supplement means, among other things, a “product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following dietary ingredients: (A) a vitamin; (B) a mineral; (C) an herb or other botanical; (D) an amino acid; (E) a dietary supplement for use by man to supplement the diet by increasing the total dietary intake of (F) a concentrate, metabolite, constituent, extract, or combination of any ingredient described in clause (A), (B), (C), (D), or (E).

For many of these rejected submissions, it’s readily apparent that the subject doesn’t meet the definition of a dietary ingredient, as is the case for topical ointments, salves, and other personal care-type products, which accounted for at least 15 rejected NDINs. Other common reasons why FDA rejected the submissions included the use of the ingredient...
in conventional foods, and statements by the submitter, or legal regulations, that indicated the ingredient qualified as a drug.

It’s important to note that only four of the 39 notifications that FDA rejected on the basis that the ingredient didn’t meet the definition of dietary ingredient were identified as having a secondary reason for rejection. If we omit those 35 NDINs that were rejected solely on the basis of not meeting the definition of a dietary ingredient, then the success and failure percentages are adjusted to 28% and 59%, respectively.

FDA has also made it clear that synthetic forms of most dietary ingredients (with the exception of certain vitamins and amino acids, as noted above) or ingredients produced via fermentation processes, for example derived from engineered *E. coli*, are ineligible for consideration as dietary ingredients. This issue is a matter of concern for industry as noted by various commenters at the May 16, 2019, FDA public meeting. It was also discussed at the 2019 Rocky Mountain Dietary Supplement Forum. It remains to be seen whether FDA will soften its stance toward synthetic ingredients on a larger scale.

Of the 28 NDINs that were successful (NDINs that received acknowledgement letters), 36% (n=10) were for ingredients extracted from botanical sources; 21% (n=6) were for probiotic-category ingredients; and the remaining submissions were for protein/peptide preparations (n=3), algae-derived ingredients (n=3), or other less-categorizable ingredients (n=5).

2. Have the ingredient specifications and manufacturing process been adequately addressed?

FDA noted in its response letters that 54% (n=51) of the rejected NDINs did not contain enough detail regarding the quality parameters of the ingredient and/or the manufacturing process to sufficiently evaluate the safety of the NDI. While many manufacturers understandably wish to protect proprietary processes, enough information about the process and resulting material should be provided to support the assertion that the ingredient is safe for consumption. As noted previously, a master file system might alleviate IP concerns, allowing for a more complete submission for review by FDA.

3. Does the ingredient have a prior history of use?

Another category that proved problematic for 48% (n=45) of the rejected NDINs was the history-of-use or other evidence of safety-in-use requirement. Many of the submissions lacked sufficient detail to establish a history of use, and in a number of notifications, the requirement was ignored entirely. FDA considers these NDINs incomplete.

4. Has an intake assessment been provided?

Under 21 CFR 190.6, NDINs must include information regarding the use levels of the NDI in the dietary supplement. Information about the levels of the NDI per serving and maximum daily servings of the supplement is essential for assessing safety. The proposed uses and use levels should be specific enough to determine an estimated daily intake of the ingredient, which should be supported by safety data in the published literature. A general “take one serving per day” statement is insufficient, whereas a statement indicating “a maximum daily intake of 2 grams per day” of a well-characterized material is likely to provide the necessary specificity. FDA noted that an insufficient intake assessment was observed in 18% (n=17) of the rejected NDINs.

5. Is the safety assessment complete, and does it support safety-in-use?

Ultimately, the purpose of an NDI is to prepare a complete evaluation of an NDI to support the finding that there is reasonable expectation that the ingredient will not present “significant or unreasonable risk of illness or injury” under the proposed conditions of use. Under 21 CFR 190.6, notifiers are required to provide a basis for the expectation of safety. An evaluation of peer-reviewed, published literature is necessary to support a determination of safety for the NDI. A review of FDA’s response letters found that nearly 40% (n=35) of the rejected NDINs lacked a safety assessment entirely, presented an insufficient safety narrative, or the published literature did not support safety-in-use.

6. Are full-text references included in the submission package?

In addition to providing a basis for the expectation of safety, an additional requirement of each submission per 21 CFR 190.6(b)(4) is that the “notification shall be accompanied by reprints or photostatic copies of those references” cited in support of the notification. Submitting an incomplete NDIN package is a procedural issue that occurred in six of the rejected NDINs. While most were cited as having additional deficiencies, one submission appears to have been rejected solely for not providing the complete full-text references cited in the dossier.

NDIs Compared to the GRAS Notification Process

Ingredients that will be added to food are subject to premarket approval by FDA unless they are Generally Recognized as Safe (GRAS) by qualified experts under the intended conditions of use. Notification to FDA of a GRAS conclusion is a voluntary process. Since January 1, 2017, FDA has filed 203 GRAS Notices (GRNs), based on the most recent update of FDA’s GRAS Notice Inventory, which occurred on January 17, 2020. Of these submissions:

- 67% (n=136) of the GRNs received a “no questions” letter from FDA
- 14% (n=28) of the GRNs were withdrawn, in which case FDA issues a “cease to evaluate” letter
- 19% (n=39) of the GRNs are currently pending FDA response

In the past, FDA has also issued “no basis” response letters to GRNs, indicating that the notice was insufficient to provide a basis for a GRAS conclusion; however, none have been issued since 2011.

Considering only the GRNs that have been closed by FDA and not currently pending review, the success and failure rates can be adjusted to 83% and 17%, respectively. The failure rate for NDINs is striking (70% public rejections) when compared to the lower failure rate for GRNs (17% rejections), especially considering that GRNs answer to a higher safety standard of “reasonable certainty of no harm”—versus NDIs, for which the safety standard is that the ingredient will not present “significant or unreasonable risk of illness or injury” under the proposed conditions of use.

Of the 164 GRNs that have been closed as of January 15, 2020, 23% (n=38) could be categorized as extracts from botanical sources, 12% (n=20) were for ingredients in the steviol glycosides category, 12% (n=20) were for enzyme preparations, 10% (n=16) were for probiotic-category ingredients, and the remaining submissions were for oligosaccharides (n=10),...
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antimicrobial ingredients (n=11), and other less-categorizable ingredients (n=49).

Many of the GRN submissions were for ingredients manufactured by fermentation (n=64), enzyme reactions (n=13), or chemical processes (n=9), which by all indications provided by FDA would prohibit them from qualifying as new dietary ingredients.

How to Plan and Prepare for an NDI Submission

While significantly more NDINs are rejected by FDA than accepted, the numbers are skewed by those submissions rejected not because of legitimate safety concerns, but rather for ineligibility of the ingredients or incomplete notification packages. For those interested in submitting a successful NDIN, special focus should be paid to the quality of the information contained in the notification package as well as completeness.

Analyzing Your Ingredient for the Appropriate Regulatory Pathway to Market

Before deciding on the 75-day Premarket NDIN pathway, one should first analyze the ingredient to assess the correct strategy to market versus another pathway. Ask the questions:

- Is my ingredient a new dietary ingredient? If it is, is the best pathway to market a GRAS conclusion, a Food Additive Application, or an NDIN? When making the initial decision as to which pathway one may want to consider, a key consideration is whether the ingredient is naturally derived and unaltered from its natural state as a constituent of a whole or whether it is a synthetically derived ingredient that mimics a constituent in a whole food.
- Would the ingredient be considered synthetic due to its manufacturing process?
- Is there substantial documentation to meet NDIN requirements for FDA review?
- Are there substantial scientific safety studies available to meet FDA requirements and pass the review process?
- What statements do I want to make about my ingredient? Will they be structure-function claims, clinical trial efficacy statements, or am I leaning toward drug claims for my ingredient? (This last question will send you past the dietary supplement/ingredient pathway to the drug API development pathway).

Once the ingredient analysis is completed, there are additional questions and due-diligence tasks to help you solidify your determination. These questions and recommendations cover the regulatory requirements listed by FDA, which define who is required to submit the NDIN for a dietary ingredient.

1. Which are you?
   a) Manufacturer who intends to market a new dietary ingredient
   b) Manufacturer who intends to market a dietary supplement that contains a new dietary ingredient
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c) Distributor who intends to market a new dietary ingredient
d) Distributor who intends to market a dietary supplement that contains a new dietary ingredient

2. Review FDA responses to previously submitted NDINs for similar ingredients.3

3. Review the suggested checklist to ensure:
   - The dietary ingredient has not been marketed in the United States in a dietary supplement before October 15, 1994, meaning prior to DSHEA pursuant to 413(d) of the FD&C Act 21 U.S.C. 350b(d))
   - The ingredient does not appear on any authoritative list of dietary supplements as being marketed before October 15, 1994
   - The ingredient meets the definition per statute as a "dietary ingredient," as defined previously above
   - The ingredient that may be the subject for an NDIN was not present in the food supply as an article used for food in the same chemical form. The key phrase to pay attention to is "in the same form."
   - There is sufficient evidence to conclude that the manufacturer or distributor has a basis on which it can be concluded that the ingredient is "reasonably expected to be safe" (Section 413(a)(2) of the FD&C Act) under the proposed conditions of use and levels if the ingredient to be used in a dietary supplement

It is important to note that FDA, as noted in the preamble of the final rule, has an expectation that the submitter "did consider the evidence of safety that is available in the scientific literature and from examination of reports of adverse effects associated with the use of a new dietary ingredient."8

### Submitting an NDIN

Per FDA final rule, 21 CFR Part 190 [Dock- et No. 96N-0232] Premarket Notification for a New Dietary Ingredient, an NDIN is to be submitted 75 days prior to its introduction into the marketplace.9 The CFSAN Online Submission Module (COSM) New Dietary Ingredient Notification Step-by-Step Submission Guide gives detailed, step-by-step directions for submitting an NDIN electronically and serves as a checklist for the information FDA requires for its review. The table at left is a suggested outline for the information required for an NDIN submission.

### New Electronic Submissions Portal at FDA

NDIN submissions to FDA can be either electronic or via hard copy (often accompanied by the NDIN on a certified virus-free CD ROM). As of September 6, 2019, in keeping with the Agency’s ongoing modernization

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Section Suggested Headings</th>
<th>Overview of Information in Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover Letter</td>
<td>Introductory information about the notification</td>
</tr>
<tr>
<td>2</td>
<td>Contact information</td>
<td>Safety narrative</td>
</tr>
<tr>
<td>3.0</td>
<td>Safety narrative</td>
<td>Identity of the NDI</td>
</tr>
<tr>
<td>4.a</td>
<td>NDI name(s)</td>
<td>Description of NDI</td>
</tr>
<tr>
<td>4.b</td>
<td>Description of NDI</td>
<td>Manufacturing methods</td>
</tr>
<tr>
<td>4.c</td>
<td>Manufacturing methods</td>
<td>Specifications</td>
</tr>
<tr>
<td>4.d.i.</td>
<td>Analytical methods</td>
<td>Analytical results</td>
</tr>
<tr>
<td>4.d.ii</td>
<td>Analytical results</td>
<td>Summary of results and compliance with specifications</td>
</tr>
<tr>
<td>4.d.iii</td>
<td>Certificates of analyses (CoA)</td>
<td></td>
</tr>
<tr>
<td>4.d.iv</td>
<td>Stability studies</td>
<td>Data to support expiry date</td>
</tr>
<tr>
<td>4.d.v</td>
<td>Conditions of use</td>
<td>Safety of the NDI</td>
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<td>5.a</td>
<td>Comprehensive safety profile</td>
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</tr>
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<td>5.b</td>
<td>Toxicology studies</td>
<td>Nonclinical toxicology studies</td>
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<tr>
<td>5.b.i</td>
<td>Genotoxicity toxicity study</td>
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<td>14-day range-finding dose study</td>
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<td>5.b.iii</td>
<td>90-day repeated-dose toxicity study</td>
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<tr>
<td>5.b.iv</td>
<td>Reproductive toxicology studies</td>
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</tr>
<tr>
<td>5.c</td>
<td>Clinical trials</td>
<td>Human safety and efficacy clinical trials</td>
</tr>
<tr>
<td>5.c.ii</td>
<td>Adverse-event reports</td>
<td>History of safe use/ Dietary exposure data (mg of ingredient per kg body weight per day)</td>
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<td>Reference list/ Appendices</td>
<td>Specifications/CoA of multiple batches/ Stability reports/Toxicology study data/ Clinical trial data/Other applicable data</td>
</tr>
</tbody>
</table>
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Last Thoughts

Often reviewing a successful NDIN submission for a similar ingredient will provide a good indication as to the level of detail preferred by FDA. Another option is to retain the services of an experienced consultant who can provide specific feedback and help prepare a complete and robust NDI notification.

A review of FDA’s step-by-step electronic submission guidance should also be completed, as this guidance provides further details on the information FDA expects in the notification. Finally, it’s important to verify that your ingredient meets the regulatory requirements for a new dietary ingredient. Many NDIs are “rejected” because the ingredient does not meet the definition of a dietary ingredient per the statute 21 U.S.C. 321(f)(1) (i.e., the manufacturing process produces a synthetic copy of the natural constituent and is not used for food or drink as part of the human diet).

For ingredients manufactured using fermentation, enzyme reactions, or chemical processes, a GRAS conclusion—either independent (self-affirmed GRAS) or submitted to FDA—is the most feasible option.

Based on comments from industry resulting from both private and public meetings with FDA, it is clear that there is a divergence of opinion on how to move forward with NDIN enforcement, regulation, and compliance. The implementation of a master file system should be considered as a good first step towards inviting industry to look at the NDIN process as viable and reasonable. Currently, a Drug Master File (DMF) system is used for human drug products and has proven successful in allowing drug companies to protect their investments by providing to FDA confidential, detailed information about their facilities, processes, or articles used in manufacturing, processing, packaging, and sorting of their products, while also allowing other companies to reference, with permission, this information without making intellectual property public to competitors. This is not the case with GRAS submissions, where very little (if any) information can be redacted as confidential upon submission to FDA.

There are still many questions to be answered by industry and FDA with regard to the definitions of “chemically altered” and “manufacturing change” due to technological advancements that have occurred over the past 17 years. A reconsideration of the current meanings would require an amendment to the law.

The authors hope this article will provide food for thought regarding the current NDIN process as it stands, as well as guidance on how to decide if submitting an NDIN is a viable pathway for your ingredient and to ensure a complete and thorough submission is presented to FDA.

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Every year, millions of pounds of turmeric (Curcuma longa) are imported to the United States. Much of it ends up in spice products and dietary supplements, but the yellow root is finding a home in an increasing number of alternative products. More research on turmeric and its active compound curcumin is certainly encouraging sales. With new innovations that make it easy to formulate turmeric into a wide range of products, the primary challenge left is taste. And turmeric product makers seem to be handling that quite well.

**Cereals**

Surprisingly, hot and cold cereals are the fastest growing category for turmeric. According to the market research company SPINS, hot and cold cereals formulated with turmeric rose 928% and 620%, respectively, last year, raking in a combined $1.35 million in U.S. sales. Unlike with berries, consumers aren’t likely to encounter freeze-dried turmeric chunks in these cereal products. A small amount of turmeric powder is enough to make an ingredient label more attractive and impart some unique turmeric flavor.

Purely Elizabeth, a maker of granola, oatmeal, and snack bar products, unveiled single-serve oatmeal with turmeric last year. The company’s Coconut Turmeric Vibrant Oat Cups feature coconut and turmeric with oats, quinoa, flax seeds, and chia seeds.

**Snacks**

Snacks represent another turmeric category that’s flourishing. In tracking the global number of turmeric food and beverage launches from 2014 to 2018, Innova Market Insights observed that snack launches jumped from the fifth leading spot in 2014 to the third in 2018, only to finish behind sauces & seasonings and ready meals & side dishes. Turmeric snacks made up 9.9% of global food and beverage product launches in 2018.

The market potential for turmeric snacks is evidently strong enough that the multinational corporation Tyson Foods wanted to join in. Last September, Tyson Foods introduced its new Pact snack bites brand featuring, among other products, Turmeric and Ginger Prebiotic Snack Bites.
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Beverages
In most cases, turmeric exhibits poor solubility and deep yellow color in liquid. In other cases, manufacturers may use more soluble or less pigmented turmeric ingredients, such as those introduced a few years ago by turmeric supplier Sabinsa Corp. (East Windsor, NJ). Regardless of whether sedimentation and color are concerns or not, turmeric beverage launches are increasing in general. SPINS reports that of all the turmeric product categories it tracked in 2018, refrigerated juices and functional beverages were the fourth largest, compiling nearly $12 million in U.S. sales and falling just a few million behind shelf-stable teas.

Though it may be possible to mask turmeric’s bitterness with especially sweet flavors, flavors on the spicy and bitter side may be most complementary. Cha Cha Matcha, for example, recently introduced a canned matcha beverage featuring ginger and turmeric.

Dietary Supplements
Not to be outperformed by emerging turmeric categories, turmeric dietary supplements continue to perform well, even if some marketing experts believe the sector will reach maturity in a few years. SPINS reports that turmeric dietary supplements brought in just under $93 million in U.S. sales in 2018, and that number is only for single-ingredient products.

There’s no denying that turmeric dietary supplements are still extremely popular. Where growth can be had is in technical advancements. “Turmeric extract can be challenging to work with,” says Shaheen Majeed, president worldwide of Sabinsa. “It has a fluffy consistency with poor flow properties, and labor costs can be higher for extra cleaning due to the staining properties of its vivid yellow color.” The turmeric ingredient supplier is addressing these challenges with several grades of its C3 Complex ingredient, such as directly compressible, high-bulk-density, and high-granular-particle options, making for improved capability in liquid and powder-based supplements.

Adulteration
As tends to happen with popular botanical ingredients, adulteration is making a dent in turmeric sales. Various reports highlight the financial and public safety risks of turmeric adulteration, so it’s important to vet ingredient suppliers when purchasing this in-demand raw material. Adulterated turmeric ingredients may be made with synthetic versions of curcumin, turmeric’s primary active ingredient, or little to zero curcumin.

Industry groups, such as the Global Curcumin Association, are closely monitoring this global problem and providing best practices and guidance for sourcing turmeric responsibly. N


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A LOOK AT LEADING HEALTH CATEGORIES

Beauty
Blood Sugar Support
Bone Health
Brain Health
Digestive Health
Energy and Sleep
Heart Health
Immune Health
Joint Health
Sports Nutrition
Weight Management

ALSO: SERVICES

Manufacturing
Packaging
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The beauty market has never looked better. Just ask those keeping track.

Market researcher Euromonitor reported last year that the global skincare market grew 6% in 2019. Euromonitor in fact notes global skincare’s upward climb from as far back as 2004—without stopping since. Dietary supplement customers are also flocking to beauty products. Market researcher IRI reported late last year that the beauty segment of the U.S. supplements market saw 18% growth in the 52 weeks ending August 11, 2019.

With so many customers flocking to the beauty space, it’s not surprising that some of the most innovative movement in the natural and healthy products market is happening over in the beauty aisle. Ahead, we talked to the experts who gave us a quick tour of what will drive the beauty market in the future.

**Clean and Green**

Naturally derived, clean-label, and environmentally friendly ingredients are de rigueur in beauty these days. "Clean beauty," which consumers associate with health, wellness, and social responsibility, is no longer necessarily a differentiator but rather a feature that today’s beauty consumers expect.

According to market researcher Mintel in a press release last November, "Mintel research indicates that ‘clean beauty’ mentions on online platforms have doubled between 2017 (0.6 million) and 2018 (1.2 million). Consumers are now seeking assurance that their skincare products will not harm them, their family, or animals." At the In-Cosmetics Formulation Summit for R&D professionals last November, Mintel reported that nearly half (49%) of U.S. adults (aged 18-24) are seeking clean beauty products, while 51% of U.S. adults would pay more for a product made by a socially responsible company.

