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The secret to creating
yummy, plant-based gummies

Plant-based eating is a top food and beverage trend – spilling into most every grocery aisle. Chewy candies and gummy supplements needn't sit this movement out. Instead, brands can look to plant-sourced pectin as the answer to their gelling needs.

"Gelatin has long been the go-to gelling agent for gummy confections, but increasingly, its animal origins are a turn-off for some consumers," explains Ravi Nana, Cargill's Senior Technical Service Specialist for hydrocolloids. "Fortunately, plant-based ingredients with good gelling properties are available, enabling brands to create chewy candies and supplements that appeal to this growing consumer base."

Among the options, Nana says pectin is the clear leader, combining consumer acceptance with functional performance. For the label-conscious consumer, the plant-based ingredient is familiar and often associated with their grandma's homemade jams and jellies. It also has a compelling "upcycled" story, as it's made from the leftovers of fruit juice production – apple pomace and citrus peels. At the same time, pectin is an exceptional gelling agent with unique organoleptic properties, addressing manufacturers' functionality needs.

"It gives confectioners and supplement makers the best of both worlds," Nana explains, "From a sensory perspective, pectin offers a pleasing bite, with an exceptionally clean flavor release. As an added bonus, its higher melting point is a huge advantage for warmer climates."

Gelatin melts around 95°F, a temperature low enough that gelatin-based gummies may lose their structural integrity on hot days and stick together, creating headaches around transport and storage. Pectin's much-higher melting point – nearly 300°F – means the gelling agent will hold its structure at higher temperatures, resisting melting, minimizing stickiness and preventing syneresis. The two ingredients also yield notable sensory differences.

"Where gelatin combines a tough first bite with an elastic, highly chewable texture, with pectin, you get a much cleaner, shorter bite, with less chewiness and elasticity," Nana emphasizes. "It's a pleasing eating experience that surprises consumer palates."

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Pectin brings benefits on the flavor side, too. Its clean release allows even the most subtle flavors to shine. Still, creating the perfect vegan gummy requires careful formulation, starting with ingredient selection.

Picking the perfect pectin

Most pectin suppliers offer a range of pectin choices, spanning both high methoxyl (HM) and low methoxyl (LM) options. Confectionery applications typically use HM pectins, which need a high solids content (greater than 60%) and a low pH (2.8-3.5) to form a gel. Most gummies already meet these requirements, enabling HM pectins to provide structure and create tantalizing textures.

LM pectins work a little differently, as they rely on calcium to form a gel. Perfect for non-acidic conditions, LM pectins are the choice for "neutral"-flavored confections. By playing with calcium content and its range of pectin reactivity, LM pectins can be used to create interesting textures – typically softer and chewier than those formed by HM pectins. LM pectins are also a good choice when incorporating better-for-you ingredients that are sensitive to acidic pH, such as inulin, into a gummy or chewy supplement.

Depending on their degree of esterification, HM pectins are classified as slow-set, medium-rapid-set and rapid-set. The higher the degree of esterification, the higher the setting temperature. This is important to keep in mind to avoid equipment obstructions – manufacturers don't want pectin to set too quickly and gum up depositing machinery. Other processing factors, such as the use of starch vs. reusable non-starch molds, and how quickly the gummies will be removed, can also influence pectin selection.

"Ultimately, to create the desired pectin-based product, it's important to consider the type of pectin, the time needed for pectin to set, the amount of solids and the pH," Nana summarizes. "Given all the variables, formulators are sometimes overwhelmed, but Cargill understands the complexity and can help brands quickly land on the best match."

Formulation tips

When working with pectin, Nana says creating a pectin pre-solution is a must. Start by dispersing pectin with other ingredients in the formula, such as sugar or dextrose, to separate pectin particles and prevent clumping. Next, add the dispersed pectin into ambient water under agitation in the pre-solution tank. Heat and hold for 15 to 20 minutes under agitation to solubilize and activate the pectin. Once this step is complete, the hot pectin solution is ready to add to the remainder of the recipe.

Chad Rieschl, a Principal Food Scientist with Cargill, offers some additional tips to streamline plant-based gummy production. "Formulators should be mindful of when acidic ingredients are added to the formula," he says. "HM pectins rely on pH to form gels and create the desired gummy texture – different than gelatin or carrageenan, which gel when heated." As a result, in pectin-based gummies, acidic ingredients should be added as close to depositing as possible.

Other considerations revolve around temperature and setting times. Gummies made with pectin offer much greater heat stability, but that also means they may require higher temperatures for depositing. Pectin gummies may also set faster than those based on gelatin, resulting in less drying and conditioning time.

"Pectins still make a great jelly, but they also do a lot more," Nana emphasizes. "For brands ready to enter the plant-based space, pectin is the key, enabling chewy confections and gummy supplements that deliver on consumers' sensory and label expectations."

Cargill experts can help you tap into pectin's plant-based appeal.