Medical Xpress

3-D food printing to the rescue of gastronomy for seniors with chewing or swallowing problems

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Credit: Ross Pollack

In Europe, the population is ageing. In 2010, about 17% of the population were 65 or older. This number is projected to increase to 30% of the population by 2060. New services are already available to meet their needs. These range from technologies enabling elderly people to live independently to medications, or even diets, adapted to this age group. As part of the EU-funded project PERFORMANCE, due to be completed in 2015, a research consortium is now developing an industrial process for producing personalised food for frail, elderly people, to improve their quality of life.

The trouble is that old people are susceptible to malnutrition. This is particularly true for those having problems to chew or to swallow. In nursing homes, about one fifth of the residents need a special diet, says Matthias Kück, project coordinator and CEO of a food company called Biozoon. "These people often receive unattractive, porridge-like food, seven days a week," Kück tells CommNet. But "meals are socially important for elderly people," he adds. The project partners therefore want to prepare "food in such a way, that these people are able to eat safely and even enjoy their meals," he says. The consortium also works on other aspects of the food supply chain such as packaging and delivery.

A number of residential homes for the elderly in Germany already apply the so-called smooth food concept. "Large industrial food producers mainly use egg or starch to solidify their strained food. But this food all tastes the same," Kück says. To keep the meal tasty and visually appealing, the researchers apply a heat-stable, plant-based solidifying agent. The chef can reshape this smoothened food with the help of silicon moulds. However, "this approach is not suitable for large canteens or catering services," Kück points out. "We therefore apply 3D printing technology to industrialise the manufacturing process," explains Sandra Forstner, project manager at Biozoon.

3D printing offers various advantages, according to Forstner. Printing the food layer by layer allows creating various forms. Moreover, the manufacturers can enrich the meals with proteins, vitamins or certain minerals. "Thus, we can personalise the food, for example in terms of caloric content or serving size to avoid malnutrition," Forstner says. Currently, the project researchers are trying to find out how to make different types of food such as meat or vegetables printable. A prototype of the food printer shall be available at the end of the project. There will also be studies in two nursing homes to test whether elderly people find such food acceptable.

An expert agrees that the growing number of frail elderly needs a specialised diet. "The issue of nutrition is crucial and malnutrition is a large problem", says Giovanni Lamura, senior researcher at the National Institute of Health and Science on Aging in Ancona, Italy. Lamura considers the project's approach as useful as far as special food products for residential homes or home care services are concerned. He also regards 3D printing as advancement if it "can help to reduce costs", he tells CommNet.

Another expert agree. The project's approach is "very interesting", comments Herman Peppelenbos, project manager at Wageningen UR Food and Biobased Research in the Netherlands. "Particularly if you are able to make the food tasty and nutritional," he adds. "In theory, using 3D printing you can have more variation in texture," he tells CommNet. In his view, this is a huge advantage compared to either chopping the foods in tiny bits or using a blender. However, Peppelenbos emphasises that it is important to consider issues of food safety throughout the supply chain.

Whether elderly people would accept the new food is another critical issue. Thus, "acceptance studies need to be planned carefully," points out Dorothee Volkert, professor for clinical nutrition in the elderly at the Friedrich-Alexander University Erlangen-Nuremberg, Germany. In her view, the challenge is not only to make the food tasty and appealing. "The product development also needs to be guided by the preferences of the elderly for more traditional meals," she says. However, she concludes, most people are happy "if they are able to eat again in the first place."

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