

# Natural Products Insider®

## Delivery formats



**Capsules:**  
Still No. 1



**Liposomes:**  
Bioavailability  
boosters



**Excipients:**  
Clean choices





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With gummies delighting consumers' taste buds, **Charlotte Traas** of TopGum Gummiceuticals explains the ingredient that makes veggie gummies go 'round—pectin.

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clickable TOC!



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Gen Z thinks oral strips are clean and fun. Millennials think they're cool, and Gen X likes their potency and swift onset, as **Dinesh AR** of Aavishkar Oral Strips details.





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## We have a **plastic** problem

**A**t the core, various delivery formats—from tablets and capsules to gummies and shots—are ways to get nutrients and botanicals into one's body. They are not part of the Supplements Facts panel, yet in many cases are the motivating factor for consumers selecting certain supplements. Consumers want “clean” and “fun” delivery formats, but those products need to be delivered to them in something. And that something is a growing black eye for the industry.

### **Plastic.**

The nonprofit 5 Gyres Institute is helping pioneer supplement companies like Rainbow Light and Natural Vitality to create all of their supplements bottles from 100% post-consumer plastic. That means the bottles are not just recyclable, but also recycled to begin with.

Hallelujah—no plastic trees were harvested in the creation of those bottles!

The recycled plastics market is a \$27 billion global market in 2021, growing at almost 9% a year and is forecast to be a \$53 billion concern by the end of the decade, according to [Maximize Market Research](#).

The North American region is expected to be the fastest-growing recycled plastics market over the remainder of the 2020s. Use of recycled plastic in the products and to help the region stay free of pollution caused by the plastic is expected to drive the regional recycled plastics market growth.

Bottles are the fastest-growing source of recycled plastics. They are also the most recycled post-consumer format due to the strength of the network for collection and sorting. Recycling business is mostly dependent on plastics due to easy availability.

Other companies are dispensing with plastic entirely and offering supplements in satchels, some made of bamboo.



[The Plastic Free Packaging Alliance](#) is all about eliminating toxic packaging and promoting eco-safe alternatives. It points out that 14 million tons of plastic end up in the ocean every year, leading to 100 million animals dying from plastic poisoning every year, while another 27 million tons of plastic end up in landfills, with only 3 million tons of plastic recycled annually.

I've seen, felt and opened plant-based, compostable packaging that feels exactly like plastic, only it's made from bamboo.

As everyone in the hemp world can tell you, hemp-based bioplastics can happen if we want it.

It's really up to supplement brands to think outside the nutritional delivery formats and consider the plastic packaging holding everything inside—and make a change for the better.

**Todd Runestad**  
CONTENT DIRECTOR



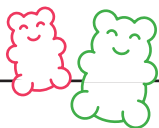
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## A pectin a day

by Charlotte Traas



WHAT MAKES A  
DELIGHTFUL GUMMY  
IN TODAY'S MARKET?  
THE INGREDIENT  
THAT TOPS THE LIST  
**IS PECTIN.**

**WHO?** The gummy texture of gummies is often associated with gelatin, but the industry's need for a vegan or vegetarian option has become apparent.

**WHAT?** Pectin is an acidic structural fiber found in the cell walls of certain plants.

**WHERE?** While pectin can be found in many types of fruits and vegetables, it is most abundant in both citrus peels and apples, making them the most popular sources of pectin.

**WHY?** Gelatin, the traditional source material for gummies, is a mixture of collagen proteins. It becomes solid after cooking and then cooling by trapping water into tangled proteins, forming little micropockets that hold water in the gelatin structure, causing it to wiggle and jiggle like gelatin does. Gelatin has some catching up to do on the sustainability side, as it is derived from the skin of cows and pigs and their bones (which all contain collagen).

**HOW?** Pectin combines with sugar, acid and water to form chemical reactions with one another that set up to support a solid gummy base.

**BUT?** Pectin can be a bit of a diva to work with, which is why many gummy manufacturers stick with gelatin. Everything from ingredient pH to water levels is factored in to make sure the pectin sets up properly, because small adjustments can make big differences in how the gummy sets up.

**WHY AGAIN?** Pectin can keep its structure at higher temperatures than gelatin, which may melt between 77 and 104 degrees. This is particularly helpful when consumers travel with their favorite supplement gummies to a warmer climate—or when you are shipping product to Arizona in the summer.

**BONUS:** Pectin's benefits may not stop at structure and sustainability. Research is developing on pectin's possible side benefits, including [balancing gut microbiota](#) and perhaps even supporting [healthy cholesterol levels](#). ♦



Charlotte Traas is VP of North American sales at TopGum Gummiceuticals.



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# 5 dynamic innovations in capsules

by Rachel Adams



**C**apsules are a tried-and-true, “old faithful” staple of the supplements category. And while enticing formats like gummies, shots and drinks continue to garner attention in the market, capsules hold their ground.

“New dosage forms are certainly growing in popularity, but capsules are still king,” said Emily Navarro, RD, global marketing manager at Lonza Capsules & Health Ingredients. She cited proprietary Lonza research showing capsules continue to be the most popular dosage form, preferred by 44% of consumers globally.

“That’s 132% higher than the preference for softgels and 5% higher than tablets,” Navarro said.

Driving the success in capsules is innovation that helps products meet evolving consumer needs. The following examples illustrate how capsule technology is helping supplements meet—and, better yet, exceed—a range of consumer expectations.

## 1. MORE INGREDIENT VERSATILITY

Capsules lend many benefits: Convenience, swallowability and efficacy are a few, per Navarro. But traditional capsules have also brought some challenges, including the inability to combine incompatible ingredients in one capsule.

Launched at Natural Products Expo West in 2023 is Lonza’s Capsugel Wave technology, which enables products to deliver oil- and water-based

ingredients in one capsule “with an appealing, wave-like visual aesthetic,” Navarro explained. The company’s capsule-in-capsule technology, comprised of a smaller, prefilled capsule inside of a larger filled capsule, enables supplement brands to create products that yield multiple benefits. Maybe a brand needs to mask unwanted odors and tastes. Or maybe ingredients need to be protected from stomach acid. Solutions like these, Navarro said, allow product developers to provide more ingredients—and thus more benefits—in one capsule.

