Precise project announcement

A freshness sensor for meat and fish

It will soon be possible to determine the exact shelf life of meat and fish with a sensor, saving tons of food from being thrown away prematurely. A consortium of researchers in the German-Danish border region is working on a sensor of this kind for a wide library of fish and meat types.

Existing test for spoilage leads to tons of unnecessary waste

Spoilage of meat and fish is a major waste problem. Until today, the expiration date is estimated and checked by trained personnel with their noses, because there is no technical solution to determine the shelf life accurately.

In our border region alone, meat/fish waste is estimated at 48,000 tons annually due to shelf-life uncertainty. A new project aims to remedy this situation with a sensor capable of measuring the cadaverine produced as an indicator of spoilage. The consortium has developed an electronic nose that can predict the expiration date of specific meat types. PRECISE will expand the addressed meat/fish types library and integrate it into an intelligent algorithm to determine PRECISE expiration dates.

A sensor that reacts to cadaverine

Each type of meat and fish has a characteristic emission of cadaverine that increases over time. Cadaverine is formed when protein molecules oxidize, contributing to a repulsive odour. However, from the very first day of slaughter, the emission of cadaverine already begins. At that time, humans are unaware of it, and it is safe to consume. Above a certain level, consumption is no longer secure, so it is essential to determine this point as precisely as possible and in an objectively traceable way.

The sensor is based on a probe that vibrates and is covered with molecules to which the cadaverine can bind. Depending on the amount of cadaverine, the resonant frequency of the probe changes and this can be measured. The whole device can be easily held and operated with one hand.

Experienced partners on both sides of the border

The project is led by partner SDU NanoSYD in Sønderborg. NanoSYD contributes with its experience with sensor development. Fraunhofer ISIT in Itzehoe specializes in microelectromechanical components and is unique in Europe. They will produce the piezoelectric cantilevers that the project needs. The Danish startup company AmiNIC will contribute with their experience in prototyping and adapting the hardware of their current device to the new sensor. Furthermore, the KIN in Neumünster is part of the consortium; food safety is a core competence of the KIN, and they will provide quality control of the measurements with references and safety checks. The Flensburg University of Applied Sciences contributes to measuring the bacterial load of fish products against cadaverine measurements. Finally, the University of Applied Sciences Lübeck will contribute with an algorithm to generate predictions based on the acquired databases.

The sensor to be developed has the potential to save an estimated of 25,000 tons of meat per year from waste in the border region.

This project is funded by the European Regional Development Fund, Interreg Deutschland Danmark, with a total of 1.8 million euros. The project will start in April 2023 and run for three years. The project will be

presented to the public in Sønderborg on April 28, 2023. Interested parties can register here: https://event.sdu.dk/precise
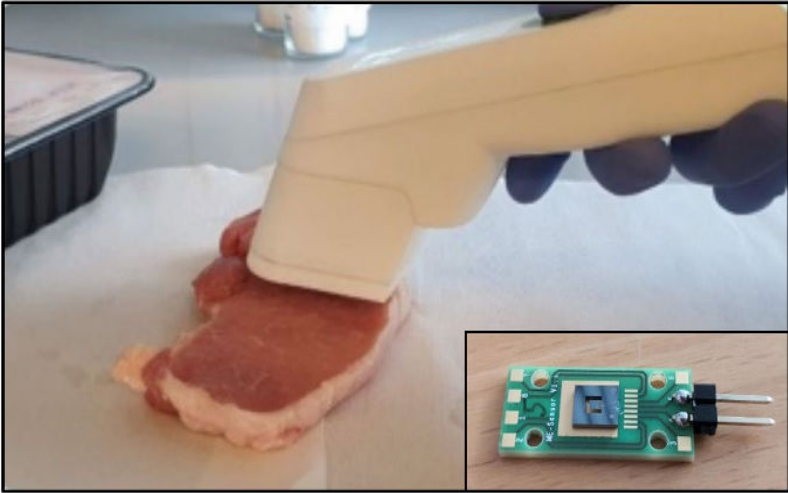
The sensor as a prototype with an electronic nose.