



Technical services

Technical support from Campden BRI

Practical application of technical excellence for the food and drink supply chain

We are membership based, with over 2,000 member sites in around 60 countries worldwide.

We work closely with members to ensure the industrial relevance of all services and underpinning R&D.

Our activities include analysis and testing, research and development, product innovation, process validation, consultancy, auditing, and training.

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Our areas of expertise cover:

- manufacturing technologies - food processing (heating, chilling, freezing), aseptic technology, microwave heating, malting and brewing, milling, baking and extrusion technology, process control and instrumentation, packaging technology, energy use and waste minimisation
- safety assurance - including hygiene and sanitation, microbiology and preservation, processing technologies, analysis and testing (microbiological, chemical), and quality and safety management
- product development and quality, consumer studies, market insights, sensory science, authenticity testing, shelf-life evaluation, labelling and legislation
- agri-food production, ingredients, raw materials, raw material technology
- underpinning science - cereal and brewing science, microbiology, chemistry and biochemistry, molecular biology

Raw materials and ingredients

Agronomy

Services in all aspects of growing food raw materials sustainably

- Advice on agronomic inputs - manure, treated waste, fertiliser and irrigation water - as well as on agronomic performance and suitability for fresh and processing markets of different fruit, vegetable and cereal varieties
- Evaluation of crop husbandry practices to ensure safety of raw materials
- Field and other trials to determine pesticide residue levels, taints and efficacy. Advice on legislation regarding pesticide usage, and on the requirements of alternative production systems - e.g. organic
- Implementation of quality systems in primary production and raw material procurement - HACCP in agriculture
- Sustainable practices



Characterisation

Ensuring that raw materials and ingredients are fit for purpose

- Post harvest handling advice to ensure quality and marketability of produce, and maximise shelf-life, including during storage, transport, retail display and consumer storage
- Provision of a range of commercial packaging technologies including modified atmosphere packaging
- Evaluation of colour, flavour, texture and odour, including assessments of consumer acceptability
- Evaluation of functionality of ingredients
- Analysis of nutritional and compositional changes during post-harvest storage and shelf life

Ensuring raw materials and ingredients are fit for purpose

Manufacturing expertise

Extensive expertise in all areas of food preservation and processing technologies including milling, baking, extrusion, malting, brewing, heat processing (canning, aseptic processing, ohmic heating, microwave heating), chilling and freezing, drying, and 'new' technologies such as high pressure processing, pulsed light and ultrasonics

Process validation to ensure safety of heat-processed foods - heat penetration trials, temperature distribution modelling

Advice on equipment selection and process control to optimise efficiency and product quality

Advice on life-cycle, sustainability and carbon and water footprinting issues

Thermometer calibration

Pilot plant facilities

A range of processing equipment (see box), as well as packaging equipment - can seamers, glass capper, modified atmosphere packaging bag and tray sealers, Multivac pouch sealer, burst testing equipment, and gas analysers



Pilot plant equipment

- Malting and brewing plants, beer dispensing equipment
- Milling, baking and extrusion equipment
- Heat processing equipment - retorts, steam-jacketed pans, UHT and pasteurisation heat exchangers, temperature monitoring equipment
- Cryogenic and air blast chillers and freezers
- Hot air and freeze driers, vacuum cooker and cooler
- Deep fat fryers
- Microwaves and conventional ovens and hobs
- High-pressure processor
- Fruit and vegetable peeling and blanching equipment
- Drinks carbonators and a citrus multi-juicer
- Sausage fillers and meat slicers
- Aerators for foams and mousses
- Mixers, blenders, homogenisers and centrifuges

Manufacturing expertise specialist sector services



Brewing

Extensive pilot plant facilities and equipment - including state-of-the-art fermentation facility

Pilot scale roaster for the production of speciality malts

New variety trials (for which our micromalting services are particularly useful), safety evaluations and process optimisation

Energy and water use

Crossflow microfiltration membrane evaluation

One-stop shop for assessing the interaction of filter aids and beers

Advice on production of organic beers

Expertise in yeast microbiology

Specialist wine services

Providing
flexibility and
innovation
through
operational
support

Cereals, milling and baking

Milling and grain processing - wide range of equipment (such as cereal mills and flour blenders) for processing wheat and other cereals in quantities of a few grams up to many kilograms

Specialist pilot-scale production and product development plant - for bread, biscuits, cakes and other flour confectionery, pastry, cereal bars and extruded products

Variety identification services to match variety to end-use suitability, provide routine variety checks and offer independent analysis as required for disputes

Specialist facilities for wheat and flour testing, and ingredient functionality

Specialist milling and baking training facilities



Product development, quality and packaging

A comprehensive service that addresses all aspects of product development and reformulation. Expertise covering cereal and bakery products, fruit and vegetable products, meat, fish and poultry, soft drinks, soups, sauces and composite ready meals - chilled, frozen, heat-preserved and other ambient-stable products.

