

## **Delphi survey on the risks of nanotechnology applications in food, cosmetics and consumer products**

BfR Project Description, 1 February 2006

The early detection of health risks in consumer-related areas is the responsibility of the Federal Institute for Risk Assessment (BfR) and is part of its daily work. In this context the subject nanotechnology is also of relevance for BfR. New materials manufactured using nanotechnology are increasingly finding their way into production processes and consumer products. Hence in 2006 BfR carried out the interdisciplinary research project “Delphi survey on the risks of nanotechnology applications in food, cosmetics and consumer products”. The goal of this project was to prestructure the technology area, nanotechnology, on the basis of potential risks through the involvement of various social groups and, in this way, to lay the foundations for future BfR risk assessments of nanotechnology applications. The Delphi approach was adopted in this work. This method is frequently used for the purposes of a technology forecast but also for the early detection of unclear risks of new technologies. It is based on structured group surveys and draws on the information participants already possess.

In the Delphi survey around 70 experts from research, industry, public authorities and non-governmental organisations were systematically questioned in two survey rounds about the potential risks of nanotechnology for consumers. The feedback from the first round gave the experts an opportunity to compare their personal impressions with the range of opinions held by the participants. The project recorded nanomaterials that are already being or could potentially be used, and assigned them to concrete applications. Based on the available knowledge on exposure and hazards, the applications were then classified according to the level of probable risk and strategies for risk reduction were developed. In two later expert workshops the results were analysed and compiled in a risk barometer.

### **Project management agency**

BfR

**Department:** Risk Communication

**Unit:** Risk research, perception, early detection and impact assessment

### **Co-operation partner**

ZIRN – Centre for Interdisciplinary Risk Research and Sustainable Technology Development at Stuttgart University

### **Project term**

02/2006-12/2006

### **Funding agency**

BfR

In 2006 the Federal Institute for Risk Assessment (BfR) carried out a Delphi survey on the risks of nanotechnology in food, cosmetics and consumer products. Some parts of the study were carried out in co-operation with the Centre for Interdisciplinary Risk Research and Sustainable Technology Development (ZIRN) at Stuttgart University.

A total of 100 experts were asked to identify and assess the potential risks of nanotechnology applications in food, cosmetics, surface coatings and textiles. One-third of

the participants came from industry (basic materials manufacturers, users from the food, cosmetics, textile and surface industries, associations), one-third from scientific institutions (basic and application-driven research) and one-third from institutions that deal more with the risks of nanotechnology (public authorities, environmental organisations, consumer protection associations, trade unions, TA institutions/networks, insurance companies).

In the study the experts forecast a moderate to major increase in consumption of all nanomaterials that are currently being used. Airborne nanomaterials were clearly identified by the experts as the group with a particularly high hazard level. It was extremely important to avoid inhalation exposure to nanomaterials. The vast majority of the experts were, however, of the opinion that a risk potential of nanomaterials could only be identified and assessed in individual cases. To this end, nine general test criteria were elaborated for nanomaterials, too and nine additional nano-specific test criteria in the Delphi study.

The bioavailability of nanomaterials, their persistence and the generally sparse knowledge about these materials were identified as important criteria for extended risk assessment. They should be taken into account in management strategies for risk avoidance and risk reduction, like for instance for the systematic recording of biological effects, the life cycle assessment of nanoproducts and systematic research into interaction between natural and artificial substances.

The experts forecast major growth potential for nanoproducts in the field of surface coatings. Moderate growth was predicted for nanoproducts in the fields of textiles and cosmetics. No major market development was expected for nanoproducts in foods. The experts were of the opinion that the greater market availability of nanoproducts would not lead to new risks for consumers. 22 out of the 30 nanoproducts presented were safe according to the experts. In the case of seven products, minor negative health effects were to be expected. Only in the case of fullerenes in cosmetics were larger negative impacts on human health to be expected. Not one nanoproduct was placed in the category "Major negative health effects".

With the exception of foods the experts assumed that nanoproducts will be accepted by consumers. However, consumers' freedom of choice should be respected. According to the experts, this could lead more particularly to a demand for the labelling of foods containing nanoproducts. What was also important was a timely dialogue with the public at large in order to address critical issues promptly and enable consumers to undertake an informed assessment of the opportunities and risks of nanotechnology applications.

Overall the majority of the experts were clearly against a separate "nano-regulation" and in favour of a moderate adjustment of existing rules. Voluntary undertakings by industry met with a high level of approval. Nano-specific workplace assessments and the safety assessment of end products should be part of these voluntary undertakings.

The final report is available and has been published in the *BfR-Wissenschaftsreihe* 04/2009. This publication can be accessed on the Internet on [http://www.bfr.bund.de/cm/238/bfr\\_delphi\\_studie\\_zur\\_nanotechnologie.pdf](http://www.bfr.bund.de/cm/238/bfr_delphi_studie_zur_nanotechnologie.pdf)