## 2. DYNAMIC SENSORY APPEAL

Capsules, by nature, give the ingredients they contain “curb appeal” by forming the outside barrier of the supplement. While the functional benefits of the capsules—how they perform to protect and deliver the ingredients they carry—are critical, their potential to visually enhance the product lends what may be immeasurable value.

Dietary supplement company First Person offers a line of functional mushroom-filled brain health supplements. The company’s chief innovation officer, Chris Claussen, described them as “tiny maracas”—a name fitting for the clear cellulose capsules filled with multicolored microbeads that contain various nutraceutical ingredients supporting cognition. (Visualize a tiny Dippin’ Dots ice cream.)

Capsules lend many benefits:  
Convenience, swallowability  
and efficacy are a few.



“It’s beyond just catching your attention while you’re looking at it,” he explained. “There’s an effect to making things pleasant and beautiful and nice that leads to people being consistent and wanting to actually take these products.”

The company’s mushroom-forward products are designed for brain health and are also designed to be taken long-term for the best cumulative effects.

“We want to encourage people to take these over time,” said Claussen, “and there is an effect to it to make ‘em pretty like that.”

Per Claussen, the microbeads get their coloring via naturally derived colors that are applied to the microbeads as a coating.

While the colorful appeal of the products yield differentiation and support the company’s branding, the delivery format serves another critical role: masking undesirable taste.

“We have a very curated blend of nootropics and nutraceuticals and botanicals and adaptogens that we’ve combined,” he pointed out. “And there’s not really another application outside of capsules for these formulations [because] it just does not taste very good. We didn’t want to tackle that. We are brain health-focused first, so it was like, ‘Let’s make the best capsules we can and make them as motivating as we can for this ingredient list.’”

### 3. IMPROVED EFFICACY

It matters to consumers that their products work as promised. In fact, 85% of consumers cited scientific proof of efficacy as a requirement for supplement products, according to the Natural Marketing Institute’s (NMI) [Supplements/OTC/Rx Trends US and Global Databases](#).

Probiotics as a category reap the benefits of advancing capsule technology that allows for improved efficacy.

As live microorganisms that must remain alive on the shelf and after they’re ingested, probiotics are uniquely sensitive to conditions like light, heat and humidity, and they must be adequately protected to survive the acidic conditions of the stomach. Spore-forming probiotic strains can help with protection from acid environments—and so can certain innovative capsules.

### 4. BETTER PLANT-BASED SOLUTIONS

Many consumers are showing interest in products free from animal-derived ingredients, even if they don’t follow a vegetarian or vegan diet. That’s especially true among natural products consumers and enthusiasts.

In supplements, that means the “extras”—excipients and delivery formats—need to be plant-based, too.



#### CAPSULES AIN’T DEAD YET – VIDEO

Age-old capsules remain the top delivery format (sorry, gummies), and new capsule technologies provide brand-defining looks with improved functionality. You get function and form all in one. Check out the wisdom dispensed from Matt Redd at Viva 5 as seen at SupplySide East 2023.

**WATCH**



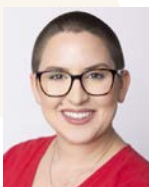
“Plant-based capsules continue to gain popularity with consumers globally,” Navarro said. “Forty percent of supplement users cite the importance of ‘vegan’ as a purchasing factor, and we’ve seen a 25% growth in supplement users who state that ‘plant based’ is important to them when making a purchase.”

Traditional hard capsules—beloved for many inherent benefits—are made of gelatin derived from porcine or bovine sources. Allergen-free and taste-free attributes are available, as well as flexibility in color options and release profiles. And, of course, veggie caps appeal to more consumers than just the abject vegans.

## 5. TARGETED DELIVERY

The microbead technology used by First Person is about more than curb appeal. The microbeads also offer sustained-release capabilities, allowing the active ingredients to be delivered at different times to yield the best benefits.

This was particularly important for First Person’s Moonlight product, which is designed to support better, more restful sleep. ♦



Rachel Adams joined Informa’s Health & Nutrition Network in 2013. Her career in the natural products industry started with a food and beverage focus before transitioning into her role as managing editor of Natural Products Insider, where she covered the dietary supplement industry. Adams left Informa Markets in 2019, but continues to freelance for the company.



## NEW KRILL PLATFORM BOOSTS BIOAVAILABILITY FOR NON-OMEGAS, TOO – VIDEO

Because they act as emulsifiers, phospholipids can transform ingredient classes with notorious absorption challenges, like curcumin, CoQ10, CBD, lutein and certain omegas—up to 25x! Aker BioMarine’s Cashtyn Lovan describes the company’s new phospho-krill platform in a sit-down with Todd Runestad here.

**WATCH**

# Gummies hit prime time but are not without challenges

by Pete Croatto

**T**he “bad, old days” of the natural products industry are over, according to Kenn Israel, who has more than 30 years of nutraceuticals experience and now works as a consultant. With true-blue supplement consumers in place, a new set of stolid objectives has emerged.

That maturation is best represented in a colorful, chewy delivery system that has long been the staple of goodie bags and grocery store candy bins.

Supplement companies are “competing for dose form, competing for price, competing for quality, competing for mindshare,” Israel said. “Gummies make it easy. They’re attractive, and I think it will definitely impact the next generation of supplement users because they’ve grown up taking ‘fun’ dose forms.”

The adoration for gummies isn’t a rebel stance or an impassioned, tie-dyed plea for better health. It makes good business sense. Companies generally don’t lose money catering to what consumers want. And pill fatigue isn’t going anywhere, noted Angie Rimel, North American marketing communications manager at Gelita, an ingredient supplier and manufacturer of CONFIXX gelatin.