During the In-Cosmetics Formulation Summit, summit chairperson Barbara Brockway, PhD, director of personal care at AppliedDNA Sciences, said: "We are seeing consumers increasingly seeking out cosmetics that have less ingredients and avoiding products made with ingredients, such as palm oil, that are associated with damage to the environment. Today, the conscious consumer is also attracted to products with a positive message, such as improving health and mental wellbeing. As a result, beauty products with minimal impact on the planet, and those delivering a strong feel-good factor, are going to be hugely important to the future success of our industry."

With clean and green claims so prevalent in the beauty market today, it can be difficult to know what’s real. At the In-Cosmetics Formulation Summit, one speaker estimated that up to 82% of companies that launched products in the past year made green claims. Those walking the talk are not only setting an example of where the beauty industry needs to go but also shedding light on how far some companies are from truly meeting that goal.

Many times, it’s small brands leading the way. Take a brand called LOLI Beauty, who stakes its existence on zero waste and ethically sourced/manufacturing. Tina Hedges, LOLI’s founder, explains the challenge of being an independent brand making sustainability part of its core identity—while trying to stand out among a sea of greenwashing claims.

"At LOLI, our goal was to be zero waste—from upcycling organic food-grade ingredients and developing waterless products to packaging in recycled, recyclable, reusable, and garden-compostable materials—but that’s just not achievable.
for most big beauty brands,” says Hedges. “For them, their goal is what small changes they can make by 2025, and it tends to be a greenwashed effort outweighed by their larger, non-sustainable footprint.” By contrast, Loli has been publicly recognized for its authentically meaningful practices. Among other awards it’s received, in 2019 the company received the Cosmetic Executive Women’s esteemed Sustainability Excellence Award.

Says Hedges: “Sustainable greenwashing is so prevalent and truly an issue, as we all need to stand together to stir up a meaningful shift in the industry. You just can’t have all the overpackaged, highly decorated jars and tubes, and all these fancy textured lotions or gels, and still be good for the planet. We need to shift how we consume beauty and start to pare down to the essentials that are multipurpose and powerful. Do you really need a regimen of 15 skincare products?”

More consumers need to be able to cut through the greenwashing, she says. “It’s truly heartbreaking for smaller indie brands who’ve done the hard work upfront and built their business on an authentic and meaningful platform of sustainability—like Loli Beauty—when these larger brands market misinformation and greenwashed claims about being sustainable. A great example of this surrounds the misunderstandings perpetuated by some of these companies with huge marketing budgets on the claims of biodegradable versus compostable packaging. Most of the biodegradable packaging in the beauty industry is made with plastic resins and glues, which will degrade over time, releasing microplastics into our food sources—from soil to water. But the consumer is convinced that the pretty pink tube with gold lettering ‘Made from sugarcane’ is a sustainable, earth-friendly package.”

We all need to become more aware of the need for more sustainable ways to source and develop beauty and personal care products, Hedges says; doing so is “no longer a luxury” given the state of the world. “I wish the consumer was completely aware of what’s real and what’s a marketing ploy, but there is still a lot of work to do to get there,” she says. It will also take commitment from consumers themselves, as “sustainable is not gimmicky or cheap,” she points out. Whether more consumers are willing to pay up for a truly sustainable ethos could be the biggest question of all.

The Microbiome

*Microbiome* is a term casually tossed around these days, but to really drill into how microbiome research is impacting the beauty industry, one should start with the ingredients.
“help protect against infection, aid in wound healing, limit exposure to allergens and UV radiation, minimize oxidative damage, and help keep the skin barrier intact and well hydrated,” explained Euromonitor in its April 2019 report, “The Role of Microbiome in the Evolution of Skin Care.”

Beauty brands are increasingly exploring how the ingredients that tip the scale toward a healthy, balanced microbiome—prebiotics, probiotics, postbiotics, and other biome-friendly ingredients—can benefit the wellbeing of the skin. Euromonitor points out that, increasingly, these products are making their way to the beauty market, with consumers in regions such as Europe and Asia among the earliest adopters.

Further possible growth of probiotic beauty products, for instance, will also depend on regulatory developments in terms of claims and labeling, points out Paula Simpson, an integrated health and beauty expert. Simpson is the founder of consulting firm Nutribloom Consulting and the author of a new book, Good Bacteria for Healthy Skin: Nurturing Your Skin Microbiome for Clear & Luminous Skin. “The ambiguity and regulatory inconsistencies around probiotics have challenged the market both for industry and the consumer,” Simpson says. “As labeling, claims, and regulations become more cohesive, probiotic-based skincare will evolve as a viable market in the beauty space.”

Furthermore, as microbiome research becomes more sophisticated, so do the resulting products. “Past probiotic skincare formulations were general in the bacterial species used and claims made for skin health,” Simpson says. “Based on evolving research and market expectation, formulations are moving towards symbiotic blends that include appropriate bacterial species/subspecies/strains that support the specific skin-health claims.”

Besides probiotics, both pre- and postbiotics are also getting more attention in this space. “Along with prebiotics that encourage probiotic viability and shelf life, postbiotics—metabolites produced when probiotics die off—are also showing some benefit to support skin health,” Simpson says.

Consumers in the know are also concerned about how the beauty ingredients they are already applying and ingesting could potentially be disrupting their own microbiome. More ingredient companies are doing the research to explore the microbiome effects of their own ingredients as a result.

Last fall, for instance, Symrise (Holzminden, Germany) announced that it became the first company to publish microbiome data for a deodorant active ingredient—specifically, its long-standing SymDeo B125 ingredient. Said the company in a press release: “Symrise researchers have now been able to show that this deodorant active is microbiome-friendly and does not disrupt the sensitive underarm biota notably.”

Florian Genrich, PhD, Symrise’s senior Cosmetic Ingredients Division, says, “Recently, the microbiome topic has seen great interest on many channels. Due to the fact that deodorant actives are based on antibacterial technology, our aim was to find out more about the actual effect on the auxiliary microbiome, where deodorants are mainly applied. We did this in order to support our customers and subsequently consumers with more data about the use of our products.”

Another supplier, Givaudan Active Beauty (Switzerland), is also releasing microbiome research data on its own ingredients. Last summer, the company publicized new clinical data for two of its ingredients: Yogurtene Balance and Vetiveryne. For Yogurtene Balance, “an active rich in yogurt constituents and probiotics supporting the skin-friendly bacteria,” the company’s researchers found that the ingredient helped positively impact the composition of the skin microbiota. For Vetiveryne, an antiaging active ingredient derived from upcycled vetiver root, the researchers found that the ingredient ‘avoids dysbiosis by preserving the Actinobacteria abundance, which is typically decreasing when the skin is aging, therefore protecting the skin microbiome composition over time.’

This research by ingredient suppliers is necessary for business, points out Givaudan’s Mathias Fleury, global category manager, biotech actives. Fleury says that Givaudan has been studying the skin microbiome for more than 15 years. In fact, says Fleury, all of the company’s latest developed ingredients must pass a “microbiomics filter” to determine their impact—and benefits—on the skin microbiome.

Says Fleury: “More and more beauty brands are asking ingredients providers with scientific evidence about the efficacy and activity of their products on the skin microbiome. From a general point of view, that means the general scientific level will have to rise, so that these results can be built on a sufficiently strong basis. This will be a way for beauty brands to select their best partners—through a rigorous evaluation of their ‘microbiomics’ capabilities (technologies enabling the study of the microbiome). Only through this intimate collaboration, beauty brands will be able to avoid pure storytelling and to design and conceive innovative products with a real added value and a perceivable benefit for the final consumer.”

But do beauty consumers “get” the microbiome? Not necessarily, Simpson says. “The science behind the microbiome is evolving faster than we can make sense of it, in some
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ways...The challenge is compartmentalizing the science around the microbiome into a consumer-friendly story that makes sense. So although this an exciting time for the microbiome, the consumer may not yet understand why they should be paying attention to it."

For instance, she says, "Probiotic skincare brands are expanding and intriguing the consumer, but in order to turn this into a macro trend/societal norm within skincare and natural beauty, there is still a lot of work to do."

But more consumers are learning. Says Shan Godbille, Givaudan market intelligence manager: "Consumers actually benefit from all the education which started with the gut microbiome decades ago. Even if they are still less aware of the 'skin microbiome' than the 'gut microbiome'—globally 69% against 85%, according to an internal study performed on more than 1,500 consumers around the world—consumers' education is at a very high level. They are eager to discover 'microbiome-friendly' products which don't endanger the equilibrium of their microflora and respect its uniqueness."

Beauty brands themselves are working to spread the word. Symrise's Genrich points to Unilever's Dove soap "microbiome gentle" education campaign. "These advertisements clearly show that there is relevance for such data," Genrich says.

There is good reason to push ahead, given that clinical studies have shown that, for instance, gut dysbiosis—when the gut microbiome is unhealthy—is linked to chronic skin conditions such as acne, atopic dermatitis, rosacea, and photaging, Simpson says. With everything having the potential to impact the microbiota, including aging, diet, and lifestyle, expect more interest in microbiome-based beauty to grow.

**Personalization**

Personalization is a primary goal in many markets these days. In the beauty industry, personalization is happening on many levels.

First, it's making marketers rethink who the beauty customer is today in order to make sure that products are accessible and relevant to diverse customers. In a Mintel Blog last October, Rosida Khanom, associate director for Mintel Beauty & Personal Care, wrote, "[B]eauty is being redefined on a daily basis by consumers... Brands should focus on people's behavior instead of simplifying complex human beings into a demographic." This redirect has given rise to beauty brands providing solutions for specific needs (such as a haircare line designed for women with Afro-Caribbean hair), genderless beauty lines, and customizable beauty products developed around a customer's specific lifestyle and skincare wants/needs. (Turn to page 10 for more on this.)

Technology and science will help bridge the next frontier in personalized beauty. "Technology is a key enabler of the changes in how consumers search for information about brands and ingredients, how they experience the products, and how they monitor their skin health status," says Givaudan's Fleury. "Personalization will be one of the biggest drivers of the beauty market that caters to the consumer demand [for] a product that is designed for me, for my specific needs. Technology will be used to further bridge the gap between consumers and brands, making personalization (i.e., skin microbiome, DNA analysis) more specific, accurate, and affordable."

Some tools, like DNA testing to develop beauty products, are still in the early stages, according to Euromonitor, which states, "DNA-based personalization to identify deficiencies exist but [are] still in exploratory stages."

**Neurocosmetics**

The term neurocosmetics may sound new, but it isn’t—in fact, it’s been an area of interest in the beauty world since the 2000s.

"Neurocosmetics is not a new concept," explains John Jiménez, MS, pharmacist and senior exploration scientist at Belcorp (Colombia). "There is still confusion about what is and what is not a neurocosmetic, and this is because there is not a legal definition yet, and there are many scientific points of view about the definition."

At its simplest, neuroscience can be described as the study of the nervous system and the physiological reactions that can occur when someone is exposed to a particular product—or even product marketing. "Neuroscience has given way to what some term as "neuromarketing"—the application of neuroscience principles to obtain information about how a person makes decisions related to the consumption of a product based on the analysis of emotion, attention, and memory," Jiménez explains.
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“The objective is to investigate and learn how consumers respond and feel in front of different products and stimuli, capturing different signals from the body,” he continues. Neuroscience tools—everything from facial coding, galvanic skin response, and functional magnetic resonance imaging (MRIs)—can help product developers create more successful beauty products.

Neuroscience is also dictating product development in a biochemical way. A neurocosmetic product, for instance, can be formulated to modulate the skin’s neuro-cutaneous system to effect changes at the skin cell level. “Some examples of neurocosmetics are botox and botox-like mechanisms, sensitive-skin treatments, skin lowering cortisol levels mechanisms, and endorphin-level-raising mechanisms, among others,” Jiménez says.

Neuroscience has the potential to take the beauty industry to new heights. “Neuroscience is providing two major areas of advancement in the beauty industry,” Jiménez says. “In the first place, we are seeing great advances in the discovery of new biochemical mechanisms to treat different problems such as sensitive skin (which is increasing due to climate change and pollution) and also more powerful new mechanisms to improve skin hydration; new approaches for skin lightening, brightening, and whitening; wrinkle reduction; and improvement of firmness and elasticity, among others.”

He continues: “Secondly, neuroscience allows us to better understand how to develop formulas, products, concepts, and fragrances that have more impact on the consumer, to ensure that their desires and needs are more successfully met and, on the other hand, also allow for development of new evaluation methods that will better identify the desires and needs towards a specific stimulus or product.”

Call it the wave of the future—something consumers want. Says Jiménez: “The consumer is anxious for new experiences in cosmetic and beauty products that neuroscience techniques can provide.”

Good-for-Me Ingredients

That’s a look at beauty future. As for beauty present, the biggest draw for customers remains the ingredients they know and love, as well as the ingredients they’re intrigued by. Consumers will continue to be drawn both by ingredients largely hailed as natural and safe as well as by ingredients just beginning to appear on the radar.

Says Givaudan’s Fleury: “Consumers remain highly interested in ingredients that are relatively well-known for their properties and benefits, such as collagen, oils, and vitamins. ‘Back to Basics’ is one of the trends that we have noticed as consumers seek the familiarity and reassurance: traditional remedies, fewer ingredients, transparency, etc. Having said that, consumers are not at all reluctant to [try] innovative ingredients, such as hyaluronic acid, peptide, probiotics, and microalga extraction, as long as they are proven safe and efficient. It can be a challenge and an opportunity at the same time for brands to find the right balance.”

Hemp cannabidiol (CBD) is another ingredient intriguing beauty consumers, with CBD beauty products proliferating the market. But does CBD really work as a beauty ingredient?

“The research is clear that CBD directly supports the endocannabinoid system (ECS), which is hugely involved in promoting skin health and its homeostasis,” says Duffy MacKay, vice president of regulatory affairs for the PlusCBD Oil brand of hemp extract products. “The ECS helps to regulate the differentiation of skin stem cells and coordinates the protection mechanisms from UV rays. Cannabinoids from the hemp plant—including CBD—interact with our ECS and may help control mast cells, which contain the histamine of allergic reactions, as well as the sebocytes that produce the sebum oil that keeps our skin moist, healthy, and slightly acidic. Thus, current science supports positive anecdotes you hear about topical hemp extracts.”

Grace Kaucic, senior communications manager for hemp extract brand Bluebird Botanicals, says that topical CBD products for the skin may be a more comfortable point of entry for those consumers still just dipping their toes into CBD. “Many people are interested in CBD but afraid to try ingestible products,” she says. “Because of this, CBD topical and beauty products dominated the market in 2019. Many CBD newcomers feel much more comfortable applying a topical or beauty product than ingesting an oil-based product. Likewise, even experienced users enjoy the versatility and ease of applying CBD topically. We believe this trend will continue in the coming years.”

MacKay adds, “Future innovations in CBD for skincare will focus on CBD bioavailability. A multitude of delivery methods are waiting to be perfected and scientifically validated. The lipid nature of cannabinoids allows them to be formulated into products ranging from patches, gels, balms, sunscreens, and the full array of beauty products. There are research and development opportunities in these areas to establish the benefits for the intended medical or cosmetic use. Luckily, we’re already seeing a wealth of products enhanced with CBD hitting the market, and this interest will continue to drive research.”

Like the interaction between various ingredients and the skin microbiome, there is still much to learn about potential benefits of CBD and other hemp cannabinoids for the endocannabinoid system and the skin, says both Kaucic and Simpson. “They’re both intriguing and exploding markets with regulatory, marketing, and claims substantiation challenges,” Simpson says. “I would say both have moved beyond a fad, even a trend, but in order for them to stabilize and maintain market share, there is still a lot of work for industry to do. The endocannabinoid system and microbiome offer unique mechanisms of action on how they work in the body and on the skin to rebalance its health and appearance. From a marketing perspective, this is a dream, but it can also be a key challenge when presenting a new concept to the market.”

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In 1958, only 1.6 million Americans had a diagnosis of diabetes—a prevalence rate of merely 0.93%. Just over half a century later, in 2015, those numbers had risen to 23.4 million diagnosed cases, affecting fully 7.40% of Americans. That’s an alarming set of statistics for a disease the national cost of which topped $327 billion in 2017, with $237 billion going to direct medical costs, and reduced productivity accounting for $90 billion.

But the numbers are even more concerning when looked at with respect to American seniors. The American Diabetes Association reports that the rate of diagnosed and undiagnosed diabetes among Americans age 65 and older is a frightening 25.2%, or 12.0 million seniors.

As the senior population continues to grow, the effects of this disease could prove profound. But does it have to be this way?

According to Ron Elul, CEO of product brand CuraLife (Tel Aviv), the answer is no. “Diabetes doesn’t need to be a degenerative condition,” he says. “It acts that way because so many aren’t able to maintain healthy glucose levels. But those who manage their diabetes successfully can lead completely healthy lives—even into their senior years—and to a certain extent can avoid comorbid conditions frequently caused by diabetes.”

The key question is: How to manage it?

**From Pharma to Nature**

For years—and for many, to this day—the answer to that question has been “pharmaceutically.” The number of drugs effective at lowering blood sugar has skyrocketed, and they achieve their goal via an equally plentiful number of means, from stimulating insulin production in the pancreas or increasing cells’ sensitivity to insulin, to inhibiting the liver’s release of glucose and blocking the enzymes that break down carbohydrates.

But even the best diabetes medications aren’t without consequences, whether in the form of high prices, side effects, or unwanted drug interactions—all of which help explain why some patients, and their clinicians, are tilting away from pharmaceuticals toward more balanced, livable solutions.

Chief among these is an enlightened approach to diet, exercise, and weight maintenance, which most experts would agree constitutes the foundation of proper diabetes care. But when those strategies, either on their own or combined with pharmaceuticals, don’t do the trick, evidence suggests a role for natural products and supplements.

As Elul insists, “Pharmaceuticals work—they lower blood sugar.” But, he continues, “They also cause severe lifestyle constraints. That’s why people increasingly supplement their medical treatments with natural products, which help recover the lifestyle that diabetes took away.”

**Constructive Convergence**

Two “converging trends” are driving consumers and patients in this direction.

First, it’s growing harder to ignore supplements’ benefits. “Natural compounds may not be as studied as drugs for the simple reason that there isn’t as much funding,” Elul points
out. "But we now recognize that nature does work. Ingredients used for thousands of years don’t suddenly stop working because your doctor doesn’t ‘believe’ in natural medicine."

Second, consumers are exercising greater agency over their wellness. "We’re more empowered and responsible for our own health," Elul continues. "What our doctors say is important, of course, but we also do our own research and make decisions that are best for us."

**Wisdom of the Ancients**

And the science behind some products is encouraging. "Natural Ayurvedic supplements are remarkably effective in helping people maintain healthy glucose levels," Elul contends. Internal surveying of benefits attributable to CuraLife’s CuraLin—a 100% natural glucose-support supplement—showed effective blood sugar maintenance in healthy ranges for about 95% of users, he says.

"CuraLin was formulated specifically to help type 2 diabetics maintain healthy glucose levels," he goes on. The product combines the forces of botanicals like turmeric, bitter melon, fenugreek, amla, Swertia chirata, Gymnema sylvestre, Syzygium cumini, Melia azadirachta, Tinospora cordifolia, and Picrorhiza kurroa to promote healthy pancreatic beta-cell function in diabetics, as well as the digestion and metabolism of sugars.

As a bonus, Elul adds, the product can reduce sugar and carb cravings and helps “support high daily energy levels.” He says it’s one of only a few “synergistic supplements” available to diabetics today. "There are many single-ingredient supplements like cinnamon or berberine, but those only focus on very narrow areas of health. Synergistic combinations can target more elements at a time."

And while many of the formulation’s ingredients are incredibly rare, "Each has thousands of years of traditional use and real-world data backing its support of healthy blood-sugar levels," he concludes.

So when attempting to make a dent in the future costs of diabetes, it might be wise to look back to the past. 

