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# Food applications of nanoscience and nanotechnologies

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25th-26th October 2007

*1st Annual Nanotechnologies Safety for Success  
Dialogue Nanotechnology in Food*





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# Overview of the Presentation

- Presentation of CIAA and its members
- General remarks on Nanotechnology
- Possible use by the food industry
- The challenges
- A new risk assessment paradigm?
- Regulatory environment
- Communication and consumer acceptance
- Vision of food and drink industry
- Conclusions and recommendations

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## CIAA Role and Mission

- The voice of the European food and drink industry
- Represents the interests of the food and drink manufacturing industries in the EU
- Contributes to the creation of the most favourable economic and legislative environment for the development of the food and drink industry
- Promotes a dynamic and responsible food & drink industry



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## CIAA Members

- **COUNTRIES**  
25 National Food Industry Federations, including observers from Norway, Romania, and Turkey
- **SECTORS**  
30 European Sector Associations
- **COMPANIES**  
20 Large Companies producing in the EU



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# What is nanotechnology?

- Nanotechnology:  
Technologies which enable development of a new product and/or process properties through the intentional and controlled reduction of material dimensions to the nanometer scale
- Nano is derived from the Greek word for dwarf:  
A nanometre is 1/1000,000,000 metre or ~ 1/100,000 of the width of a human hair
- Nanoparticle defined as <100nm in one dimension
- New technologies that have the potential to bring new benefits to food products



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# Food applications of nanotechnologies & nanoparticles

- Naturally occurring nanoparticles can be found in many existing food products e.g. milk & fruit juices
- Some man-made nanoparticles do have a history of safe use in food e.g. emulsions & powders
- Food industry sees great potential that nanotechnologies can bring to the industry. For example to improve:
  - food quality, packaging & transport;
  - taste & sensory properties of food
  - functional foods;
  - seed production;
  - pesticides.

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# Food applications of nanotechnologies & nanoparticles

- Some patents on use of nanotechnology in food are out in the public domain, others patents are applied for
- BUT - to the best of CIAA knowledge, there is hardly any use of nanotechnologies in food and drink manufacture in Europe at present.
- Interest in the potential application of these technologies is mainly at the research and development stage.
- The Food & Drink Industry in its strategic research agenda (ETP Food for Life) identifies research areas in nanotechnology for years 2010-2020

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## The Challenges

- Challenge 1: Nanotechnology has potential to deliver new innovations in Food & Drink industry in Europe but we must be given the opportunity to explore and utilise this new technology
- Challenge 2: A new risk assessment paradigm?
- Challenge 3: Regulatory environment
- Challenge 4: Communication and consumer acceptance

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# A new risk assessment paradigm?

- How do we assess the safety of nanotechnology/nanoparticles?
- Reviewed by experts in Europe e.g. SCENIHR
- Current approaches to hazard identification and risk assessment can be used to assess the risks with the use of nanotechnology *but* with some modification
  - Expression of dose
  - Utilisation of cell based assays for assessment of cytotoxicity, oxidative stress, mediator release to help inform any in vivo testing
- Food and drink industry can contribute to the debate on how we assess the safety of nanotechnology but to help ensure consumer confidence in the technology risk assessors e.g. EFSA should express a view in public on a road map to assess possible hazards of nanotechnology

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# Regulatory Environment

- Some potential uses of nanotechnologies in food manufacture and processing might require independent safety assessment by regulatory body in Europe e.g. EFSA, **BUT** need clarification on
  - What is the definition/criterion to be used, and what are risk managers seeking to regulate?
  - If based on particle size, how is a distinction to be made between a particle of that size which is naturally present, whether beneficial or not, and in the case of a milled product, what proportion of the product would have to be of nanoparticle size in order to fall within the definition /criterion?
  - If naturally present at the nanoscale, how does this differ from manufactured particle size?



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# Regulatory Environment

- Does anything cause the product/substance/ingredient to behave differently if a new process is applied?
- If differences relate to chemical composition, these would need to be reviewed.
- Strategy for hazard identification to address specific nanotechnology-related aspects, should be addressed via additional guidelines



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# Regulatory Environment

- The food area in Europe is one of the most regulated areas that exists
  - General principles of food law “Food shall not be placed on the market if it is unsafe” (Article 14(1), Regulation 178/2002)
- Several existing pieces of legislation that can potentially cover nanotechnology
  - Novel foods and processes
  - Food additives
  - Food contact materials
  - Other areas:
    - Hygiene
    - Pesticides
    - Veterinary Medicines



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# Regulatory Environment

- There is no need to have specific nanotechnology legislation
  - But it is important to look at existing legislation and adapt if deemed necessary
- Regulatory framework should be flexible enough and appropriate to scientific progress
- Legislation should be combined with guidelines on properties that trigger the need for regulatory review
- Guidance also required on hazard characterisation, exposure and risk assessment
- Intellectual property confidentiality issues need to be addressed
- Coherence between different pieces of legislation both at EU and global levels is necessary



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# Communication and consumer acceptance

- Comparisons with GMO debate inevitable but stakeholders must utilise the learnings from the GMO debate
- Nanotechnology has the potential to deliver consumer benefits e.g. intelligent packaging systems signalling food spoilage
- Public should be informed on research activities in the nano-food area as appropriate (ETP Food for Life, Strategic Research Agenda 2007-2020)
- Active dialogue should take place between stakeholders i.e. food industry/ risk assessors/ regulators/consumers on use of nanotechnology on food
- Communication strategies should be developed & implemented which address not only the science behind the technology but also risk perception



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# The Vision of the Food and Drink Industry

- Nanotechnologies have the potential to deliver new innovations in the food and drink industry
- Nanotechnologies should be used in a responsible way
- Cautious approach to the introduction of Nanotechnology products into food structure, manufacture and production
- Management of potential risks requires the investigation by scientists and technologists, but also legislators and politicians as needed and appropriate

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## Conclusions & recommendations

- Most uses of nanotechnologies should lead to improved food materials but many applications will use permitted materials and processes & therefore are unlikely to require new regulation
- The production of a road-map integrating safety aspects and competitiveness in nanotechnologies is required.
- Strengthening of coordination and stakeholder dialogue to prevent GMO-type debates is also required
- If specific regulatory measures are required or existing regulations adapted then “Nanotechnology” should be clearly defined to include the “property” which the use of this technology imparts, as well as particle size and application/end use



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# Where to find more information about CIAA



**CIAA Public Website**  
**<http://www.ciaa.be>**

Access to news and positions

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