



## Topical Research Meeting on Physics in Food Manufacturing

### **(P5) Non-destructive black heart cavity detection in post-harvest potatoes using microwave energy**

I Mohamed<sup>1</sup>, R Dudley<sup>1</sup>, A Gregory<sup>1</sup>, R Mouthaan<sup>1</sup>, Z Tian<sup>1</sup>, P Andrews<sup>2</sup> and A Mellonie<sup>3</sup>

<sup>1</sup>National Physical Laboratory, <sup>2</sup>UK, MMG Citrus Ltd, UK, <sup>3</sup>Marks and Spencer, UK

Destructive quality testing for black heart results in £10 million worth of post-harvest potatoes in the UK going to waste. We present a first investigation into the use of microwave energy to non-destructively test for the presence of cavities caused by black heart. Electromagnetic computer simulations show that how microwave energy propagates through a potato is changed by the presence of a cavity. This change can produce measureable differences in the magnitude of microwave energy measured exiting the potato. Laboratory based measurements using a cavity phantom submerged in potato phantom liquid confirms the simulation results, but with measured changes in magnitude in the order of 0.1 dB.