**References**


Kimberly J. Decker writes for the food and nutrition industries from her base in the San Francisco area, where she enjoys eating food as much as she does writing about it.
When Christine Rosenbloom, PhD, RD, co-author of *Food & Fitness After 50*, thinks about healthy aging, she thinks in terms of “functional fitness”—meaning that as we age, we’re capable of doing the things that are important to each of us. “I love to travel,” she says, “and I want to be able to lift my own suitcase into the overhead bin. I love my dogs, and I want to be able to pick up a 50-pound bag of dog food.”

Not exactly the kinds of things you could do with fragile bones or weak muscles.

For Robert Kachko, ND, LAc, president of the American Association of Naturopathic Physicians, it’s about “graceful aging.” Not a big fan of the term *anti-aging*, viewing it as vilifying to aging, he believes the better way is to look at how we can age gracefully within the context of our environment.

Let’s face it: It’s hard to age gracefully when your bones are crumbling.

The Burden of Weak Bones, and Defying the Odds

The National Osteoporosis Foundation (NOF) calls osteoporosis “a major public health threat for an estimated 54 million Americans,” advising that “one in two women and up to one in four men over age 50 will break a bone due to osteoporosis in their lifetime.”

“The way I look at most chronic conditions is they come about through some combination of genetic influence and environmental exposure,” comments Kachko. With regard to bone mineralization, he advises that genetic influence accounts for about 60% versus 40% reliance on lifestyle factors. He views this as a positive opportunity to “pull the levers on healthy diet, exercise, sleep, and other environmental components” in order to potentially change your odds of keeping your bones healthy later in life. “If we do the right things, we can turn on the good genes or turn off the bad genes.”

He adds, “Weight-bearing exercise is the most important external influence on reducing the lifetime risk of osteoporosis. We can absorb all the calcium we want, but the effect of taking a calcium supplement is lost unless we are also engaging in a combination of muscular strain and aerobic activity.”

Beyond Calcium and Vitamin D

The 2019 Council for Responsible Nutrition (CRN; Washington, DC) Consumer Survey on Dietary Supplements reveals that one-quarter (24%) of U.S. adult supplement users take supplements for healthy aging, with only slightly less (22%) seeking supplements for bone health. Despite some controversy in recent years that questioned calcium supplements’ safety, the mineral most associated with good
Bone health has maintained its shine, with 26% of supplement users taking calcium. Calcium makes CRN’s list of most popular supplements among U.S. adults, tied for fifth place (20% of users taking it), while vitamin D ranks second (at 31%).

But that’s not all—or shouldn’t be all—Rosenbloom says. “It’s for good reason that we all think of calcium and vitamin D for bone health, but we do a disservice when that’s all we think about,” Rosenbloom says. “You don’t want to look at just one supplement; you want to look at all of them. For example, vitamin C is an important co-factor for our bodies to produce collagen, and potassium is important to buffer the acidity in our bodies. The higher the acidity, the more likely it is that calcium will be leached from the bones. Magnesium effects parathyroid secretion, and if your parathyroid levels are too high or too low, the hormone imbalance can affect bone health.”

Luke Huber, ND, MBA, vice president, scientific and regulatory affairs, Council for Responsible Nutrition, says, “Emerging research suggests vitamin K2 may support bone health. Vitamin K2 promotes carboxylation of osteocalcin, allowing this bone protein to bind to bone minerals, thereby strengthening bone.”

Minerals like calcium and magnesium, and nutrients like vitamin D and vitamin K2 menaquinone-7, that specifically either increase bone mineralization or help nutrient absorption or direct their nutrient partners to the right place in your body, are vital for virtually everyone.

Then you need to look at your individual risks. How do you keep your body healthy to keep your bones healthy? For example, Kachko says if your thyroid is not working optimally, if you’re hypothyroid, that could negatively impact bone strength, and you’d want to look to the benefits of selenium, vitamin A, iodine, tyrosine, zinc. Turmeric, although not a classic bone supplement, can be helpful to bring down high levels of inflammation.

When we think of the bones, Kachko opines, “We’re used to thinking of them as the inert part of our body that doesn’t change, but that’s not true. If our body is healthy, our bones are more likely to be healthy.”

An Age-Old Dilemma
Huber advises that people “make sure they’re getting adequate levels of calcium and vitamin D throughout their lives to support bone health as they age.”

It’s smart advice, but still represents a disconnect for younger adults.

CRN’s survey confirms the dilemma that the supplement industry has been concerned about for quite some time—customer demographics skewing older.

Only 15% of supplement users ages 18-34 take dietary supplements for bone health, and the 35-54 age category isn’t doing much better at 20%. That percentage rises to 28% in the 55+ category, but is that too late?

“People have a lot of trouble engaging in practices 20-30 years in advance of developing a condition,” Kachko observes.

Rosenbloom warns, “We’re not doing a very good job encouraging younger people to think about developing strong bones as a preventive measure. Once you get osteoporosis, there aren’t great treatment options.”

She explains, “Peak bone mass occurs up to the age of 30 and after that, we’re not going to build a lot of new bone; instead it’s about how we can mitigate losses. The more bone mass you have early on, the better off you’ll be.”

For women, bone mass plateaus in their 40s; rapid bone loss occurs in the first five years after menopause, which usually begins in the early 50s. “By the time you get a bone density test, you might already have osteopenia,” Rosenbloom says.

“Osteoporosis is a silent health disease because most people don’t feel anything until they have a fracture or a fall,” declares Rosenbloom. Unlike joint pain from arthritis or shortness of breath signaling heart disease, you’re probably not going to feel the effects of low bone mass—but the long-term ramifications can be just as debilitating.

Meeting Evolving Needs
Both Kachko and Rosenbloom are encouraged by the interest from the scientific community and the potential beneficial impact that vitamin K2 (menaquinone-7?) may have on bone health.

While Huber is aware that some manufacturers are starting to put that vitamin form into their multivitamins, he’s also found an increase in combination formulas specifically for bone health. “These products may contain a core formulation including calcium, vitamin D, and vitamin K2, but other ingredients, such as magnesium, may also be included.”

Huber has also noticed ways that companies are paying attention to evolving customer needs. With consumers weary from pill fatigue, he states, “We’re seeing companies increasingly use novel and alternative delivery forms such as gummies or chews, enabling people to get adequate levels of nutrients that are beneficial to bone health without having to swallow too many large pills.”

Holly E. Johnson, PhD, chief science officer, American Herbal Products Association (AHPA; Silver Spring, MD), is keen to have people think about food as medicine. “What I’m seeing in the supplements marketplace is companies increasingly sourcing minerals from plants,” she says.

She asserts: “All kinds of plants contain a variety of vitamins and minerals important to maintaining healthy bone. For example, flax, almonds, sunflower seeds, and asparagus are all good sources of silica, as is horsetail, a popular herb for promoting strong bones, nails, and hair.”

“Calcium is traditionally thought of as found in dairy products,” Johnson continues, “but many plants are also good sources for calcium, including leafy greens, beans, as well as commonly used herbs like nettle leaf, which is rich in constituents important in bone health.”

Both Kachko and Rosenbloom subscribe to a food-first approach, but both see a role for supplements.

“As a dietitian,” says Rosenbloom, “I always want people to take a food-first approach, and that sounds good, but in the real world, we know they’re not always getting the kinds of nutrients needed for good health.” She advises supplements can help, but people need to understand the overall picture and supplement wisely.
Postbiotic Fermentates: The Next Disruptor in Gut Health

Postbiotics may be new to the natural products industry, but with increased stability and consistency, and a wealth of science, they are slated to be the next “it” ingredient in gut and immune health.

Probiotics have a dominant hold in the gut-health space, but issues with stability and confusion about strains and CFUs gives postbiotic fermentates the opportunity to be the new market leader. EpiCor®, a postbiotic fermentate made through a specialized fermentation process, has a wealth of science supporting its immune-health benefits. Emerging research on EpiCor also supports its role in gut-microbiota modulation. Nutritional Outlook sat down with Justin Green, Ph.D., director of scientific affairs at Embria Health Sciences, to discuss the ins and outs of postbiotics, how EpiCor can help differentiate your gut-health products, and more.

Nutritional Outlook: What is a postbiotic, and what makes EpiCor a postbiotic?

Green: Postbiotics are the beneficial functional components created by fermentation of live microorganisms that are subsequently deactivated, or killed, and then dried into a powder that is easily characterized, studied, and formulated into supplements.

EpiCor is fermentation of Saccharomyces cerevisiae, or baker’s yeast. After it’s fermented, the live yeast is inactivated, or heat killed, and dried. It keeps all those metabolites intact and is standardized and consistent from batch to batch, which gives it a unique metabolite fingerprint. It is then used in human clinical trials to support its health benefits both in immunity and the gut.

Nutritional Outlook: What’s the difference between a postbiotic compared to a probiotic and prebiotic?

Green: Probiotics are live microorganisms that are introduced into the gut through a supplement and then, hopefully, remain alive to produce those metabolites.

Probiotics are inherently more unstable than the metabolites in postbiotics because they need to remain alive throughout that entire process. As such, it is a lot more challenging for supplement makers to ensure delivery of health-benefiting components.

A prebiotic is essentially the energy, the food, for the beneficial bacteria in your gut. That good bacteria grows and produces the metabolites that are important for the body. Everyone has a different microbiome, so prebiotics may affect people in different ways. The beneficial doses for prebiotics, which are essentially fibers, are very large, at 3 - 4 g or more, and won’t fit in a capsule—as opposed to probiotics where the actual size is quite small; EpiCor has a 500-mg dose.

Nutritional Outlook: As a postbiotic fermentate, what makes EpiCor different?

Green: EpiCor has a unique fingerprint because it’s made using a proprietary natural proprietary process that creates many unique beneficial metabolites. Inspired by a real-life health discovery and supported by award-winning science, EpiCor helps people live more healthy days.
fermentation technique. This process makes it very consistent, but it’s a complex compound. We’ve used it in human clinical trials and only EpiCor can take advantage of the science that shows benefits for immunity and gut health.

EpiCor also has a great discovery story. Our parent company has 75 years of fermentation experience, which is how it developed the proprietary method for beneficial fermentation. About 15 years ago, it noticed the factory workers who were working directly with the fermentation ingredient for animals seemed healthier. Based on this hunch, it decided to develop a new product for humans. After years of research and development, EpiCor was created.

**Nutritional Outlook: What are the advantages of EpiCor over probiotics and prebiotics?**

**Green:** EpiCor is more stable than probiotics—the actual ingredient has a three-year shelf life—and it offers consistency in different formulations, unlike probiotics. Compared to prebiotics, EpiCor doesn’t have the side effects mentioned earlier, so you don’t get as much bloating. Also, the efficacious dose of EpiCor is at 500 mg per day, whereas an efficacious dose of prebiotics is between 3 - 7 g per day.

Another benefit of EpiCor is the consistent science—all our human trials were conducted with a consistent dose of 500 mg a day. And lastly, the strong science. Probiotics, and to a certain extent prebiotics, show changes in the gut, but it’s difficult to show the actual health benefits. EpiCor, on the other hand, has strong supporting research for its role in immune health and an emerging body of science for its role in gut health.

**Nutritional Outlook: What is the research behind EpiCor?**

**Green:** EpiCor has 15 published studies, eight are human clinical trials. We looked at immune science first, and most of our human clinical trials show increased immune strength in subjects, both with cold weather and seasonal challenges. And now we have science in the human field and in model systems that show gut-microbiota modulation as well.

**Nutritional Outlook: Why do you think postbiotics like EpiCor will be disrupting the gut-health space?**

**Green:** Consumers are always looking for better ways to support their gut. And postbiotics don’t add more bugs to your system, they simply support the bacteria that you currently have, so we’re building on the story of the microbiome. The microbiome is something that scientists and consumers are interested in. Now, with postbiotics, they have a new option to support their gut with no side effects and additional health benefits such as immune strength.

Supplement manufacturers who know consumers like the microbiome and fermentation stories can capitalize on this by using EpiCor, which builds on both those stories and offers science to back up its health claims.

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**EpiCor**® whole food fermentate is a postbiotic ingredient clinically shown to support the immune system and beneficially modulate the gut microbiota. Backed by over 75 years of fermentation expertise, EpiCor is made through a natural proprietary process that creates many unique beneficial metabolites. Inspired by a real-life health discovery and supported by award-winning science, EpiCor helps people live more healthy days.
Brain health is a growing area of interest to dietary supplement makers. Today’s supplement companies are looking to capitalize on the expanding population of consumers seeking to nourish their minds with a variety of nutrients in the name of mood support and cognitive performance.

While there are countless ways to position a brain health product in today’s market given the central role brain health plays in health and wellness, cognitive nutrition teeters on nutrition’s uncertain frontier, points out Nutrition Business Journal’s (NBJ) 2018 Supplement Business Report. Simply put, research on the interplay between nutrition and the brain is still emerging, and how that relationship shakes out in terms of effective dietary supplementation remains to be seen.

Despite this, the brain health supplements market seems to be going nowhere but up. Brain health supplement sales grew 24% in 2019, according to market research firm (IRI) Chicago during a presentation given at last November’s Council for Responsible Nutrition (CRN) annual conference. And according to CRN’s own 2019 Consumer Survey on Dietary Supplements, up to 14% of supplement users today take dietary supplements for brain health.

The Case for Nutritional Psychiatry

According to a recent article in Psychology Today, “The human brain is by far the most complex and intricate organ in the body. Apart from regulating our most basic biological functions, the brain is also the seat of consciousness. When something is not right, either due to an irregularity in neurochemical signaling or because of structural deficits caused by either injury or old age, this can often affect how we experience consciousness and how we perceive the world around us.”

Suffice it to say the brain is pretty important, and so too is what you feed it. That is the impetus behind an emerging field called “Nutritional Psychiatry,” which leans heavily on the connection between diet and brain health. It is a discipline in its infancy, created only in the last 10 years.

A 2015 article in the Lancet said that Nutritional Psychiatry is developing into a real opportunity for clinical intervention for patients, especially those who suffer from depression and anxiety.

“Psychiatry is at an important juncture, with the current pharmacologically focused model having achieved modest benefits in addressing the burden of poor mental health worldwide,” the Lancet authors wrote. “Although the determinants of mental health are complex, the emerging and compelling evidence for nutrition as a crucial factor in the high prevalence and incidence of mental disorders suggests that diet is as important to psychiatry as it is to cardiology, endocrinology, and gastroenterology.”

Further, evidence is steadily growing for the relationship between dietary quality (and potential nutritional deficiencies) and mental health, and for the select use of nutrient-based supplements to address deficiencies, or as monotherapies or augmentation therapies, the Lancet article said.

A leading organization in the field of Nutritional Psychiatry is the Food & Mood Centre at Deakin University in Australia. This multi-disciplinary research center aims to...
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understand the complex ways in which what we eat influences our brain, mood, and mental health. The Food & Mood Centre is supported by a team of researchers from various backgrounds studying the food-mood relationship at various levels, from microbiology to public health.

"Within the field of Nutritional Psychiatry, our research initiatives aim to identify nutrition-based approaches to preventing and treating mental disorders that may improve brain and mental health both in Australia and globally," the organization says.

Leading the charge for the Center is Deakin University Associate Professor Felice Jacka. In a recent study, Professor Jacka examined data from MRI scans of approximately 250 older Australians, then studied their diets to see if the quality of their diets was linked to the size of their hippocampus—a region of the brain thought to be central to learning, memory, and mood.

Those people who had a diet higher in fruit, vegetables, and fish had larger hippocampi, while those whose diets were high in processed and takeaway foods had smaller hippocampi. These dietary patterns were also linked to the participants’ risk for depression over time.

A 2018 Harvard Health Blog noted that while the burgeoning field of Nutritional Psychiatry is finding there are many consequences and correlations between not only what you eat, how you feel, and how you ultimately behave, there are also strong links to the kinds of bacteria that live in the gut.

According to Nutrition Business Journal, the gut-brain axis is already getting a lot of attention. "The idea that the brain talks to the gut and the gut talks back is intuitive and increasingly well studied. What we put in our gut affects our mood, and our mood in turn affects how our gut feels and functions," said NBj in its 2018 Supplement Business Report. "Though perhaps years and millions of dollars away from proven efficacy, microbiome research presents a proposition that the right microbe or team of microbes could provide an option for everything from asthma to autism. Consumers spent $75 million in probiotics for brain health in 2016, but that number will undoubtedly grow."

When it comes to the prevention of Alzheimer’s disease, one of the leading researchers in the world on dementia can recommend quite a few ways to stave off the dreaded regressive disease. But none of these methods are a magic pill.

"There are four medications that have been approved for preventing or treating Alzheimer’s, but their effectiveness is limited, and new medications that have been tested in the last decade do not work. This makes it even more essential to do what we can to change or delay the course of the disease," said Professor Michal Beeri, director of The Joseph Sagol Neuroscience Center at Sheba Medical Center, Tel HaShomer (Israel), and a professor of psychiatry at the Icahn School of Medicine at Mount Sinai (New York City).

Professor Beeri reports that there are methods that have been shown to decrease the risk for this devastating disease. Habits that are good for the heart are also good for the brain, and five of the seven established risk factors for Alzheimer’s (lack of physical activity, obesity, diabetes, hypertension, and smoking) are also the risk factors for heart disease. She is firm in her belief that Alzheimer’s is a disease that requires care and attention well before it starts to rear its ugly head in the later decades of life.

Future Challenges
While the brain health supplements market holds so much promise and potential, it is also riddled with obstacles that could impede growth.

As NBj pointed out in its 2018 report, "We know how good we feel when we eat well and how sluggish we feel when we succumb to the pitfalls of the modern plate. But somehow, and the culprit remains unclear, that connection between health and wellbeing stops somewhere short of the blood-brain barrier for too many people, and perhaps too many supplement brands and manufacturers."

The report went on to say while heart health, sports nutrition, and better digestion are easy and obvious sales targets, throwing in words like "anxiety" or "mental acuity" invites a certain amount of skepticism: "The unseen and unknowable neurons suddenly become a pharmaceutical dominion. Even nutritional and natural remedy options start to sound more like drugs, targeting a single organ and abandoning the holistic approach."

For the future, supplement companies must tread carefully in this sector and pay close attention to how they position and communicate the promise of their products.

References
Natural Beauty from Within

Marine Collagen with clinical research which supports the improvement of elasticity, fine lines and wrinkles

Water Soluble Egg Membrane: New research proven for wrinkle reduction, improved skin tone and hair health

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One in four people in the U.S. report dealing with a digestive issue on a daily basis, according to a 2017 report from market researcher Innova Market Insights. This can range from mild stomach upset to debilitating symptoms like pain and diarrhea. Perhaps this is why dietary supplements for digestive health are particularly popular among consumers.

According to the Council for Responsible Nutrition’s (CRN; Washington, DC) 2019 Consumer Survey on Dietary Supplements, 17% of supplement users take dietary supplements for digestive health, with those aged 35-54 demonstrating the most interest in this health benefit.

As far as consumer awareness, last year ingredients supplier Kerry (Beloit, WI) conducted its own research and was able to show that, in particular, high numbers of consumers across the world understand the benefits of probiotics for gut health. More specifically, around eight in ten (79%) of Americans surveyed perceived probiotics to provide digestive health benefits. In the UK, 72% of consumers who were aware of cultures—a term sometimes used to describe probiotics—were able to correctly identify their benefits for digestive health.

Julian Mellentin, director of New Nutrition Business, and author of its latest report “10 Key Trends in Food, Nutrition, and Health 2020,” believes consumers are willing to accept digestive benefits from a wider array of products than ever before. To that end, they are particularly

### Digestive Health

The digestive market’s mainstays, probiotics and gut-friendly foods, are holding strong.

By Becky Wright
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interested in fermented foods with a back-story of traditional usage, such as kefir or kombucha.

