



# Brave New Proteins

U of M researchers partner with industry in search of next-generation plant-based proteins.

By Kelli Billstein



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**W**hen people hear the word “protein,” many immediately think of conventional meat products: a juicy burger, succulent steak, or a beautifully roasted chicken. After all, these are the proteins we’ve always known as part of the classic food pyramid. But the protein nutrient has never come exclusively in a meat-shaped box—and today plant-based protein research continues to grow as more people adopt vegetarian, vegan, or flexitarian diets.

Today, plant proteins have definitely sprung into the mainstream food industry and consumer consciousness. The company that produces the Impossible Burger, a plant-based meat substitute, says 15,000 restaurants internationally now offer it (you can order one at your local Burger King).

And when Beyond Meat, another producer of plant-based meat substitutes, introduced its IPO, it nearly tripled in price on the first day.

“The trend has been increasing steeply toward plant-based food, and there are three main reasons for that,” says Baraem Ismail, associate professor in the U of M’s Department of Food Science and Nutrition. “First, the consumer is becoming more aware of the environmental impact of our current agriculture, utilization of animals, and its combined unsustainability for the growing population. Second, consumers are becoming more health-conscious, and they’ve figured out that plant-based food is healthier for them as they age. And third, consumers are becoming more concerned with animal welfare.”

Ismail, who’s conducted research at the University for the past 13 years, specializes in food chemistry, food analysis, and protein chemistry. Her focus has been on proteins (soy, whey, and now pea protein), studying how she can modify them to enhance both nutritional quality and functionality.

In 2015, Ismail took a sabbatical that would change how she approached her research. During that time, she did some consulting work for agribusiness giant Cargill Inc., helping to establish its protein research team. The experience was eye-opening.

“That year, I saw the world outside my lab,” Ismail says. “I was exposed to the needs of the industry, hearing from the private sector and their customers. I started to see how my research on proteins could benefit many stakeholders.”

In November 2018 Ismail launched, and is now the director of, the Plant Protein Innovation Center (PPIC) at the U of M, focusing on plant and alternative protein research. As the first center of its kind in the nation, PPIC brings together different departments and colleges across the U of M to fill knowledge gaps about plant protein while innovating for the future. PPIC also partners with industry; General Mills, Hershey, and Coca-Cola are supporting members. PPIC’s research ranges from breeding, genetics, and production in the field to marketing new plant-protein products, and everything in between.

“We’ve come a long way from those early soybean patties, but there’s still so much research to do,” says Michael Boland, (M.Ed. ’90) director at the U of M’s Food Industry Center, part of the Department of Applied Economics. His group studies how food reaches consumers and contributes to healthy lives. “There’s a growing consciousness around [plant proteins], and there’s more interest than ever before.”

Currently, PPIC researchers are experimenting with a cold-plasma technology that could make plant protein function better (read, less processing required) as it’s transformed into a new food product. Ismail’s group also received funding to study how protein from various legumes can be used to mimic the texture of chicken. The center is also researching the viability of pea proteins, the key protein in products like the Beyond Meat burger; exploring ways to minimize waste by finding uses for plant-source byproducts; and developing a new hemp plant hybrid that could produce a functional and nutritious protein source.