“Gummies give the customer instant gratification—who doesn’t love a midday treat for the senses?” asked Charlotte Traas, VP of North American sales at TopGum Gummiceuticals.

“Adherence is another big win within the gummy space,” she added. “While pills and tablets tend to have lower adherence—with data showing that a three-tablet dose will most likely be whittled down to two or one tablet—gummies tend to have the opposite effect. As we know,



most supplementation is most effective when consistently taken, and gummies really help to achieve that.”

Rosella Del Vecchio Herrera, marketing director at contract manufacturer Funtrition, said vendor management systems forms indicate growth among delivery formats, but “none has rocked like the gummy.”

## THE GUMMY BOOM

She offered some numbers: For prebiotics and probiotics, gummies are seeing 14% growth year over year on Amazon, according to SPINS. “Active nutrition is driving the most growth, but probiotics and superfoods are gaining steam, and all these categories also come in a gummy,” she said. “Rest, sleep and relaxation are also doing really well in gummies.” According to Nutrition Business Journal, Del Vecchio Herrera said, more than one-third (35.3%) of consumers who began taking supplements in the last one to five years prefer gummies over other formats.

Is it any wonder that Procaps, Funtrition’s parent company, recently opened a 62,000-square-foot manufacturing facility in Florida devoted solely to gummies? Or that it was the company’s second such building? Or that Israel counts seven such facilities coming online in the United States in 2023?

The attitude surrounding gummies’ future ranges from optimistic to “Price is Right”

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Anything that has challenges with water activity—so most of your B vitamins—are a challenge in these systems.



Showcase Showdown winner. “All trends for gummies are exciting!” Rimel gushed. “New ingredient combinations, new flavors, new sweeteners and new formulations come to market.”

However, Israel tempered his enthusiasm with caution. “There’s going to be a lot of people who are new to gummy formulation that are going to make some mistakes.”

Companies looking to enter this market need to take a chill pill—sorry, gummy.

### DON'T GUMMY UP THE WORKS

Del Vecchio Herrera is fond of telling partners, “We can gummy that,” but some old standbys don’t fit in new clothes.

“Anything that’s spicy/bitter/sour can be challenging,” Israel said. “Anything that has challenges with water activity—so most of your B vitamins—are a challenge in these systems. Probiotics, outside of your spore formers, are challenged by this form system.”

Traas added another no-go to the list: Valerian gummies. “Valerian has some traditional uses in the sleep space but smells like gym socks—seriously funky. Although you can make a gummy out of it, at higher doses, it’s harder to hide its natural organoleptic potency. While you can make a ‘sweat sock’ gummy—probably not a bestseller—stick to a capsule.”

Blake Ebersole, president and founder of consultancy NaturPro Scientific, has concerns with manufacturing and quality assurance (QA)/quality control (QC).

“Unlike a capsule, where we’re measuring the weight of the powder in the capsule, it’s hard to get very precise on the amount of active that is

in each gummy because of the manufacturing process,” he revealed. “So the variability in the amount of actives in each gummy is much higher than for capsules. The other issue, a large portion of it is water. Water oxidizes and destabilizes a lot of the active nutrients that we want in there. A lot of gummy companies don’t necessarily do a lot of stability studies where they’re making sure to add enough vitamin C or certain nutrients that are on the label.”

Israel also would like to see more consistent potency—an issue revealed in the New York Times’ look at [melatonin gummies](#). One solution to nutritional shortages is to increase the serving size of gummies. That strategy, Ebersole pointed out, courts gummy fatigue and an increase in nutritional drawbacks such as calories from sugar.

“What didn’t get me on the gummy train for a long time is, I looked at gummies and I saw two ingredients, and I saw them big and bold. Ingredient No. 1 was sugar,” Israel said. “And ingredient No. 2 was gelatin. And I didn’t think they were aligned with where the health consumer was going. Gosh, was I wrong. It turned out they loved sugar in gelatin and they like collagen, too.”

### THE SUGAR ISSUE

Sugar has long been considered the backbone of gummies. It contributes to texture, mouthfeel and flavor, plus it’s hard to replace, Rimel said. Gummy companies are trying. “Even though the gummy is a candylike delivery vehicle, that doesn’t mean that gummies should come with sugar anymore,” Del Vecchio Herrera charged.



Funtrition's gummies, she added, usually consist of 65-75% nontraditional sweeteners "where you would commonly find sugar, glucose syrup and tapioca syrup." That includes sweeteners such as inulin, FOS (fructooligosaccharides) and stevia. "We want to sweeten our products without negatively affecting our consumers' health and without affecting the quality and shelf life of our products," Del Vecchio Herrera said.

TopGum, Traas noted, offers a "truly sugar-free gummy" that includes "no stevia, no sugar alcohols, no monk fruit, no artificial sweeteners." Protein, Rimel offered, is a good option because sugars, in addition to sweetness, provide volume to the gummy—a property sweeteners lack.

Israel has seen progress in gummy production, including downplaying sugar. "Most of the innovations are there," he said. "There are really brilliant microencapsulation systems readily available. There are precision manufacturing technologies. There are nongelatin polymers that work. There are nonsugar sweeteners and other humectants that work."

### DON'T RACE TO THE LOWEST PRICE

There is, of course, a catch, Israel added. "They're expensive and they're challenging, and they require equipment changes and patience and a really deft hand at your product development and formulation in the lab to make the mouthfeel, the flavor, the aroma, all these things work correctly."



Supplement companies may want to invest in a contract manufacturing partner where gummies are the focus and not just a menu item. Traas said gummies "need extra attention, extra care, extra planning for development, and extra work around flavor, texture and taste."

No wonder she deems gummies "divas" and TopGum focuses on them exclusively. Any company can make a gummy, but Traas said "tiers of quality" exist. It's the difference, she said, between getting sushi at a gas station convenience store and at a sushi bar. Since gummies are, according to Ebersole, "a low-cost, low-price product," spending extra to ensure potency and purity often makes sense.

"It can't be a race to the lowest price for gummies," he said.