Mellentin goes on to say that digestive health is also strongly connected to probiotics or “live bacteria.” He emphasizes that the biggest opportunity is for probiotics that can really deliver benefits.

“Beyond that,” he says, “consumers turn to whole foods (such as fruit and grains), gluten-free foods, or plant milks or lactose-free dairy or (emergent) goats or sheep dairy.”

“This share of mind that whole foods and probiotics have in digestive makes it challenging for other ingredient types to gain a foothold,” he adds.

Fibers also have an established place within the segment—but their presence on a label might no longer be a compelling point of difference, Mellentin says. “When you say ‘fiber,’ you need to have another benefit alongside—such as ‘less sugar/no sugar’—to get consumers’ attention,” he comments.

In terms of market performance, probiotics have been quite impressive during the last decade based on estimates from Nutrition Business Journal (NBJ).

Every single year since 2006, sales of probiotic supplements have shot up considerably, according to NBJ data. Take 2012, for instance, during which probiotics notched 27% growth over 2011. Even recession-plagued 2009 saw probiotic sales jump an impressive 24% in one year.

“This explosive growth tracks with probiotics moving mainstream,” said NBJ. “Fueled by an avalanche of microbiome research, more medical doctors and pharmacists are recommending probiotics for digestive health, and [with] the proliferation of products like Dannon’s heavily marketed Activia yogurt, probiotics have practically become a household term.”

Mellentin believes evolving microbiome science will also pave the way for other possible benefits for probiotics, including skin, heart, and brain health, as well as weight management.

**Healthcare Impact of Probiotics**

A recent study found that probiotics could reduce healthcare costs and the societal impact of flu-like infections across the U.S. The analysis considered the impact of generalized probiotic intake from a healthcare payer’s perspective in primary care, as well as in a broader societal setting by including productivity loss associated with flu-like respiratory tract infections (RTI).

The model accurately reproduced the U.S. population structure, the incidence pattern, and the risk factor prevalence over the study period. Two meta-analyses reported clinical benefits of probiotics, one showing a reduction of disease duration and the other both a decrease of disease incidence and duration.

While the changes are small at an individual level, when applied to the U.S. population, the health impact is sizable, ranging from an estimated 19-54 million eliminated RTI sick days, 1-2 million averted antibiotic courses, and 3.5-4 million avoided missed workdays, according to the U.S. population structure, the incidence pattern, and the risk factor prevalence over the study period. Two meta-analyses reported clinical benefits of probiotics, one showing a reduction of disease duration and the other both a decrease of disease incidence and duration.

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In terms of cost savings, the impact of avoided RTI events, translated to the U.S. population, represented a potential total amount of approximately $1.4 billion, of which $370 million represents savings for the healthcare payer.

**Prebiotics: The Perfect Probiotic Partner**

The prebiotic fiber inulin is having its moment in the sun thanks to strong consumer desire for less sugar, for more protein, and for products that support digestive wellness, according to Mellentin.

“Inulin has become a success as a natural sugar replacer, used in an ever-growing number of products, and its presence means that companies can also flag up the enhanced fiber content on the label,” he says.

Sales of breakfast cereals have suffered in recent years, both from the lower sugar and lower carb trends, but many brands are discovering that they can gain sales in a challenging market by using inulin to offer both a digestive wellness benefit and a low-sugar promise, “two of the biggest consumer growth trends,” Mellentin claims.

Troo Granola, for example, uses inulin syrup in its products because it serves both as a prebiotic fiber and a sweetener, giving a more appealing taste to consumers while keeping the sugar low.

“For companies who choose to use inulin in their brands for digestive benefits, a big plus is that it delivers a ‘feel-the benefit’ effect—one of the most compelling reasons for someone to keep buying a product and one of the biggest marketing advantages you can have,” says Mellentin.

“These benefits have caused demand for inulin to surge. The number of products launched that feature inulin doubled between 2012 and 2019,” he adds.

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**Reference**

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Energy and Sleep

More consumers and marketers are tackling the interplay between these two critical need states.

BY SEBASTIAN KRAWIEC, ASSOCIATE EDITOR

We can all use a boost. Lack of sleep, stress at work, having a social life; it all adds up to create exhaustion that makes us rely on substances like coffee or energy drinks to keep us moving throughout the day. Ironically, those things combined can also add up to a restless night’s sleep. As a result, consumers are turning to dietary supplements in the hopes of finding a healthy way to sustain their energy and get a decent night’s sleep.

Energy

According to the Council for Responsible Nutrition’s 2019 Consumer Survey on Dietary Supplements, “energy” is the second most cited reason that a whopping 32% of supplement users take dietary supplements. What does that look like age-wise? The majority of supplement users (42%) who cite energy support as a reason they take supplements are between the age of 18 and 34, but consumers between the age of 35 and 54 still make up 35% of those who seek out energy products.

According to market researcher Innova Market Insights, food and beverage launches, including supplements, with energy and alertness claims grew 20%, globally, between 2014 and 2018. Sports nutrition is among the top market categories whose food and beverage launches are making energy and alertness claims, representing 38% of the global share of launches in 2018. Not only that, sports nutrition is also among the fastest growing categories, with food and beverage launches of products with energy and alertness claims growing 40% since 2014.

According to market researcher SPINS, during the 52 weeks ending October 6, 2019, energy support was one of the mainstream retail channel’s three bestselling ingredient categories, earning $803 million. Some of the bestselling energy-support ingredients in that channel overlap with sports nutrition, such as protein and creatine, whose sales grew 61.8% and 11.6% over the previous year, respectively. One of the most prominent sources of energy for the everyday consumer is caffeine. According to SPINS, in the mainstream channel, sales of caffeine grew 14.7% over the previous year, to $109 million.

While energy is important, consumers are also looking for balance. They are drawing distinctions between physical energy and mental energy, and understanding that superficial ideas of energy aren’t enough to get them through their workday or even a workout. In May of 2019, the World Health Organization classified “burnout” as an
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occupational phenomenon. It defined it as “a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed. It is characterized by three dimensions: 1) feelings of energy depletion or exhaustion, 2) increased mental distance from one’s job, or feelings of negativity or cynicism related to one’s job, and 3) reduced professional efficacy.”

Concerns about burnout open up the energy category to new ingredients that complement energy ingredients. For example, dietary supplement ingredients classified as nootropics, which are meant to support cognition and focus, can be marketed in sports nutrition to improve workout performance and longevity. Nootropics, such as those found in the NOOstart product from ThinkNOO, are marketed to complement your morning cup of coffee. One of its active ingredients, L-theanine, is known to reduce the side effects associated with caffeine such as the jitters, for example. By taking a capsule 30 minutes prior to one’s morning coffee, consumers can expect their bodies to more efficiently process the caffeine they consume, the company says.

“[Coffee] is the most consumed beverage after water,” says Shannon O’Brien, founder and CEO of ThinkNOO. “There are these unspoken side effects of coffee that people don’t often think about. The jitters, the crash in the afternoon, and what people don’t often realize is that coffee does actually have a much slower breakdown cycle for how long it takes to get out of the body, especially if you’re topping up multiple times a day with any kind of caffeine. So, what we then looked at was how do you level out that energy throughout the day so people have more sustained healthy energy rather than turning to cup after cup after cup, which led us to a range of different nutrients.”

The connection between energy and focus is extending into the gaming space, where e-sport athletes play hours of video games, requiring focus and fast reaction times. Traditionally, energy drinks have been a big part of gaming culture, but ingredients like L-theanine and MCTs (medium-chain triglycerides), which also help the body process caffeine, open the door to healthier options.

“We’ve been speaking to a bunch of e-sports teams, and they’re really looking into this with scientific rigor,” says O’Brien. “Especially when you’re playing reactionary games that require a lot of precision, within 45 minutes of having caffeine, you are actually ineffective, worse than baseline. So, it’s at about the 45 minutes to an hour mark that you are out of your peak.”

Sleep
The flipside of energy is sleep, and what we consume to keep ourselves alert during the day can have consequences for how well we sleep at night. Natural sleep aids provide a potential solution. According to SPINS, during the 52 weeks ending October 6, 2019, in the mainstream retail channel, the sleep category earned $389.8 million, growing 24.3% since the previous year. In the natural category, sleep sales grew 11.2% to $29 million. One of the bestselling ingredients in the category is melatonin, which grew in sales by 10.2% in the natural channel to $11 million, and by 26.4% in the mainstream channel to $322 million.

ThinkNOO keeps the consumer’s desire for restful sleep in mind with its NOOreset product, which aims to counteract the ill effects of caffeine consumption and to replenish the body of nutrients lost during the day.

“The main ingredient we have in there is rutaecarpine, which is a plant extract that has really positive initial research showing it can assist with the production of key enzymes that break down caffeine,” explains O’Brien. “On the flip side of that is that caffeine causes the absorption of a lot of nutrients of which we’ve looked to target and really replenish so that you get a more restful sleep and end up feeling better.”

These products are an example of how the mindset around energy is shifting, taking on a more holistic approach that acknowledges the importance of the mind in our overall physical health.

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Heart Health

A crowded, competitive, and niche market for supplements

Heart health is a solid category where natural solutions have found fertile ground for the last several years. But it is also crowded and very generic. That’s why there is a lot of movement to be more specific about a heart health product’s benefits, as well as find new angles for innovation.

Offering a sobering view of the market, Julian Mellentin, director, New Nutrition Business, says, “Heart health is arguably the most-crowded and competitive of all benefit platforms. The benefit of heart health is offered directly and indirectly by a massive array of products stretching across all categories. In heart health, whatever proposition you develop—no matter how good its science—is in competition with a wealth of ‘regular foods’ that consumers and the media perceive as heart healthy. These include oats, olive oil, dark chocolate, whole grains, almonds, pistachios, blueberries, and many, many others. This competitive reality has helped keep heart health brands in a niche.”

Still, heart health remains one of the top reasons why overall supplement users take supplements. “This reason is especially popular among supplement users aged 55+, with heart health being the third most popular reason for taking dietary supplements in this age bracket,” says Nancy Weindruch, vice president, communications, Council for Responsible Nutrition (CRN; Washington, DC).

In the mass-market retail channel, the top three ingredients for heart health as of October 6, 2019, according to market researchers SPINS and IRI, were fish oil, psyllium, and CoQ10. However, the only categories of the top 10 ingredients listed in this market under “cardiovascular health” that posted gains compared to the previous year were psyllium (which grew 0.5%) and CoQ10 (ubiquinol; which grew 15%).

In the natural retail channel, the top three ingredients for heart health were CoQ10, fish oil, and garlic. Those posting gains in the natural channel’s cardiovascular category were garlic at 5%, red yeast rice at 1%, magnesium at 4%, and resveratrol at 9%.

Most top 10 ingredient categories across both channels were in the red, indicating a stagnating and/or declining market from previous years. That being the case, omega-3s and CoQ10 continue to hold the top positions in terms of market share.

Among consumers, according to CRN’s 2019 Consumer Survey on Dietary Supplements, usage of omega-3/fatty acid supplements has remained steady over the past five years. “Historically and currently, omega-3s are most popular in the 55+ age category,” says CRN’s Weindruch. “Omega-3/fatty acids are in the top five most popular supplements taken by men. In fact, the number of men who take omega-3/fatty acid supplements has grown by four percentage points over the last year.”

Mellentin also believes nutrients like omega-3s are among those likely to keep the heart health category afloat for years to come, among others.
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"Ingredients like walnuts or almonds have strong epidemiological data showing their cardio-protective effects, which helps to strengthen the ‘naturally heart healthy’ beliefs around whole foods," he says. "Ingredients like omega-3, beta-glucan, phytosterols, CoQ10, and lycopene dominate the heart health supplement category. It will be difficult for emerging ingredients to challenge ingredients like omega-3s, which have been studied since the 1970s."

**Omega-3 Drugs Dominate Recent Headlines**

The omega-3 market has had its share of ups and downs. In 2019, there was a mix of news related mostly to the publication of several high-profile studies. Indeed, REDUCE-IT, VITAL, and ASCEND were the studies that kept on giving when it came to headlines.

All published about a year ago, new findings generated from these studies continue to shine a light on omega-3s EPA and DHA, especially with regard to heart health.

Most recently, AstraZeneca’s Vascepa EPA ethyl ester drug stunned the world in the REDUCE-IT study by showing its extraordinary ability to reduce the risk of cardiovascular (CV) events by 30%, an achievement a cholesterol medication could only dream of.

This prompted FDA in mid-December to expand label-claim approval for Vascepa for the secondary prevention of cardiovascular events, claiming that it would "...give patients with elevated triglycerides and other important risk factors, including heart disease, stroke, and diabetes, an adjunctive treatment option that can help decrease their risk of cardiovascular events."

However, the wave omega-3 drugs were riding abruptly crashed in January of this year when two other omega-3 drug makers, AstraZeneca and Acasti, reported the clinical trial results of Epanova (a fish-oil based EPA/DHA drug) and CaPre (a krill oil–based drug), respectively. The STRENGTH trial was halted because Epanova didn’t show a likelihood of cutting LDL cholesterol when combined with a statin for patients at risk of heart disease due to high levels of LDL (or bad) cholesterol. At the same time, Acasti reported that its krill oil drug failed to sufficiently perform better than placebo in terms of reducing triglyceride levels.

In the meantime, although a full-scale direct-to-consumer marketing campaign for Vascepa is well underway, many analysts continue to question its future due to intellectual property concerns.

In light of these recent studies and reports, it is important to keep things in perspective. Fish, dietary supplements, and pharmaceutical omega-3s all have an important role to play in delivering omega-3s to support heart health.

But at the end of the day, if health outcomes are the goal, then it will always come down to dose, regardless of how these omega-3s are delivered.

**The Omega-3 Index: A Tool for Growth**

Another aspect of heart health that will likely come into play for 2020 and well into the future is the importance of knowing one’s Omega-3 Index. This is simply a measurement of the omega-3s EPA and DHA in red blood cell membranes, and it has the potential to hold more weight than measuring cholesterol as a risk factor for heart disease, according to William S. Harris, PhD, the inventor of the test.

Originally proposed more than 15 years ago by Drs. Harris and his colleague Clemens von Schacky, the Omega-3 Index has since been featured in more than 200 studies, including some of the largest in the world like the Framingham Heart Study and the Women’s Health Initiative Memory study, both of which included thousands of subjects.

With a risk factor that can be easily modified (i.e., one just needs to consume more EPA and DHA to raise their Omega-3 Index), this test is particularly attractive to doctors who want to assess risk for their heart patients. Stakeholders hope that the Omega-3 Index will one day become the standard of care like a cholesterol or CRP test. Lending credence to the importance of measuring omega-3 levels was a statement released late last year by the International Society for the Study of Fatty Acids and Lipids (ISSFAL) relating to the importance of omega-3 blood testing in research studies.

What this basically means is that any study looking to assess the benefits of omega-3s is heavily encouraged to measure omega-3 levels before and during the study in order to better correlate health outcomes. Similarly, consumers and practitioners should establish a baseline omega-3 blood level (i.e., Omega-3 Index) before deciding where to go next when it comes to strategizing when and how to adopt supplemental heart health strategies.

References

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Herbs have consistently been among the best-performing immune health ingredients on the market. Horehound, echinacea, and elderberry are dominant forces in this category. According to the most recent *HerbalGram* Herb Market Report, published in the American Botanical Council’s journal in September 2019, total 2018 sales of horehound in the U.S. mainstream retail channel were $146.6 million. Total sales of echinacea in the U.S. mainstream channel that year were $110 million. Horehound and echinacea were, in fact, the first- and second-bestselling herbs in the mainstream herbal channel in 2018.

According to market researcher SPINS, sales of these two immune-health leaders, horehound and echinacea, in the mainstream channel a year later remain steady, growing 0.8% and 5.8%, respectively, during the 52 weeks ending October 6, 2019. In the immune health category, sales of horehound and echinacea reached $149 million and $103 million, respectively, in 2019.

Families have a big need for immune health ingredients, for all parties involved. However, while adults have a variety of options, children have fewer.

However, the most impressive sales growth among herbs in the immune health space goes to elderberry. According to *HerbalGram*’s Herb Market Report, back in 2018 elderberry sales grew 138.4% to $51 million in the mainstream channel and 93.9% to $25 million in the natural channel.

Taking a look at the elderberry market a year later, per SPINS, during the 52 weeks ending October 6, 2019, cross-channel sales growth of elderberry was 83.4%, for total sales of $113 million. In the mainstream channel alone, sales of elderberry for immune health grew 116% to $63 million.

Another usual suspect in the immune health category, vitamin C, is the mainstream channel’s bestselling immune health ingredient, according to SPINS, with $244 million in sales in 2019 and relatively steady growth of 6% over the previous year. It is also the eighth-bestselling ingredient in the mainstream channel, with total sales of $346 million. Here, vitamin C also shows steady growth of 4.5% compared to the previous year.

While probiotics corner the market on digestive health, the relationship between digestive health and immune health cannot
be overstated. Probiotics are among the bestselling ingredients across all channels, but according to SPINS during the 52 weeks ending October 6, 2019, cross-channel probiotic sales fell 3.7%. It could be that the digestive health space is getting saturated with all kinds of probiotics and specialty ingredients. With strains that are proven to support immune health, this could be an opportunity to cross-market to immune health.

Based on these sales figures, it’s clear that consumers are buying products with these ingredients, and that immune health is a concept they believe in and take seriously. According to the Council for Responsible Nutrition’s 2019 Consumer Survey on Dietary Supplements, immune health ranks among the top five reasons for taking dietary supplements, cited by 27% of supplement users. Immune health is also a category that spans different demographics.

“Immune health is a foundation of quality of life for people of every age and in every need state, which is one of the reasons it is the most sought-after health benefit for consumers across the world,” says John Quilter, vice president and general manager, ProActive Health, for Kerry International. “Families with young children and people experiencing lifestyle stress are two obvious groups seeking an immune health boost. Immune health is also one of the health benefits most likely to be sought by seniors, so population aging will fuel further growth in the category.”

Families have a big need for immune health ingredients, for all parties involved. However, while adults have a large variety of options, children have much fewer. A report published by Kerry International, citing insights from Mintel, states that despite the high level of interest in immune support for children, only 2% of children’s food and drink products launched globally between 2012 and 2017 carried immune health claims. This means there is a large gap that needs filling, particularly in the functional food and beverage space.

“Another area where the consumer appeal of immune health ingredients is growing—given that avoiding illness is a key goal for active consumers—is sports nutrition,” adds Quilter. Staying healthy is central to peak athletic performance, and incorporating immune health ingredients into sports nutrition products is a way to encourage their use.

According to a report from Kerry International, 37% of consumers from the United Kingdom stated they would buy a sports nutrition product that supports immune health. That same report said that sports nutrition consumers are also adventurous, with 49% of them saying they would try new or different sports and energy foods sometimes or often. If you consider that proteins of various kinds have seen cross-channel decline in sales, based on figures from SPINS, the sports nutrition space can be another viable platform for immune health ingredients.

References
Remaining active is difficult as one gets older. Part of the problem is our joints, which wear with age and become more inflamed, causing pain. It’s why many consumers today are seeking relief. According to Innova Market Insights, 21% of consumers from the United Kingdom over the age of 55, for instance, said they used prescription medication for joint health in 2017. While pharmaceuticals certainly have their place, dietary supplements can be a viable solution for less serious joint pain and overall maintenance.

“The best analogy I have heard [about pharmaceutical drugs] is from a well-known Australian cardiologist named Dr. Ross Walker,” says Neal Mercado, chief marketing officer at Designs for Health, a practitioner brand of dietary supplements. “He compared pharmaceutical drugs to taking a Ferrari to get from point A to B, versus supplements, which is like riding a bike. They will both get you there. The Ferrari will get you there quicker but may also introduce some risk depending on how fast you drive it, whereas the bike is much less risky but might take a little while longer.”

