

Laser makes sure food is fresh

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Minced meat, bread, fruit juice and many other foods are packaged in a protective gas which extends their shelf life. There is currently no good method to check whether the packaging has the correct gas content. However, researchers in Atomic Physics and Packaging Logistics have developed a new laser instrument which could solve the problem. The first product is expected to be ready for market launch later in the autumn.

"It will be the first non-destructive method. This means that [measurements](#) can be taken in closed [packaging](#) and the [gas composition](#) over time can be checked. This will make it possible to check a much higher number of products than at present", says Märta Lewander, Doctor of [Atomic Physics](#) at Lund University in Sweden.

Dr Lewander developed the technique in her thesis and now works as chief technical officer for the company Gasporox, which is commercialising the technology.

Today, spot checks are performed on individual samples, with the risk that damaged products could slip through.

"We hope that, in the long term, this type of equipment could also help to stop people throwing so much food away, because they would know that it is packaged as it should be", she says.

The product that will be launched in the autumn could be used to check and improve how airtight packaging is.

Gasporox estimates that within two years the method could also be used as a means of quality control in production when products are packaged. In the future, shops could also use it to check the [shelf life](#) of their goods.

No plastic packaging is 100% airtight. How easily oxygen can enter depends on both the material and how well sealed the packaging is.

"It has been shown that part-baked bread, for example, doesn't always meet the mark", says Annika Olsson, Professor of Packaging Logistics at Lund University.

The technology can measure through almost all packaging materials.

"As long as light can pass through then we can measure. Almost all materials allow at least some light to pass. Even packaging that contains aluminium foil, for example some [fruit juice](#) cartons, often has some part that is not covered by the foil", says Märta Lewander.

At Lund University, research in the field is continuing. Patrik Lundin, a doctoral student in Atomic Physics, is now focusing on measuring carbon dioxide in packaging.

"It is important to measure both oxygen and carbon dioxide. Oxygen is most important, but there is also interest in carbon dioxide from the industry", says Märta Lewander.

The development work has been financed by several research grants from bodies including Vinnova and by private entrepreneurs and investors. The product that is being developed by Gasporox is manufactured by a part-owner of the company, the Norwegian company Norsk Elektro Optikk.

How the technology works:

The protective atmosphere that surrounds the food product in the packaging usually comprises [carbon dioxide](#) or nitrogen and contains little or no oxygen. Oxygen leads to oxidisation, bacteria growth and decay.

By shining a laser beam into the packaging and studying the light that comes back, it is possible to see if the composition of the gas is correct. The laser beam measures the amount of oxygen.

The laser is connected to a handheld unit which is held against the sample. A handheld detector measures the light that comes out of the packaging and sends a signal to a computer.

The technology is based on a technique for measuring the gas composition of samples containing cavities. An early application was to diagnose sinusitis, by enabling doctors at a primary health centre to find out whether the sinuses were full of gas as they should be. Clinical studies have confirmed that the technique works, and this application is expected to be on the market within a year or two.

Background:

The idea of using lasers to measure food packaging came about by chance, when Sune Svanberg, Professor of Atomic Physics at Lund University and the father of this laser technology, met Annika Olsson, then a Reader in Packaging [Logistics](#), on a management course at Lund University a few years ago. When they told one another what they worked with, they began to brainstorm possible areas of collaboration. At the time, there was a fierce debate going on in Sweden on the repackaging of minced meat by a major supermarket chain.

Provided by Lund University

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