

NIA Comment

on the UK House of Lords Science and Technology Select Committee Call for Evidence: Nanotechnologies and Food

Background

The NIA, Nanotechnology Industries Association (NIA), is the market-independent, responsible voice for the industrial nanotechnologies supply chains; it supports the ongoing innovation and commercialisation of the next generation of technologies and promotes their safe and reliable advancement.

The NIA stands for science- and technology-based expertise in nanotechnologies, encompassing members companies that have successfully developed and commercialised nanotechnologies for over 25 years.

Through proactive collaborations with regulators on the national, European and international level, as well as engagement with other nanotechnology stakeholders, the NIA promotes a framework of shared principles for the safe, sustainable and socially supportive development and use of nanotechnologies, by securing a publically and regulatory supportive environment for the continuing advancement and establishment of nanotechnology innovation.

On the 15th December 2009, the House of Lords Science and Technology Select Committee appointed a sub-committee [Sub-Committee I], to investigate the use of nanotechnologies in the food sector.¹

The Committee intends to focus on the following areas: food products, additives and supplements; food contact packaging; food manufacturing processes; animal feed; pesticides and fertilisers; and products that may come into contact with food, such as food containers and cooking utensils. The Committee will not be considering what happens to nanotechnologies and nanomaterials when they become waste products, or their potential impact on the environment.

On the 3rd February 2009, the Sub-Committee launched an inquiry was into the use of nanotechnologies and nanomaterials in the food sector, inviting the submission of evidence to the questions below.

¹ Follow this link to the House of Lords website, in order to find out more about the members of Sub-Committee I:
http://www.parliament.uk/parliamentary_committees/lords_s_t_select/st1members.cfm.

State of the science and its current use in the food sector

- What are the main potential applications and benefits of nanotechnologies and nanomaterials in the food sector, either in products or in the food production process?
 - *Nanotechnologies are enabling technologies, which help to improve existing products and enable the development of entirely new applications and products; the (potential) applications of nanotechnologies in the food sector include:*
 - *Improved barrier material in food & drinks packaging (i.e. enabling better/longer safe storage and transport of food & drink, preventing premature perishing of food & drink, enabling longer retention of flavours and gas content)*
 - *Smart packaging materials, which enable real-time indication of potential perishing of a food/drink (i.e. gas detector with colour indicators, etc.)*
 - *Anti-fouling and anti-stick coating on food/drink processing surfaces (i.e. enabling a reduction of water- and detergent-use in food/drink processing plants)*
 - *Anti-microbial surfaces reducing food contamination*
 - *Nanomaterials are one product of nanotechnologies; the (potential) applications of nanomaterials in the food sector include:*
 - *Increased solubility compared to macroscale particles of the same substance (i.e. enabling increased flavour with lower levels of ingredient, such as salt)*
 - *Encapsulation of vitamins and other food additives (cf. nutraceuticals), preventing the premature degradation of the additive upon ingestion*
 - *Solubility modification of macroscale materials, enabling a change in bioavailability of beneficial substances*
 - *Improved functionality of ingredients enabling lower levels of additives giving cleaner labelling*
 - *Improved control of texture, taste and stability of processed foods*

- What is the current state of the market for, and the use of, food products and food production processes involving nanotechnologies or nanomaterials, either abroad or in the UK?
 - *A few sources of information on the current state of the market for nanotechnologies and nanomaterials in food & drink:*

- *'Nanotechnology in Agriculture and Food' (Nanoforum report, 2006)*²
 - *'Nanotechnology in Agriculture and Food' (Project on Emerging Nanotechnologies, Woodrow Wilson International Center for Scholars, 2006)*³
 - *'Study: Nanotechnology in Food and Food Processing Industry Worldwide 2006-2010-2015' (Helmut Kaiser Consultancy, 2006)*⁴
- What might the 'next-generation' of nanotechnologies and nanomaterials look like? How might they be applied in the food sector, and when might they enter the market?
 - *See above*
 - What is the current state of research and development in the UK regarding nanotechnologies and nanomaterials which have or may have an application within the food sector? How does it compare to research and development in other countries?
 - *There are ongoing research and development activities conducted by University labs (part-funded by public funding, and part-funded by industry), in enterprises focussed on nanotechnology, or on food/drinks innovations, as well as in the labs of large multinational companies.*
 - What are the barriers to the development of new nano-products or processes in the food sector?
 - *Public perception: Both large and small companies fear a consumer backlash, if the benefits of using nanotechnologies and nanomaterials in food, drinks and food processing cannot be communicated adequately.*
 - *Regulatory threats & lack of guidance on potential approval hurdles: Enterprises and small companies, which are sometimes conducting contractual research for larger companies, fear that a backlash on the use of nanotechnologies in the food sector, or, indeed the introduction of a demanding and costly approval process will render their companies' core technologies non-viable.*