Assuming consumers do eventually experience a noticeable benefit from taking a joint health supplement, they might find the supplement route a more prudent approach, especially if they are seeking long-term preventative health strategies versus acute treatment of already existing conditions.

One ingredient making a name for itself in the joint health space is curcumin, the active constituent of turmeric. “Curcumin has experienced significant popularity over the past few years due to its demonstrated effectiveness as an anti-inflammatory as well as its positive safety profile,” Mercado explains. Turmeric continues to do well in general. According to market researcher SPINS, during the 52 weeks ending October 6, 2019, cross-channel sales growth for turmeric overall was 1.8% to reach $143 million.

In the joint health category specifically, joint health mainstays such as glucosamine and chondroitin sulfate have higher sales than curcumin, but as the library of research on curcumin and other joint health ingredients such as collagen grows, glucosamine and chondroitin sulfate are at risk of losing more market share.

“Glucosamine and chondroitin have had a longstanding history of use for joint health and have been the subjects of numerous large-scale clinical trials. However, recent meta-analyses have seemed to question the statistical significance of their effect and have introduced some doubt as to their efficacy in the broader medical community,” says Mercado. “Other ingredients such as collagen and turmeric (curcumin) have shown promising results in recent clinical trials.”

Supplementation with collagen supports the structure of the joints. The ingredient has experienced huge sales growth. According to SPINS, cross-channel sales growth of collagen was 82.7% in 2019, to reach $147 million. Collagen straddles multiple categories, including joint health, bone health, and nutricosmetics, with different types of collagen offering a variety of benefits. This allows for combination products that target multiple need states.

The advantage of ingredients such as curcumin and collagen are their versatility, allowing manufacturers to feature them in different delivery formats. For example, Designs for Health has softgel and soft chew options for its curcumin products, and collagen can be incorporated in capsules, chews, and powders. Having a variety of delivery formats helps with compliance because as we age, the number of prescriptions and supplements we take increases.

“Compliance is key—the ingredient cannot work if you don’t take it,” says Mercado. “Pill fatigue is real, and having a variety of dosage forms, including softgels, capsules, and powders as well as bars and chews, really helps.”
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The sports nutrition market is an interesting animal. On the one hand, there are clear groups of consumers who continue to seek the performance gains that nutritional supplementation can provide in conjunction with training. On the other hand, someone who buys a sports nutrition product today might also look like me—maybe even you: the everyday consumer looking to lead an active and healthier lifestyle but who isn’t necessarily a hardcore athlete. (If we average Joes also reap some performance gains along the way, all the better.)

This evolving profile of the sports nutrition customer has turned the sports and active nutrition categories into growing markets with more possibilities for brand marketers than ever. Market researcher Euromonitor International reports that between 2014 and 2019, the U.S. sports nutrition market grew at an impressive 10.3% CAGR, sitting at $13 billion in 2019. Sports nutrition’s steady growth has extended as far back as 2004. Last July, Euromonitor’s Matthew Oster observed a 7.9% CAGR for the sports nutrition market from 2004 through 2018. Wrote Oster: “Such high growth for that long is unprecedented in fast-moving consumer goods. Fads and new product developments can stir consumer interest for a handful of years, but even the broadest trends mature and show flattening growth over the long term.”

It’s great news for those playing in this space. So, what’s really performing strongly in the sports nutrition market, and what trends will continue to influence products on the shelf?

Plant Protein
For all the research supporting the benefits of dairy proteins for muscle gain and recovery—whey especially—one might ask whether there is even a place in sports nutrition for plant proteins considering that, individually, most plant proteins often lack the full amino acid profile that whey proteins can offer those looking to build and maintain muscle mass.

“Plant proteins differ in digestibility and amino acid composition from animal proteins,” says Ralf Jäger, PhD, cofounder and partner at consulting firmIncrenovo LLC. Jäger is a certified sports nutritionist and a fellow of the International Society of Sports Nutrition. “Specifically, plant proteins such as pea or rice are lower in leucine and total BCAA [branched-chain amino acid] content, amino acids that have been linked to muscle health by activating muscle protein synthesis.”

To get comparable amounts of leucine from a plant source that you would from a dairy source, a person would have to consume a lot more of the plant source, he says. For instance, while animal proteins such as whey contain approximately 10%-11% leucine, pea and rice protein offer a lower 8% leucine content. So, although rice and pea protein “have been shown to be as effective as whey protein in increasing lean body mass and strength when combined with resistance exercise,” that is only if the serving size of the plant protein is doubled “to compensate for the low leucine content of the plant proteins,” Jäger says.

Plant proteins can still compete in the sports market, with some considerations. While it’s likely that few isolated plant protein sources will stack up to the amino acid profile of dairy, the key is using a blend of plant protein sources to additively reach the amino acid target.

“I think the key with plant-based diets, other than soy, is really just eating a variety of different protein sources. Eating a legume with something else, like rice, would provide at least the same quantity of amino acids,” says Enette Larson-Meyer, PhD, RD, CSSD, FASCM, a registered dietician and exercise physiologist and professor at the University
of Wyoming. She is also the coauthor of a new book, *Plant-Based Sports Nutrition.*

Whereas there are a ton of studies demonstrating the athletic benefits of dairy proteins, sports performance studies involving plant protein, or studies comparing dairy to plant proteins, are largely still lacking. Here, Larson-Meyer reminds the market that the well-funded dairy industry has a lot of power to drive the research on dairy, but “the little legume board isn’t going to be able to afford a big research study.”

Another way to hit sports targets while using plant proteins is to add other complementary ingredients. Says Jäger: “An alternative strategy to boost the muscle protein synthesis benefits of plant proteins is the addition of leucine or HMB (beta-hydroxy-beta-methylbutyrate).” For instance, he says, “HMB has been shown to increase the anabolic potential of soy protein.” Digestive enzymes or certain probiotic strains can also be added to help increase a person’s absorption of amino acids from plant protein, he adds.

Plant protein sources do have a lot to offer athletes and active nutrition customers by way of benefits, says Larson-Meyer: “I think that the recovery benefits of the plant-based diet are greater than those of the standard American diet because you’re eating more plants that have various phytonutrients, and some of those we know what they do, and some of them we don’t know—but those are the ones that help with anti-inflammatory effects...after a hardcore workout. Plant-based diets [also] tend to provide ample carbohydrates [for] those people who are doing more endurance type of exercise.”

It’s all in how you manage a plant-based diet, Jäger says. “Insufficient protein intake from vegetarian diets may occur if the diets are low in protein-rich foods such as legumes, nuts, or seeds; however, there is currently no evidence that a balanced vegetarian diet provides inadequate total protein intakes.”

Larson-Meyer reminds that some nutrients from plants, such as iron and zinc, can be harder to absorb from plant sources, and that consumers may want to think of other strategies to get additional, adequate amounts of those nutrients.

The decision about whether to use plant or dairy proteins—or both—also depends on your goals, she says. “You have to look at the short term versus the long term,” she says. “We definitely know that if you’re an athlete, you definitely want quick gains. If you’re doing an intense strength-training program that’s eight weeks long and you want to maximize that gain, then probably whey protein might be the way to go during that time—more of an acute phase related to that intense recovery.”

However, she says, “There’s also some suggestion that if you keep that up, eventually you’re not going to keep gaining that much muscle. It’s probably going to level off, and then probably over time, some of the other proteins are going to catch up.” And this can be where plant proteins step in, she says, as a long-term, everyday source of protein.

It’s impossible to escape the consumer interest in plant-based diets overall, and plant sources will continue to infiltrate the sports nutrition space. Jäger says he continues to see plant proteins perform strongly in the sports nutrition market.

The market is certainly growing. Market researcher Innova Market Insights reports that in 2014-2018, the global number of new sports nutrition product launches making a plant-based claim grew a whopping 40%. Drilling down, the fastest-growing plant proteins based on % CAGR growth in 2014-2018 were pea protein (+65%), rice protein (+64%), and soy protein (+35%).

Among notable plant protein sports products now on the market, Innova highlighted in a recent report plant-based BCAAs, pea protein powder, and soy protein ready-to-drink (RTD) shakes. Increasingly, said Innova, plant protein is cropping up in the everyday snacks that active nutrition customers might consume, including bars, chips, and more. This trend toward higher-plant-protein snacks is also notable because researchers are finding that the most effective protein strategy is to spread intake out evenly throughout the day—something that snacks provide.

Consumers are interested in plant-based diets overall, whether driven by the health halo surrounding plant foods, or even sustainability concerns over the environmental detriments of producing animal protein. Beyond vegans and vegetarians, more consumers today are going flexitarian—and, by extension, looking for plant-based alternatives, including in the sports space. This is a trend expected to continue. Euromonitor calls plant proteins “now a staple” and “here to stay.”

**Other Drivers**

Other than plant protein’s wide-reaching influence, what other trends and ingredients are driving the sports space nowadays?
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In general, says Jäger, the biggest concerns athletes still have are ones answered by proven ingredients: hydration (ingredients like water, electrolytes, betaine), lean body mass/strength/power (protein, creatine, HMB, ATP, phosphatidic acid, etc.), endurance (beta-alanine, nitrates, choline, astaxanthin), mental performance (phosphatidylserine, creatine, caffeine, alpha-GPC, L-theanine, etc.), immune health (probiotics, beta-glucans), and recovery (protein, amino acids/BCAAs, probiotics, tart cherry, etc.).

As for emerging topics like personalization and the microbiome, which are increasingly being discussed in other sectors of the nutrition market, Jäger says that “Personalized nutrition and the microbiome are new areas in sports nutrition that might shape the future of sports nutrition; however, as of today, they play little to no role in sports nutrition, outside absolute elite athletes.” Some companies, such as FitBiomics, he says, are delving into this area, but they are the few.

Serving New Markets

Today’s sports nutrition companies are finding big opportunities within the expanding and evolving market, keeping in mind the need to serve all of the different audiences now shopping this space.

One example of this is a brand called TruWild, a nutrition brand geared to what the company dubs as “outdoor athletes”—“adventure seekers, ocean riders, mountain ascenders, obstacle racers, and, of course, trailblazers.” This brand appeals to the “weekend warrior” audience—consumers staying active and seeking nutritional support to complement their efforts.

Nathan Cox, cofounder of TruWild, talks about targeting customers. “Sports nutrition customers are ever changing,” he says. “In the past, they were more focused on body building and lifting weights in the gym. As the Internet age came, so did new sports nutrition brands, focusing on other fitness demographics such as female, natural, and outdoor fitness. These new categories are some of the leading trends in the sports nutrition industry today.”

He continues: “Supplements are shifting to a focus on lifestyle instead of being one dimensional, such as weight loss. Brands are building out their products to match the lifestyle of a very specific target market in which they cater to. In the past, brands carried large product offerings that were sold to large demographics all with different needs. Today, brands are more focused on providing supplementation focused on a certain lifestyle and regimens to support the specific needs of their users. For example, a brand will not create a weight-loss supplement if its market is geared towards runners, as they already are running to lose weight or are already in shape. Instead, they would create products to support running, such as anti-inflammation, joint support, and electrolytes.”

Paying attention to specific consumer types beyond the core athlete has paved the way for changes in everything from energy products to pre and postworkout supplements, says Cox. For instance, everyday consumers are now looking for more natural energy sources, such as green coffee bean, green tea extract, and yerba mate—ingredients that may provide the energy previously provided by ingredients like caffeine and stimulants, but without the crash. Natural ingredients are also the goal in preworkout products courting consumers such as those engaging in spin class and yoga, and are also focusing more on supporting recovery, joint health, and hydration, he points out. And active consumers are also seeking ingredients such as adaptogens that provide adrenal support.

“The new consumers, the so-called weekend warriors, now have a supplement that enable[s] them to hit their specific fitness goals,” he says.

References
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At its most superficial, weight management is a matter of aesthetics—think bikini season, beach bods, rockin' the yoga pants et al.

But anyone even remotely schooled in healthful living knows that keeping body weight and composition in check pays dividends in far more substantial ways, including with respect to metabolic health, cardiovascular health, joint health and—crucially—healthy aging.

Which is why supplement brands that cater to aging consumers should stay on top of the latest science around healthy weight management—and the best formulating strategies for addressing it.

Weighty Issues
In aging and youthful populations alike, it's no secret that overweight and obesity exact a heavy toll, both on society and on individuals.

The Centers for Disease Control and Prevention (CDC) reports that the medical costs of obesity in the United States amounted to approximately $147 billion in 2008 dollars. But those are only direct medical costs; CDC also notes that obesity's absenteeism-related productivity costs could take anywhere from $3.38 billion, or $79 per obese individual, to $6.38 billion, or $132 per individual, out of the economy.  

On a more personal level, the obese pay a price in higher risks than their healthy-weight peers for developing serious conditions like high blood pressure, type 2 diabetes, stroke, osteoarthritis, heart disease, sleep apnea, stroke—even depression and all-cause mortality.

In fact, says Sarah Brewer, MD, a UK-based doctor and member of supplement brand Curalife's (Tel Aviv) medical advisory board, "Those who are overweight are 1.5 times more likely to have a heart attack than someone who maintains a healthy weight. Getting down to the healthy weight range for your height can reduce your risk of a heart attack by as much as 35%-55%.”

Where individuals store excess weight also affects health outcomes. "If you're overweight and store fat around your middle—the classic 'apple shape'—you're twice as likely to develop coronary heart disease, especially if this runs in your family," Brewer adds.

Time Is Not on Our Side
So regardless of whether one's young or old, staying on a path of healthy weight maintenance pays off. Alas, maintaining a healthy weight is simply more complicated the older an individual gets.

As Brewer notes, weight tends to accumulate with age, starting with the infamous"middle-age spread" that descends sometimes around one's thirty-fifth birthday."We
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put on weight more easily in our later years,” she explains, “because of changes in both our bodies and our lifestyles.”

Those bodily changes can involve age-related shifts in muscle mass. Namely, between age 25 and 70, the average female loses about 11 lb. of muscle and the average man loses about 22 lb. “Because muscle cells burn more energy than fat,” Brewer notes, “your metabolism slows in proportion to the amount of muscle tissue lost”—on average, about 5% every 10 years following age 25.

The upshot of a slower metabolism is less need for caloric energy. That translates into about 300 fewer kcals needed per day for a 75-year-old woman than for her 18-year-old self, and about 130 kcals fewer than when she was 50. “Unfortunately,” Brewer points out, “many of us remain in the habit of eating just as much.”

Harnessing Endocannabinoids
Bending the weight-gain curve downward will necessarily involve, among other factors, training older individuals away from that habit—which, as anyone who’s tried to diet their way to a lower scale reading knows, can be like swimming uphill.

But, Brewer notes, “There’s growing interest in how our endocannabinoid systems and our gut bacteria help shape our food choices and snacking behavior.”

The endocannabinoid system, a complex network involving neurotransmitters and cell-signaling pathways, is a product of millions of years of animal evolution that ultimately helps control feeding responses, Brewer explains.

“In the tiny freshwater creature the hydra, for example, endocannabinoids regulate the opening and closing of the mouth when food is detected,” she says. “Something similar still controls suckling in newborn babies, and your responses to the sight and smell of food.”

Normally, this system helps keep feeding in balance by fine-tuning nerve transmissions passing to and from the brain and the rest of the body, she continues; but if that signaling malfunctions, cannabinoid receptor type 1 (CB1) sites in the brain as well as fat cells can get turned on—and stay on. “This overstimulation,” she notes, “is believed to contribute to obesity by promoting excess food intake and fat storage.”

A potential solution: Block that over-stimulation to reduce hunger signals and promote the burning of fat rather than its storage. “Although one drug was developed to do this—Rimonabant—it was later withdrawn because of side effects,” Brewer notes. “So scientists are still looking for an alternative, and there’s some indication that the hemp-derived cannabinoid supplement cannabidiol, or CBD, may help reduce appetite and stimulate fat cells to burn more fat to generate heat.”

Diet and lifestyle always come first in the battle against excess weight, says Sarah Brewer, MD. “Exercise more and select the right foods.”

Diet and Lifestyle First
It’s a tantalizing prospect—and one that adds yet more sizzle to the already smoking buzz around CBD.

But, Brewer advises, its promise shouldn’t distract consumers, clinicians, or supplement brands from the basics. “Diet and lifestyle always come first” in the battle against excess weight, she says. “Exercise more and select the right foods.”

For instance, consuming too many carbohydrates—especially simple sugars—stimulates the release of insulin, the body’s main fat-storing hormone; by contrast, Brewer says, “Following a low-glycemic diet with minimal impact on blood glucose levels will help you lose weight more easily.”

Similarly, she points to protein’s prowess at satiating hunger more quickly than carbohydrates and even fat. “You also use more energy and generate more heat when metabolizing proteins,” she adds, “which helps to promote weight loss. We therefore recommend a Mediterranean-style diet that favors vegetables, fruit, fish, olive oil, nuts and seeds.”

Ayurvedic Solutions
As for pointing people toward weight-loss drugs, Brewer acknowledges their availability, but says, “I prefer not to prescribe them, as they don’t retrain dietary habits. And when people stop taking them, weight will likely pile back on.”

But what about supplements and natural products?

If an overweight consumer with glucose intolerance or type 2 diabetes is already cracking away at the diet and lifestyle pieces of the puzzle, Brewer doesn’t hesitate recommending Ayurvedic supplements.

CuraLife’s product CuraLin contains 10 herbal ingredients with long Ayurvedic track records of helping people address type 2 diabetes, Brewer claims.

“While most of these help maintain healthy glucose levels through their complementary actions, neempan appears to slow the absorption of dietary glucose and aids satiety by slowing the rate of stomach emptying after eating,” she explains, “while Gymnema contains unique gymnemic acids that interact with taste receptors to block the ability to detect sweetness, reducing sugar cravings.”

She cites testimonials from users who “don’t feel hungry when cutting back on food to lose weight.” And while the ingredient is no panacea—nor is it for everyone—she advises those already taking diabetes medications such as metformin to consult with their physicians before introducing the supplement to their regimens. It’s another reason for hope in the fight against “spread” in middle age and beyond.

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

References
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With the dietary supplement and natural products marketplace growing more global, complex, and competitive each year, one could argue that the need for contract manufacturers has never been greater. Contract manufacturers are hired to alleviate the headaches of product manufacturing—and more. "Brand owners, private-label owners, and marketing companies do not want to get involved in the complexity of manufacturing," says Sultana Haque, technical director for contract manufacturer Nutra Solutions USA (Deer Park, NY).

"Contract companies that are able to take on a lot of the technical load are attractive because it allows brand owners to completely focus on making sales, advertising, and marketing the product," says Steve Holthby, president and CEO, Soft Gel Technologies Inc. (Los Angeles, CA).

The manufacturers interviewed in this article describe what's driving the continued reliance on contract manufacturers—and how manufacturers and their clients can optimize their relationship.

**Increased Competition**

As supplement brands face greater pressure to deliver more innovative products and expand their product portfolios quickly, contract manufacturers can help them get products to market faster.

"With the ever-increasing complexity and speed with which the market moves, the need for contract manufacturers is more critical than ever because consumers' appetite for new and improved offerings is more acute than ever," says Terry Keller, vice president of sales for CAPTEK Softgel International (Cerritos, CA).

Novel delivery systems help brands stand out in the market. Here, it obviously helps to find a contract manufacturer who excels in producing the specific delivery form you're seeking. Sometimes, it takes years of training and manufacturing expertise to perfect the optimal manufacturing of a specific type of delivery system, such as softgels, points out Soft Gel Technologies' Holthby. An experienced contract manufacturer specializing in that format will be able to deliver the best results.

Manufacturers who can handle a diverse range of delivery forms are also seeing a return on their investment that way.

"Growth opportunities continue to be in novel dosage-type formats—i.e., gummies, softgels, liquids—and custom packaging services," says Eugene Ung, CEO, Best Formulations (City of Industry, CA). "Brands need to differentiate by formula, dosage type, and/or packaging, and the more manufacturers can offer in these areas, the greater the opportunities."

