



Microbiological accelerated shelf-life testing

annette.sansom@campdenbri.co.uk +44(0)1386 842263

Commercial pressure from the short time-frame for the product development cycle has led to many requests for accelerated shelf life testing. This is possible in some cases, but it requires an understanding of product composition and whether (and when) accelerating conditions cause a switch of spoilage mechanisms. We have used microbial growth prediction models and actual growth data to generate data for the growth of naturally occurring mixed spoilage flora at a range of temperatures. This allowed us to determine if and where a spoilage 'switch' occurs, to give us an indication of realistic versus non-relevant 'accelerated' conditions.

Cooked meat and dairy dessert trials

For example, in a cooked meats trial, we found Enterobacteriaceae to be the main spoilage group, and derived comparable results with predictive models above 5°C. Data suggests that it is possible to produce a formula for cooked meats where: x days at 22°C = y days at 8°C. When testing a cooked meat in which lactic acid bacteria were found to be the main spoilage group, a similar formula could still be applied.

With a dairy dessert, a switch in primary spoilage organisms occurred, with yeast more significant at lower temperatures, and TVC above 15°C. This suggests that accelerated testing would not be possible for this type of product.

Supporting food authenticity

Authenticity assurance remains one of the biggest challenges currently faced by the food and drink industry. The recommendations of the Elliott Report and compliance with BRC's Global Food Safety Standard (version 7) has led to a requirement for companies to perform vulnerability studies and risk assessments, and in certain circumstances test the authenticity of raw materials and ingredients. Our extensive experience in authenticity issues and state-of-the-art laboratories allow us to support our clients. We are working with our members and clients to help address the issue of authenticity through our technical services, research and strong industrial links.

2

We are proud to be recognised as a UK Centre of Excellence in food authenticity testing by defra. We carry out olive oil grade testing for the Rural Payments Agency to ensure the authenticity of olive oil imported into the UK. For the past 13 years we have been scientific analysts for HM Revenues and Customs (HMRC) carrying out analysis of goods imported into the UK from outside the EU. We were pleased to be chosen to provide technical and administrative support to the Food Industry Intelligence Network (FIIN) last month (see page 3).

Steven Walker, Director General

Emerging ingredients - considerations for use in products (Member funded research project)

Ingredient insight factsheets are a new addition to the project website:

www.campdenbri.co.uk/research/emerging-ingredients.php

- 1 Chia seeds (*Salvia hispanica*)
- 2 Insects

Also see the Chia seeds article on page 7.

Switch channel



LinkedIn - company news
www.linkedin.com/company/campden-bri



YouTube - videos on the science and technology of food and drink production
www.youtube.com/campdenbri



Twitter - keep up to date with our latest news and activities
<https://twitter.com/campdenbri>



iTunes - subscribe to our podcasts



Facebook - find out about our history and lighter side
www.facebook.com/campdenbripage



Supporting industry in fight against food fraud

We are delighted to have been chosen to provide technical and administrative support to the Food Industry Intelligence Network (FIIN).

We will curate a database for FIIN to collect anonymised (via legal host) industry data on food authenticity testing. We will analyse the data and produce regular reports for the FIIN members. We will also be responsible for managing the FIIN membership and organising FIIN events.

FIIN is an important industry network addressing an important industry issue. We are pleased to be helping its members in proactively addressing the issue of food and drink fraud. If you are interested in joining FIIN, please contact FIIN@campdenbri.co.uk

Out and about - at Packaging Innovations

We will be playing a major role at the Packaging Innovation exhibition at the NEC, Birmingham on 1-2 March. Come and visit us at **Stand J48** – where a rolling programme of packaging videos will be shown throughout the day.

