Sensor detects spoilage of food

May 6 2015, by Olli Ernvall

VTT has developed a sensor that detects ethanol in the headspace of a food package. Ethanol is formed as a result of food spoilage. The sensor signal is wirelessly readable, for instance, by a mobile phone. VTT Technical Research Centre of Finland Ltd is searching for a partner so as to commercialise the sensor.

The sensor monitors ethanol emitted from the spoilage of foods into the headspace of a package. Ethanol, in addition to carbon dioxide, was found to be the main volatile spoilage metabolite in fresh-cut fruit. The information given by the sensor is transmitted from the package to the customer by means of a reader, and the data is saved digitally in a remote server.

This ethanol sensor can have potential in other applications, such as in alcometers.

The sensor layer is part of a radio-frequency identification (RFID) tag, and the sensor data can be read wirelessly using an RFID reader in, for example, a smartphone. The sensor transmits information about the freshness of the food in the package to the retailer or customer. The freshness data can be stored in real time in the cloud, enabling the comparison of food quality with its previous or later condition.

A similar optical readout based on the colour change of the ethanol sensor was also developed for a smart-phone.

The sensor and the RFID tag can using printing techniques be

manufactured into a label or sticker and easily attached to a food package. The price of the sensor will then be low enough for use in food packages.

Using the sensor, it will be possible to control the food quality throughout the distribution chain and to prevent waste caused by spoilage. More than 100 tonnes of food products end up in waste annually (estimation 2014) in Europe, and the amount will rise to 126 million tonnes in the year 2020 if nothing changes.

The sensor is developed in the European project SusFoFlex Smart and sustainable food packaging utilizing flexible printed intelligence and materials technologies, EU 7th Framework Programme Agreement No 289829. The invention is currently in the process of being patented.

Provided by VTT Technical Research Centre of Finland