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companies. While many small- and mid-size companies may lack the internal expertise and capital resources to manufacture in house, larger companies also still often rely on contract manufacturing.

"The contract manufacturing model is continuing to thrive due to the array of benefits it provides to companies, regardless of their size," says Doug Brown, sales and marketing director, Americas, Sirio Pharma (U.S. and China). "In the case of big nutraceutical companies, partnering with a contract manufacturer allows them to focus their efforts on both product development and marketing...They want partners that can help them launch products in multiple markets across a range of ingredients and delivery formats."

What Makes a Good Manufacturer?
The best contract manufacturers are ones who look at their client relationships as true partnerships, say the companies interviewed for this story. That starts with shared goals. "If there's a true ‘partnership,’ the forecasting and supply chain management become more critical for both contract manufacturer and brand," adds Ung.

He says: "From a long-term and strategic perspective, fit and communication are the most important. Do the companies share similar values as it relates to how they do business, vision of the supplement industry, etc.? Is there alignment with the respective quality/regulatory, R&D, and customer service/supply chain teams? Is there open and proactive communication to address issues before they arise? Although manufacturing products can be seen as transactional, the more established companies have built relationships allowing both brand and manufacturer to grow and prosper."

Being a contract manufacturer means, of course, being an excellent service provider. A contract manufacturer should strive to be a ‘one-stop-shop’ for customers, where it can help, from concept to completion (formulation, manufacturing, bottling, etc.)," says Soft Gel Technologies’ Holtby. Qualifying and purchasing raw materials is also a big part of the job, he says.

Increasingly today, contract manufacturers are being asked for much more than just manufacturing. This could include regulatory and market guidance. Sirio’s Brown notes that "there is also a noticeable demand for custom testing requirements. We typically run everything from analytical testing for active ingredients, stability testing during the R&D process, through to microbiology and heavy metal testing."

It can’t be stressed how much effective communication, on both the manufacturer side and the client side, determines successful results. Says Holtby: "Effective communication is a big factor in developing a successful working relationship with our customers. More specifically, clearly articulated requests are important to a successful partnership. It is imperative for a customer to establish clear priorities that meet the company’s needs. While many customers discuss product integrity (effective quantities of safe, clinically, proven, and ethically obtained ingredients), other factors, such as product price, delivery timelines, and batch sizes, are sometimes more critical."

Transparency is also important, says CAPTEK’s Keller. "I still get the sense that there’s a reluctance to be as transparent as would be optimal for a mutually successful partnership. And this cuts both ways—customer and manufacturer. Transparency builds trust, but if either party is unwilling to be truly transparent, neither party will maximize their potential."

It’s also necessary to set clear expectations—and to manage those expectations, says Best Formulations’ Ung, including turnaround time and capacity. And, says Holtby, a transparent manufacturer will readily share information such as test results and batch records, as well as the procedures it follows when unexpected problems arise, such as testing issues and raw material shortages, and encourage visits to their facility. A good manufacturer will also share copies of its own certifications and FDA inspection reports, adds Nutra Solutions’ Haque, along with certificates of analysis for raw materials.

And, at the end of the day, pure customer service is key. Says Keller: "It sounds simple, but manufacturers ensure they are satisfying customer requests/service via constant and consistent communication and transparency."

And reliability. A brand partner must be able to count on their contract manufacturer to deliver the product, within spec, on time, and at consistent value," he says. "‘Value’ is not simply price; it’s the relationship between that price and what you receive for that price. These include technical expertise, sourcing, customer service, quality support, etc.”

The Changing Contractor Landscape
A lot is changing in the contract manufacturing market. For one, mergers and acquisitions among contract manufacturers have led to a new contract manufacturing landscape.

"Of the larger, more established contract manufacturers, there has been a wave of consolidation and acquisitions in the past decade," says Best Formulations’ Ung. "Several are owned by financial institutions, strategic brands, or are publicly traded. While these companies may have some financial resources, they may not be as nimble or flexible as privately owned manufacturers." And, he says, "There are still entrepreneurs who are starting contract manufacturing operations, typically because of a certain technical expertise or customer relationship. These smaller contract manufacturers offer lower minimum order quantities and greater flexibility, but may not be able to scale up as sufficiently as volumes increase, or may be limited in their services and offerings. The dietary supplement industry as a whole continues to be quite fragmented, which offers opportunities for manufacturers of different sizes and capabilities."

CAPTEK’s Keller adds: "True contract manufacturers—i.e., pure-play contract manufacturers—don’t ‘own’ the brands they manufacture; they produce a product that meets a particular specification. While that sounds relatively straightforward, I’ve seen a continued ‘creep’ in that mentality."

Things are also changing on the client side, points out Nutra Solutions’ Haque, who notes "the continuation of the trend for large companies to consolidate and divest their internal manufacturing capacity, and move towards an outsourcing model for non-core activities."

Despite shifts in the landscape, one thing hasn’t changed, and that is that this industry continues to rely on its contract manufacturers. "I do believe that customers are expecting more from contract manufacturers," says Keller. "While it does vary some, from customer to customer, in general, the expectations are more versus less."
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Imagine the Possibilities
Presentation is everything when one considers how crowded the natural products marketplace is. Brands have to stand out both on the shelves, and on a screen as someone scrolls on their computer, tablet, or smart phone. Therefore, the kind of packaging and the labels one uses is important to engage with consumers and communicate one’s values.

“There is a consistent trend across all product segments to use packaging and labeling to differentiate their brand and encourage consumer trial,” says Marny Bielefeldt, vice president of marketing for packaging supplier Alpha Packaging (St. Louis, MO). This looks different across product categories, she explains. “Nutritional supplements often do it through colored bottles or unique shapes that allow them to stand out on crowded shelves. Cosmetic companies are doing it through dramatic decorating techniques such as Eco-Frost spray frost or direct screen printing on clear or colored bottles. Food and beverage companies are embracing disruptive packaging shapes and materials—such as clear PET plastic jars for smaller portions of ice cream and gelato.”

According to Deborah Straus, marketing manager for Overnight Labels Inc. (Deer Park, NY), shrink sleeve labels and flexible film packaging are becoming increasingly popular due to design options and costs. For example, shrink sleeves offer 360-degree graphics for maximum brand impact, while also providing some function, such as creating a light barrier, depending on the materials used.

Flexible film packaging is also great for graphics because they’re printed directly on the film. They also offer a number of other solutions. “The advantages are lower costs, reduced freight/distribution costs, and lower packaging component inventory requirements,” explains Straus. “It’s typically made from extruded laminated films, which gives the product extended shelf life. It’s traditionally used for single-use sampling of lotions, tablets, and powders, but it’s now used across virtually every product category, incorporating ‘reseal’ (either zipper or re-close labels) capabilities for multi-use packaging.”

Flexible resealable packaging taps into the need for convenience that is less wasteful than single-serve bags. Single-use stick packs and sachets also have their place in certain applications, giving consumers convenient, on-the-go options for drink mixes and powdered supplements, for example. The downside is that single-use packaging creates more waste, which some firms are trying to offset with the choice of materials they use. Dietary supplement brand ThinkNOO, for example, has a functional instant coffee product in single-use sachets and is exploring more sustainable options.

“We’re already sampling and trying to roll over to a fully recycled and recyclable single-serve packet,” says ThinkNOO CEO Shannon O’Brien. This does come with its own challenges. “It does come at the expense of potentially looking a little different in terms of aesthetic; however, for
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fundamental business principles, you do really need to have that engrained in you if you are going down that route,” he adds.

Bielefeldt points out that it’s brands like ThinkNOO that are at the forefront of pushing sustainable packaging because it is more representative of their values. “The proliferation of products with organic ingredients is driving a trend toward more sustainable packaging,” she explains. “Companies that invest in ingredients that are clean and natural want to reinforce that message by choosing packaging that is environmentally responsible.”

However, says Bielefeldt, while emerging brands have led the charge in demanding sustainability and eco-friendly packaging, global consumer packaged goods companies are beginning to answer that call, and because of their resources are really dominating the conversation. “Sustainability has been a buzzword for more than a decade, but now we see brand leaders actually investing in recycled plastics, plant-based resins, and high-end screen printing that all demonstrate a real commitment to the environment,” she explains.

“Reduce, reuse, and recycle’ is still a very relevant catchphrase for the easiest ways to make your packaging more sustainable,” continues Bielefeldt. “Brand owners can choose lightweighted packaging that uses less plastic but still protects the product inside. They can incorporate postconsumer resin collected in community recycling programs in the same bottles and jars they buy now. And they can sell their products in clear bottles and change from pressure-sensitive labeling to eco-friendly direct screen printing to make the packages they sell easier to recycle.”

Of course, there are often limits to the level of sustainability packaging for certain products can achieve. “Even if you are using a PET bottle or recyclable stock, you still may not be able to claim 100% sustainability,” explains Strauss. “Are the inks you are printing with produced from limited volatile organic compounds? Are you using an adhesive that cleanly separates during the recycling process? Are you working with a certified Sustainable Green Printing Partnership printer? Although we have seen tremendous innovations over the last few years, we are probably a few years away from packaging that offers the right combination of being fully sustainable, affordable, protective, and can showcase high-end finishes.”

Emerging forms of packaging made from plant-based resins such as polylactic acid (PLA) that are touted as compostable and biodegradable have a lot of potential, but are not well understood by consumers. “These resins—often made from corn or hemp byproducts—will decompose if they are taken to an industrial composting facility and kept in a hot, humid environment for an extended period, but they are not going to decompose or biodegrade in a backyard compost pile,” explains Bielefeldt.

Packaging technology will continue to innovate, opening up the possibilities for sustainable packaging, but adoption is not guaranteed given the limitations of certain options and the cost of more versatile options. More than a receptacle for products, packaging is immensely important for branding; therefore, a compromise will always exist between early adoption of eco-friendly packaging and aesthetics. The adoption of innovative packaging by global CPGs is a bright spot and hopefully inspires innovation of more ubiquitous solutions.
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In some respects, the pharmaceutical and nutraceutical industries share common ground. Take delivery systems, for instance. Both the drug and supplement industries produce ample amounts of pills—tablets, capsules, softgels, etc. There’s something else these industries share, too: the desire to produce the best-quality products possible, all while increasing manufacturing efficiency and lowering costs.

Equipment advances play a large role in making these goals possible. To this end, could nutraceutical manufacturers find inspiration in the benefits offered by some of today’s pharmaceutical-grade equipment? Many equipment providers say yes.

**Common Ground**

Pills are common to both the pharma and nutrition industries. And while more advanced delivery features are certainly more frequent in the pharma industry, some of these designs have caught the attention of nutritional companies.

For instance, “Immediate-release, delayed-release, [and] sustained-release delivery technologies are commonly used within pharma, and these are now being employed by nutritional manufacturers to provide more unique products, improve efficacy, and differentiate their product from the competition,” says John Carey, international business head of developed markets for ACG Engineering (Piscataway, NJ), part of ACG Group, a supplier of capsule and tablet manufacturing solutions for the pharmaceutical industry. Advanced delivery forms include those that enable incompatible ingredients to be combined in the same tablet or capsule, including “capsule-in-capsule, pellets/beads with powder/liquid, and numerous other permutations and combinations,” he notes. Two-piece hard capsules filled with liquid is a particularly growing trend in the nutraceutical industry, he says.

Bilayer tablets are another increasingly popular format among both nutraceutical and drug makers. “The use of bilayer tablet formats, to combine different products, is clearly emerging as a favored technology that is easily understood and accepted by consumers,” says Frederick Murray, president of tablet press technology provider KORSCH America Inc. (South Easton, MA).

The same equipment can be used to produce these pills for both nutraceuticals and drugs. “In general, the tablet and capsule delivery platforms used in nutritional and pharmaceutical products are basically identical, making transition to these [pharma-grade] technologies fairly straightforward,” says Carey.

He points out, however, that there are some differences between nutraceutical and drug product formulas that require special consideration. “The one major difference

**Equipment**

Are more nutraceutical makers turning to pharmaceutical-grade equipment?

**BY JENNIFER GREBOW, EDITOR-IN-CHIEF**
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between nutraceutical and pharmaceutical oral solid dosages is the percentage of actives and the number of actives in a dose. Pharmaceutical APIs tend to be relatively small in the overall composition of a dose, whereas a nutraceutical dose comprises a larger number of varied natural ingredients. This also means that traditional additives and fillers that were added to support the easy flow and mixing of pharmaceutical products are not viable for nutraceutical manufacturers, and hence, many equipment companies offer a 'Nutra Kit' that mitigates this challenge whilst running on the equipment. The cleaner labels sought by nutraceutical customers can further exacerbate this challenge, Carey says, noting that there "may be some modifications that need to be made to the standard pharmaceutical equipment to withstand processing more abrasive natural products and especially to help with clean-label claims."

On a whole, however, nutraceutical companies can use pharma-grade equipment—if nutraceutical companies choose to do so. There are some good reasons to consider it, according to many of the equipment suppliers interviewed for this story.

Pharma equipment can sometimes offer advantages over nutraceutical equipment, says Stan Matthews, sales manager, processing division, for MG America (Fairfield, NJ), the U.S. subsidiary of MG2 (Italy) and a supplier of processing and packaging equipment. Says Matthews: "Pharma-grade equipment is much more advanced in specialized delivery forms."

With pharma-grade equipment, you get "a higher degree of control over the uniformity of the dosage, thus providing a final product with an increased quality," adds ACG's Carey. For instance, pharma-grade fluid-bed granulation equipment can make it easier to handle nutritional products that otherwise aren't easily compressible or to produce specialty pellets for delayed- or sustained-release products, he says.

"Pharma-grade equipment is designed and manufactured with highly accurate dosing systems, resulting in better-quality products that reduce rejects, diminish waste, and offer significantly upgraded products overall," says Matthews. He adds: "Today's nutraceutical formulations are more complex; this is where pharma-grade equipment provides a major manufacturing advantage."

Tablet manufacturing is a good example of where pharma-equipment stands out, says KORSCH's Murray. "The basic process of tablet compression—fill, compress, eject—is common among all tablet presses, but there are very stark differences in machine design, quality, and reliability when you compare high-end pharma equipment and low-budget nutraceutical machines."

For instance, he says, "Tablet compression equipment—including high-speed, fast-change, single-sided machines, and high-volume, double-sided machines—are both being utilized" in the pharma world. "The fast-change capability is critical to maintain an acceptable operating efficiency where there are small batch sizes and a vast portfolio of different products"—things nutraceutical firms deal with often. These efficiencies, and subsequently better margins, are goals of all businesses, including nutraceutical makers.

"There is anecdotal information that the nutraceutical industry could benefit from using traditional pharmaceutical equipment for their manufacturing operations to meet current Good Manufacturing Practices (cGMP) guidelines," says Darryl Peterson, key account manager for Antares Vision North America (Moorestown, NJ), a provider of visual inspection systems, track-and-trace solutions, and smart data management.

He continues: "There are similarities in both industries around proving cleanliness, and limiting microbial growth as well as following strict quality standards and keeping meticulous batch records. The pharma industry has a long history of identifying these sources of contamination that the nutraceutical industry could take note of. For example, supplying equipment that has stainless-steel contact surfaces with welds ground smooth, polished with 2B type (or greater) finishes, helps to eliminate hard-to-clean surfaces. In addition, supplying in-process steam-sterilizable systems rated to handle pressure and high temperature to kill microbial growth, or CIP (clean-in-place nozzles), aid in assuring aseptic operations and can, if done properly, promote sterility. All drains should promote full draining of cleaning liquids and water to the lowest point of the chamber with a drain so that water can be removed entirely. Having equipment that is designed and engineered for maximum cleanliness, like in the pharma industry, provides advantages to the nutraceutical industry for repeatable operations with little downtime between cleaning procedures due to employing validated cleaning operations used for many years in the pharma industry."

He further notes that many pharma systems come equipped with advanced control systems, including software packages, as well as high-speed cameras used to inspect pills. In general, he says, "Pharma-grade equipment has several advantages over typical food-grade equipment in cleaner construction materials, automated controls, and precise inspection tolerances. Pharma-grade equipment is made to handle complex manufacturing demands at high speeds."

Higher-end inspection equipment can also benefit nutraceutical makers, says companies like Antares Vision as well as WIPO-TEC-OCS (Lawrenceville, GA), a supplier of precision in-motion weighing and x-ray scanning equipment. WIPOTEC-OCS's senior marketing manager, Jim Benehan, says, "One of the main types of pharma-grade equipment being used by nutraceutical producers are the inspection machinery. There are many types of packaging inspection machines, like checkweighers, metal detectors, and x-ray scanners, that increase the overall quality of the product that is being packaged. In a world where brand protection and integrity is becoming more and more important, having the ability to prevent quality issues prior to a product reaching the retail shelf is very valuable."

Traceability is also an increasing concern in the complex nutraceutical supply chain, and this is where pharmaceutical companies have pushed ahead—in part due to regulations requiring them to—and could further influence the nutraceuticals space.

Thomas Burke, food traceability and safety scientist at the Institute of Food Technologists (IFT), and Bryan Hitchcock, IFT's senior director, food supply chain, and executive director, Global Food Traceability Center, state: "Pharmaceutical traceability is highly mature due to regulatory, safety, and commercial considerations inherent in that market. Essential components of effective traceability, including standards in labeling coding, and
Introducing the First Edible Food Grade Jellyfish Collagen.

kollaJell™
COASTAL JELLYFISH COLLAGEN POWDER
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HEALTH BENEFITS:

- NATURAL COLLAGEN BINDS TO MINERALS*
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* THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT ANY DISEASE.
Nutraceutical firms might want all of the bells and whistles that come with pharma equipment, but can they afford the higher cost?

MG America’s Matthews says that some larger nutraceutical companies have been switching to pharma-grade units in the last decade, and notes that “the trend is now extending to mid-size and smaller companies looking to improve product quality with superior equipment.”

Still, it’s likelier that a minority, rather than a majority, of nutraceutical businesses are making that investment today. According to Ken Langhorn, vice president of sales for mixing-equipment specialist Charles Ross & Son Co. (Hauppauge, NY): “Nutraceutical companies continue to follow the requirements of the food industry and specify features that are more in alignment with those requirements. It is very rare that a nutraceutical customer will opt for features that are more closely aligned with those required in a pharmaceutical process. We have not seen any indicators of a trend in that direction.”

When comparing pharma-grade and nutraceutical machinery, he says, “It is not quality control that separates the two; it is design features and documentation. Mixers in pharmaceutical applications often require finishes and construction details to allow a higher level of cleanliness or sterilization. There are also different levels of ‘clean’ within different pharmaceutical applications. For example, the requirements for a sterile injectable drug will be different than those for an oral drug. Other than initial cost, there is no downside to these features, and a pharmaceutical-grade mixer can be used to process food-grade products as well.”

The cost of pharma-grade equipment might be lowering to some extent. Nutraceutical manufacturers also have other options, such as adapting a pharma machine at a lower price point, or buying aftermarket equipment.

Still, says Ross’s Langhorn, pharma-grade equipment will only be affordable for some. “The cost difference is likely the reason nutraceutical manufacturers are not specifying features that are more common in a pharmaceutical process,” he says. “Unless the nutraceutical product has a high profit margin, they are not likely to specify a pharmaceutical-grade machine.”

Antares Vision’s Peterson says: “If the only consideration is initial capital outlay, then it is doubtful that a nutraceutical company will see the value of a pharmaceutical labeler machine that is four times the price of their standard vendor.” If, however, that labeler were to provide additional flexibility or functions that would eliminate the need to purchase additional equipment, the company might come around.