Funtrition's Del Vecchio Herrera said gummies are prone to melt when exposed to high



### WHAT'S SO GUMMY ABOUT MELATONIN? – ANALYSIS

Gummies and melatonin got a bad rap recently in the press. Of course neither the researchers nor the mainstream media bothered getting informed about supp regs like stability programs and overages—an issue particularly relevant to gummies. What do gummy makers—and brands—need to know to avoid getting dragged in the mud?

**READ**

There are really **brilliant microencapsulation systems** readily available. There are precision manufacturing technologies. There are nongelatin polymers that work. There are nonsugar sweeteners and other humectants that work.

temperatures, which the company's GummieX technology was designed to help prevent. Marketplaces, including Amazon, have implemented shipping policies that require products remain intact. "As a result, supplement brands have had to pay for 'cold shipping' and other temperature-controlled solutions which can significantly elevate logistics costs," she added.

Rimel advised manufacturers to consider a starchless molding manufacturing process. "By replacing starch molds with silicon or plastic trays, the process is streamlined and avoids all starch-related issues," she said. "The process also reduces production time from two days to less than two hours, reduces the overall footprint of the process, saves energy, enables gentle fortification, and rules out the risk of cross-contamination through the reused starch."

A quality gummy product isn't just beneficial for a company's reputation or its profit margins. It reinforces why many believe in the natural products industry.

For instance, Del Vecchio Herrera counts women's health, gut health and sexual health among today's "it" categories—and suggested gummies can be part of the unfolding landscape. "There is so much to explore when it comes to new categories and ingredient combinations ... There is much more to come," she predicted.

And Traas, a former gummy skeptic, remembers the first time she tried TopGum's AQUI-Nutri line, which included beta-glucan gummies and astaxanthin gummies. "I feel like I'm tasting the future," she told her husband. It was that epiphany moment when one realizes two terrific ingredients—and a world of others—have an additional (and frankly, more attractive) opportunity to be taken consistently by consumers. ♦



Pete Croatto ran Informa's Supplement Perspectives blog from March 2011 to January 2015. His writing has appeared in many publications, including The New York Times, GQ.com, and AARP the Magazine. His first book, "[From Hang Time to Prime Time: Business, Entertainment, and the Birth of the Modern-day NBA](#)," was released in December 2020.



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# Small delivery system yields big rewards

by Lisa Schofield



**W**e all want protection—a safety bubble—if you will. And so do many ingredients. Liposomal delivery systems provide the resilience necessary to deliver ingredients where they are best absorbed in the gastrointestinal (GI) tract.

Liposomes are sphere-shaped vesicles that protect the nutrients within against digestive enzymes and immunological breakdown. Comprised of a lipid bilayer membrane that surrounds water, the liposomal structure can enrobe either or both hydrophilic and lipophilic ingredients in its bilayer membrane.

More specifically, according to authors of a [study investigating](#) the efficacy of mineral absorption in a liposomal multivitamin/mineral (MVM), “Hydrophobic compounds are encapsulated within the interior of the sphere, adjacent to the hydrophilic phospholipid heads, whereas hydrophobic compounds can be accommodated among the hydrophobic fatty acid tails.”

The phospholipids of the liposome attach to the cell membranes, which provides for smoother, faster and increased absorption. Interestingly, a liposome is as tiny as a cell, allowing it to journey through the buccal layer (or inner cheek) in the mouth.

## CHALLENGE SOLVED: BIOAVAILABILITY

Christopher Shade, Ph.D., founder of dietary supplement company Quicksilver Scientific, explained the need for liposomal technology to keep pace with consumer expectations, as people increasingly rely on nutraceuticals to enhance and sustain wellness.

“Although retail shelves are packed with dietary supplements, many are not formulated in a way that enables efficient absorption of key ingredients,” he said. “Consequently, these supplements merely travel through the digestive system and are expelled from the body due to inadequate absorption—they are sending money down the drain. The crux of the problem lies not in the efficacy of specific vitamins, amino acids or nutraceuticals, but in their bioavailability.”

He pointed to glutathione as an example. As a vital antioxidant, glutathione protects cells from the harmful effects of toxins. In its natural form, glutathione exhibits poor bioavailability. This challenge inspired the development of the Quicksilver Delivery System as a solution to enhance bioavailability. By employing liposomal technology, glutathione is encapsulated in tiny liposomes that can easily pass between cells. This allows absorption (and potential effects) to begin the moment it enters the mouth.

Liposomes allow a greater health benefit at a lower dose, which may help alleviate side effects like stomach discomfort or toxicity.



As another example, [a study](#) of 25 participants supplementing with an MVM made with liposomal technology, or without, found that iron absorption was greater from the liposomal MVM than the standard MVM. Further, the researchers found that iron returned to near baseline levels in the liposomal group six hours after ingestion, while iron concentrations fell below baseline in the standard MVM group.

### CHALLENGE SOLVED: HERBAL ABSORPTION

Another challenge lies in the herbal arena, where some botanical herbal compounds tend to exhibit poor water solubility and limited intestinal absorption, resulting in significantly reduced oral bioavailability. Phytosome, a proprietary technology from Indena USA, is made with phospholipids that act as vectors, dynamically reducing the self-organization of natural compounds, according to a company release.

“Functional dispersion allows natural compounds to interface efficiently with the gut’s ecosystem in terms of absorption and microbiota interactivity,” the release described. “It thus optimizes bioabsorption without relying on pharmacological adjuvants or the structural modification of ingredients, maintaining tolerability and safety over time.”

### DISCERNING QUALITY

Shade emphasized not all liposomes are created equal. “Some supplement manufacturers use inexpensive shear methods, resulting in large particles that are too big for effective absorption into the bloodstream,” he explained. “Consequently, these supplements often face the same bioavailability issues as their conventional counterparts. Also, some manufacturers use low-grade phospholipids like raw lecithin, rather than the high-phosphatidylcholine [PC] phospholipid mixtures required for a high-quality liposome.”

