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Gummy Vitamin Manufacturing Hurdles Grow With Demand For Novel Formulations

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Executive Summary

Gummy manufacturing challenges include stability of “decaying” active ingredients, loading all ingredients into limited space and inadequate testing, says Church & Dwight scientist Kristen Farr.



Gummy vitamins can be a sweet investment for dietary supplement firms given explosive consumer demand, but manufacturing can be rife with challenges, from nutrient stability to inadequate botanical testing, says a research executive with a leading gummy brand marketer.

During a Council for Responsible Nutrition webinar on supplement product delivery formats, Kristen Farr of Church & Dwight Co. Inc. said consumer demands, including for vegan formulas and novel botanical and herbal ingredients, add to the existing complexity of gummies that consumers expect to be “soft, chewy, delicious and flow freely out of the bottle.”

“How do you measure and ensure what you put in there is in there throughout the shelf life and in there uniformly throughout the entire batch?” said Farr, research and development program scientist at C&D, on 15 December.

Additionally, unique herbal and botanical ingredients are emerging in the gummy space, many without “validated or reliable” test methods to determine their viability in the format. “Gummies are complex systems. With the addition of different vitamins and minerals, it adds more unknown components,” Farr said.

She advised collecting data on active nutrients as early as possible “to understand your specific process parameters and tolerances and working within them, because there are a lot of levers you can pull when you encounter issues.”

C&D is well positioned to speak on gummy manufacturing as the US market leader of gummy vitamins after entering the space with its 2012 acquisition of the manufacturer of the vitafusion and L'il Critters brands. (Also see "With Avid Buy, Church & Dwight Seeks Sweet Spot For Supplement Market Growth" - HBW Insight, 27 Aug, 2012.)

Sales growth for the brands during the pandemic has exceeded the Ewing, NJ-based firm's manufacturing capacity and drove up its health care product sales 24.5% in the third quarter to \$453.2m. (Also see "Demand For Vitafusion, L'il Critters Gummy Lines Exceeds Church & Dwight Capacity, Drive Q3 Growth" - HBW Insight, 30 Oct, 2020.)

Practice Parameters Necessary For Stability

In addition to active ingredient nutrients, most gummy products contain four primary ingredients: 40%-55% corn syrup; 28%-50% sucrose; 15%-20% water; and 5%-8% gelatin/pectin, Farr said.

Maintaining gummies' stability is a challenge partly because vitamins “typically hate light, acid, water and heat, four of the main things you need to make a gummy,” she said.

CAPSULES, TABLETS, GUMMIES, POWDERS, LIQUIDS

Delivery Forms *Matter*



THE COUNCIL FOR RESPONSIBLE NUTRITION HOSTED A WEBINAR ON 15 DECEMBER ON SUPPLEMENT PRODUCT DELIVERY FORMATS.

Manufacturers must consider in the development process how ingredients may degrade over time and which will degrade fastest. Establishing practice parameters – setting quantities of ingredients to add to each batch in manufacturing to ensure finished products are consistent with labels – is critical, she said.

For example, if formulating “decaying” or “problematic” active ingredients such as herbals and vitamin C – typically water soluble and quickly degrading – use a higher amount of the active to ensure the product delivers the same amount of active that is on the label throughout its shelf life.

Farr said for vitamin C, “you may want to add in 100% overage to account for a decay that you are going to encounter in that gummy matrix.”

In setting overage amounts, consider first the cap for overage added to a product as well as historical data on the active ingredient. “If you are partnering with a chemical manufacturer that has a robust history of formulas similar to what you are looking to develop, you can leverage that,” she said.

“You can work with raw material vendors on data that they can share. Maybe they don’t have it on a gummy matrix, but they have under different conditions, like heat or acid, things you can bridge to what you are looking to do.”

Active ingredients’ stability can change with minor formulation changes, such as a color change. Any change should be tested before manufacturing.

“Just because you are changing a color or the acid level, doesn’t necessarily mean you’re going to get the same results as far as stability goes,” Farr said.

Manufacturers also should consider processing variability for stable active ingredients, which include most minerals and fat-soluble vitamins, even though there is little risk of degradation. If adding active ingredients before cooking gummies, Farr suggests adding about 10% overage of the stable active ingredient; if adding them after cooking, use a little less “to account for any testing or batch to batch variability.”

‘Loading’ Ingredients In Gummies A Delicate Science

Another challenge is proper “loading” of ingredients – fitting all ingredients into a gummy while maintaining uniformity and homogeneity across batches. Most of the space in the formulation is taken up by the gummy base material and some active ingredients throw off the balance, Farr said.

Minerals such as calcium and magnesium can interfere with the gelling of a gummy, and firms may want to seek different forms of those ingredients or rebalance a formulation to stabilize the matrix.

Likewise, certain active ingredients such as vitamins B1 and B2 and omega fatty acids can have hard-to-mask flavors and odors. “You can overcome this with great masking technology that is out there, or an encapsulated version of those actives,” Farr said.

For active ingredients that react with the base formulation to cause rapid decay, stickiness or browning of a gummy, consider alternative base options, she said. “We know a specific amino acid decays very rapidly in the presence of a sugar base. So you could potentially change your base from sugar to sugar-free and use things like sorbitol” to help deliver the gummy base with the active.

Formulating vegan gummies, companies use pectin, which requires more acid in the base of a gummy and can result in stickiness, and sugar/syrup ratios should be adjusted. Consumer demand for natural products can also lead to problems. Natural colors, for example, tend to brown over time, so firms should considering making gummies darker to begin with to hide that color change, Farr said.

Traditional But Trendy: Capsules And Tablets Lead VMS Delivery Formats Despite Gummy Growth

By Eileen Francis

17 Dec 2020

Natural Marketing Institute survey found capsules (42%) and tablets (41%) are most popular supplement formats followed by gummies (35%). Results presented during a Council for Responsible Nutrition webinar showed younger consumers are willing to try formats such as tinctures, oral sprays and tablets.

[Read the full article here >](#)

Proper testing is another challenge in gummy manufacturing, especially using botanicals and novel herbals that don't have validated or reliable test methods. Manufacturers can develop their own tests or find marker compounds to test for within the formulations.