



Microwave research

Background

frperc has unique facilities and expertise in microwave processing of foods and other materials. We have an air-conditioned microwave laboratory (maintained at 20ffl1°C) with stabilised mains supply for oven and food testing. Product temperatures can be measured during heating, using fibre-optic sensors, or post heating, using multi-point arrays of thermocouples. We have a unique system which allows the continuous measurement of temperatures using fibre-optic sensors in a microwave oven having a turntable, this allows the measurement of product temperatures under normal oven operating conditions. We also have a unique microwave oven which was designed and manufactured to have a highly reproducible heating performance and incorporates several instrumentation and control features. For example the power output is variable between 0 and 1200 W, the cavity walls are water cooled to keep them at a steady temperature, the forward and reflected power can be recorded and the speeds of the turntable and mode stirrer are adjustable.

Projects carried out at frperc in this field range from those involving domestic microwave ovens to industrial scale continuous tunnel systems, from a few hundred Watts up to thirty thousand Watts output power. We have experience of processing a wide variety of both food and non-food products, using both 2450 MHz and 896 MHz microwave frequencies. Our customers include oven manufacturers and retailers, food manufacturers, supermarket chains, product developers, non-food product processors and even baby equipment manufacturers and retailers.

How frperc can help

frperc offers the following microwave services:

Microwave ovens

Assessment of microwave oven performance

Output power measurement - IEC 60705 1000 g and MAFF 350 g

Heating uniformity and reproducibility

Effect of mains supply voltage variation

Energy consumption

Effect of load size

Leak testing

Troubleshooting

Food and non-food products

Development and testing of heating instructions

Temperature measurement - during/after heating

Effect of packaging - material/size/shape

Effect of composition/ingredient modifications

Advice and development of test procedures

Development of food simulants to enhance the reproducibility of oven testing

Troubleshooting

To discuss any aspects of processing with microwaves, microwave ovens, food testing or simulant development, please contact us on +44 (0)1472 582400 or email us on frperc@grimsby.ac.uk