He explained that if a liposome product appears milky—or if the consumer must shake it to mix the solution—it should raise concerns about the product’s bioavailability.

According to Shade, the Quicksilver Delivery Systems uses smaller, more stable and uniformly distributed single-layer spheres made from top-quality ingredients.

“We also utilize high-quality phospholipids chosen for their shelf stability and superior absorption,” Shade shared. “As we often say, the difference is visibly clear.”

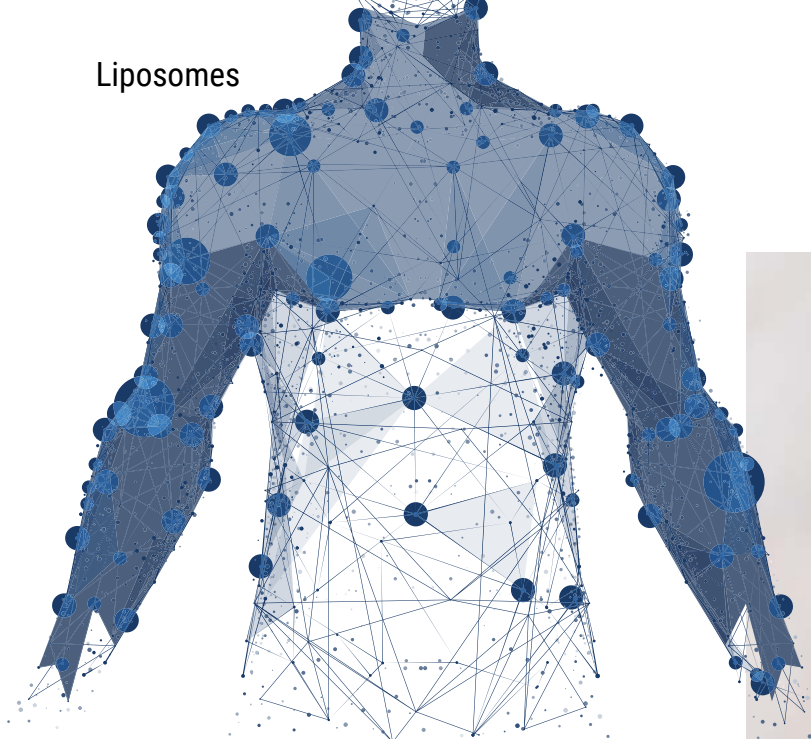
Emek Blair, Ph.D., founder and CSO at Cellg8, noted his company’s liposomal technology has been studied for its ability to offset digestive disturbances, specifically in cases involving vitamin C and magnesium—which can sometimes



### SUPPLEMENT DELIVERY FORMATS: LET’S GET SMALL WITH LIPOSOMES – VIDEO

Liposomes create microscopic nanoparticles that enrobe nutrients for improved bioavailability. Liposomes make ingredients perform better—so you can make a superstar ingredient with a liposome around it. Listen in on a convo with liposome innovator Sebastian Balcome, CEO and founder of Specnova.

WATCH



be accompanied by side effects like stomach upset and constipation.

Also, Cellg8 liposomal technology does not use high temperature, pressure or toxic solvents, thus creating a longer shelf life, up to 24 months for a liquid supplement and up to three years for a powdered product, according to Blair.

By way of scientific backing, Cellg8 offers numerous human clinical studies showing its performance with more than 20 ingredients and actives.

“Rather than trying to guess if a liposome works or if a product is efficacious, we provide peer-reviewed published human clinical data,” Blair commented. “Clinical studies are critically important because the marketing that is used by other manufacturers that ‘smaller is better’ breaks FDA and FTC regulations for nanotechnology in agriculture,” he warned.

### WHAT'S NEW IN LIPOSOMES

Pharmako Biotechnologies' new PlexoZome technology provides supplement formulas with high zeta potential, according to the company. The scientific term describes the surface charge of particles in a solution. The lower the zeta



potential value, the more unstable the particles and the higher the ability to cluster and combine. The higher zeta potential means better stability, with reduced risk of clumping and coagulation.

The presence of PlexoZome liposomes is validated through transmission electron microscopy (TEM) and Cryo-TEM imaging; that is, according to its maker, the only way to clearly view the structure of liposomes and the structure of their bilayer membrane. TEM is an imaging technology that uses an electronic beam to see a nanoparticle, also providing a significantly higher resolution than light-based imaging.

Pharmako uses a technology it calls dynamic light scattering (DLS), which validates the liposomal particle size that enables supplement manufacturers to obtain customized sizes, helping to meet regulatory requirements.

If your next blockbuster formula incorporates challenging ingredients, liposomal technology is one way to help consumers achieve the health and wellness experience you intend—and that they have come to expect. ✨













Lisa Schofield is a veteran writer and editor who got her start interviewing rock stars for national music magazines. She now writes and edits content for B2B media and suppliers in the natural health product industry. She has served as editor for Vitamin Retailer and Nutrition Industry Executive, and prior to that as associate editor for Whole Foods.



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-  Women Wellness
-  Oral Hygiene
-  Pet Health
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-  Signature Collection

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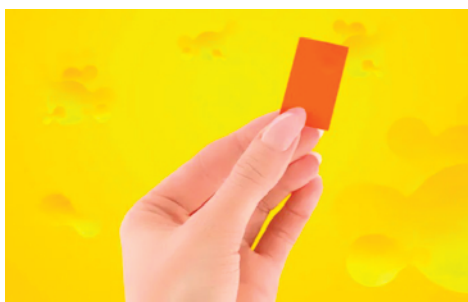
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# Clean label excipients 101

by Laurie Van Gels

**T**he food and dietary supplement industries are greatly influenced by consumer demand and global trends. The clean label movement prompted manufacturers around the world to reformulate or create new products to meet this rising demand.

As consumers get more interested and involved in what is on their product labels, they are asking exactly what those “other” ingredients—known to the industry as excipients—are and what purpose they serve. Marketing and sales teams want to be at the forefront of these industry trends, while production teams are being forced to change to accommodate these growing requests.

