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A CONSTRUCTIVE CONTRIBUTION TO THE RESPONSIBLE DEVELOPMENT AND USE OF ENGINEERED NANOMATERIALS

nanoRISK

OPTIMIZING THE BENEFITS OF NANOTECHNOLOGY WHILE MINIMIZING AND CONTROLLING THE RISKS

Insider Report

It appears that nobody knows how much nanomaterials are produced. Researchers in the U.S. attempt to estimate the range of production quantities for five classes of popular nanomaterials - nanosilver, carbon nanotubes, cerium oxide, fullerenes, and titanium oxide.

DOES ANYONE KNOW HOW MUCH NANOMATERIALS ARE PRODUCED?

Life cycle assessment – a cradle-to-grave look at the health and environmental impact of a material, chemical, or product – is an essential tool for ensuring the safe, responsible, and sustainable commercialization of a new technology. With missing data about the large scale impact of nanotechnology, life cycle assessments of potential nanoproducts should form an integral part of nanotechnology research at early stages of decision making as it can help in the screening of different process alternatives. Unfortunately, life cycle studies of emerging nanotechnologies are susceptible to huge uncertainties due to issues of data quality and the rapidly evolving nature of the production processes.

Part of any meaningful results from a life cycle assessment is the total quantity of the material under investigation. Especially exposure assessments often begin with estimates based on total amounts of a material produced with the assumption that some fraction of the material in question will ultimately released to the environment.

As it turns out, nobody – no research institution, no government agency, no industry association – knows even vaguely how much nanomaterials are manufactured today.

"Obtaining estimates on the potential nanomaterial production capacity is like pulling teeth given the uncertainties, proprietary issues, and rapidly changing landscape," says Mark Wiesner, James L. Meriam Professor of Civil & Environmental Engineering at Duke University and Director, Center for the Environmental Implications of NanoTechnology (CEINT). "For that reason it is difficult to pin the potential production values down to even within an order of magnitude. But upper bounds on production amounts, as well as quantification of the uncertainty of production amounts are critical quantities that we need to produce estimates of the potential for exposure to nanomaterials."

In a recent paper in *Environmental Science & Technology* ("Estimating Production Data for Five Engineered Nanomaterials As a Basis for Exposure Assessment"), Wiesner and his group attempt to estimate upper and lower bound annual United States production quantities for five classes of engineered nanomaterials (ENM) – nanosilver, carbon nanotubes (CNTs), cerium oxide, C_{60} fullerenes, and nano titanium dioxide.

Since there is no easy way of obtaining production volumes for manufactured nanomaterials, the team had to take an almost criminalistic approach to gather their data. Accessing a variety of sources, the researchers collected data on product types, production capacity, and various other parameters used as proxies for estimating production volume of engineered nanomaterials in the United States (ignoring the impact of imported and exported nanomaterials). Even with this regional focus the task remained almost impossible; getting a grip on worldwide production volumes, and for all engineered nanomaterials, appears to be, at least for now, entirely out of the question.

"Professional reports provide some quantitative data about ENM markets but typically focus on revenue rather than production" says Wiesner. "Production methods and capacity volumes are often considered proprietary and were rarely shared. When the EPA tested their Nanomaterial Stewardship Program for voluntary data reporting, only two companies

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Several manufacturers are incorporating nano-sized particles of silver into, among other things, garments like socks and shirts to kill bacteria that cause odor. But does the silver stay in the socks or T-shirts?

THE ENVIRONMENTAL FOOTPRINT OF YOUR NANOSILVER T-SHIRT

The use of silver nanoparticles in all kinds of consumer goods in daily use, such as personal hygiene articles, cosmetics, food, refrigerators, protective plant sprays and, above all, textiles, has considerable commercial potential and is increasing all the time. Although over 1000 kilograms of nanosilver is already being used each year in environmentally sensitive areas, extremely little is yet known about its effects on the environment.

Several manufacturers are incorporating nano-sized particles of silver into, among other things, garments like socks and shirts to kill bacteria that cause odor. But does the silver stay in the socks or T-shirts? And what happens to it if it washes out? Also, what is the climate footprint of producing the required nanosilver?

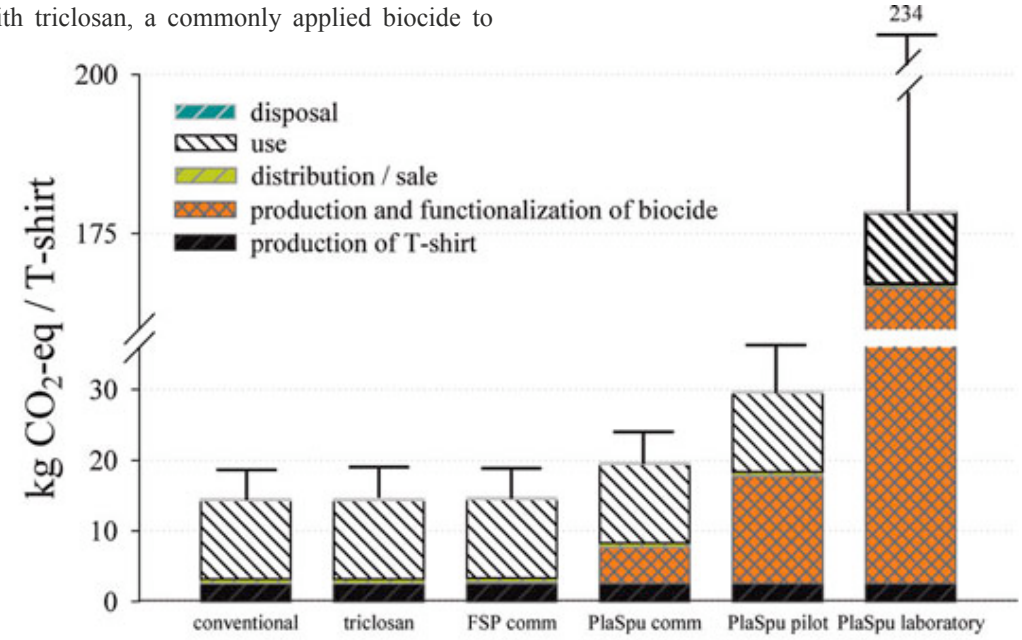
To answer these questions, a group of researchers, led by Stefanie Hellweg, a professor at the Institute of Environmental Engineering at ETH Zurich, have performed a cradle-to-grave life cycle assessment (LCA) to compare nanosilver T-shirts with conventional T-shirts with and without biocidal treatment. For their assessment, the team used conventional T-shirts treated with triclosan, a commonly applied biocide to prevent textiles from emitting undesirable odors.