The Campden BRI mini-theatre on the stand will feature presentations on:

- The role of packaging in optimising quality
- EU food contact materials rules
- Understanding migration testing
- Food packaging: shape, colour and texture



Creating a tasty burger with increased fibre

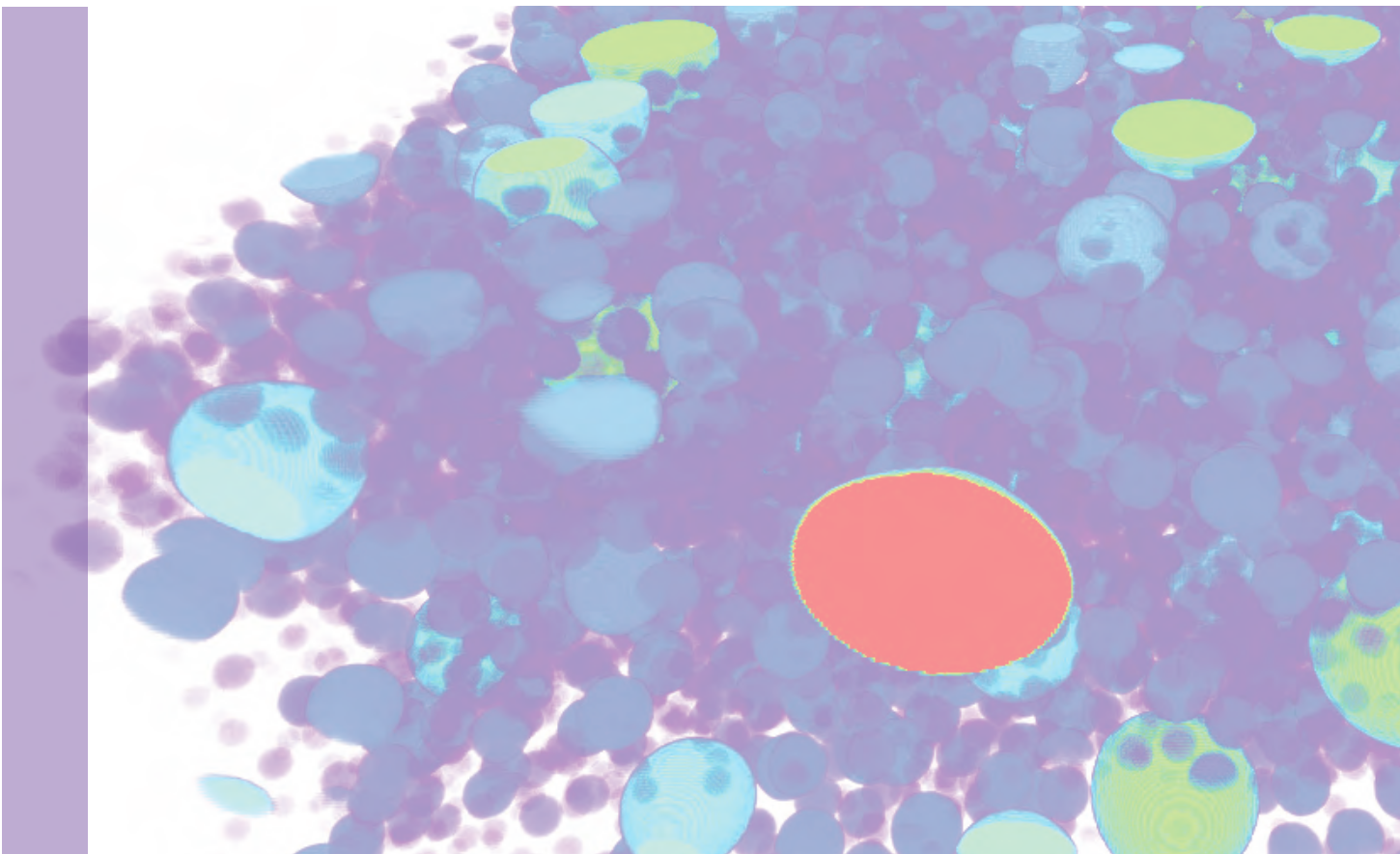
philip.richardson@campdenbri.co.uk +44(0)1386 842036

We were challenged as part of a project for the Food & Health Innovation Service (FHIS) to reformulate economy beef burgers to make them 'healthier'. Our aim was to reduce the sodium (salt) content of beef burgers while adding beta-glucan (soluble fibre).