These excipients are often located in the “other ingredients” section on a Supplements Facts panel and are used to assist in the manufacturing process. Formulators are exploring the use of clean label excipients, but also need options that function and still provide the necessary results.

Four types of excipients and the function or benefit they serve in the process are:

**FLOW AIDS**, also known as anti-caking agents or processing aids, help specifically with manufacturing. They ensure the formulation runs smoothly through machinery and prevents any sticking or caking. Due to the increased efficiency in the manufacturing process, flow agents can help increase output and in turn reduce overall costs.

**FILLERS** are used to add size and substance to capsules and are also known as bulking agents. In addition, they can be used as a carrier to disperse the active ingredient(s) evenly.



**BINDERS** are most widely known for exactly what it sounds like, binding or compacting all the ingredients together (to assist with breakage and shedding) into a tablet, as well as ensure proper consumption or dosage.

**LUBRICANTS** are also an important excipient beneficial to the manufacturing process. Lubricants reduce picking and sticking on equipment tooling, as well as help to extend the life of the machine. By improving the powder flow energy required, the overall flow is improved.

Some of the potential advantages clean label excipients offer consumers include:

- Pronounceability.
- Source transparency.
- Perceived safety.
- Overall positive association.

Proper sustainability practices and transparency are now expected in the industry. Knowing where ingredients come from also helps ensure consumers are not supporting companies that use harmful practices within their manufacturing process.

“  
Consumers desire the  
**same clean label**  
from dietary supplements that  
they get from food.

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When companies showcase the process and path finished products take to get to retail, it not only has the potential to influence consumers who are trying to decide between products, but can also be part of a bigger global movement transforming the food and supplement industries for future generations.

Consumers are inundated with information; label declarations can be an easy tool to help them understand what they are feeding themselves and their families. Being able to pronounce ingredients and finding alternatives to synthetic materials is a plus in the ever-changing food and dietary supplement landscape.

### EXCIPIENT HELP FROM THE CLEAN LABEL ALLIANCE

The Clean Label Alliance was developed out of the increasing demand from consumers for cleaner labels on dietary supplements. Savvy consumers have made the connection between “food as nutrition” and “dietary supplements as nutrition,” and desire the same clean label from dietary supplements that they get from food.

However, as dietary supplement makers transition to clean labels, some are experiencing production challenges. Leaders within the dietary supplement industry joined forces to collectively serve producers seeking to develop or transition

to clean label by providing support and problem-solving solutions. As consumers look beyond the product and demand transparency, it is clear they simply want to understand product purity and clarity, which motivates their purchase habits.

As dietary supplement manufacturers are trying to navigate the changes, they can find free, confidential consultations, recommendations, and technical support from industry leaders with experience and viable resources for clean label products from the [Clean Label Alliance](#). Projects and questions can be submitted at [CleanLabelAlliance.com](#).

RIBUS, one of the Clean Label Alliance members, offers excipients that enable companies to remove chemistry lab-sounding excipients and provide clean label alternatives such as “rice extract” or “rice fiber,” while enabling the same functionality and quality.

Utilizing the entire grain (the hull and bran) creates natural, gluten-free, hypoallergenic excipients. Rice hulls are a natural source of silica, one of the most effective anti-caking agents in use today.

Clean label excipients are a crucial part of the growing natural and organic food and supplement industry. As ingredients, they can provide safe options that not only satisfy consumer desires, but are also effective for manufacturers. ♦



Laurie Van Gels is director of strategic communications at [Ribus Inc.](#), which calls itself “the original clean label ingredient company.” The supplier offers American-made natural and organic, plant-based ingredients to the food, beverage, dietary supplement, pet and personal care industries.

# SIRIO

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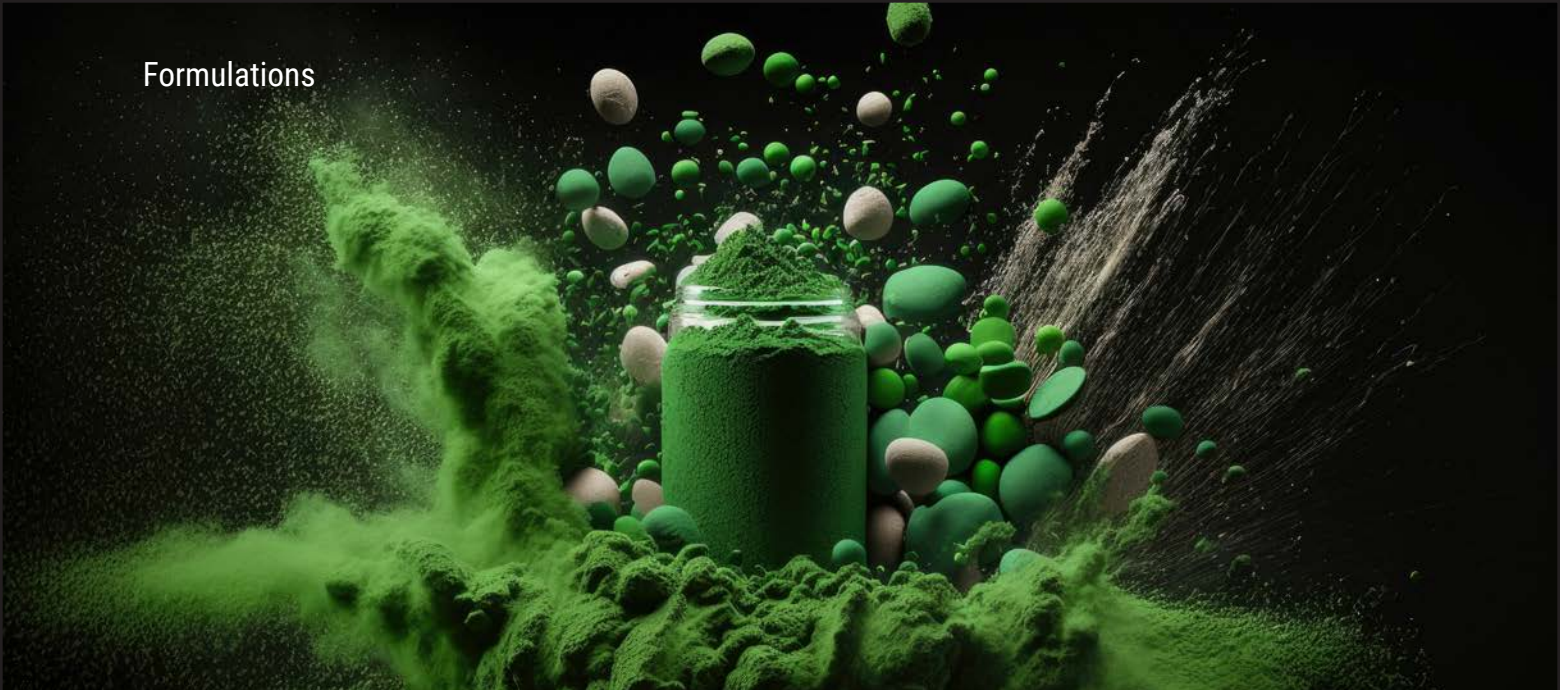
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Amaze your customers with our  
irresistible flavors, delightful textures,  
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USDA Organic Certified | U.S. Gummy Manufacturing Launching Soon!





