

# An Evidence Review of Public Attitudes to Emerging Food Technologies – Executive Summary

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# 1 Why the study?

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In September 2008, the FSA commissioned Brook Lyndhurst to conduct a fast-turnaround evidence review in order to consolidate its knowledge of public opinion on emerging food technologies and ascertain what gaps there were in the research (if any) so that it could think about how these might be filled.

The aim of the review was to establish what was known or, more precisely, what data had been publicly released about the following:

- what the public's views are on emerging food technologies;
- whether views differ depending on the type of technology;
- what shapes the public's views;
- whether different types of people hold different views;
- how views affect behaviour such as food choices;
- how views have changed over time;
- what relevant research is in progress; and
- what the gaps in the research are.

The review was to build on existing in-house work carried out by the FSA and focus in particular on Genetically Modified (GM) foods, novel food processes, food irradiation, nanotechnologies, animal cloning, functional foods and synthetic biology.

## 2 How the evidence review was conducted

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The review was conducted as follows:

1. In a first instance, a broad search for relevant materials using a range of on-line sources generated over 400 (mainly academic) references meeting the agreed criteria<sup>1</sup>.
2. We prioritised these sources to identify which should be formally reviewed.
3. We then read and fully documented some 105 articles.
4. This review of published sources was complemented by contacting a range of people working in the field to ensure that we had uncovered the most relevant material and would be made aware of any research that was in the pipeline.

## 3 What we found

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### 3.1 The strength of the evidence

Although there is a large body of evidence available on public attitudes to GM foods, evidence on the other technologies reviewed is a lot more limited. In particular, where technologies are used for other applications as well as food (i.e. nanotechnologies, animal cloning and synthetic biology) data on food applications are relatively scarce.

Where data are available, their quality is variable. Studies on functional foods and novel food processes tend to be based on particular products and be very geographically limited and, overall, there is a shortage of large, nationally representative studies, of cross-national research, of longitudinal data and of high-quality qualitative work.

### 3.2 The public's views

Overall, the public was found to be wary, uneasy and uncertain about emerging food technologies. Having said this, emerging food technologies tend not to be top-of-mind concerns and, across the technologies that we looked at, people tend not to have strong opinions. Nevertheless, where technologies have many applications,

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<sup>1</sup> For further details of the inclusion criteria, please see Appendix A of the main report.

food is often seen as the least acceptable (e.g. GM, cloning) and people often seem unconvinced of benefits (e.g. use of nanotechnologies in food).

Awareness of emerging food technologies is generally low, and the concept of 'functional foods' and food applications in synthetic biology seem virtually unknown. The exceptions to this are GM and cloning which most people have heard of, at least in the UK<sup>2</sup>. Nevertheless, people may not realise that they are consuming GM foods, even in the US where GM foods are widely available, and awareness certainly does not mean that people feel confident in their knowledge about these technologies.

On the whole attitudes towards novel food technologies in the USA and in Asian and developing countries seem to be more positive than they are in Europe. There are differences even amongst European attitudes though.

### 3.3 Differences according to technologies

Few studies directly compare the technologies to each other, but the evidence does suggest differences in how they are perceived:

- attitudes are most positive towards functional foods, and it is suggested that this is due to clear consumer benefits and low perceived risk;
- the technologies which give rise to the most concerns are GM and animal cloning, closely followed by synthetic biology (although no data specific to food is available in the case of the latter). These technologies seem to elicit particular moral and ethical concerns and represent the greatest departure from what are perceived to be 'natural' or 'traditional' foods;
- irradiation provokes responses of wariness and is a technology for which there is low understanding.

### 3.4 What shapes the public's views

The review uncovered a great deal of information about what shapes the public's views and the following factors are seen as particularly important:

- **Weighing up risks and benefits:** although the evidence suggests that the majority of people are 'moderately risk tolerant', one of the big issues is whether they feel they have any control over their exposure to risk.
  - Perceived risks tend to centre on health, uncertainty, and, in the case of biotechnologies, on environment. There is some suggestion that health risks carry more weight than environmental ones.
  - People often fail to identify any benefits to emerging food technology, but where they do they have to be tangible and direct in order to figure in their evaluations. Health, environment, and impacts on developing countries are seen as the main benefits where they are identified.
- **General attitudes:** Given a lack of knowledge about emerging food technologies, people seem to rely on their pre-existing knowledge and values to form judgements about the technologies they are questioned on. Indeed, general attitudes are often found to be the most important drivers of attitudes towards the new technologies looked at. Among these:
  - attitudes towards science;
  - cultural values/ world outlook;
  - attitudes towards health and nutrition;
  - attitudes towards food.
- **Emotion:** In a research situation, limited knowledge and pre-existing values combine to cause affective or emotional responses to the idea of particular technologies. In many cases, people tend to form negative associations and are inclined to assume the worst. Studies have found that the language of technologies, perceptions of their 'naturalness', and the products that they are applied to all contribute towards this. In particular, there is a 'hierarchy of acceptability' with applications to humans and large animals being least acceptable and micro-organisms being the most acceptable.
- **Prior knowledge and effects of information:**

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<sup>2</sup> Awareness levels in the UK are at 94% and 81% respectively according to figures from the Eurobarometer (2008) and work by Blaine et al (2006).