Economy beef burgers contain fillers as a bulking agent. Whilst fillers can help manage the cost of the burger, they also provide an opportunity to re-formulate the nutritional content. We created three variations of the economy beef burger using three fillers to replace low fibre rusk filler: fine milled oat bran, milled oats or ground quick oats. The three reformulated beef burgers contained almost a third less sodium than the ordinary economy burger, meeting the target set by the Department of Health for 2017.

The burgers made with oat bran filler retained moisture best and had a similar cook loss to the ordinary economy burger. Informal tastings showed that the beef burgers containing oat bran filler were also preferred to the ordinary economy burger.

The work showed that substituting rusk filler in economy beef burgers with oat bran filler produced a burger that contained less sodium and more fibre, and crucially had a preferred taste to an ordinary economy burger.



Food structure and image analysis

alix.comish@campdenbri.co.uk +44(0)1386 842054

Many foods and food materials have a non-uniform structure and composition. They may contain bubbles, emulsions, multiple components such as fruit pieces in yoghurt, structures such as marbling fat in meat, or gradients of fat, water or salt.

As well as measurements of average composition, aspects of the structure, appearance and distribution of components are also important. There are several techniques available to study these - and we are leaders in this field. Measurements can be used, for example to document appearance, to check that ingredients are uniformly dispersed or to study changes in colour or migration of components over shelf life.

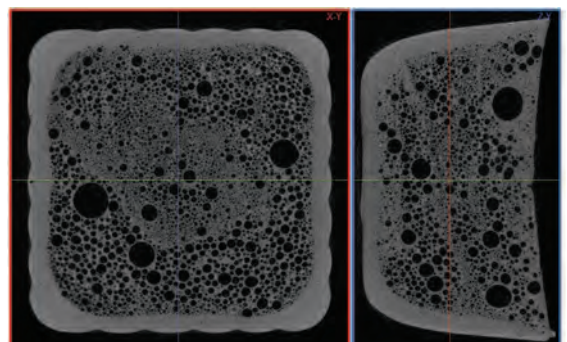
Colour and appearance

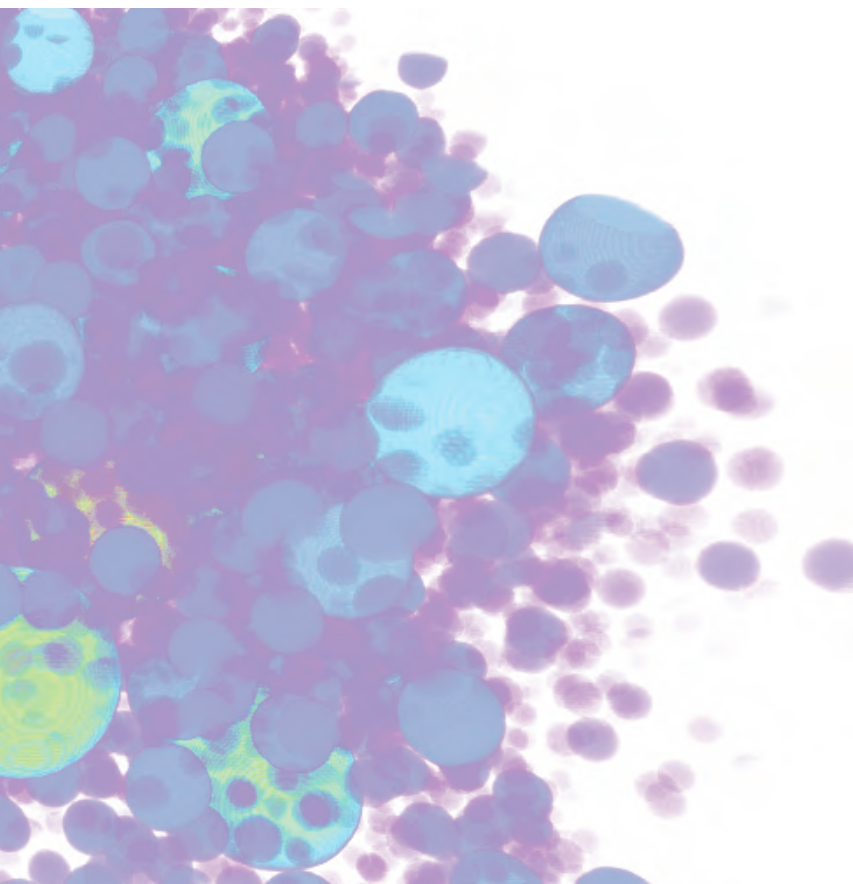
The colour and appearance of food products are critical for customer acceptance. Colour meters and spectrophotometers provide accurate measurements for uniform products. For more complex products or to aid interpretation and communication of appearance, digital images are also used. Calibrated