² *'Nanotechnology in Agriculture and Food' (Nanoforum report, 2006)*

<http://www.nanoforum.org/dateien/temp/nanotechnology%20in%20agriculture%20and%20food.pdf>

³ *'Nanotechnology in Agriculture and Food' (Project on Emerging Nanotechnologies, Woodrow Wilson International Center for Scholars, 2006)*

http://www.nanotechproject.org/news/archive/new_report_on_nanotechnology_in/

⁴ *'Study: Nanotechnology in Food and Food Processing Industry Worldwide 2006-2010-2015' (Helmut Kaiser Consultancy, 2006):* <http://www.hkc22.com/Nanofood.html>

Health and safety

- What is the current state of scientific knowledge about the risks posed to consumers by the use of nanotechnologies and nanomaterials in the food sector? In which areas does our understanding need to be developed?
 - *The use of nanotechnologies as an innovation to processing methodologies and tools, as well as the use of nanotechnology-enabled smart packaging and food-safety screening detector and sensors does not create any new properties in the final food/drink product; therefore, risk assessments apply as before.*
 - *Nanomaterials are currently not used in food & drink in Europe (NOTE: this does not include products available over the internet).*

- Is research funding into the health and safety implications of nanotechnologies and nanomaterials in the food sector sufficient? Are current funding mechanisms fit for purpose?
 - *'Nanotechnologies' should be excluded from this question (see above – i.e. 'The use of nanotechnologies as an innovation to processing methodologies and tools, as well as the use of nanotechnology-enabled smart packaging and food-safety screening detector and sensors does not create any new properties in the final food/drink product; therefore, risk assessments apply as before.')*
 - *For Nanomaterials:*
 - *Research funding is needed, but needs to be aligned with other, ongoing programmes of research into similar areas (cf. FP7 Programmes, other national initiatives, such as in Germany (see Fraunhofer Institute))*
 - *Research must be coordinated; test protocols must be agreed.*

- Can current risk assessment frameworks within the food sector adequately assess the risks of exposure to nanotechnologies and nanomaterials for consumers? If not, what amendments are necessary?
 - *'Nanotechnologies' should be excluded from this question (see above).*
 - *For Nanomaterials:*
 - *Yes. The current RA methodologies have been reviewed; they have been found to be generally adequate to cover RA on nanomaterials in the food sector, BUT agreement on the following desperately needed:*
 - *Test protocols*
 - *Sample handling*
 - *Dosimetry*
 - *Exposure scenarios*

- *Exposure assessment*
 - *Testing of (commercially) relevant nanomaterials*
 - *Research, conducted in the absence of the above agreements, will only increase confusion, mixed messages and will ultimately increase the possibility of a backlash.*
- Are the risks associated with the presence of naturally occurring nanomaterials in food products any different to those relating to manufactured nanomaterials? Should both types of nanomaterials be treated the same for regulatory purposes?
 - *The risks associated with engineered nanomaterials should not be different from those associated with naturally occurring nanomaterials (given that it is the transport mechanism of insoluble material that causes the biggest uncertainties).*
 - *HOWEVER, it needs to be clarified, if (and when) a naturally occurring nanomaterial becomes an engineered nanomaterial (i.e. do processing/manufacturing steps, such as harvesting/mining, isolating, purifying, etc., turn a naturally occurring nanomaterial into an engineered/manufactured materials).*

Regulatory framework

- Is the regulatory framework for nanotechnologies and nanomaterials fit for purpose? How well are imported food products containing nanotechnologies and nanomaterials regulated?
 - *On the 17th June 2009, the European Commission released a Review of the 'Regulatory Aspects of Nanomaterials', which concluded that 'current legislation covers to a large extent risks in relation to nanomaterials and that risks can be dealt with under the current legislative framework.' This conclusion is true for products of the food sector, which have to adhere to the safety requirements laid out in the relevant directives (e.g. Novel Food Directive, Product Safety Directive).*
 - *The European Commission highlighted that guidelines were needed, in order to clarify approval processes of (food) products containing nanomaterials (i.e. if/and how additional data requirements are triggered upon the use of nanomaterials in a product). The nanotechnology industries agree that guidance for implementation is required.*
- How effective is voluntary self-regulation either in the UK or EU or at an international level? What is the take up by companies working in the food sector?