Says WIPOTEC-OCS’s Renehan: “Advanced equipment systems play a significant role in the quality of the products nutraceutical companies manufacture. The class and capabilities of machinery investments made by nutraceutical companies only adds to the [industry’s] credibility both from an industry and public perception standpoint. With each capital investment made by a nutraceutical company, they can clearly show that they are making tangible strides to achieve a chain of custody of all products throughout the full supply chain cycle and ensure quality products are shipped to their end customers.”
A look at ingredients, services, and more from today’s leading industry providers
AlfaSigma

MitoCarn, by Alfasigma, provides four targeted L-Carnitine ingredients, including MitoCarn™ Brain, MitoCarn™ Heart, MitoCarn™ Sport, and MitoCarn™ Weight. The solutions focus on optimizing mitochondrial function by providing continuous energy to the body in addition to antioxidant protection for cells, supporting lean energy production while minimizing cellular waste during the ATP process, and helping to manage the body’s cellular aging process. For more information on Alfasigma’s L-Carnitine solutions, visit mitocarn.com*.

MitoCarn is backed by 31 process patents and over 100 clinical studies for safety and function.

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

AuNutra Industries Inc.

Founded in 2003, California-based AuNutra® Industries, Inc. is a rapidly growing nutraceutical ingredient company. AuNutra® has one of the largest collections of herbal ingredients in US, focused on standardized botanical extracts, we also supply nutraceutical, functional food, cosmetic and pharmaceutical industries with herb powders, vitamins, amino acids and other nutritional ingredients.

With a commitment to always provide products with exceptional quality, all of our ingredients are manufactured under strict GMP and ISO-9001:2000 quality certifications. AuNutra® Industries, Inc is also a supplier of Kosher-certified high purity botanical extracts.

Besides a massive inventory, we have strong sourcing capabilities in locating high quality ingredients. We also conduct contract manufacturing, such as custom extraction, formulation, blending, granulation, etc.
Bioenergy Life Sciences

BLS creates innovative, scientific based ingredients for healthier living. We sell in bulk to businesses who manufacture or formulate functional foods & beverages, supplements, sports nutrition products, and cosmetics. We are best known for the only patented & FDA GRAS-certified D-Ribose: Bioenergy Ribose®. Bioenergy Ribose is the true source of sustainable, cellular energy and is crucial to the production of ATP. Bioenergy Ribose increases energy for Endurance, Performance & A Healthier You. Our newest ingredient, RiaGev™, is the first and only commercially available proprietary compound uniquely combining Bioenergy Ribose and nicotinamide. It is distinctly formulated to enter the salvage pathway directly to more efficiently increase nicotinamide adenine dinucleotide (NAD) in the body. RiaGev maintains and enhances mitochondrial health by boosting NAD levels. Increased NAD and healthy mitochondria help slow the aging process, reduce age-related cognitive decline, and prevent cellular damage from free radicals. RiaGev helps Repair, Prevent & Rejuvenate.

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Products/Service
Balchem is the leading manufacturer of choline; its branded VitaCholine is a premium, quality ingredient. VitaCholine has long been acknowledged as the quality choice for use in dietary supplements, OTC products, infant formula, and food. We lead in the scientific field as well, having supported research efforts by Cornell University, the University of North Carolina, and other institutions. Choline is essential for metabolism, neural function, and cognitive health. After many years of study, experts established an RDI for choline along with labeling for the percent Daily Value (%DV). Studies have established that a large part of the population does not consume enough choline in their diets, necessitating supplementation. Choline plays a key role in cholinergic memory function, is essential during early childhood development, and promotes normal metabolism throughout life. Choline contributes to cell membrane integrity, as part of the phospholipid membrane. It possesses an important ability to transport fats out of the liver.

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Products/Service
BLS creates innovative, scientific based ingredients for healthier living. We sell in bulk to businesses who manufacture or formulate functional foods & beverages, supplements, sports nutrition products, and cosmetics. We are best known for the only patented & FDA GRAS-certified D-Ribose: Bioenergy Ribose®. Bioenergy Ribose is the true source of sustainable, cellular energy and is crucial to the production of ATP. Bioenergy Ribose increases energy for Endurance, Performance & A Healthier You. Our newest ingredient, RiaGev™, is the first and only commercially available proprietary compound uniquely combining Bioenergy Ribose and nicotinamide. It is distinctly formulated to enter the salvage pathway directly to more efficiently increase nicotinamide adenine dinucleotide (NAD) in the body. RiaGev maintains and enhances mitochondrial health by boosting NAD levels. Increased NAD and healthy mitochondria help slow the aging process, reduce age-related cognitive decline, and prevent cellular damage from free radicals. RiaGev helps Repair, Prevent & Rejuvenate.
The majority of the neuro supportive strategies are based on the improvement of cholinergic function in the brain and one of the emerging therapeutic targets is to enhance the acetylcholine level in the brain. Standardized botanical extracts including *Huperzia serrata* (CP), *Convolvulus pluricaulis* (Shankhapushpi; SP) and *Celastrus paniculatus* (Jyotismati; JY) have been demonstrated to attenuate brain function by serving as a natural acetylcholinesterase (AChE) inhibitor and exhibited their efficacy in the management of neurological impairment & dementia. The Cepham team has developed a novel combination of CP, SP & JY named CogniUP®.

Based on our studies and published literature we found that the unique combination of CogniUp® can provide:

* Neuroprotection*
* Cognitive enhancement*
* Increased focus*

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

Protodioscin is known to promote healthy testosterone levels. Furosap® contains 20% protodioscin, which has been found to promote healthy testosterone levels through its effects on testosterone-dihydrotestosterone conversion. It appears to promote healthy production of luteinizing hormone (LH). Protodioscin delivers its hormonal effects in a balanced fashion.* Protodioscin also promotes healthy red blood cell production, which ultimately supports healthy oxygen delivery throughout the body. This combination of hormonal and circulatory effects results in support for both healthy sexual function and optimal athletic endurance.*

Patent-protected Furosap® is ideal for a variety of men’s health goals:

* Promote healthy sexual function*
* Maintain overall energy and vitality*
* Promote optimal athletic performance*
* Support healthy muscle development*
* Patent-protected process (#US8754205)
* Water soluble – Optimal bioavailability and manufacturing versatility

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

†This informational write-up is for professional education only. Not for consumer distribution.
KLK OLEO – Davos Life Science

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Products/Service

Davos Life Science is part of KLK OLEO, one of the leading market players in producing high-quality Tocotrienols and Natural Mixed Carotenes. DavosLife E3 Tocotrienols is a natural Vitamin E comprising the full spectrum of Tocotrienols and α-Tocopherol. It is a potent bioactive for use in nutraceuticals, cosmeceuticals and topical applications, with functionalities as:

• Antioxidant
• Anti-inflammatory agent
• Gene modulator

These properties give Tocotrienols a wide range of health benefits, which include promoting brain health, heart health, liver health, bone and joint health, and skin health. DavosLife Biocarotene is a natural mixed carotene complex, containing high concentrations of β-carotene and α-carotene as well as small amounts of γ-carotene and lycopene. It has functionalities as:

• Provitamin A
• Antioxidant
• Blue light filter
• Modulator of cellular signaling and inflammation.

DavosLife Biocarotene can be applied in dietary supplements, and it can also be used as a natural colour additive (E160a) for foods and beverages.

Cepham

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Products/Service

Gyngerlean™
Three gingers for ultimate thermogenesis†

Cepham R&D have made extensive phytochemical analysis on three plants from ginger family and formulated an optimal concentration of actives. GyngerLean™ is composed of *Alpinia galangal* (Red Ginger), *Kaempferia parviflora* (Black Ginger) and *Zingiber officinale* (Yellow Ginger). Kaempferia parviflora is standardized for 5,7-dimethoxyflavone (DMF), 5,7,4’-trimethoxyflavone (TMF), and 3,5,7,3’,4’-pentamethoxyflavone (PMF). *Alpinia galangal* is standardized for alpha and beta pinenes. *Zingiber officinale* is standardized for gingerols and shaogals.

The initial findings are based on open arm human study of GyngerLean™. In this study GyngerLean™ has shown the following effects:

[1] Boost thermogenic brown adipose tissue (BAT)*
[2] Suppressed body weight gain and intraabdominal fat*
[3] Overall reduction in inflammation*
[4] Reduction in hepatic lipogenesis*
[5] Increase in energy expenditure*

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
†This informational write-up is for professional education only. Not for consumer distribution.
DRT Purextract®

Products/Service

Because everyone deserves to live better and longer, we, at DRT Purextract® offer a safe and natural solution with OLIGOPIN®

OLIGOPIN® is produced from the bark of French Maritime pine trees, a mile away from where it has been harvested, at the heart of LES LANDES forest, certified for its responsible management.

OLIGOPIN® contains an optimum composition of low molecular weight oligomers which ensures it bioavailability and efficiency. Unlike crude extracts, OLIGOPIN® has a minimum of 67% OPC (Procyanidins).

Thanks to the unique Crystalpure® technology, we supply the functional food and dietary supplement industry with a scientifically-proven active food ingredient.

With OLIGOPIN®, we help our partners to grow by providing efficiency in the formulas. (Gold standard of scientific evidence: randomized double blind clinical studies & publication in peer review available on demand)

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Ecuadorian Rainforest, LLC

Products/Service

Ecuadorian Rainforest, LLC was founded in 1997 by Ecuadorian native Marlene Hurtado-Siegel. The company is a wholesale bulk raw materials supplier of fruit, herb, marine, spice and vegetable nutraceutical ingredient powders and powdered extracts from South America and beyond. For over 20 years, Ecuadorian Rainforest has provided quality tested and competitively priced wholesale nutraceutical ingredients to the beauty, health and nutritional industry.

We strive not only to meet your expectations but to exceed them. To show our commitment to quality, we have earned several certifications including:

- Quality Assurance International (QAI)
- USDA-Organic certified ingredients
- Halal certified ingredients
- Star-K Kosher-certified ingredients
- cGMP-certified facility

Ecuadorian Rainforest, LLC, is truly a global company. From the company’s warehouse in New Jersey, we are able to deliver ingredients to virtually anywhere in the world. No matter what your location is, Ecuadorian Rainforest can bring a world of ingredients straight to your doorstep.

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Gnosis USA

Gnosis by Lesaffre, a business unit of Lesaffre, is a world expert in yeast, bacteria and pure molecule from fermentation, dedicated to human health and nutrition. The company aspires to be a trusted innovation partner for its clients in the pharmaceutical, nutritional and functional food industries, and to assist them in helping consumers lead healthier and happier lives.

From nutritional and fortified yeasts to yeast fractions, probiotic yeasts and bacteria, vitamin or pure molecules, Gnosis by Lesaffre develops and supplies innovative solutions and ingredients of natural origin with scientifically proven efficacy to target a wide range of applications: digestive health, bone protection, immunity enhancement, joints and liver health, women health, vegetarian support and overall wellbeing. The broad range of differentiating solutions aims at improving and boosting human health by bringing to our diet bioactive nutrients.

GMP Laboratories of America, Inc

GMP Laboratories of America is a custom contract manufacturer of quality dietary supplements and homeopathic drug products. GMP Labs™ manufacture capsules, tablets, liquids, and powders. GMP Labs is an NSF GMP for Sport Registered Facility and USDA Organic certified manufacturer that operates out of two facilities, totaling over 100,000 sq. ft., both located in the Anaheim Center for Advanced Technology in California. GMP Labs holds a Drug Manufacturing License issued by the State of California Food and Drug Branch and is registered as a Drug Establishment with the FDA. We also have a Foreign Site Reference Number registration with the Health Canada.

Products/Service

Gnosis by Lesaffre

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Products/Service

GMP Laboratories of America
**IFF Health**

**Empowering Healthy Living**
Formerly known as Frutarom Health, we are a leading global manufacturer of high-quality health ingredients supported by science. We have a long track record of meeting consumer demand for ingredients that are safe and scientifically substantiated as well as natural.

Our selection of technologies and ingredients keep pace with the developments in health and wellbeing, and help you find answers to the unique needs of your consumers. Even better – all our products reflect our commitment to quality, safety, science, and innovation.

Our customers also benefit from a wealth of regulatory, application and formulation expertise, along with proprietary science, in-depth market knowledge and global capabilities.

Now part of the IFF family, we are even better placed to help you gain a competitive edge in the dynamic health landscape.

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**Grain Processing Corporation (GPC)**

**Products/Service**

**Specialty Ingredients from Grain Processing Corporation**

Grain Processing Corporation (GPC) provides quality ingredients for the food, beverage and nutritional industries. Our commitment to quality is second to none and is supported by the world-renowned GPC global supply and service.

**Premium Maltodextrins**
Providing a dependable supply of high-quality maltodextrins is a primary focus for GPC. GPC’s globally marketed MALTRIN® product line offers maltodextrins and corn syrup solids including Quick-Dispersing (QD) versions. MALTRIN® tapioca maltodextrins and tapioca syrup solids are sourced from 100% tapioca and are non-GM by origin.

**Specialty Starches**
GPC also provides a diverse range of specialty food starches including PURE-COTE® coating/film-forming starches, INSOSITY® instant modified starches, PURE-SET® thin-boiling starches, PURE-GEL® stabilized starches and PURE-DENT® unmodified and specialty starches.

Non-GMO Project Verified Maltodextrins, Corn Syrup Solids and Ethyl Alcohol are now available from Grain Processing Corporation.

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Jost Chemical

With 35 years of experience, Jost Chemical manufactures high-purity USP/EP/FCC mineral salts in cGMP compliant, FDA-registered facilities in St. Louis, Missouri. We manufacture and test everything we sell. Our products are fully reacted, consistent from lot-to-lot and meet all customer requirements.

Improve bioavailability with our high purity mineral chelates that are exceptionally low in heavy metals, including our new 100% pure, fully reacted Magnesium Glycinate and a new product coming soon, Magnesium Citrate Glycinate.

Jost Chemical is a leading supplier of high-purity mineral salts including, Calcium, Copper, Iron, Magnesium, Manganese and Zinc, with exceptionally low levels of heavy metals. Our wide selection of 250+ chemical salts includes citrates, gluconates, glycines, lactates, phosphates, malates, ascorbates, acetates, sulfates, oxides, carbonates, fumarates, and nitrates. Jost’s team of scientists provide particle size options, from free-flowing granular to ultrafine (< 6 microns) powders, custom product development and technical support.

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Kaneka

Kaneka Floradapt™ Probiotics offers clinically studied probiotic formulations for the nutrition industry. As leaders in the probiotic space, Kaneka Floradapt™ is at the forefront of developing novel probiotic solutions for a variety of health applications which utilize specific strains for a targeted health benefit.

Why Floradapt?
Floradapt™ probiotics are based on a mechanistic approach to identify optimal strains for specific health applications. Strains are strategically sourced from rural areas and populations with good health yet little exposure to modern lifestyle and amenities. As a result, our strains are derived from healthy individuals with “conserved microbiomes” that have not lost their health functionality, therefore providing a diverse microbiome which is more adept at achieving better homeostasis. Hosts with conserved microbiomes have abundant, acid-resistant smart strains that can offer superior efficacy for a variety of health applications.

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Mineral Logic

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**Products/Service**

**MLG-50™ Fulvic Mineral Powder**

MLG-50™ potentiates other ingredients and differentiates your product line. Our powder measures 40% fulvic acid by the standardized Lamar method, and as much as 99% by the old V&B method.


Based on scientific clinical studies these compounds enhance many biological processes:

- Reducing free radical damage
- Increasing more mitochondria and ATP production
- Improving oxygen transport
- Nourish a healthy gut microbiome
- Encourage better carb and fat metabolism

Mineral Logic has been in the industry for twenty-three years focused entirely on fulvic acid and its customization for nutraceutical, food, beverage, personal care, and pet products.

- Highly concentrated
- pH 7.0-9.0
- Pleasant taste and aroma
- Excellent potassium to sodium ratio
- RDI: 100 mg
- UL Dietary Supplement certified with FSMA plan
- USA Manufactured

Morre-tec

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**Products/Service**

MORRE-TEC Industries, Inc. founded in 1987, has established a leading position as a global supplier of specialty vitamins and supplements for nutrition, beverage and personal care. It is cGMP compliant, ISO 9001-2015 certified and FDA registered and inspected. Its Vitacyclix division supplies water soluble formulations of vitamins including A, D and E for milk, functional beverages and other applications as well as for other uses. Products are Kosher and Halal certified. The company is in the final stages of FSSC 22000 certification.
**NATCO**

**Products/Service**

Persimonal™ (Patent Pending) Persimmon Leaf Extract Powder. Persimmon Leaf Extract (Diospyros kaki Thunb) 8%-10% Total Flavonoids (quercetin & kaempferol). Research has shown that Quercetin is the most abundant dietary flavonoid. It has been linked to improved exercise performance and reduced inflammation, blood pressure, and blood sugar levels. Humans cannot make “quercetin”, it must be consumed from nature and supplements. On the other hand, Kaempferol is a strong antioxidant and helps to prevent oxidative damage of our cells, lipids and DNA. Persimonal™ is the ultimate botanical pharmaceutical food grade extract powder nutritional supplement that contains both quercetin & kaempferol. These flavonoid group of polyphenols may help to reduce blood pressure, boost the immune system, reduce allergic responses, and lower cholesterol.

With more than 30 years of experience in Nutritional Supplements, NATCO, Inc. offers the finest nutritional botanical ingredients that are found in nature! We select high-end pharmaceutical food-grade ingredients with all co-factor constituents intact in every ingredient we promote. Nothing synthetically made in a laboratory, nor isolated ingredients from petroleum or coal based. Innovative nutraceuticals from nature (food-grade) are the principal we stand by and ethical integrity we bring to manufacturers, health care professionals, nutritionists, wholesalers, distributors, consumers, and clients worldwide.

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**NATCO**

**Products/Service**

Kollajell™ (patent pending) Edible Jellyfish Collagen. Edible jellyfish has large amounts of collagen in its mesogloea (gelatinous layer) and holds remarkable nutrients and minerals that are not found in any other collagen type. Jellyfish are one of Asia’s most popular foods and are served dried and used in soups, dips, chopped into small pieces and boiled to add a crunchy texture and to remove the salt. Research has shown the health benefits of edible jellyfish among Asians have been tested, spoken about for thousands of years, and clinical data supports medical benefits that include skin hydration, bone structure, anti-inflammatory against (RA) and (OP), and minerals that contain a lot of calcium-binding proteins which improve memory and help to fight age-related cognitive decline. Kollajell™ is the only collagen type to contain the amino acid “tryptophan” which makes it the perfect collagen and a complete protein.

Backed by three decades of research and development of nutritional supplements, Certified Nutraceuticals Inc. pioneered the original invention of three Collagen Types: KollaGen II-xs™, kollaGen I.V.X.HEM™ and Tendoguard”™ I, II, V, X (Joint-Bones-Tendons-Skin Health), and the first to introduce hydrolyzed Collagen Types I, II, and III as a nutritional supplement to the market more than 30 years ago. We develop the finest ingredients with uncompromising integrity for maximum effectiveness. We continue our quest to find the ultimate nutritional supplements through our extensive knowledge and R&D by providing anti-aging nutritional ingredients backed by cutting edge science and technology. Our newest inventions Telos95® (Telomere Health Support) and Kollajell™ (Edible Jellyfish Collagen Powder) will change how we think about our nutrition and lead us to live longer, healthier, and most importantly live disease-free “forever young”.

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NP Nutra

For more than twenty years NP Nutra® has been supplying customers with the finest nutraceutical ingredients produced at their approved partner facilities around the world. In addition to a unique Signature Ingredient line, their extensive portfolio boasts a number of popular product categories including Nutra Organics, Plant Protein, Keto-friendly, Nutra Flow, Nutra Pet, Nutra Pura, Nutra Sprout, Superfruits, Supergreens and Nutra Ayurveda. Their ongoing commitment to purity, quality and reliability has earned the trust of a growing clientele, including the world’s leading functional food and beverage, dietary supplement, cosmetic and pet food manufacturers, who have become loyal customers through the years. Approved manufacturing partners have gone through a rigorous validation process which is an integral part of Triple-T Verification®, their own supply chain validation program that ensures supply chain transparency, ingredient quality and sustainability.