imaging systems using controlled imaging conditions and colour reference standards enable accurate colour reproduction to be achieved for digital and printed images. Images can be analysed to discriminate features such as lean meat and marbling fat and to measure the colour of specific regions of interest.

Structure characterisation

X-ray micro-tomography is a powerful technique for characterising product structure, enabling the internal structure of samples to be scanned non-destructively in 3D at resolutions as small as 1 micrometre. The resulting images can be studied interactively on a computer screen without any destructive sample preparation and measurements can be made of properties such as bubble size distributions and internal product dimensions. Applications include characterisation of porous structures





such as snacks, baked products and confectionery, and non-destructive investigation of problems such as leaks in plastic closures, or foreign bodies.

Optical and scanning electron microscopy methods are also useful for characterisation of product structure, particularly for high magnification work. These can be used in combination with techniques that provide further information on the structures imaged, including X-ray spectroscopy to identify elemental composition.

Compositional mapping

Imaging at non-visible wavelengths can provide information on product composition. A hyperspectral near infrared imaging system measures an NIR spectrum for each pixel in an image, enabling the distribution of compounds such as fat and moisture to be measured. Following calibration for a given product application, rapid quantitative measurements can then be made for test samples, including at-line measurements. Applications include mapping of moisture distributions, for example to study uniformity of baking processes, or to study moisture migration between product components during storage.

These techniques offer solutions for a diverse range of problems. Please get in touch to discuss your requirements.



Food rheology

sarab.sahi@campdenbri.co.uk +44(0)1386 842140

The rheological properties of food materials are important in determining both texture and behaviour when subjected to physical forces and forced to flow. Here are four examples of how we can study the rheological properties of raw materials, intermediate products such as batters and doughs, and final products.

Oscillation: a small deformation is applied and the response measured, while maintaining the integrity of the test material. This provides insight into the structural properties of the material and the likely stability over time.

Viscosity: Rapid Visco Analysis measures the viscosity build up of starch-based materials as they are heated. The rate of heating and degree of shear force on the viscosity of the material can be measured as can the effect of salt, emulsifiers, enzymes and other materials.

Drop shape analysis: surface or interfacial properties play an important role in foam and emulsion creation and stability. The wetting behaviour of a liquid when in contact with a solid surface can be determined by making contact angle measurements.

Flow measurements: the distance a sample flows in a given time indicates the consistency of products such as sauces, purees, salad dressings, and batters.



