Ring-shaped container for better canned food

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Credit: Nofima

Canning is a sustainable way of storing food, but the method requires a lot of energy and water and can affect food quality. A newly developed can with a different shape may be the solution that makes canned food of the future more attractive.

The can looks like a regular can with a hole in the center. The new shape means it can be heated from both the outside and the inside to provide better food quality and use less energy. Therefore, manufacturers will be able to save time and electricity costs and sell a better product to consumers.

Hermetically sealed innovations

"The hermetically sealed can is old technology, but it is very environmentally friendly. The metal is 100 percent recyclable, in contrast to many of the alternatives," says Skipnes.

In order to kill bacteria, the metal cans are heated in a pressure cooker (autoclave) before being sent out to the shops. One challenge regarding round metal cans is that it takes some time before the food in the core of the can reaches a temperature high enough to guarantee food safety, since the heat penetrates from the outside and moves inward toward the coldest area. The food at the outermost parts of the can is exposed to heat loads for longer periods than it actually needs. Therefore, quality loss can occur, or the product may even get burned.

Scientists are trying to do something about this. In a European research project, they are investigating a totally new hermetically sealed can concept.

The idea first came from Turkish scientists: What if we could heat the food not only from the outside of the can, but also from the inside? The scientists started working on mathematical models and simulations of heat transfer rates in cans with a hole in the middle—called toroids. The simulations were promising, and the scientists developed prototypes to undergo trials with different types of food.

The advantages of a hole in the middle

The first prototype was custom-made for pineapple rings and was tested under the direction of Professor Ferruh Erdogdu of Ankara University, Turkey. This year, the can has undergone further testing. Scientist Bart van Droogenbroeck at the Belgian research institute ILVO developed new toroid can prototypes in several sizes, and has conducted experiments including potatoes, black salsify, tomato based mushroom sauce and tomato soup with vegetables. During the experiments, the prototypes were tested alongside regular cans in order to compare the results.

"The toroid cans produced the best results when used to contain purées, sauces and soups. These were heated up much quicker, almost twice as fast," says Van Droogenbroeck.

There was less of a difference regarding the samples of canned vegetable chunks. The new can still heated up faster, but not as much. Studies on food quality are now taking place.

"Common to all products was that the color and appearance of the food in the toroid cans improved. The effect also depends on the recipe of the food product in the can," says Van Droogenbroeck.

Shaking is next in line

At Nofima in Norway, the new cans will be tested in a pressure cooker where they are shaken at the same time as they are heated up. This is to see if the heating time can be further reduced and preserve as much quality as possible of the food product.

"Through international cooperation, we can share perspectives and experience, and benefit from each other's skills and equipment. In this way, we can conduct investigations that we wouldn't have been able to manage on our own," says Skipnes.

The scientists are collaborating in the EU-funded research project InProVe, whose goal is to contribute to a more sustainable utilization of raw materials in the potato and vegetable industry.

"The sale of canned food on a worldwide basis is still huge. If we can get even more taste and nourishment in this food with the toroid can, it will be a great step forward for both the food industry and consumers," says Skipnes.

The scientists believe there is every reason to be optimistic about the future of canning.

"In terms of food safety in a world of explosive population growth, this method of preserving food is absolutely something to pursue," says Skipnes.

More information: For more information, see inproveproject.eu

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