

## Less food waste thanks to innovative sensor systems – The ILT.NRW opens up new ways for more durability

How can the individual spoilage of products be determined and food waste be counteracted? The aim of the smartFoodTechnologyOWL initiative – an innovation alliance of the German technical university Technische Hochschule Ostwestfalen-Lippe – is to explore this. With the help of innovative sensor technology, the researchers want to determine the kinetics of change in food in order to derive more precise statements about the "best-before" date.



The teams led by Prof. Volker Lohweg (left), Prof. Hans-Jürgen Danneel (centre) and Prof. Helene Dörksen (second from right) are dedicated to identifying volatile organic compounds that allow conclusions to be drawn on shelf life. (Photo: © ILT.NRW)

### Focus on individual product shelf life

Every year almost 13 million tonnes of food ends up in the waste bin in Germany. As complex as the causes are: It is certain that consumers in this country dispose of their food too quickly. In around 58 percent of cases, the "best-before" date is the main reason for food waste, as the German Federal Ministry of Food and Agriculture (BME) states in its 2019 nutrition report.

"Batch or product-specific shelf life specifications cannot be implemented yet with the methods used in industrial practice today, because they involve prolonged storage tests," confirms Prof. Hans-Jürgen Danneel. At the Institute of Food Technology.NRW (ILT.NRW), researchers are therefore focusing on the identification and determination of volatile organic compounds which, as spoilage indicators, allow conclusions to be drawn on shelf life at a very early stage. When choosing the test object, the Lemgo researchers opted for a ready-made pizza. "In the case of convenience products with complex recipes, like those typical for pizza, each raw material spoils differently. This gives us significantly more starting points for our measurements and a broad database," explains Daniel Pauli, research assistant in Hans-Jürgen Danneel's team, in answer to the the question of why.

## New methods for data analysis

Danneel and his team are supported in their work by the Institute for Industrial Information Technology (inIT), which is headed by Prof. Volker Lohweg. The focus here is on methods for data analysis of product properties. "Data analysis is a powerful tool for gaining knowledge and creates an enormous potential for improvements in the production process, product optimisation and troubleshooting," says Paul Wunderlich, a member of the Mathematics and Authentication research area headed by Prof. Helene Dörksen at inIT.

"Spoilage is such a complex process that it is not enough just to recognise the individual factors," adds Stephanie Wisser, a member of the Image Processing and Pattern Recognition and Sensor and Information Fusion working group of Prof. Lohweg. The applied mathematician develops the models that are later to generate various parameters and valuable, coherent information from the individual data – and thus enable a more accurate prediction of the "best-before" date. Until then, there is still a lot of work to be done by the scientists. They have identified ethanol and acetic acid as the first candidates for a reliable spoilage indicator.

## Real-time quality control

But the project partners have not only set their sights on predicting durability, for: "If smart sensors are used that provide comprehensive results on the condition of each individual product, food producers can also optimise their quality control processes," says Prof. Volker Lohweg. The use of real-time data in production makes it possible to react to changes in the process at any time and achieve the desired product quality. "With the two institutes, we have combined unique expertise at the Lemgo Innovation Campus to develop technologies that enable food manufacturers to meet the future demands of the market," says Lohweg.

## An alliance for innovations

The impulse project "Data Analysis and Autonomous Prognosis for the Improvement of Transparency and Safety of Food" launched in April 2019 is a sub-initiative of the network association smartFoodTechnology OWL - an innovation alliance of the Technische Hochschule Ostwestfalen-Lippe. Together with around 40 small and large regional partners from industry, trade, commerce and other research institutions, the Technische Hochschule Ostwestfalen-Lippe works on innovative products and technologies for the food industry.

By bringing together industry 4.0 competencies and food technology know-how, a competence centre on the topic of "Where Food Meets IT" is being created at the Lemgo Innovation Campus. smartFoodTechnology OWL sees itself as a learning network that is open to additional partners. The long-term aim is to improve energy and resource efficiency, optimise the use of raw materials and meet new consumer demands for the individualisation of food. The initiative is supported by the Federal Ministry of Education and Research (BMBF) through the programme "Research at Technical Colleges: Technical College Incentive".

## Additional information and contact

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