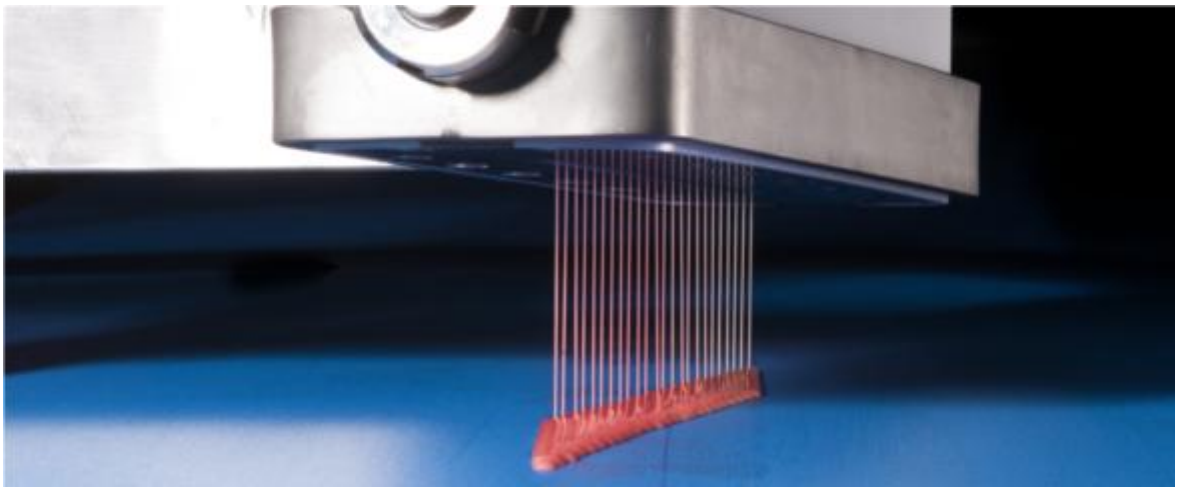
Horizon
The EU Research & Innovation Magazine

European Commission



Transforming mealtimes with 3D-printed food

Researchers are working to revolutionise mealtimes for elderly people with swallowing problems – by 3D-printing their food.

07 April 2014 - By DAMIEN PEARSE

The 3D printer will be able to create easily digestible food, which not only maintains the shape and taste of the real thing, but can also be fortified with specific nutrients.

Studies suggest that more than one in five people over the age of 50 have problems swallowing their food – a condition known as dysphagia. Those with this problem have difficulties eating because the larynx fails to close properly during swallowing, so that food ends up in the lungs instead of the stomach.

Sometimes, this can happen silently without any sign that food has gone into the lungs. This can lead to serious health complications, such as a type of pneumonia and renal failure, sometimes resulting in death.

In nursing homes, it is estimated that up to 60 % of people suffer from the condition. People are often fed 'porridge-like food' which has been pureed and mixed together from a variety of ingredients, said Matthias Kück, the chief executive of Biozoon Food Innovations in Germany, who is coordinating the EU-funded PERFORMANCE project.

'This can feel frustrating – especially when the plates of fellow residents are filled with chicken fillets and vegetables,' Kück said. 'Meals are the most important social event in a nursing home – it is when they meet together, for breakfast, lunch or dinner.'

Scientists at Biozoon have already helped to cater for those with swallowing problems by reconstructing food items into a more digestible form. For example, a chicken fillet will be cooked, pureed and strained and the liquid then used to produce a jellified portion of chicken that can be safely digested.

However, at the moment these foods are hand made by a chef and this is quite time-consuming and available only to a limited number of people. The three-year PERFORMANCE project hopes to have developed 3D food printer technology and specialised texturing systems by the time it finishes in 2015 that can make safe, appetising meals available to many more people.

Kück expects that elderly residents will be able to choose from different menus each week and the meals will be prepared in a processing plant before delivery. It is hoped that the new technology will also mean that food can be personalised, adding specific vitamins or nutrients – for example folic acid – as required by residents.

'If you have people who don't want vegetables, you might fortify the meat with certain vitamins – there really are no restrictions in terms of what food can be recreated,' he said.

Jets of liquefied food

The 3D printer will work in the same way as a conventional inkjet device – except the cartridges are filled with liquefied food, instead of ink.

Two dimensional food printers are already widely in use, for example they might produce the decorations on the tops of cakes, or spread the tomato layer evenly on a pizza.

The 3D model takes the technology a step further. Instead of having separate cartridges for black ink and for colour, the printer will have cartridges filled with liquefied food – one for vegetables, one for meat and one for carbohydrates.

The printer will create the first layer of the food, for example, the two-dimensional form of a chicken wing, with liquid from the meat cartridge and shaped by 48 nozzles in the printer head.

A gelation agent, which is currently being developed, will be added to the liquid in the cartridges, so that the food sticks together. Eventually, after many layers have been printed, the finished product emerges: the jellified chicken wing – or any other type of food such as carrots or pudding.

'The result is that when you bite on the reconstructed food, it is very soft – it melts in your mouth,' Kück said.

Europe's ageing society

More than one in five Europeans will be aged 65 and over by 2025, and the EU is working to keep elderly people healthier for longer. It plans to increase the average healthy lifespan of Europeans by two years by 2020.

Within this period, the EU will spend over EUR 7 billion to tackle health, demographic change and wellbeing, which includes dealing with the challenges of ageing societies, under Horizon 2020, the EU's nearly EUR 80 billion research funding programme.

As well as improving the health of elderly people, the EU wants to ensure health and social care systems are sustainable and efficient in the long term, and enhance the competitiveness of European industry so it can serve elderly people better.

More info

Biozoon

PERFORMANCE