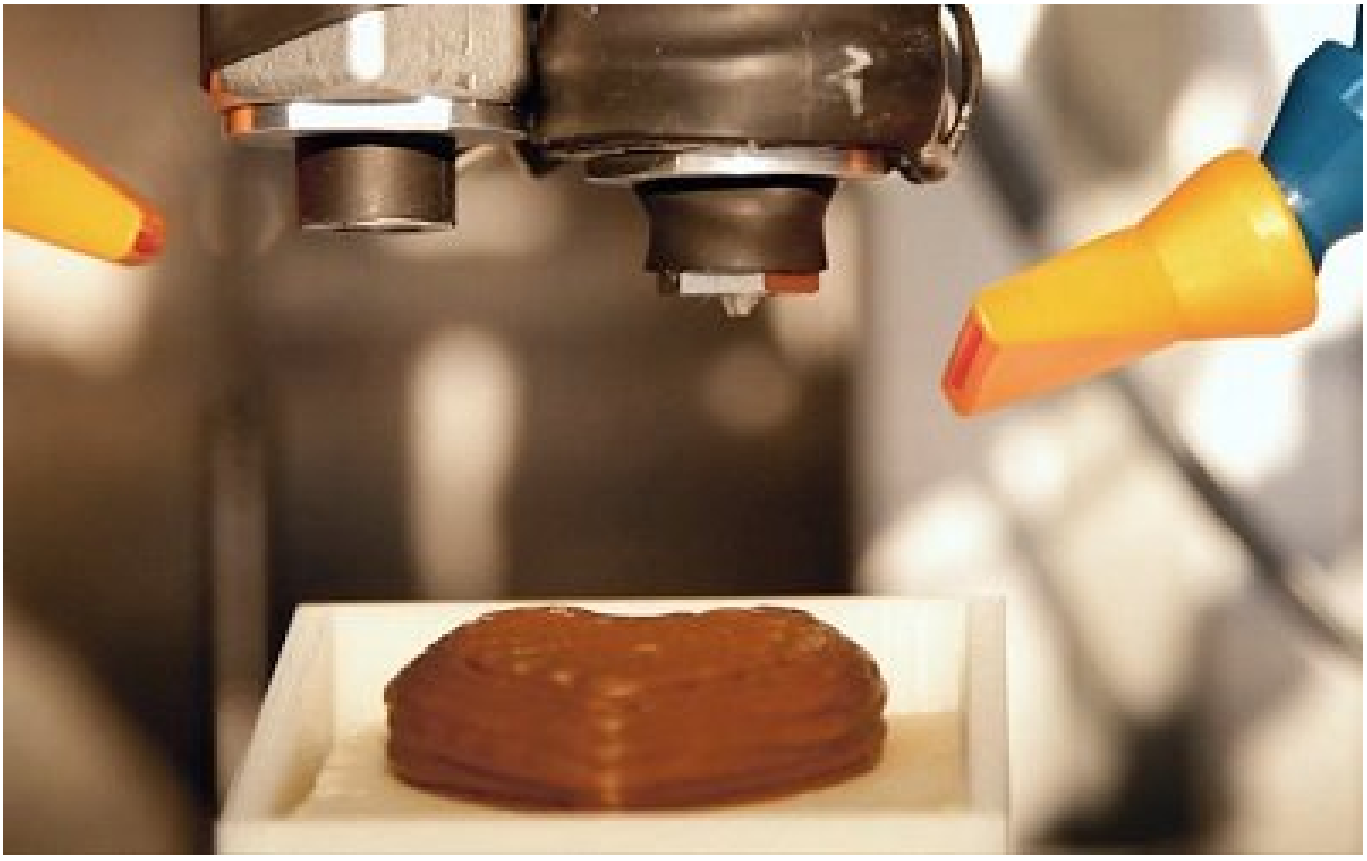
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3D printers to revolutionize food manufacturing in coming years: scientists

The use of 3D printers has the potential to revolutionize the way food is manufactured within the next 10 to 20 years, impacting everything from how military personnel get food on the battlefield to how long it takes to get a meal from the computer to you

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The use of 3D printers has the potential to revolutionize the way food is manufactured within the next 10 to 20 years, impacting everything from how military personnel get food on the battlefield to how long it takes to get a meal from the computer to your table, according to a symposium at IFT15: Where Science Feeds Innovation hosted by the Institute of Food Technologists (IFT) in Chicago on July 12.

The price of 3D printers has been steadily declining, from more than $500,000 in the 1980s to less than $1,000 today for a personal-sized device, making them increasingly available to consumers and manufacturers. Although they are not widely used in food manufacturing yet, that availability is fueling research into how they can be used to customize foods or speed delivery of food to consumers.

“No matter what field you are in, this technology will worm its way in,” said Hod Lipson, Ph.D., a professor of engineering at Columbia University and a co-author of the book Fabricated: The New World of 3D Printing. ”The technology is getting faster, cheaper and better by the minute. Food printing could be the killer app for 3D printing.”

Lipson, addressing the conference by video, said 3D printing is a good fit for the food industry because it allows manufacturers to bring complexity and variety to consumers at a low cost. Traditional manufacturing is built on mass production of the same item, but with a 3D printer, it takes as much time and money to produce a complex, customized product that appeals to one person as it does to make a simple, routine product that would be appealing to a large group.

For example, Lipson said, users could choose from a large online database of recipes, put a cartridge with the ingredients into their 3D printer at home, and it would create the dish just for that person. The user could customize it to include extra nutrients or replace one ingredient with another.

The U.S. military is just beginning to research similar uses for 3D food printing, but it would be

used on the battlefield instead of in the kitchen, said Mary Scerra, food technologist at the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) in Natick, Massachusetts. She said that by 2025 or 2030, the military envisions using 3D printing to customize meals for soldiers that taste good, are nutrient-dense, and could be tailored to a soldier's particular needs.

"Imagine warfighters in remote areas—one has muscle fatigue, one has been awake for a long period without rest, one lacks calories, one needs electrolytes, and one just wants a pizza," Scerra said. "Wouldn't it be interesting if they could just print and eat?"

She noted that there are still several hurdles to overcome, such as the cost of bringing the technology to remote areas, the logistics of making it work in those locations and, perhaps most importantly, making sure the food tastes good.

"If the meals aren't palatable, they won't be consumed," Scerra said. "It doesn't matter how nutritious they are."

Anshul Dubey, research and development senior manager at PepsiCo, said 3D printing already is having an impact within the company, even though it is not yet being used to make food. For example, consumer focus groups were shown 3D-printed plastic prototypes of different shaped and colored potato chips. He said using a prototype such as that, instead of just a picture, elicits a more accurate response from the focus group participants.

"Even though the future of food 3D printing looks far off, that doesn't mean it's not impacting the industry," he said.

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