- Market insights, brainstorming and product benchmarking (*see opposite*)
- Bespoke product development
- Reformulation for reduced fat and salt reduction
- Replacement of additives with functional ingredients
- Supplementation with vitamins, minerals and antioxidants, and assessment of their stability
- Effect of processing on individual ingredients and product stability
- Interaction of packaging materials, ingredients and process
- Quality issues - rancidity, texture, spoilage, staling
- Compositional mapping, image analysis and colour determination
- Legislation constraints - permitted additives, labelling claims
- Consumer demands and preferences
- Microbiological aspects including shelf life and challenge testing
- Reheating instructions for conventional and microwave-heated foods
- Scale-up in our pilot plant
- Back-up analytical services
- Troubleshooting



Packaging

- Product, process and package compatibility
- Barrier properties, leaks and seal integrity
- Strength, tensile strength testing, compression testing, drop testing, burst testing
- Troubleshooting and fault diagnosis
- Biodegradable packaging, light weighting and 'alternative' materials



Consumer studies

Consumer opinion

Investigation of consumer opinion on food and drink in general, as well as on specific products or groups of products, packaging and the issues of the day:

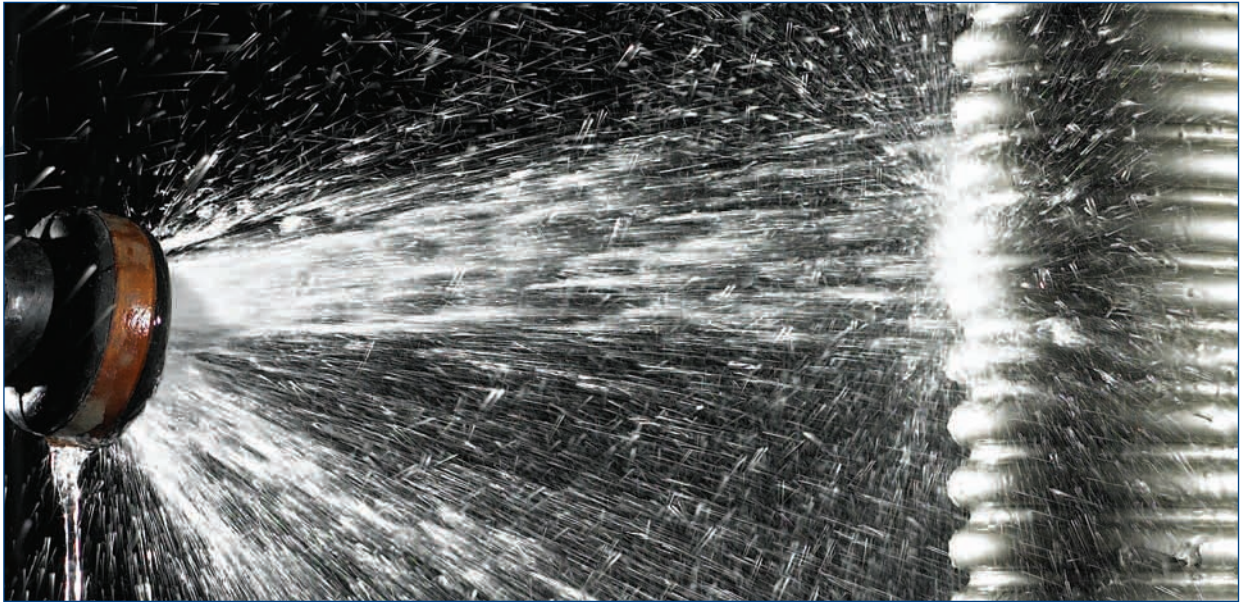
- Questionnaire design, field work, experimental design and full analysis interpretation
- Workshops, group discussions, observation studies, as well as face-to-face interviews, product placement, hall testing and internet research
- State-of-the art facilities, test kitchen, viewing studio and beer dispensing
- Dietary choices and satiety

