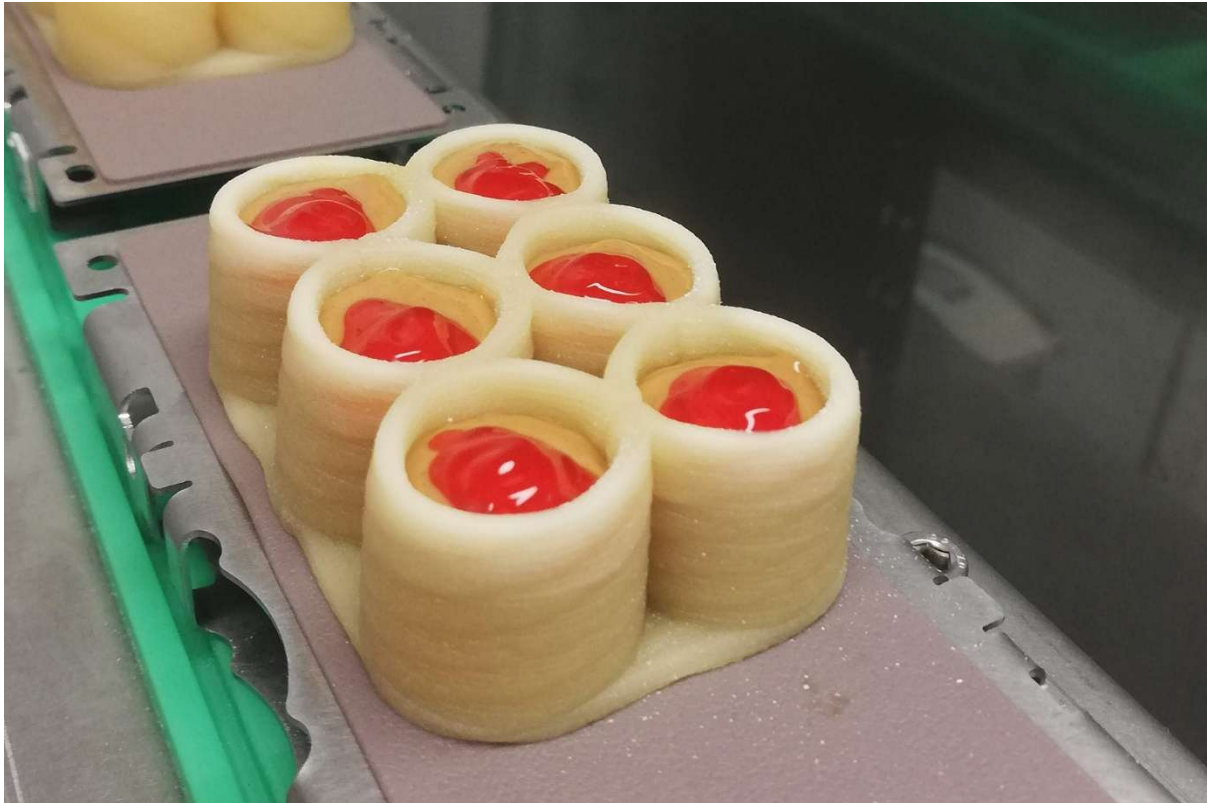


3D-Printed Nutrition to the Gram: Diet of the Future?



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FOOD DIGITALIZATION

Digitalization is penetrating deeper into healthcare—even onto the plate. How does digitalization positively contribute to the future of nutrition in healthcare? Gelderse Vallei Hospital conducted a pilot with 3D-printed nutrition, and the first results are promising.

3D-printed nutrition may sound futuristic, but this method of food production is closer than we think. “A good example is the ready-made pancake in the supermarket. That’s also printed,” says Femke Hoevenaars, senior researcher at the Netherlands Organization for Applied Scientific Research (TNO).

Printing works through extrusion. This means an ingredient, in this case batter, goes into a small press and comes out in an organized way. “The small holes you see in pancakes are from the print heads that press out the batter side by side. They’re real ingredients, digitally controlled.”

3D-printed nutrition at Gelderse Vallei hospital

Every body is different and needs different nutrients. Personalized nutrition can help patients live healthier lives or recover better and faster. Gelderse Vallei Hospital in Ede therefore conducted a ten-day pilot with 3D-printed nutrition among 87 patients. With a capacity of up to 25 products per day, a total of 137 products were made and distributed.

Hoevenaars recently presented the first results at the [International Nutrition Congress](#) in Paris. “We didn’t tell patients in advance that it was 3D-printed food. The goal wasn’t to measure effectiveness—what effect the product has on health—but to see to what extent people would accept this food. The reactions were mostly positive.”

Findings from healthcare professionals

The findings from healthcare staff were also included in the research, including dietitians, nurses, nutrition assistants, and chefs. Hoevenaars: “Overall, the concept of 3D-printed nutrition was well received. It was seen as a good alternative to existing nutrition. Healthy nutrition for the patient is paramount, and they see room to add such technologies.”

Max Melchers, who conducted the pilot as a physician-researcher at the hospital, also saw some reservations. “Dietitians in particular were skeptical, probably because effectiveness hasn’t yet been proven.”

3D-printing vs. traditional baking

The strength of 3D nutrition lies in its ability to personalize. You can adjust it per person based on taste, texture, and nutritional values such as minerals, carbohydrates, proteins, sugars, and fibers. Melchers: “We enter all the data into the computer, and a few hours later the product is delivered to someone’s bedside. The advantage is that you can personalize nutrition—down to the gram.”

Such individual ‘wishes’ are more difficult with traditional methods. Food is often produced in large quantities, so a small adjustment would require changing the entire production chain.

Benefits for patients with chewing and swallowing problems

Although effectiveness still needs to be proven, Melchers sees a future for people who can’t eat everything easily. “It’s interesting that you can possibly adjust the texture of such a product. For example, people with chewing and swallowing problems could benefit.”

Hoevenaars mentions the Dutch company Gastronology, which works for this group. “They print, for example, broccoli that looks like broccoli, but in purée form.”

She adds: “In the hospital, there are people with various conditions. With 3D printing, you can offer nutrition that fits the specific recovery process. When it comes to strengthening products in healthcare, patients often get drinks. But some people prefer to chew on something.”

3D-printed nutrition in the future

The pilot at Gelderse Vallei has shown that patients accept 3D-printed nutrition, offering perspective for follow-up. 3D printing personalized nutrition is applicable beyond hospitals. “Generally, people don’t stay long in the hospital. It’s interesting to look further—think of rehabilitation centers and nursing homes, where people spend more time,” says Melchers.

Hoevenaars and Melchers emphasize the importance of further research into the impact of 3D-printed nutrition on health and patient recovery. Hoevenaars: “We’d like to conduct an effectiveness study to show that the nutritional advice we now provide actually has positive health effects.”