

food

Ann Yonetani: An Accidental Microbe Farmer

Learn how a passion for beneficial foods and microbiological diversity led this New York professor to begin selling a Japanese fermented staple in the United States.

By Hannah Chenoweth



From sushi to ramen, there are plenty of Japanese staples Americans have readily embraced. Natto, a superfood made from sticky fermented soybeans, isn't one of them ... yet. This didn't stop Dr. Ann Yonetani from launching NYrture Food (www.NYrture.com), one of the only sources of handmade natto in the United States. Today, her company is one of the only fresh sources around.

That isn't to say Yonetani (pictured right) set out to be a food entrepreneur; in fact, it's something she "didn't see coming in a million years." It's a tall order to introduce a new, slimy food to a country of slime-averse eaters, but natto is a food she fully believes in. It can be an acquired taste for some, but its health benefits are incredibly substantive, and the growing realization into natto's functionality was the impetus for Yonetani to fill a gap where she saw one.

Bacteria-Centric Beginnings

While growing up in Philadelphia, Pennsylvania, Yonetani was always interested in science. As the daughter of a biophysicist father, she was particularly fascinated in uncovering the "why" behind patterns that form in nature. It was a question she never tired of asking, and as she earned a bachelor's degree in biology, a master's degree in biochemistry, and a doctorate in microbiology, she spent nearly two decades passionately engaged in cell reproduction research.

Alongside microbiology, food was something Yonetani was "equally obsessed with." Her passions first collided when she became a professor at The New School in New York teaching classes on the intersection of food and science.

This was in 2008, during the takeoff of the fermentation craze. Ever the biology geek, it didn't escape Yonetani that mainly *Lactobacillus*-based ferments — kimchi, kombucha, etc. — were stealing the spotlight. Natto, which is fermented with the lesser-known *Bacillus subtilis*, was a perfect way to expose her students to the idea of greater microbial diversity, both in terms of food fermentation traditions and the gut microbiome it feeds.

Yonetani herself had become acquainted with the fermented soybeans of natto on childhood trips to visit relatives in Japan, where natto's a common, convenient, and protein-packed breakfast, comparable to yogurt. "Honestly, I don't remember



if it was love at first sight, or if I just ate it to be a polite guest," she says. "Very quickly, though, it was familiar to me as a beloved Japanese staple, often served on a bed of rice with a little soy sauce."

An Entrepreneurial Experiment

Yonetani believes there are a few reasons natto has remained virtually unknown in the U.S., despite the rising interest in fermented foods. For one, the supply is scarce. Most Americans have been limited to low-quality, frozen imports that may have been refrozen and thawed multiple times on their trip across the globe. This understandably pales in comparison to fresh, handmade versions (the difference between processed and artisanal cheese, for instance).

There's also the smell, which Yonetani admits has drawn various, er, *funky* comparisons (see: gym socks). The taste is also up for debate: It's been described as savory or umami-rich, slightly chalky, nutty with coffee-like notes, and a bit cheesy, all at once. Then, there's the uniquely slimy texture — perhaps natto's most polarizing trait.

Foods with a goeey or sticky texture are revered in Japan. There's even a Japanese word for it: *neba neba*, which means slippery or sticky in a good way. That mucilaginous mouthfeel is a positive quality associated with health in Japan, because "it's very organic-feeling," says Yonetani. But in Western diets — with the exception of okra, and even that's a stretch for many people — these *neba neba* foods are almost nowhere to be found.

"Whole soybeans are steamed to make natto, and the fermentation produces a 'special sauce' that coats the beans. This 'goo' is simply a bacterial biofilm that the probiotic cultures secrete in order to move through, communicate, and protect themselves," Yonetani explains. "We see this everywhere in nature, but Americans aren't used to seeing it in their food."

Though Yonetani had spent decades working in research labs, her exploration into natto-making was a different story altogether. Tinkering at first in her Manhattan apartment, and then in an incubator space for food startups, she doled out handmade batches of natto to her students and anyone who would try it. "There's only so much you can eat yourself," she says, "even as a natto lover." She was surprised by the number of people who were genuinely interested in trying it. Yonetani even went straight to the source, taking a trip to Tokyo to learn the ins and outs of the process from various experts, including a respected fifth-generation natto-maker.

Ultimately, however, it was her understanding of natto's true medicinal value that propelled her to launch NYrture Food in 2015. "The more I researched the health benefits of this unique food, the more I became amazed at the breadth and depth of clinical scientific evidence out there," she says. "What drove me was the fact that, in a culture where it's an unfamiliar option, people could truly benefit from being aware of and having access to natto's functional properties."

Natto and Nutrition

The small but mighty soybeans of natto pack an unrivaled nutritional punch: They're one of the only food sources of healthful *Bacillus* bacteria available. And, for those seeking a good source of vitamin K2, natto is by far one of the best options.