- prior knowledge about a technology can be an indicator of support, and is often linked to positive attitudes.
- the effects of new information can be both positive and negative, depending on the nature of the information given. The relationship between information and attitudes is not a simple one though – it is mediated by pre-existing knowledge, values and associations which lead to a biased assimilation of new information.
- although there is evidence to suggest that negative information carries more weight, there is also evidence to suggest that people are more likely to accept a viewpoint from a source of information which shares a similar outlook to theirs.
- **Trust:** In general, higher levels of social trust are associated with more positive attitudes towards novel food technologies overall. The review highlighted that:
  - the media, government and industry tend to be the least trusted sources of information about emerging food technologies (and people are particularly sceptical about the motives of 'big business'), but trust in these institutions does vary according to location (e.g. US consumers have higher levels of trust in their regulator than European consumers);
  - people expect to rely on 'experts' (scientists and regulators) to make decisions for them, but at the same time do not trust them;
  - the most trusted sources of information on these issues are friends and family, and, where relevant, health professionals.

### 3.5 Do different people hold different views?

Few links have been found between attitudes to emerging food technologies and standard demographic characteristics.

- The most consistent finding is that women are more concerned, less positive and likely to perceive fewer benefits in these technologies than men (with the exception of attitudes towards functional foods). There is also some evidence that levels of concern may be higher in older people (although functional foods are again an exception).

Overall, values, attitudes, beliefs and experience are seen as better predictors of attitudes than socio-demographics. Alternative population segmentations have been developed with this in mind (e.g. see Cormick, 2007).

### 3.6 The effect of views on behaviour and purchasing choices

While evidence suggests that intention to purchase is directly related to attitudes towards particular technologies and data exist in some areas to support the link between intention to purchase and purchase decisions (e.g. in function foods), stated intentions are generally seen to be an unreliable guide to actual behaviour. Various reasons are given for this – for example:

- respondents often answer surveys as citizens rather than consumers. This means that price, for example, becomes absent from stated preferences;
- in survey situations, consumers with negative attitudes state that lower cost would not be a strong enough benefit to convince them to buy products (which is not necessarily true).

In reality, the production technique only forms a small part of factors taken into account in purchasing decisions. Others include price, taste, convenience, expectation of enjoyment and so forth. It was stressed that consumers bought particular products rather than the technologies that went into making them, and only testing attitudes on a product-by-product basis would provide an accurate assessment of likely purchasing choices.

### 3.7 How views have changed over time

We found a lack of longitudinal data on emerging food technologies. Nevertheless, we can say that public attitudes have generally remained ambivalent, and that although there have been some cycles of volatility, during the time period covered by this review (1999 – 2008), changes have occurred within a parameter of most people remaining neutral, undecided, and slightly wary.

Short term changes in awareness and attitudes seem to be related to particular periods of media attention, and media reporting has tended to be somewhat negative. At the same time, people are most suspicious of the

least familiar technologies and, in both survey and field research, growing familiarity has been linked to increased levels of acceptability.

### 3.8 What research is in the pipeline

We are aware that many applications for funding of pertinent research have been made to the European Commission's seventh framework programme – notably, for work on cloning and nanotechnologies. However, decisions about grant allocations are still pending. Beyond this, relevant research is currently underway on:

- GM – in particular, work on perceptions of GM animals and longitudinal research on implicit and explicit attitudes towards GM;
- Cloning – pan-European work on consumer acceptance of biotechnology and cloning in animal production
- Nanotechnologies – various studies looking at how consumers weigh up the risks and benefits of these technologies and the psychological underpinning of differing attitudes.

## 4 Recommendations

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- We found very limited data on how attitudes towards any of the technologies we looked at had changed over time. To counter this, **we would recommend placing a few questions on a yearly or six-monthly tracker survey and ensuring that question wording remains unchanged.**
- There is a growing understanding that people have different concerns and preferences and set the information they receive about new technologies in different personal contexts. **With this in mind, we feel there would be benefit in a) differentiating populations based on values and b) further examining the drivers of difference.**
- Studies have repeatedly found that a large proportion of the population are undecided about novel food technologies. **Examining the source of indifference in further detail would seem a priority.**
- Many of the studies we looked at were based on small samples from quite narrow populations and tended not to combine qualitative and quantitative research. **We feel there would be a great deal of merit in testing emerging findings with nationally representative populations, and combining this work with qualitative research to reach a deeper understanding of why particular results may have come about.**
- There is a lack of good qualitative work examining the links between underlying values, expressed attitudes and actual behaviours. **We very much feel that further qualitative work needs to be undertaken in this area.**
- We feel we would benefit from stronger research into purchasing behaviour, particularly in the European context. In order to do this, **we would recommend field experiments involving simulated purchasing with a range of products.**

Finally, we would highlight the relationship between – on the one hand - rational, scientific, factual, evidence-based perceptions and understandings; and emotional, irrational, ethical, values-based perceptions on the other. In the context of public attitudes towards novel food technologies both perspectives are real and valid – there is no right or wrong *per se*. Any organisation seeking to pursue public engagement around novel food technologies will need to respect this reality and adopt a neutral stance.