# Today, delivery formats that deliver

(TOMORROW, EVERLASTING SUPPLEMENT GOBSTOPPERS)

by Blake Ebersole

**I** remember the time I was invited to an all-hands product development call regarding an amazing new technology. The crack team of young marketing whizzes had spent months compiling extensive market exploration research, mapping consumer needs and diagramming product idea matrices.

The culmination of this work was a groundbreaking product concept that was not only completely unique, but also met the unserved needs of millions of Americans.

The beautiful, graphically pleasing PowerPoint deck was flush with consumer surveys and expert market analysis demonstrating persuasively why the next big supplement idea was ... injectable botanicals. That's right: plants stuck right through arms, into veins. The rationale? B12 shots are a growth category. So why not a proprietary blend of herbs delivered with a 22-gauge needle for immediate action?

After I wiped up my spilled coffee, I took a deep breath and calmly explained the challenges with this well-presented concept. Injectables are always regulated as drugs, and supplements must always be swallowed (that's by the mouth,

and into the stomach, to be clear). Being solution-oriented, I listed a few alternatives that might fit the bill and would be, well ... legal.

## THE LEGAL ALTERNATIVES

Capsule and tablet options are plentiful, ranging different sizes, shapes, compositions and release characteristics. And nothing beats a well-made capsule in terms of maximizing the benefit while minimizing unnecessary junk. A world of ingredients is available in different varieties and forms to create a unique and groundbreaking capsule supplement.

I also love powdered drink supplements. A lot of effective ingredients and dosages can fit into a powdered drink format. They're versatile and convenient. They are usually somewhat pleasant tasting. And startups or companies test marketing can start with a low MOQ (minimum order quantity) for jars or pouches of powder to test the market and bootstrap before committing to large order quantities.

Of course, we can't forget everyone's favorite candy-with-benefits: gummies. But gummies aren't the only candy in the candy store—there's



Being solution-oriented, I listed a few alternatives that might fit the bill and would be, well ... *legal*.

more to the world of enjoyable supplement delivery forms than just squishy nuggets of sugar and cowhide extract. Supplements can also come in forms like chocolatey bites, sugar-free gel chews and quick-dissolve tablets, to name a few.

Truth be told, we've only touched the surface of what is possible in supplement delivery forms (without touching injectables, of course). Still waiting for the right opportunity are things like exploding vitamin candy, fizzy lifting energy drinks, and of course, the everlasting supplement gobstopper. (Not all of these have left the Wonka invention room—still a few kinks to be worked out.)

### THE OPPORTUNITY OPPORTUNITY

Luckily, we don't need to wait for a fanciful, candy-filled future. Some inspiration can be found in history, notably inside a 2,140 year old Roman shipwreck, the Relitto del Pozzino, discovered off the coast of Tuscany in the 1990s. The vessel contained the first known medicine—tins of soft tablets containing zinc, iron, starch, pine resin and beeswax. The Pozzino tablets serve as a reminder that swallowable or chewable supplement dosage forms don't necessarily need to contain a lot of sugar or artificial ingredients. For example, more plant-based, organic excipients are becoming available to replace ingredients of unspecified origin, like microcrystalline cellulose.

"Supplementified foods" has been a thing for a while, but we've only dipped our toes into the surface of the ocean. Within whole foods, we've



seen calcium-fortified orange juice, algal DHA (docosahexaenoic acid)-supplemented milk, and probiotic-doped prunes. And in the world of packaged foods, a number of opportunities exist for supplementing or fortifying nutrients into drinks, snacks and dairy.

Why do I consider these opportunities? Well, recall that much of the American population is at least marginally insufficient (if not deficient) in one or more nutrients, including calcium, vitamin D, B vitamins and iron. And more people are looking to food to get these nutrients. Teenagers and the elderly are two examples of vastly underserved populations in the nutrition world. Reaching sufficiency of these nutrients on a daily basis is critical for health and longevity, but a lot of people avoid taking pills until they need to.

So, opportunity abounds for supplement firms that deal with the more traditional formats to launch product forms that complement their existing product mix. Powders, bars and drinks are tried-and-true routes to expand brand reach and penetrate new market segments. Fortified coffee, teas/tisanes and chocolate are three other approaches where some supplement firms have seen success to expand their reach outside the supplement section of the store.

### TACTICAL CHALLENGES REMAIN

But when we replace our marketing and innovation hats with our regulatory and quality assurance (QA) cap, we start to look

at “supplement treats” in a different way. The limited loading capacity, difficulty to ensure consistent dosage amount and stability issues are the recurring headaches for manufacturing supplement treats. And safety: Some of these formats taste so good that, like a great potato chip, it’s hard to eat just one. We should be careful that the dosage in our favorite candied supplements will not cause adverse events or provide more than the upper limit of nutrients if a Homer Simpson accidentally (or intentionally) eats 10 or 20 of them in a sitting.

