

ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES**NANOPARTICLES IN FOODS****ISSUE**

Concerns regarding the use of nanoparticles in food were raised from the floor at the ACNFP annual open meeting on 24 November 2004. These were discussed briefly by the Committee at its closed meeting on 25 November 2004 and Members noted that this issue should be included in the agenda for a future meeting. The Committee is asked to comment on relevant issues related to nanoparticles in food and identify aspects that may require further discussion.

BACKGROUND

1. Nanotechnology as a collective term refers to technological developments on the nanometre scale. A nanometre (nm) is one thousand millionth of a metre. For comparison, a single human hair is about 80,000nm wide, a red blood cell is approximately 7,000nm wide, the diameter of a haemoglobin molecule is 6nm and a single atom is about 0.2nm wide. There is an interest in nanoparticles (usually defined as 100nm down to the size of atoms) because at that size, the properties of materials can be very different from those at the larger scale.
2. Nanoparticles are not new. Chemists have been making polymers, large molecules made up of nanoscale subunits, for many decades. Nor has there been a sudden step change down to the nano scale. Instead, the ability of scientists and manufacturers manipulate and apply nanoparticles has developed over time.

Royal Society / RAE report

3. Members will wish to be aware of the recent publication of a Royal Society and Royal Academy of Engineering report entitled "Nanoscience and Nanotechnologies: Opportunities and Uncertainties". This report highlights the immediate need for research to address uncertainties about the health and environmental effects of nanoparticles (representing one small area of nanotechnologies). It also makes recommendations about the regulation of nanoparticles. Annex 1 contains the summary of the report¹.
4. Of particular relevance to the ACNFP, are the conclusions:
 - That the toxicity of chemicals in the form of free nanoparticles and nanotubules cannot be predicted from their toxicity in larger form and that in

¹ The full report is available at <http://www.nanotec.org.uk/finalReport.htm>.

some cases they will be more toxic than the same mass of the same chemical in larger form;

- That regulatory bodies and their respective advisory committees include future applications of nanotechnology in their horizon scanning programmes to ensure any regulatory gaps are identified at an appropriate stage.

5. The Government is expected to publish its response shortly, in which it will set out its agenda on nanotechnologies.

ETC report

6. In November, the environmental group ETC published a report “Down on the Farm: The Impact of Nano-scale Technologies on Food and Agriculture”² which identified a number of current and projected uses of nanoparticles in food manufacture. These included

- The current practice of using nano-scale carotenoids as colourings in lemonades, fruit juices and margarines. The small particle size improves dispersion and stability of the ingredient.
- The current practice of micro-encapsulating nano-scale active ingredients in functional foods, for example when adding fish oils to bread. The oils are released from the micro-capsules in the stomach and so do not impair the taste of the product.
- The projected practice of using oxygen impermeable coatings on confectionery, made from nano-scale silicon dioxide, to improve shelf life

The conclusions in this report included

- That national governments must establish a *sui generis* regulatory regime specifically designed to address the unique health issues associated with nano-scale materials used in food
- That in keeping with the Precautionary Principle, all food, feed and beverage products (including nutritional supplements) incorporating manufactured nanoparticles should be removed from the shelves until such time as regulatory regimes are in place that take into account the special characteristics of these materials, and until the products have been shown as safe.

COT discussions

7. At its meeting in September 2004, the Committee on Toxicity considered the implications of nanotechnology for the chemical safety of foods. The COT concluded:

² The full report is available at <http://www.etcgroup.org/article.asp?newsid=485>

“Nanoscience/nanotechnology is a new and rapidly emerging technology and as such there are divergent views on the potential for human health risks. Theoretical concerns have been raised by some individuals about the possibility of risks associated with oral or dermal exposure, as well as with inhalation. Members agreed that there is a need for critical evaluation of the basis for these concerns and development of evidence to support conclusions. It was noted that there are many diverse applications of nanotechnology, and it should not be assumed that risks would be generic to all of them.

Although the Royal Society report raised theoretical concerns, almost no studies had been identified providing conclusive evidence that nanotechnology was capable of changing the toxicity of chemicals. However, some recent research had shown the potential for transplacental transfer of nanoparticles. Members agreed that they would welcome future discussions of specific applications of nanotechnology.”

COMMITTEE ACTION REQUIRED

8. Members are invited to comment on issues related to nanoparticles in food and advise on aspects that may require further discussion.

**Secretariat
January 2005**

Annexes attached:

Annex 1: Royal Society and Royal Academy of Engineering Report:
Nanoscience and Nanotechnologies: Opportunities and
Uncertainties - Summary. July 2004

Available on request:

- ETC Report: Down on the Farm: The Impact of Nano-scale Technologies on Food and Agriculture. November 2004

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