Training events

A full list of scheduled courses is available on our website www.campdenbri.co.uk/training.php or request a booklet from training@campdenbri.co.uk +44(0)1386 842104

March events

1-2	Understanding microbiology
2	USA food and drink labelling course
6-10	HACCP - advanced (level 4)
7-8	Internal auditing - principles and practices
10	Microbiological criteria for foodstuffs
14-15	HACCP - intermediate (level 3)
16-17	Gluten free conference
21	Packaging hazards
24	Safe production of dried food
27-31	Food safety - advanced (level 4)
28-30	Practical microbiology - advanced
28-30	Food processing hygiene management (course in 2 modules)
28-30	FSPCA preventive controls for human food
29-30	An introduction to food law

Seminars

Microbiological criteria 10 March

www.campdenbri.co.uk/micro-criteria-foodstuffs.php

Will cover the importance of microbiological criteria, and a description and demonstration of our new searchable database, along with an update on the associated microbiological criteria guideline and new guidance on sampling for microbiological hazards.

Packaging hazards 21 March

at the pro2pac exhibition at the Excel, London

www.campdenbri.co.uk/packaging-hazards.php

Unlike food and drink hazards, those associated with packaging are less well documented and may not be considered; however, they can affect the safety and quality of the product. Identification of potential packaging hazards, migration testing, packaging decontamination, and the use of HACCP will be discussed.

Safe production of dried foods 24 March

www.campdenbri.co.uk/dried-foods-production.php

Although traditionally thought of as stable from a microbiological point of view, dried foods can still be contaminated, and survival of organisms is possible, even in tough conditions. It is important to understand not only the risks of microbial contamination and control methods, but also non-microbial issues such as allergens and foreign bodies.

Member zone

www.campdenbri.co.uk/memberzone.php

to access privileged member information and services

Welcome to new members

We are delighted to welcome the following new members:

AllinAll Ingredients - ingredient blender

British Airways - airline

Daily Bake Ltd - manufacturer of pies, ready meals, sauces, soups, puddings and pastry

FarmHouse Biscuits Ltd - manufacturer of sweet and savoury biscuits

Flower of Life Limited - brewer of Kombucha, a fermented green tea

Imspex Diagnostics Ltd - manufacturer of gas chromatography ion mobility systems

Niacet BV - producer of organic acid salt powders for food, pharmaceutical and technical applications

Pip & Nut Ltd - manufacturer of nut butters

Sarant Ltd - producer of honey, seasonings and soup powders

Sheriffs Foods - trader in gluten-free products

Clare Brett +44(0)1386 842125 membership@campdenbri.co.uk

Please notify the Membership Department of any name or address changes to allow us to keep our records up to date.

Catch up on webinars

Have you missed a recent Campden BRI webinar? Are you looking for another quick and easy way to discover some of our latest research findings? Our website now allows you to access our recorded webinar content, including topical presentations and member funded project updates. Highlights so far include benefits of membership, TACCP and presentations on cereal testing, online sensors and super chilling (further recordings will be added as they are produced).

Dates and times for live webinars aren't always convenient for everyone. Now you can catch up with the latest recorded content when it suits you. For further details, please visit www.campdenbri.co.uk/webinars.php and enter your member login details when prompted.