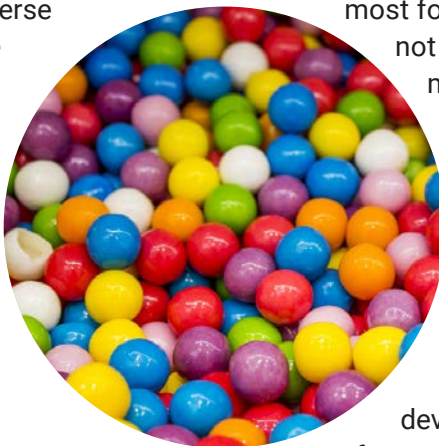
A lot of challenges are inherent in developing combination food-supplement products—some of which are similar to those for gummies. And first, we’ve got to understand whether the product should be labeled as a food or a supplement. There are a few restrictions to be mindful of. Foods require the use of GRAS (generally recognized as safe) ingredients—which precludes many supplement ingredients, such as most old dietary ingredients or NDIs

(new dietary ingredients). Foods cannot make structure-function claims for ingredients which are not essential nutrients (vitamins or minerals). And supplements require manufacturing in a supplement GMP (good manufacturing practice)-compliant facility meeting CFR 111 requirements. This is a more stringent set of standards than for food, which most food manufacturing facilities do

not meet. Additional considerations may require support from legal counsel or regulatory experts.

So, be ready for a potentially long and expensive development process to win the supplement “Nailed It” contest for some of these more palatable delivery forms.

Needless to say, product development of new and exciting formats for supplements can be a little messy. But we don’t need to spill too much coffee or attempt to launch impossible products to enjoy success. Although a big blue ocean is out there, so are the metaphorical sirens and shoals that can bring about a shipwreck of a failed new product launch. ♦



Blake Ebersole has led several botanical quality initiatives and formed collaborations with dozens of universities and research centers. As president of [NaturPro Scientific](#), Ebersole established quality compliance and product development services for supplements and ingredients such as ID Verified. Follow him on Twitter at [@NaturalBlake](#).



### SUSTAINABILITY: SOURCING AND PACKAGING FIND PERFECTION— VIDEO

Some supplement brands proclaim sustainably sourced ingredients. Others are addressing the plastic problem that otherwise defines packaging. Youtheory threads the needle on both accounts. Hear how with this quick convo with John Doherty, chief innovation and scientific officer at Youtheory.

**WATCH**

## Can you film that?

by Dinesh AR

**WHAT?** Oral films are made of a plant-based cellulose (pullulan), pectin and a few other gums. The polymer matrix also acts as a great oxygen barrier and hence may increase the shelf life of the product. Oral strips do not have sugars and may have up to 10 times less fillers when compared to gummies carrying the same dose.

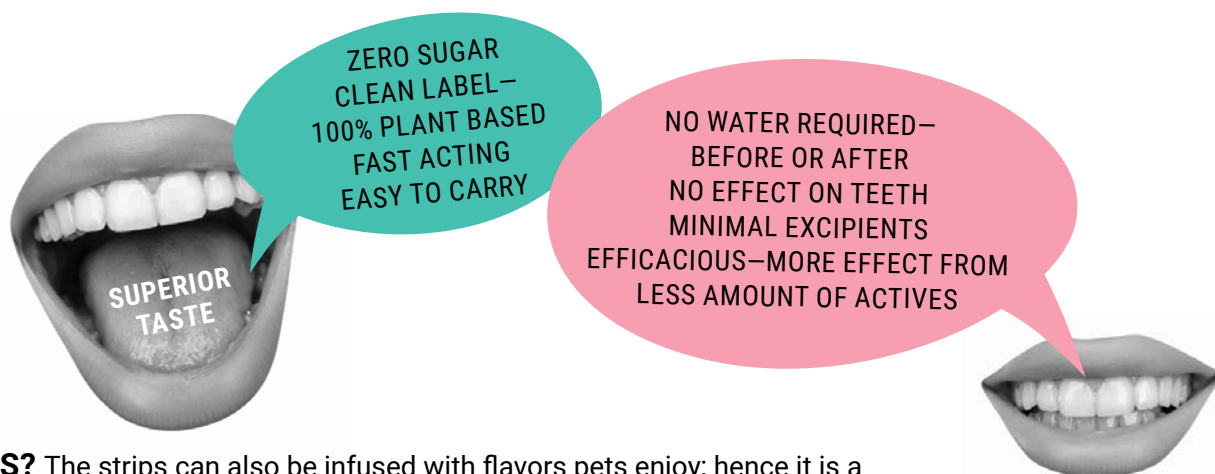
**HOW?** Natural gums—a simple, plant-based, water-soluble polymer—help hold the bioactives, which dissolve almost instantaneously as the strip hits the saliva in the mouth. Absorption happens quickly through passive diffusion into the dense vein endings present in the mouth, avoiding the digestive tract where most bioactives are denatured and wasted.

**WHO?** Gen Z: Clean and fun. Millennials: Cool and quick. Gen X: Potent with swift onset. Boomers: Goodbye, dysphagia—no swallowing, no water required.

**WHERE?** The strips can accommodate vitamins, botanicals, amino acids, minerals, enzymes and probiotics.

**BUT:** For the best experience, the active load cannot cross 150 to 175 mg.

**WHY?** Advantages over other oral dosage forms:



**BONUS?** The strips can also be infused with flavors pets enjoy; hence it is a comprehensive delivery format for applications spanning the whole family. ♦



Dinesh AR is CEO of Aavishkar Oral Strips, makers of the patented ThinSol Strips in a 220,000 square-foot facility with an annual production capacity of 2 billion strips. The company's oral strips portfolio is in more than 125 finished products exported to more than 25 countries.

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