

German Meat-Tracking Project Focuses on Lasers and RFID

A group of university researchers are developing a system designed to ensure the freshness of meat distributed throughout the supply chain.

By Rhea Wessel

Jan. 2, 2007—A few months ago, Germans were horrified when government authorities announced they had uncovered 110 tons of rotten meat at several wholesale warehouses in Bavaria. Some of this meat was more than four years out of date, and may have been exported to other European Union countries. The manager for one of the involved wholesalers hung himself as the scandal received widened coverage.

However, an RFID project funded by the federal government in Germany may help eliminate future abuses of this kind. Not long before the news erupted, five research institutes launched a project to develop an RFID-based system using laser beams to recognize and record meat freshness.

The FreshScan project, funded with €3 million from the Federal Ministry for Education and Research (BMBF), is being coordinated by the Fraunhofer Institute for Reliability and Micro-integration (IZM) in Berlin, which focuses on assembly and packaging technologies. No commercial partners are participating at the current time.

Established in mid-2006, the three-year project FreshScan project is still in the conceptual phase. The participants are developing a two-component system. The first part consists of a semi-active RFID tag with temperature sensors to document the condition of meat, from slaughter to sale, and record temperatures on a continual basis. The second is an RFID reader integrated with an optical detector—a device utilizing a laser to analyze and record the meat's condition in the tag. "The reader measures the light spectrum in which chemical changes can be detected," says Rolf Thomasius, an IZM researcher involved in the project.

Other partners consist of the Ferdinand-Braun-Institut für Hochfrequenztechnik (FBH), which is developing the optical detector; the Federal Research Center for Nutrition and Food (BfEL), which is defining those chemicals and positions in the radio spectrum that should be monitored by the system; the Leibniz Institute for Agricultural Engineering Potsdam-Bornim (ATB), which is determining how best to read the signals and define the freshness parameters; and the Technical University of Berlin (TU), which is designing the software needed to run the device. In addition, two professors are studying the chemical makeup of meat samples as they age. Fraunhofer's IZM is coordinating the results of the research conducted by these partners, and is building a demonstration model.

To determine the meat's freshness, the system will use technology often found in telescopes or satellites. One potential technology researchers are testing is Raman spectroscopy. This involves pointing a laser beam at the meat and measuring the beam's absorption and reflection, which change as the meat's chemical properties (i.e., the freshness) change.

The processing site will tag the meat's packaging, and the sensor on the RFID tag will measure temperature, moisture and light incidence at different intervals, recording this information on the tag. This mobile "freshness scanner" will be used at different points to determine the meat's condition.

No vendors have yet been chosen for the project, and standards remain unclear at present. However, Thomasius says the tags used are likely to be 13.56 MHz and comply with an ISO standard. Additionally, the designers are working out the type of power on which the tags should rely. When the project is finished, the demonstration model will still need some more development before it can be brought to market.

RELATED_ARTICLES "Our goal is to create a very close prototype at the end product, so that we can launch the system shortly after the research project ends," he says.

According to Thomasius, one focus of the project is to create a tag that is smaller and thinner than 2 millimeters and can last at least one year so it can be reused. Since the project is noncommercial at this point, researchers are not focusing on the cost of the components.

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