While most people know that vitamin K1 is responsible for beneficial blood clotting, the crucial duty of vitamin K2 — to bring calcium out of your bloodstream and deliver it to your bones — flies largely under the radar. According to Yonetani, this lack of information can be detrimental to people's health. Science has recently revealed that without sufficient vitamin K2, the calcium you eat can't find its way to your bones.

"When calcium accumulates, it can form deposits on the walls of your arteries. This is something you want to avoid, because it can lead to vessel blockages," Yonetani says. "After decades of encouraging people to up their intake of calcium supplements, many in the medical community are realizing that this may have inadvertently put millions at greater risk for heart disease because so much of the population doesn't get enough vitamin K2."

Natto is undisputedly the most concentrated food source of vitamin K2, specifically the form menaquinone-7 (MK-7). A vast body of research supports vitamin K2's preventative benefits for both osteoporosis and cardiovascular disease.

"Vitamin K2 is an essential nutrient that can only be made by bacteria, and thus is present in fermented foods, but most bacterial species other than *B. subtilis* produce very little of it. One tablespoon of sauerkraut contains around 0.4 micrograms of vitamin K2 (MK-7). By comparison, a tablespoon of natto contains about 160 to 170 micrograms. That's a whopping 400 times more," Yonetani says.

The nattokinase enzyme is yet another noteworthy star in this fermented Japanese staple's unique nutritional lineup. "This is a natural enzyme that's specifically produced by the bacterial fermentation in natto, and literally can't be found elsewhere. You can find this enzyme in pill form in any good health supplement store, yet one has to ask why more people aren't eating the nutritious food that it originally comes from," Yonetani says. "Nattokinase is a protein-degrading enzyme that has been shown to be particularly effective in disassembling fibrin, one of the main proteins that forms blood clots. So here we have another reason natto is incredibly beneficial for decreasing risk of stroke and heart disease."

Finally, no conversation about natto is complete without mentioning that *B. subtilis* is a sporulating bacteria. Translation: In times of stress, these bacteria form dormant cells called "spores" that are all but indestructible. Spores are resistant to all kinds of extreme environmental conditions, and can even survive for centuries without nutrition. To produce natto, soybeans are cooked at temperatures and



pressures that would be fatal to other microbes, but *B. subtilis* spores still work their magic.

Beyond the fact that these spores are just plain cool and will outlive us all (did I mention they survived in space?), they also provide meaningful health benefits. While many probiotic species are largely decimated by strong gastric acids and digestive enzymes as soon as they go through your digestive system, it's just another day in the life for the *B. subtilis* spores, which have little trouble surviving. This means they can make it to your gut, which is precisely where you want them to end up in order to replenish and build your microbiome population.

Yonetani believes that the recent explosion in fermented foods is due in part to the parallel rise of research into the microbiome. Just a decade or so ago, bacteria wasn't necessarily welcome in our food; now, as scientists uncover the need for a diverse and balanced microbiome, the tides have shifted.

According to Yonetani, these nutritional benefits may be more bioactive and bioavailable in their natural context — an argument to opt for food sources over supplements. When it comes to a live, teeming, probiotic food like natto, this is even more true. “The microbiome is made up of a diverse, enormous community of species; it's believed there are thousands of different species of bacteria in a healthy human gut, *B. subtilis* being one of them. So, if you simply eat lacto-fermented yogurt and call it a day, you're missing the health benefits that come from nurturing the gut microbiome as a whole,” she says. “The more species of fermenting microbes we can use, the more diversity we can take in, and the more we can build that diversity inside us and support different functions within the body.”

Keeping the Microbes Happy

Yonetani and her team are always experimenting with different ways to enjoy natto (which they share on their Instagram @NYrture), and she says the options are endless. It can be added to toast, rice crackers, savory soups, grilled cheese sandwiches, hummus, guacamole, or any number of dishes as a condiment. Sprinkling freshly grated Parmesan cheese on top is another of Yonetani's favorite recommendations.

Although she never thought she'd be a food entrepreneur, Yonetani says it's been an incredibly gratifying experience, especially as more and more people are becoming aware of natto and seeking it out. NYrture Food's products are now sold by roughly 60 retailers in 11 different states, and can also be ordered online.

“Ten years ago, I might have said that kimchi and kombucha would never reach the amazing levels of ubiquity they have. Not to say that natto will reach that level, but I'm so inspired that people are open to new, different things from other cultures, especially those that bring novel nutritive properties and real potential health benefits,” she says.

About two years ago, Yonetani moved NYrture Food from Queens to a production facility in Brooklyn, where her No. 1 goal is to create an environment that “keeps the microbes happy.” With a smile, she says, “I have to bring all the parts together, but it's the microbes that actually do all the magical, complicated work. That's why I call myself a microbe farmer.

“Fermentation is a real art, and sort of antithetical to how our food system works. It's biology, so it's not exactly the same way each time. But I think people are beginning to realize the value of quality, handmade, small-scale food production that pays attention to sustainable sourcing and environmental concerns. They're certainly valuing more natural resources to improve their well-being. And it doesn't get better than natto.” 🐾



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