

## Food safety and hygiene

Our aim is to develop fundamental understanding both of how to ensure safety through process design and equipment cleanliness.

This will involve the development of computational models to predict thermal and flow fields in processes, the formation and removal of fouling deposits and their combination with models for microbial behaviour, as well as the use of process probes such as Positron Emission Particle Tracking (PEPT) and Time-Temperature Indicators (TTIs) in validation. We study:

- Process modelling; linking with leading edge computational groups to build models for food safety and processing, incorporating equations for microbial growth and quality
- Novel processes, including electric-field and high-pressure sterilisation
- Cleaning of process plant; most of the water use in food plants is for hygiene, and so understanding how to clean leads to savings in cost and environmental impact. We have built the first direct measure of the force needed to clean microbial and other deposits from a surface, leading to new models. BBSRC and DEFRA funding led to £3.6 million TSB consortium project led by University of Birmingham, with partners: Universities of Newcastle, Imperial and 8 companies to reduce their environmental footprint, including EngDs with GSK, Scottish and Newcastle, and Unilever`
- Process validation using PEPT and TTIs for safety assurance, including the first TTI for sterilisation and its validation in industrial practice; with links to Campden Food RA and to industry.