

Food safety is a multidisciplinary topic which impinges on aspects of biology, health, economics, history and geography. The main scientific ideas are related to microbiology, because most routine safety problems in Britain derive from bacterial and fungal contamination of food. The following microbiological concepts are useful in appreciating the underlying science of food safety.

- The unity/kingdom of life – from bacteria to humans; basics of cells – start with the idea of a cell being the ‘unit of life’; in bacteria, the cell and the organism are one and the same thing (bacteria being single-celled organisms), while humans consist of billions of cells organised into tissues, organs, and systems (respiratory system, circulation etc). It might be useful to look briefly at the structure within a cell, noting that bacteria do not have a central core called a nucleus, while all other organisms – from fungi through to humans – do have nuclei within their cells
- Differences between the main classes of microbes (viruses, bacteria, fungi, protozoa). The names of some common (and not so common) food poisoning bacteria – *Salmonella*, *Campylobacter*, *Listeria*, *Clostridium* – where they grow and why. Many cases of food poisoning arise from toxins produced by bacteria. Viruses do not produce toxins, so they are a less common cause of food-borne infection.
- The microbial lifestyle – what they need to grow (nutrients, water, the right temperature) and why some foodstuffs in certain conditions provide these (cook-chill, incompletely thawed meat – all practical examples that pupils can relate to).
- Food hygiene – how to stop microbial growth/kill microbes. *Show them round the school kitchen and have the staff there explain what they are doing to prevent food poisoning and why, and some of the problems (eg storage) of producing food in bulk.*
- BSE – introduce the idea of prion proteins and the controversy around the variant CJD/BSE link to show that science is *not* a fixed body of knowledge. The prion protein hypothesis suggests that the cause of the BSE infection is not a virus, bacteria or any other known microbe, but a ‘corrupted’ form of a naturally occurring protein called the prion protein. The idea of an infectious protein goes against the accepted rules of microbiology – ‘germs cause disease’ – hence the controversy.

The citizenship issues around food safety fall into three main areas: information, responsibility, and how to bring about change to make food safer.

- **Information:** Most pupils will be familiar – or can soon familiarise themselves – with food safety labels such as ‘sell by’ and ‘use by’ and discuss the role these play in protecting from food-related health problems. They can then discuss whether more information is needed – the origin of meat, or the state of the kitchens in a restaurant or café.
- **Responsibility:** If you contract food poisoning – who is to blame? The retailer, the distributor, the manufacturer, the Government? How far should Government responsibility go – at local and national level in enforcing hygiene during food processing, labelling and distribution? Or do you bear some responsibility yourself for not following hygiene guidelines?
- **Rights:** As a citizen you have a right to safe and healthy food. How much have recent ‘food scares’ eroded our confidence, and our rights? Was withholding information about BSE to avoid spreading panic in fact a violation of a citizen’s right to know what is happening to the food we eat?
- **Taking action:** How do you trace the origins of, an outbreak of food poisoning or, more seriously, the cause of BSE? Who should be involved in such an investigation and what steps should be taken to protect the public in the future? The BSE enquiry is worth thinking about – it was long and complex, but anyone could attend the hearings and reports were published daily on the enquiry’s website, where the complete BSE report is now freely available. Is this a good way of doing things?

The Food Standards Agency

(www.foodstandards.gov.uk)

The FSA is a new organisation set up by Act of Parliament in the wake of the BSE crisis, whose mission is to protect public health from risks arising from the consumption of food. It claims to put the consumer first, to be open and accessible, and puts great store by its independence. The Agency provides advice and information to the public and the

Government on food safety 'from farm to fork', and also protects consumers through monitoring and enforcement, chiefly through the Meat Hygiene Service, which took over meat inspection duties from local authorities on April 1st, 1995. The FSA also supports consumer choice by promoting accurate and meaningful food labelling.

The Public Health Laboratory Service

(www.phls.co.uk)

The mission of the PHLS is to protect the population from infection through the detection, diagnosis and monitoring of communicable diseases, relying on the expertise of microbiologists and epidemiologists.

The Laboratory does a great deal of work on food-related infection such as outbreaks of *E.coli* and *Salmonella* infection. It gives advice to policy makers and medical professionals at local, regional, national and international levels.

Independent Scientific Advisory Committees

These are composed of a number of scientific experts in the field of food safety and may also include consumer representatives, members of other interest groups, and members of the public. The main committees are: The

Advisory Committee on the Microbiological Safety of Food, the Scientific Advisory Committee on Nutrition, and the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment.

National Media

The Internet allows easy access to archived feature collections and special reports on various topics of public interest. This approach provides a far greater breath and depth of information than a cuttings collection.

The Guardian has a constantly updated archive on food safety (www.guardian.co.uk/food) with comprehensive coverage of issues such as food labelling, restaurant hygiene, supermarkets and health issues.

The Institute of Food Research

(www.ifrn.bbsrc.ac.uk)

Sponsored by the Biotechnology and Biological Sciences Research Council, IFR carries out

research in three main areas: food safety, diet and health, food material and ingredients.

The Institute of Food Science & Technology

(www.ifst.org)

The Institute is an independent professional body for food scientists and technologists. One of its purposes is to serve the public interest by applying science to the supply of safe,

wholesome, nutritious and attractive food. (*The IFST's website has won several awards for the quality of its science content.*)

The Consumers' Association

(www.which.net)

The consumers' watchdog produces surveys and reports on various aspects of food safety, and campaigns for changes in the law to protect the general public. Of particular interest in the food safety context is the

Association's *Fit to Eat* campaign, which is urging everyone across the food chain from 'plough to plate' (similar concept to the Food Standards Agency's 'farm to fork') to 'clean up their act'.

The food retailers

(supermarkets, small grocers, greengrocers, butchers)

Sainsbury's, for example, has a section on food safety on its website (www.sainsburys.co.uk/foodsafety) which explains measures it takes to protect its

customers, and its image, such as temperature monitoring, labelling, staff training and their food safety team.

The organic movement

Proponents claim that organic food is better for your health than food produced by more intensive means. The Soil Association (www.soilassociation.org) is one of the bodies which certifies organic produce. It campaigns for organic agriculture and

forestry, both in the UK and worldwide. The Henry Doubleday Research Association (www.hdra.org.uk) promotes organic gardening; pupils may find this easier to relate to than large-scale agriculture.

Sustain

Sustain for Better Food and Farming is an umbrella grouping of more than 100 bodies – farmers, consumers, health and

environmental groups. Its aim is to promote more sustainable agricultural practices in the UK and worldwide.

(www.sustainweb.org/homefra.htm)