Marketplace knowledge

- Benchmarking - independent assessment of products from an informed consumer perspective
- Screening product concepts - identifying the best product for development
- Creative recipe development combining food styles, trends and novel use of ingredients and packaging
- Idea generation, working as part of or alongside client teams

Helping you to
deliver quality
products for
the consumer

Food and drink safety



Factory hygiene

Advisory, analytical and design services on reduction of microbial contamination from food contact surfaces, non-contact surfaces, water, people, protective clothing and air

Planning of factory and laboratory layouts

Advice on hygienic suitability and testing of production equipment, process area building materials - such as floor tiles and wall coverings - and air hygiene systems

Design, implementation and assessment of cleaning and disinfection (sanitation) programmes

Evaluation of efficacy of detergents and disinfectants

Factory hygiene audits and trouble shooting

Investigation of sources of contamination

Advice on legal requirements of factory and equipment design

Physical and chemical contamination

Advice on preventing physical contamination ('foreign bodies') in food - in-line detection systems

Analysis of chemical contaminants and natural toxins - advice on processing to remove toxins

Allergen management systems

Food microbiology

Process validation and heat penetration studies to determine microbiological 'kill'

Predictive modelling and microbiological testing to determine product shelf life

Extensive knowledge of microbial growth and death characteristics

Specialist expertise in *Clostridium botulinum*, *Salmonella*, *Escherichia coli*, *Listeria* and other pathogenic microbes

Microbiological risk assessment studies

Specialist analysis and testing facilities for characterising, identifying and tracking pathogens

Food safety management systems

HACCP - extensive international experience of assisting with the development and implementation of HACCP-based systems in food businesses

Quality management - help for clients in all aspects of quality management - to ensure that their systems meet legal requirements, and the sometimes much stricter requirements of their customers

Risk and crisis management services

Traceability systems and their implementation

Auditing - helping you achieve what you want to do

Safety databases for the brewing sector



Designing safety
into products
and processes

Analysis and testing

Routine analysis and troubleshooting help when things go wrong

Physical analysis

Foreign body identification - identification of adventitious and deliberate contaminants, helping to pinpoint the source and advise on preventative solutions. Expertise with glass, metal, stones and plastics, hair and fibres

Analysis of the structure of foods - imaging and colour analyses

Mapping food composition for quality

Ingredient functionality including wheat and flour testing

Authenticity determination

Examples include meat and fish speciation, variety identification, GMO status, pasta authenticity, frozen versus fresh meat



Chemistry

Nutritional analysis:

Fats, proteins, and carbohydrates

- Dietary fibre (AOAC and Englyst)
- Meat and fish content
- Vitamins, minerals and trace elements, including salt
- Organic acids and alcohol

Pesticide analysis - both targeted and screening

Analysis of additives - including preservatives, antioxidants, sweeteners, colours, emulsifiers and stabilisers and gelling agents.

Residue and contaminant analyses, such as mycotoxins, processing contaminants (e.g. 3-MCPD and acrylamide), illegal adulterants (e.g. melamine and Sudan colours), environmental contaminants



Microbiology

End product testing - routine microbiological analysis is important to confirm that manufacturing control mechanisms are effective

Pathogens (including *Escherichia coli* O157 - in a category 3 laboratory - and *Clostridium botulinum*)

Spoilage organisms and indicator organisms (those that indicate a potential problem in the production chain)

Microorganism identification and characterisation - utilising state-of-the-art biochemical and molecular methods - including genetic fingerprinting to track problem organisms

Development and evaluation of new and advanced microbiological methods

Sensory analysis

Descriptive analysis - evaluation of the flavour, odour and texture characteristics of products

Discrimination testing - is one version of a product noticeably different from another?

Product benchmarking - how does one product compare with another?

Sensory quality analysis - how liked is a product?

Sensory method development and taste analysis

Specialist brewing sensory services



Routine analysis and help when things go wrong

Practical application of technical excellence for the food and drink supply chain

We are the largest member-based food and drink research centre in the world.

Our facilities include:

- 380 staff across four sites
- around 3,000 m² of laboratories for food and drink microbiology, hygiene, chemistry, biochemistry, molecular biology, brewing and cereal science, sensory and consumer studies, and packaging technology
- around 3,500 m² food and drink process hall and pilot plant including malting and brewing, retorting, chilling, milling, baking, hygiene and packaging
- 800 m² of dedicated training and conference facilities

For more detail including podcasts and case studies visit www.campden.co.uk/services.htm or email us at info@campden.co.uk

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