Natreon

Natreon’s botanical ingredients are derived from nature and founded on evidence based Ayurveda. Our extracts are purified and standardized using proprietary process technology that result in optimal levels of bioactive components. All our ingredients are patent protected and have been tested in multiple clinical studies to ensure safety, efficacy and authenticity. Leading the nutraceutical industry with storied knowledge and expertise in botanical cultivation and extraction for over 20 years.

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Nutralliance

As a supplier of premium ingredients, Nutralliance prides itself in the ability to cater to our customer’s specific needs while maintaining focus on integrity and commitment to high quality product standards. Nutralliance is proud to represent four innovative and quality driven manufacturers. Advanced Organic Materials (AOM), an Argentine company dedicated to the extraction and purification of natural ingredients, is an established leader in the natural vitamin e and tocopherol markets. Bio-gen Extracts Pvt. Ltd., India is a GMP Certified company that specializes in the production of natural carotenoids. Ildong Bioscience, a comprehensive bio corporation with patented quadruple coating technology for probiotics, is focused on their contribution to the health and happiness of mankind. Ningbo Beilun Excare Pharma-Tech Co. specializes in the manufacture of high quality plant extracts and organic fruit and vegetable powders. Established in 2009, Excare Pharma aims for perfection in every product that it produces.

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Nutrition 21

Nutrition21 is a trusted developer and supplier of novel and clinically substantiated branded ingredients for the dietary supplement and functional food and beverage industries. With a diverse portfolio of patented health and wellness ingredients, Nutrition21 provides ingredient solutions to some of the most successful dietary supplement brands in the marketplace today.

In February of 2020, Nutrition21 announced the introduction of CertainT® to the functional ingredient industry. CertainT is an authenticity and traceability platform designed to protect the intellectual property (IP) of ingredient suppliers and brand owners of consumer products. This state-of-the-art technology allows ingredients and products to be tagged with a unique molecular identifier that can be tested for its presence throughout a global supply chain.

CertainT is GRAS and can be easily added to ingredients. Nutrition21 will not only be utilizing this technology within their portfolio, but is also offering it as a solution to other ingredient suppliers as a move toward a safer and more honest supply chain for all.

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OmniActive

**Products/Service**

OmniActive Health Technologies offers a wide range of scientifically validated, sustainable solutions from natural sources to address complex challenges for customers in the dietary supplement and functional food and beverage space. OmniActive brings added value with a focus on healthy living as well as healthy aging through IP-protected, science-backed branded health benefit solutions that consumers demand in top categories such as: active wellness and physical performance; metabolic health and weight wellness; vision, cognition and mental wellness; and daily energy and productivity performance.

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Orgenetics

**Products/Service**

Orgen-E® is part of our Orgen® brand ingredients, which are 100% USDA Certified Organic Vitamins/Minerals/Antioxidants. These are completely plant-based water extracts, so no synthetic solvents, excipients, or carriers are used. No synthetic additives are added, and no fermentation is used.

Orgen-E® is standardized for 15% Natural Vitamin E as alpha tocopherol. The remaining % is the Organic Annatto extract components, which include the naturally occurring co-factors & co-nutrients. We believe this is what helps with the stability and activity of our Organic Vitamin E – and this is shown in our 3 year shelf life stability.

This ingredient is perfect for use in Organic products, vegan/gluten free products, and really, any product that wishes to remain synthetic free while delivering a standardized dosage of Vitamin E. Check out our Behind the Science video, which explains our Organic vitamins/minerals in 2 minutes: www.organicvitamins.science
ROSS, Charles & Son Company

Products/Service

Serving all the process industries in virtually every industrialized country, Ross offers experience and production capacity that no other manufacturer of specialty mixing and blending equipment can match.

In the US, Ross operates five plants dedicated to engineering, R&D, manufacturing, and process testing. Overseas, Ross equipment is manufactured in four state-of-the-art plants in China and India.

The Ross Test & Development Center, located at the corporate headquarters in Hauppauge, NY, is the industry’s best-equipped laboratory for process testing. Hundreds of Ross customers visit the test center each year to confirm their equipment selections and optimize processes.

From single-axis to multi-axis designs, Ross control systems offer unprecedented accuracy and flexibility in the mixing and blending process.

Ross custom-fabricated storage tanks and pressure vessels are built to exacting standards at competitive prices. Build to ASME, USFDA, BIISC, API and UL code requirements, in capacities from 1 to 80,000 gallons.

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Sabinsa

Products/Service

Nigellin® - The Most Revered Medicinal Seed for Health and Wellness

Black seed (Nigella sativa) is one of the most revered herbs in history for restoring the body’s health and harmony. Recorded as ‘blessed food’ in the Qur’an, and referenced in the Bible, this remarkable, time-honored wisdom of the ancients is now a focus of modern research. In the last 40 years, published works have expressly validated black seed’s ability to support general immune system functioning, as well as brain, and liver health.

The growing understanding of black seed’s health-promoting benefits led Sabinsa to investigate and isolate its most active compounds, Thymoquinone (TQ) and Thymohydroquinone (THQ). Extraction with eco-friendly and selective supercritical carbon dioxide yields material that independent researchers discovered out-performs cold-pressed and other preparations in a head to head assessment. To offer its customers differentiation-ability in the market, Sabinsa produces its Nigellin® in AMBER, ONYX, and PEARL grades.


Sabinsa

Products/Service
Shagandha™ - Correctly Standardized Ashwagandha

The ancient Ayurvedic herb, Ashwagandha (Withania somnifera), commonly known as Indian ginseng, has seen a significant spike in popularity in recent years due to the range of health benefits it offers. As an adaptogen, it’s thought to help strengthen the body’s ability to cope with stress. Research suggests it rejuvenates and tonifies the entire system on a cellular level helping to increase stamina, endurance, and improve overall health and longevity.

Ashwagandha is currently one of the top ten selling herbs in the U.S. The consequent demand has subjected the herb’s root powder to tainting by unscrupulous marketers with undeclared ashwagandha leaf material. To assure safe, unadulterated stock that complies with the U.S. Pharmacopeia-National Formulary (USP-NF) monograph, Sabinsa has responded with Shagandha™, the correctly standardized Ashwagandha Root Extract. It’s our commitment to quality assurance for your products and the ingredient’s continued success in the marketplace well into the future.

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Soft Gel Technologies

Products/Service

Soft Gel Technologies, Inc.® specializes in providing premium quality dietary supplements in a softgel delivery system. We are a full-service contract manufacturer dedicated to the production and marketing of branded products and custom turnkey formulations. We obtained GMP certification through the NPA/UL and NSF, including NSF’s GMP for Sport™. We are Halal certified by the ISA and are an approved foreign manufacturer by Health Canada.

Customer care shapes every department; it is of utmost importance for our customers to receive prompt and courteous service. We take the guesswork and liability out of the GMP responsibility equation by ensuring that our softgels contain the intended ingredients and are absent of contaminants. We embrace corporate transparency through our meticulous quality assurance procedures, comprehensive QC testing, and record keeping/documentation on all products for traceability purposes. We have the capacity to meet high volume demands as well as accommodate smaller jobs in a reliable manner.

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Stauber Ingredients

Since 1969 STAUBER has consistently offered the finest quality ingredients to the nutritional, food, pharmaceutical, cosmetic and pet care industries. The company was founded on the principle of partnering with FSMA approved manufacturers that provide premium quality products. Stauber provides full product transparency with unparalleled service! From our corporate office in Fullerton, California, manufacturing capabilities under our control in New York, warehouses in four strategic geographic locations and alliances with major freight companies, STAUBER is able to react quickly and deliver customer needs by being a complete solution provider.

STAUBER is pleased to represent numerous reputable and quality brands including: Pomma+, Xanthosight, J. Rettenmaier, PANMOL, Jungbunzlauer, EPAX, CoreFX, Industrial Organica, NIPPI, Biova, Brewster Probiotics, Avena, Fermentalg, Covico, Daesang, Elemend Colostrum, Organic Monk Fruit & Organic Stevia, M2 Organic Mushrooms, Lallemend, Enzymology Research and Lipofoods.

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Products/Service
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**Products/Service**

The Wright Group delivers custom nutritional blends, vitamins/mineral premixes, direct compression and microencapsulated ingredients for the functional food and nutritional supplement markets. Our 100+ years of innovative expertise, accomplished R&D team, and comprehensive production capabilities allow us to provide faster lead times to successfully bring your products to market.

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**Vidya Herbs**

**Products/Service**

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Available in conventional and organic versions, our award-winning Turmeric MicroBeadlets are the hottest new product in the herbal extract market. Created with innovative single excipient technology, these uniformly-sized encapsulated MicroBeadlets are perfect for nutraceutical and functional food manufacturing. Our most popular version has a 95% Curcuminoid content. Our MicroBeadlets are Directly Compressible, have low hygroscopicity, and are ideal for high-speed tablet manufacturing.

Gone are the days of stained equipment and dusty manufacturing facilities. Our MicroBeadlets are known for their free-flowing and low-dusting properties, which are rare qualities for a Turmeric product.

We take pride in providing the finest Turmeric with DNA/Tru-ID certification and C-14 carbon testing to ensure the quality of our Turmeric products. Also, we have full traceability from farm to finished product. Our MicroBeadlets are a novel addition to our Turmeric portfolio and are a Production Manager’s dream with their easily clean-up and short turnaround time.

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XSTO Solutions

Products/Service
XSTO’s focus is introducing new science-supported nutritional ingredients to the functional food and dietary supplement markets.

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Any Questions?
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*Based on IMS data as of November 6, 2018. Based on 4 total industry magazines. Print only.
One in three U.S. adults is prediabetic, and with no apparent signs or symptoms, many of those affected don’t even realize it until it is too late. So, what is prediabetes? Prediabetes is a group of health conditions that indicate a decline in the body’s ability to maintain glucose levels within the parameters necessary for healthy function. Prediabetes is a precursor to type 2 diabetes. The American Diabetes Association (ADA) projects that 70% of prediabetic adults will eventually progress to type 2 diabetes, which leads to complications in vital organs such as kidneys, eyes, and lower limbs, and a higher incidence of cardiovascular disease.

Prediabetes occurs as sedentary lifestyles, obesity, abdominal fat, and unhealthy eating patterns negatively affect the body’s ability to metabolize carbohydrates. This results in fasting blood sugar levels that are higher than normal, yet still below the diabetic range. But elevated blood sugar levels isn’t the only factor that needs to be addressed. As blood sugar levels increase, they begin a cycle of increased oxidative stress and inflammation, making it more difficult to drop back down to a healthy range.

Addressing Prediabetes with Citrus
Healthcare costs from diabetes, both direct and indirect, continue to increase, and there is an urgent need for safe, effective, and affordable approaches for diabetes prevention. The ADA states that a prediabetic condition is reversible through lifestyle changes that include a healthy diet and regular exercise. But in order to efficaciously address prediabetes, that cyclical interaction of blood glucose levels with insulin sensitivity, inflammation levels, and oxidative stress must also be addressed. In addition to modifications to current lifestyles, affected persons can look to supplementation as a viable means to better health.

There has been much research into the effectiveness of flavonoids for improved health outcomes, including antioxidant support and anti-inflammatory activity. A major source of flavonoids comes from fruits and plants and were first discovered in citrus. Individual studies on citrus flavonoids have made it clear that addressing the many physiological systems—which interact to improve insulin resistance and glucose uptake—helps to manage prediabetes and its interrelated health concerns.

(Disclosure: The author’s company, Ingredients by Nature, partially funded this study, which was performed on the company’s Eriomin ingredient.)

The Insulin-Resistance Dilemma
The body relies on insulin to help regulate the entry of glucose into cells and organs. However, as the body enters a prediabetic condition, the hormone GLP-1, which increases insulin secretion by the pancreas and improves glucose uptake, begins to degrade from the enzyme DPP-4, which inhibits insulin secretion. As a result, the body starts to build up a resistance to insulin and tries to compensate by delivering increased amounts of insulin. Over time, the functionality of insulin-producing beta cells decreases, and blood glucose levels rise.

As seen when studying the flavonoid naringin, lemon flavonoids have the ability to inhibit the DPP-4 enzyme. This helps to prevent the hydrolysis of GLP-1 and thereby improves insulin secretion and glucose uptake. When blending multiple lemon flavonoids, such as eriocitrin, hesperidin, and naringin, one study showed an improvement in blood glucose levels as a result of reduced insulin resistance and increased GLP-1 levels.
FIVE THOUSAND YEARS OF EXPERIENCE

We have an advantage over other health science companies across the world. Unlocking the mystery of ancient Ayurvedic herbs, extracting their potency, using science to standardize it and gifting the world with new plant based molecules to catalyze reliable healthcare - that is the mission we pursue with a passion at Sabinsa... OUR INNOVATION IS YOUR ANSWER®.

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Cycling into Inflammatory Issues
Prediabetes is associated with low-grade systemic inflammation, indicated by the increase of pro-inflammatory cytokines, such as interleukin 6 (IL-6) and C-reactive protein (CRP), which are strong indicators of type 2 diabetes risk. As the pro-inflammatory cytokines increase, they are eventually released into the bloodstream and reach the liver and pancreas, resulting in dysfunctional beta-pancreatic cells. The body will also further develop an insulin resistance, which then leads to a chronic cycle of cytokine production and further inflammation, contributing to long-term micro- and macrovascular complications.

Addressing inflammation is a necessary effort towards the normalization of glycemia and improvement of insulin resistance to prevent further development. Lemon flavonoids have demonstrated that short-term intervention can significantly reduce the secretion of IL-6 and CRP along with other pro-inflammatory cytokines, by activating PPAR-γ expression to inhibit those cytokines and NF-κB, a protein complex that controls cytokine production. Hesperidin, eriocitrin, and naringin have specifically shown a successful increase of adiponectin for decreased insulin resistance in addition to their ability to support cytokine reduction.

Improving Antioxidant Defense
As blood glucose levels elevate and inflammation progresses beyond a normal range, reactive oxygen species (ROS) production begins to accelerate, creating unhealthy levels of oxidative stress. The growth of free radicals begins to outpace the rate of antioxidant defense mechanism to neutralize the ROS allows the excessive levels of ROS to cause damage to proteins, carbohydrates, and lipids. Combined with heightened inflammation from CRP, the damage from oxidative stress cycles back to the root issue to cause further glucose intolerance and insulin resistance.

It has long been known that citrus contains powerful antioxidant properties. As such, lemon flavonoids can provide both short- and long-term protection against oxidative stress by helping to prevent the formation of and neutralize ROS. Studies of the lemon flavonoids naringenin, hesperidin, and eriocitrin have attributed them to reduced ROS as they enhance the body’s antioxidant defense mechanisms. These defense mechanisms are supported to be able to increase the levels of reduced GSH, vitamin C, and vitamin E in addition to suppressing excessive ROS production and thereby preventing oxidative damage.

Make Lemon-Aid
Ideally, the first intervention is to start taking steps towards an improved diet and more regular exercise. Even small changes can largely impact prediabetes management.

But, when life gives lemons, supplementing with clinically validated “lemon-aid” can help provide the body an additional boost towards supporting normalized blood glucose levels, a healthy inflammatory response, and improved antioxidant activity. A lemon a day may just keep the doctor away.

Rob Brewster is president of Ingredients by Nature (Montclair, CA). As a third-generation ingredient manufacturer for the natural products industry, Rob Brewster is proud to be part of the health and wellness world. He has followed in his grandfather’s and father’s footsteps, helping their company Brewster Foods grow since he joined in the 1990s and then developing it into Ingredients by Nature, the world leader of citrus bioflavonoids and extracts. As president of Ingredients by Nature, Rob takes pride in citrus science and continues to invest heavily in citrus flavonoid science for condition-specific applications. Ingredients by Nature recently launched its latest branded lemon flavonoid blend, Eriomin, for prediabetes management.

Rob holds degrees in Business Administration and Biology from California State University.

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*Based on IMS data as of November 6, 2018. Based on 4 total industry magazines. Print only.

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Look How You Eat

The dietary approach to skin health

BY SEBASTIAN KRAWIEC, ASSOCIATE EDITOR

More consumers today understand that our diets are directly correlated to the function of our skin, hair, and nails. As a result, they understand that nutrition can be used as a tool to enhance our outward appearance.

Research on this relationship is growing. A recent study published in *Nutrients*, for instance, demonstrated how different dietary patterns can influence the skin. For example, in this study, a diet high in potatoes and starch, seeds and nuts, fruits, and eggs was associated with lower sebum content in subjects—a benefit to skin health, because too much sebum content has been linked to skin acne. This dietary pattern was associated with higher intakes of vitamins A and D, and linoleic acid, which play a major role in regulating sebaceous gland physiology.

In terms of food sources, eggs, cheese, and fatty fish are great sources of both vitamins A and D. Vegetables such as sweet potato, spinach, carrots, and peppers, and fruits such as cantaloupe, mango, and apricots, are good sources of vitamin A. Nuts like walnuts, cashews, pecans, and almonds are good sources of linoleic acid.

On the flip side, according to the *Nutrients* researchers, a diet characterized by a low intake of beans and a high intake of meats, dairy products, beverages such as soft drinks, and alcohol was associated with high sebum content. This diet, similar to the typical western diet, is high glycemic, meaning it contains a great deal of simple sugars that lead to elevated levels of insulin secretion and insulin growth factor 1 (IGF-1), which in turn stimulate sebaceous gland hyperplasia and sebaceous lipogenesis.

According to the *Nutrients* researchers, this study is the first to discover associations between dietary patterns and skin health parameters. They also acknowledge that further, larger-scale studies are required to support the findings and better understand the results.

There is already a wealth of anecdotal evidence suggesting that diets such as vegan, ketogenic, and paleo diets do improve the appearance of skin, and many consumers alter their diets in an attempt to improve skin health outcomes such as reducing outbreaks of acne or hydrating skin.

The nutricosmetic space—a result of this interest linking diet to appearance—offers consumers a more direct path to skin, hair, and nail health, being home to a number of ingredients people trust, such as biotin and collagen. According to market researcher SPINS, during the 52 weeks ending October 6, 2019, biotin was one of the bestselling ingredients in the mainstream retail channel, bringing in $179 million.

Collagen has seen enormous cross-channel growth, increasing in sales by 82.7% compared to the previous year, to $147 million. A majority of these sales are coming from the hair, skin, and nails space.

While common in capsules and other dietary supplement formats, one of collagen’s biggest advantages has been its versatility. Collagen in powder form can be used in food and beverages. For example, Reserveage Nutrition, a brand from Twinlab Consolidated Corp. (Boca Raton, FL), sells Collagen Candy, a powder that comes in stick packs reminiscent of the childhood candy Pixy Stix. This convenient delivery format makes compliance easy and fun for the consumer.

Collagen has other advantages that make it an important nutricosmetic ingredient, says Gene Bruno, Twinlab’s senior director of product innovation. Part of its versatility means collagen can also be incorporated into restrictive diets such as the ketogenic and paleo diet. This gives the ingredient an edge in terms of functional food and beverage formulation. Collagen can complement the potential skin health benefits of these diets, providing consumers with long-term support for reducing skin dryness and wrinkles.

Unfortunately, collagen does not yet fit into the vegan diet because it’s exclusively derived from animal sources. This is a major area of potential innovation. In fact, the collagen supplier Gelita (Sergeant Bluff, IA) recently partnered with the biotech company Geltor to develop, produce, and market the first ingestible animal-free collagen. Adapting to dietary trends will be important, especially with the growing demand from nutricosmetic customers looking to eat, drink, and be merry when it comes to their beauty regimens.

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