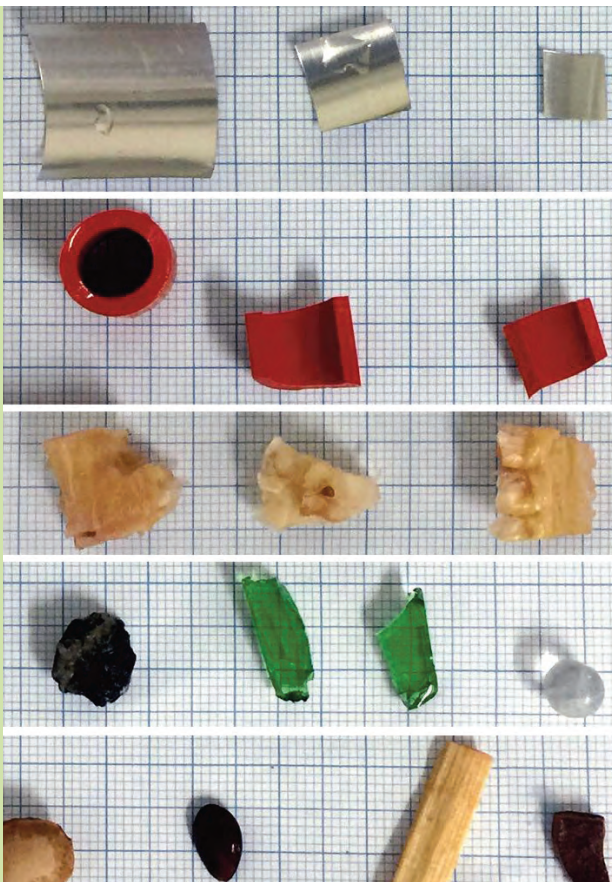
Chia seeds

charlotte.holmes@campdenbri.co.uk +44(0)1386 842257

Product developers are continuously looking for new ideas to introduce to the market place, and for novel ingredients to give a product a really interesting slant. On-going member-funded research is looking at a number of these ingredients.

Chia seeds are of interest because of their protein, fibre, antioxidant and oil contents, and the possible nutritional claims that could be made when using them. As they are classed as a novel food under EU legislation, their use is controlled. In the first of a series of ingredient factsheets, we have briefly outlined the background, regulatory status, nutritional characteristics and potential uses of these seeds.

A feasibility study into their use in fruit juices found that they affect product viscosity and organoleptic characteristics. Pre-wetting was important in improving processability, and temperature affected the rate of wetting out. The seeds also decreased flavour and odour intensity in drinks. The findings of the study will be reported in *Chia seeds: considerations for use*, which will be on the project website (www.campdenbri.co.uk/research/emerging-ingredients.php) along with the ingredient factsheet.



On-line detection of foreign bodies

In food manufacturing it is important to ensure that the product is free of contaminants. Metal detectors and x-ray systems are capable of on-line detection of many types of metallic object, and dense materials such as stones, glass and bone. However, material such as plastics, wood and fruit stones are difficult to detect with standard technologies.

The Food Radar system, reviewed in report RD412, uses microwave technology to detect and remove foreign bodies from pumpable food products such as jams, sauces and baby foods. *Review of the Food Radar system for online detection of foreign bodies - RD412* can be found on the project web page at www.campdenbri.co.uk/research/food-process-control-technologies.php

Evaluating consumer and sensory methods

Given reduced lead times associated with product development, robust but rapid and cost-effective evaluation methods involving sensory assessors and/or consumers are required. Ongoing work is evaluating a selection of traditional and novel sensory and consumer methods that can support the product development process. In the first report (RD414), the focus is on the sensory methods investigated for the evaluation of up to five samples (very small to moderately large sample sets).

We looked at eight different methods and found a good consensus between several of them in terms of the information that they provided. However, decisions on which one to choose is dependent on research objectives (e.g. description, discrimination or both) and a variety of constraints (e.g. time, resources and number of samples).

An evaluation of traditional and novel sensory and consumer methods suitable for product characterisation: sensory methods (part 1) - RD414 can be found on the project web site at www.campdenbri.co.uk/research/product-characterisation.php

Register now

Campden BRI Day 2017

Network, catch-up with peers and soak up knowledge. Make a date in your diary now, for Wednesday 7 June. Further information will be published about briefing sessions, site tours and the Annual Campden Lecture in the coming weeks. To find out more visit www.campdenbri.co.uk/campdenbri-day.php

Campden BRI (Chipping Campden site)
Station Road, Chipping Campden,
Gloucestershire, GL55 6LD, UK

+44(0)1386 842000 Fax: +44(0)1386 842100

Campden BRI (Nutfield site)
Centenary Hall, Coopers Hill Road,
Nutfield, Surrey, RH1 4HY, UK

+44(0)1737 822272 Fax: +44(0)1737 822747

For other sites, see
www.campdenbri.co.uk/campdenbri/contact.php

information@campdenbri.co.uk
www.campdenbri.co.uk