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OSU researchers hope their eggs pass muster

By [Ben Sutherly](#)

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COLUMBUS | It may be the incredible, edible staple of a traditional Midwestern breakfast, but eggs have been hard for soldiers to stomach for decades.

Before 1980, when Meals-Ready-to-Eat (MREs) were first introduced, omelettes canned with ham gained infamy among the infantry for their rubbery texture and greenish appearance. More recently, in 1995, the Army stopped offering a ham and cheese omelette as part of MREs because of problems with its texture and flavor.

"It's very difficult to replicate that fresh egg into something that's a shelf-stable product," said Chief Warrant Officer Stephen Moody of the Army's Natick Soldier Center in Natick, Mass.

For the past 15 months, Ohio State University professors have worked with researchers in Natick and at other universities to develop an egg product that can withstand temperatures of 80 degrees for at least three years — and also pass muster with soldiers.

"In the past, they prepared the eggs using canning or thermal processing (heat treatment)," said V.M. "Bala" Balasubramaniam, an assistant professor of food safety and engineering at Ohio State. "Because of that, they produce unacceptable quality. The heat treatment destroys the quality of the eggs."

Balasubramaniam and Ahmed Yousef, an OSU microbiology professor, are trying a different approach. They pack the frozen egg product in a flexible container, preheat it, and lower it into a high-pressure chamber filled with hydraulic fluid. Inside the chamber, the egg product is subjected to 100,000 pounds of pressure per square inch and heated to 221 to 250 degrees for three to five minutes. Such high pressure kills microorganisms, while the heat kills spores that could spoil the egg.

Of the \$250,000 in research funding, \$80,000 is earmarked for Ohio State, Balasubramaniam said. The Illinois Institute of Technology and Washington State University also are participating in the project, as are Michael Foods, which is supplying the frozen egg product, and Avure Technologies, a Seattle-based manufacturer of high-pressure processing equipment.

Balasubramaniam said some of Ohio State's results were shipped to Natick earlier this year. There, the products were subjected to a "sensory panel" of food scientists, who test their texture, appearance, odor and flavor.

Statisticians then crunched numbers and gave the food an "acceptability rating" based on a nine-point scale.

Once a product appears to meet stringent shelf life requirements, it will be sent to soldiers in the field, who will fill out evaluation forms, said Moody, who heads up the advanced processes and packaging team at Natick.

"Everybody to a soldier tells me how much better MREs are today than they were 10 years ago," Moody said.

A diverse offering of meals has been key to improving the reputation of MREs.

Moody said at one time there were 12 different meals available to soldiers; now, there are 24. "That takes away a lot of the monotony."

Soldiers also are offered a much wider range of "whole muscle meats" than in the past, Moody said. And the Army is catering to soldiers with more ethnic and regional fare, even including well-known brands such as SlimJims, M&Ms or Skittles.

"It's amazing what that does for morale," Moody said.

Asked what seems to be the most popular MRE item, Moody said, "One thing that does come up recurringly is a jalapeno cheese spread. . . . Soldiers in Afghanistan have said . . . 'please don't take it out.' "

Balasubramaniam said more work lies ahead before eggs prepared with high pressure attain such hallowed status.

"It is better than the thermally processed product, but they want us to look at the gold standard, which is the freshly prepared eggs," he said. "This is going to take some more time before it's ready for the prime time."


In the meantime, soldiers next year will be offered a cheese omelette with vegetables in a thermal-processed laminate pouch, Moody said. But the hope is to eventually replace that item with one prepared using high-pressure methods.

"We're confident we're going to get a good breakfast product out of this," he said.

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