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Microwave technology

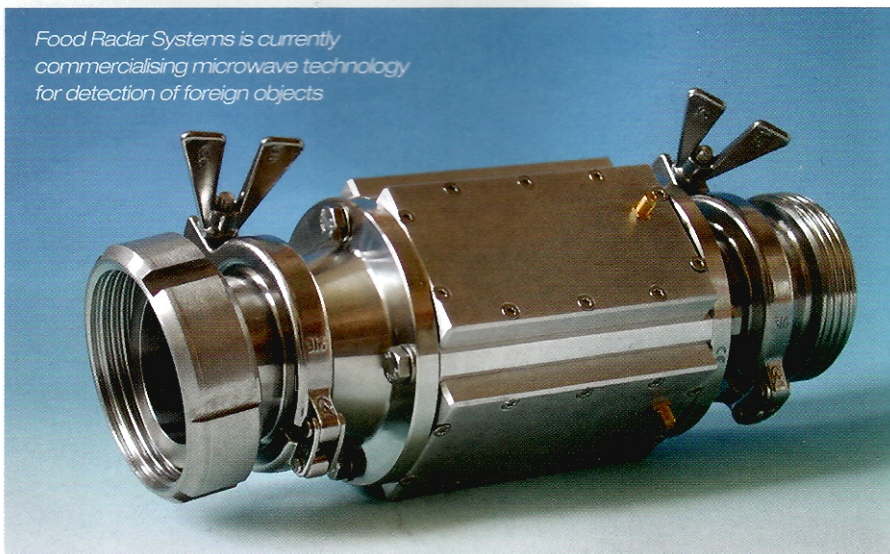
Clearly, food safety permeates all technology being developed for the food industry, and research work into the use of low-power microwave technology for detecting foreign bodies is now at the point of commercialisation by Food Radar Systems, which has a pilot plant up and running at SIK.

First used in 1996, near field radar technology was used like a microwave microscope to detect water in the field. The technology is now being developed for applications in the food industry, and the first system to be perfected by Food Radar Systems is the LOOK100 food radar sensor for determining the existence of foreign bodies in emulsions and pumpable products.

"We have chosen to implement the technology for frequencies in the range of one to 30 GHz, ie in the microwave region," said Mikael Reimers, managing director of Food Radar Systems, who explained that this was because the physical properties of foreign objects as well as the bulk material (the food) have pronounced features within this frequency range – and importantly, there is an abundance of standard microwave components available. "Using microwave technology we are able to detect all types of foreign bodies including glass, wood, plastics, cardboard, bone, stone, shells, nuts/kernel, rubber and, of course, metal, simultaneously, without alteration to the frequencies. This puts detection into a different league."

Inside the sensor there is a glass (borosilicate) section that allows the microwaves to probe the food product that is flowing through the sensor, which uses four antennae that surround the glass tube and can be configured to transmit or receive

Food Radar Systems is currently commercialising microwave technology for detection of foreign objects



microwave signals. They ensure that no area of the product in the pipe is 'unprobed'.

The sensor is designed to be slotted into existing stainless steel piping without causing extra flow resistance or turbulence, and is capable of taking 75 million measurements per second to assess the probability of a positive signal. For products such as lasagne, a contaminant in the region of 3mm by 3mm can be detected, while for homogenous sauces identification of contaminants of just 1mm is possible, according to Food Radar Systems.

"We are just starting with baby foods and purées at the moment, but are working on a scanning system for the future for dry goods or products within glass jars," said Mr Reimers. "We are building up a database library of foreign bodies, and we are also looking at the use of microwave technology as a non-invasive means of measuring and controlling the temperature in three dimensional objects."

For further information on any of the subjects covered in this article enter the following numbers on the reader enquiry card: Food Factory of the Future 800; SIK 801; LMT 802; EFFoST 803; ENSIA 804; Food Radar Systems 805; TNO 806; Technical University of Berlin 807.