



## TODAY'S CONVENIENCE:

Next-gen solutions for meat analogues  
and convenience applications

Many people are becoming more discerning about the foods they eat, with a growing focus on products made from ingredients they know and understand.

However, it doesn't change the fact that all of us need to get dinner on the table for our families. And, after a full day of work, many of us are looking for solutions that are both nutritious and easy.

Enter those classic frozen dinners and convenience foods. According to data from Packaged Facts, 90% of consumers are still buying packaged frozen meals that they can quickly heat in the microwave or oven, and this number is up 15% from two years ago.<sup>1</sup> What's more, 55% of women still depend on convenience or frozen foods when preparing dinner, according to the National Frozen and Refrigerated Foods Association, NFRA.<sup>2</sup> But, at the same time, consumers are also looking for healthier ways to get more protein and vegetables in their diets, leading to a greater demand for nutritious convenience foods and plant-based meat substitutes that are no longer fringe products in the health food store. These healthier changes will have a big impact on the global frozen foods market, which is predicted to reach \$309.98 billion U.S. dollars by 2021, according to Orbis Research.<sup>3</sup> (The U.S. market is expected to make up more than \$60 billion of that market by 2021, with the largest share in frozen ready meals.<sup>4</sup>)

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**In the meat substitutes category alone, sales are expected to reach**

**\$4.63 billion  
in 2018**

**and could jump to as high as \$6.43 billion  
by 2023.<sup>5</sup>**

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This growth in frozen foods leaves product manufacturers with great opportunities, but also with a significant challenge: To help consumers feel good about the convenience products they purchase. A key way to do this is to swap out ingredients that are perceived negatively with those that are label-friendly, cost-effective and functional, creating the next generation of convenience foods. Fortunately, there are more label-friendly ingredients than ever to help cover the complex set of functions needed for applications like frozen meals and plant-based meat substitutes.

"It is really an exciting time across the categories, not just for starch-based ingredients, but also in lecithins, and even into the plant-based protein space," said Erin Radermacher, a technical service manager for the convenience products group at Cargill. "We are looking into these areas to see how we can build functionalities that are new to the market and don't even exist yet," she said.

To that end, Cargill recently introduced its SimPure™ portfolio of plant-derived ingredients from various botanical sources to address the consumer demand for label-friendly products, along with the greater process tolerance, shelf-life and storage stability needed for these complex applications. The range of ingredients has various functions, from moisture retention to providing texture and viscosity, so they can be used in a variety of applications, from bakery and cold dressings to soups, sauces and even meat analogues.

For example, the SimPure™ 99560 ingredient, derived from botanical sources, can be used to replace modified food starch in the entrée sauce for a frozen prepared meal. The ingredient can achieve the same texture, mouthfeel and shelf-life stability as conventional modified starch, and can also withstand up to 10 freeze-thaw cycles to perform on par with current modified starches.

The SimPure™ portfolio also includes ingredients that can re-create viscosity, texture and process tolerance. “The SimPure 99530 ingredient made from potato starch has excellent dispersibility, so it can be used in dry mixes like taco seasoning to distribute the seasoning and build viscosity and texture when heated,” said Radermacher. “It can also be used in meat and meat substitutes to improve yield, as it has good water retention.” Because the ingredient is replacing protein with water, it also represents a cost savings, she added.

SimPure™ functional native starches are also suitable in hot-fill applications such as in tomato sauces that are acidic, according to Radermacher. “If a starch can hold up to acid, that is a good thing,” she noted. “The 99570 and 99571 are both instant starches, and that means they can build viscosity without heat, so they work in cold processes and can be used in applications like salad dressings and vegan dressings. They are potato-based, so they build viscosity and a creamy mouthfeel, so you get that same simulated fat-like quality without using dairy,” she added.

## Re-creating meat

Meat analogues are an especially challenging category, according to Joe Purl, Senior Convenience Food Scientist at Cargill. “We know a lot of customers want to get into this [meat analogue] space, but it’s very new. We are trying to re-create the same mouthfeel of meat, which is very difficult. The challenge is, when you are making a meat analogue, you have to re-create the texture of meat – where you have muscle fibers, protein, fat and a solid structure. But with plant protein, you are usually starting with a powder, so it’s tough to incorporate that mouthfeel and retain the moisture and juiciness. Those are the challenges.”

Pea proteins are now a standard and useful plant-based option in this tricky category. But to determine which ingredients will work well does take a different mindset on the part of product formulators, the Cargill team noted. Customers need to really break things down, said Melissa Machen, a technical service manager in the plant proteins group for Cargill. “You need to look at the functionality of what you are taking out with meat,” she explained.

“You are taking out fat, protein, mouthfeel and moisture. So what building blocks do you need to bring back into the alternative product?”

Many meat analogues today are created using pea protein as a base, because it brings protein back into the formula to carry the water and it has a more neutral flavor than soy – so it can be used at higher levels without impacting product taste. “Pea protein also offers a good selling point for processors who want to get allergens off their label,” said Machen. Soy ingredients have dominated the meat analogues category, she added, but “many people want to get away from using a potential allergen such as soy so that makes pea protein a good substitute.”



Another critical step in developing label-friendly meat analogues is to understand the process, restrictions and capabilities that might be needed for the finished product. "Some require very high shear, or very high heat, other products need a moist heat. So to begin with, it helps if we understand these process requirements and can put a bubble around them so we can work within those capabilities," Purl said.

It is also critical to know how the product will be used by the consumer, noted Haley Smolinski of Cargill's food applications group. "Reheating a product could have an impact on texture," she explained, so, for example, some ingredients might work better for microwaving versus grilling.

The bottom line for label-friendly convenience and frozen applications, especially those with meat analogues without allergen warnings, is that the best approach is to have a good understanding of the product from start to finish, Radermacher reiterated. "How will the product be processed and ultimately under what conditions will the end consumer eat it? Will they eat it cold, will they microwave the product or heat it in the oven? All of these considerations play a role in the beginning stages and in which ingredients we select for the final product."

#### References

<sup>1</sup> Packaged Facts. Frozen Foods in the U.S.: Hot Meals, Sides and Snacks. 6th Edition. <https://www.packagedfacts.com/about/release.asp?id=4097>

<sup>2</sup> Dudlicek, J. "Five Ways to Boost Frozen Sales in 2017." Progressive Grocer. <https://progressivegrocer.com/5-ways-boost-frozen-sales-2017>

<sup>3</sup> Orbis Research. Frozen Foods Market Expected to Reach \$309.8 Billion by 2021. Industry Research Report. <https://www.reuters.com/brandfeatures/venture-capital/article?id=13943>

<sup>4</sup> Grand View Research. U.S. Frozen Food Market Analysis by Product and Segment Forecasts to 2024. September, 2016. <https://www.grandviewresearch.com/industry-analysis/us-frozen-food-market>

<sup>5</sup> Markets and Markets. "Meat Substitutes Market Worth \$6.43 Billion by 2023." <https://www.marketsandmarkets.com/PressReleases/meat-substitutes.asp>

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