- *The NIA worked very closely with DEFRA on the UK's Voluntary Reporting Scheme; all industry submissions have been made by NIA Members, most of them through the NIA as an agent.*
 - *DEFRA was never able to say, how many submission were expected to be received in two years, and the 10 submissions that had been received were openly called a 'disappointment'. However, DEFRA representatives have now repeatedly said that the low quantity of submissions seems to be 'commercial reality'.*
 - *One major problem of voluntary reporting schemes is the high requirement of staff time to complete the onerous questionnaires, without any visible benefits.*
- Will current regulations be able adequately to control the next generation of nanotechnologies and nanomaterials?
 - Is there any inter-governmental co-operation on regulations and standards? What lessons can be learned from regulatory systems in other countries?
 - *The OECD is running two working parties on nanotechnologies:

 - *The Working Party of Manufactured Nanomaterials (WPMN) (established October 2005) is concerned with the safety aspects of nanomaterials; this WP has recently started a multinational Sponsorship Programme on the Safety Testing of Manufactured Nanomaterials: 14 internationally agreed, commercially relevant manufactured nanomaterials will be tested, and testing protocols developed.**

Public engagement and consumer information

- What is the current level of public awareness of nanotechnologies, and the issues surrounding the use of nanotechnologies and nanomaterials in the food sector? What is the public perception of the use of such technologies and materials?
 - *There is little understanding in the public domain of the use and benefits of either nanotechnologies or nanomaterials; the public is very vulnerable to science-fiction stories, without realising that our daily food (i.e. milk, tea, etc.) is based on natural nanomaterials.*
- How effective have the Government, industry and other stakeholders been in engaging and informing the public on these issues? How can the public best be engaged in future?
 - *Governments and industries are adamant not to allow nanotechnologies and nanomaterials become another 'GMO' (i.e. public backlash against the technology), but the lessons learnt have let to little action so far: industrial companies are still concerned to be the first one to 'stick the neck out' by publically engaging in the debate, and Governments have done little to run 'generic'*

stakeholder engagement programmes, which do not highlight a particular company.

- *The UK Government funded one of the most comprehensive reviews of public engagement in nanotechnologies,⁵ without actually conducting public engagement itself. Now, that the review has recommended, how it should done, Government should step up and run public engagement programmes that are delivering balanced risk-benefit communications.*
- What lessons can be learned from public engagement activities that have taken place during the development of other new technologies?
 - *The public needs to be trusted to understand technical details, but they also need help to understand the concepts of (a) very low risk potential, and (b) very low exposures.*
- Should consumers be provided with information on the use of nanotechnologies and nanomaterials in food products?
 - *Consumers should be given an opportunity to understand the benefits of nanotechnologies and nanomaterials.*
 - *Consumers need to be provided with information, but labelling is not necessarily the best way to provide balanced information – it often raises concern and causes confusion.*

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The NIA and its member companies thank you for the opportunity to provide these comments.

⁵ The Nanotechnology Engagement Group (<http://www.sciencewise-erc.org.uk/cms/nanotechnology-engagement-group-reports/>)

The Nanotechnology Industries Association

Formed in 2005 by a group of companies from a variety of industry sectors including healthcare, chemicals, automotive and consumer products, the [Nanotechnology Industries Association](http://www.nanotechia.org) (NIA) creates a clear single voice to represent the diverse industries in the multi-stakeholder debate on nanotechnologies.

The NIA provides a purely industry-led perspective, derived from the views of the collective membership and forms an interface with government, acting as a source for consultation on regulation and standards, communicating the benefits of nanotechnologies and interacting with the media to ensure an ongoing advancement and commercialization of nanotechnologies.

For further information visit <http://www.nanotechia.org> or contact us on enquiries@nanotechia.org.

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