



Topical Research Meeting on Physics in Food Manufacturing

(Invited) Measurement, modelling and validation at the National Physical Laboratory

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Lord Kelvin famously said that “when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind.” The role of the National Physical Laboratory is to provide the measurement infrastructure that permits traceability of measurements to universal references, ensuring equivalence of measurements worldwide. This in turn permits reproducible manufacturing processes.

There is an extensive measurement, modelling and validation capability resident at NPL across a wide range of disciplines, including temperature, humidity, gas and particle, pressure, mass, dimensional, density, colour, microscopy, and foams, amongst others. Modelling permits a better understanding of the sensitivity of a process to environmental and material parameters, supporting enhanced process control. Underpinning the modelling is the capability for validation of the input parameters (material properties, thermophysical quantities, etc.), as well as validation of the output through bespoke measurements.

NPL’s impartial role offers the potential for food manufacturing organisations, and the associated supply chain, to gain a competitive edge through improved confidence in modelling and measurements, and the associated improvement in process consistency.

We will describe some key concepts underpinning traceability and validation, present some of the physical disciplines where NPL can offer value, and provide some examples of modelling and validation that have benefitted manufacturing organisations.