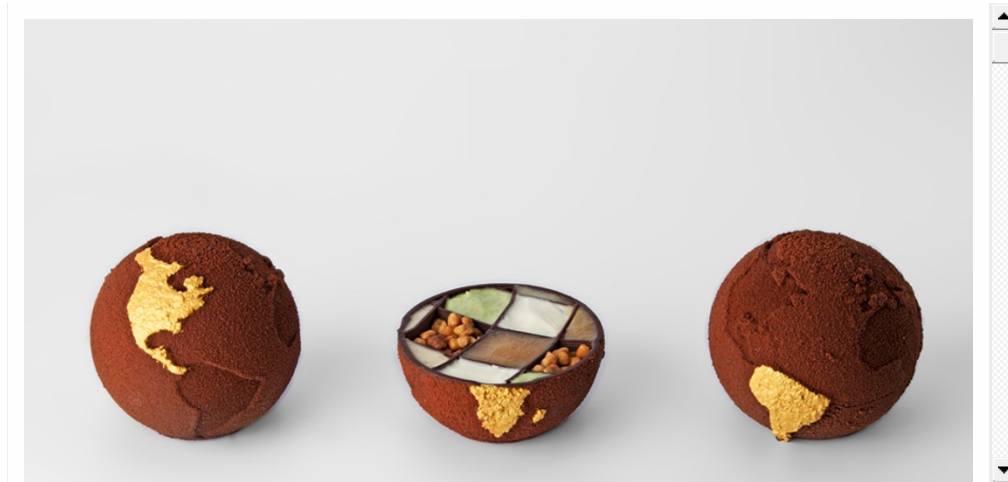


Foodies embrace 3D-printed cuisine

Printers unleash creative cookery, but will consumers bite?

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Marijn Roovers' epicurean delights have graced the tables of some of the Netherlands' finest restaurants. But the food designer's Chocolate Globe is his most intricate — and technologically advanced — creation. A chocolate shell just 0.8 millimetres thick is embossed in gold with the chocolate's continent of origin, and it holds delicacies that symbolize the region.

Roovers and chef Wouter van Laarhoven printed it — layer-by-layer of chocolate — on a 3D printer. Roovers is at the forefront of a small group of gourmets and technophiles who want to revolutionize how food is prepared. On 21 April, they will gather in the Netherlands for the first conference dedicated to the 3D printing of food.

Later this year, Natural Machines in Barcelona, Spain, will try to bring the technology into household kitchens when it begins selling Foodini, its 3D food printer aimed at consumers.

"There is a big debate in the 3D-printing world: will one day everybody have a 3D printer at home? Is it like a personal computer?" says Hod Lipson, an engineer at Cornell University in Ithaca, New York. "I think the answer is yes, but it's not going to print plastic. It's going to be a food printer."

Arts and crafts

Lipson, whose laboratory has been working with 3D printing for decades, says that it was not long before his students began to print frosting and chocolate. Most gourmets who have embraced the technology have focused, like Lipson and Roovers, on artistic and playful confectionery.

Others are developing the technology with an eye to health care. At TNO, the Netherlands organization for applied scientific research in Eindhoven, researchers are developing printing techniques that would allow consumers and hospitals to tailor nutritional content to individual needs, says project coordinator Pieter Debrauwer.

That would dovetail with the popularity of consumer electronics for collecting detailed health metrics, notes Lipson. He foresees a time when a person would be able to print a breakfast bar that provides nutrition customized to that person's allergies, activity level, age and health on that particular day.

But technology must improve before that can happen. 3D food printers tend to be slow. Roovers' chocolate globes, for example, currently take about an hour to print. To prepare one per guest in a restaurant with 40 patrons would take almost 2 days of continuous printing. "It's not very realistic," he says. "At the moment it's a way to show craftsmanship."

Then there is the matter of texture. Most 3D printers work with either pastes or powders, so the resulting food tends to be mushy, says Julian Sing, founder of 3DChef, a firm near Tilburg, Netherlands, that specializes in 3D printing of sugar. “The food needs to have the right texture,” he says. “It needs to look like food and not like slop.”

Technological tweaks

But there are signs of progress. Debrauwer says that his researchers have been playing with parameters such as the amount of air trapped in the food, the density of the food and the amount and length of fibre it contains to modify the texture. And Roovers says that he has had good experiences in printing cheese and strained yoghurt, which he praises for its firmness.

In the meantime, 3D-printing aficionados are already trading recipes on the Internet. Some are experimenting with unusual ingredients. Debrauwer says that his lab mates once gave him a wafer printed with protein harvested from ground-up insects. “It tasted quite good.”

Not everyone is so adventurous. Lipson says that for a time his lab experimented with creating foods using “those ingredients you don’t recognize on the back of a food label”. The results were interesting but strange, he says. A purple cube that tastes of broccoli may be delicious but pose a psychological barrier. “It’s edible,” he says, “but when you eat it you feel very uncomfortable.”

Roovers says that his globes tasted akin to aerated chocolate bars — a byproduct of printing the chocolate in 200 layers. He is not too worried about how customers will handle new textures and colours: they are accustomed to bright colours and odd shapes in cakes and confectionery, he says. Consumers do tend to be more conservative about savoury foods, but it need not always be that way. “People just need time to adapt to some changes in the way food is presented,” he says.

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