Reporting their findings *Environmental Science & Technology* ("Prospective Environmental Life Cycle Assessment of Nanosilver T-Shirts"), the team examined two manufacturing processes for nanosilver production and textile incorporation: flame spray pyrolysis (FSP) with melt-spun incorporation of silver nanoparticles and plasma polymerization with silver co-sputtering (PlaSpu). The environmental impacts of conventional, nanosilver, and triclosan T-shirts were compared, with respect to the production, use, and disposal phase.

According to the researchers, "the results show significant differences in environmental burdens between nanoparticle production technologies: The "cradle-to-gate" climate footprint of the production of a nanosilver T-shirt is 2.70 kg of CO_2-equiv (FSP) and 7.67 - 166 kg of CO_2-equiv (PlaSpu, varying maturity stages). Production of conventional T-shirts with and without the biocide triclosan has emissions of 2.55 kg of CO_2-equiv.

The researchers find that FSP and triclosan T-shirts are produced with a smaller climate footprint than are PlaSpu T-shirts: "Distribution/sale and the disposal phase are of minor importance in the life cycle of the T-shirt and could be further lowered by reducing transport distances, avoiding air transport, and increasing energy efficiency in retail outlets."

The use phase (various cycles of washing and drying the T-shirt) pollutes the environment most if commercial technologies are used (assuming that users would wash their nanosilver T-shirts less). "On the contrary, nanosilver T-shirts produced with the non-commercialized PlaSpu technology have higher climate change impacts during production than in use. Greenhouse gas emissions show high sensitivities to washing load and frequency and lower sensitivities to T-shirt lifetime and washing temperature. Of all tested parameters, a reduction or abandonment of tumbling would reduce the climate footprint the most."



Cradle-to-grave climate footprint of biocidal T-shirts and a regular T-shirt (100 washings). Error bars show the upper bound of the 95% confidence interval for the results (Monte Carlo analysis of the inventory; Commercialized = Comm.). (Reprinted with permission from American Chemical Society)

With regard to the toxic impacts of nanosilver versus triclosan, the jury is still out on if and how nanosilver's toxicity impacts the environment. In this study, the researchers believe that toxic releases from washing and disposal in the life cycle of T-shirts appear to be of minor relevance. But: "By contrast, the production phase may be rather significant due to toxic silver emissions at the mining site if high silver quantities are required."

NANOMATERIAL PRODUCED…

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volunteered any production information. Similarly, when our team tested contacting companies with more formalized requests for information, even when these requests included assurance of confidentiality, there was zero success."

Rather than producing hard data on ENM production, the researchers point out that the key findings of their work are 1) the dearth of production volume information and 2) the inconsistency in viable data sources across various nanomaterials.

In the absence of hard data, the team used refining assumptions to attribute production levels from companies with more reliable estimates to companies with little to no data, to come up with ranges (framed by upper and lower bounds) of projected U.S. production quantities for each of the five ENMs (figures in tons per year):

Product	Lower Bound	Upper Bound
nano titanium dioxide	7800	38000
nano silver	2.8	20
nano cerium dioxide	35	700
carbon nanotubes	55	1101
fullerenes	2	80

It is striking that these estimates, based on the best available data spanning all sources, still cover at best two and in some cases three orders of magnitude.

The researchers speculate that some materials that have gained high public visibility – notably through being critically assessed by consumer protection and environmental organizations – in personal care, cosmetic, and food and beverage, make their manufacturers less willing to divulge any information.

"On the other end of the spectrum," they write "the most data were gathered for fullerenes. These particles are not currently utilized in a large number of consumer products but are often purchased for highly technological applications or research. With this more technological or scientific audience, perhaps the chance for a manufacturer to set itself apart from others with regard to purity and ability to meet production demands makes sharing production information worthwhile."

Bottomline of this sorry state is that, as long as governments don't compel manufacturers to fully disclose their nanomaterial production data, and instead rely on voluntary schemes that clearly don't work, life cycle assessments will not reflect the real situation.

"Without these data on the magnitude of potential releases, efforts at predicting environmentally relevant concentrations prior to their eventual detection in the natural world will be hampered considerably," concludes Wiesner.

NEW SAFETY GUIDANCE DOCUMENT FOR EMPLOYERS AND EMPLOYEES WORKING WITH NANOMATERIALS

The Dutch Ministry of Social Affairs and Employment has released a new document "Guidance working safely with nanomaterials and nanoproducts, the guide for employers and employees" (pdf).

The research has been executed on behalf of the Dutch Social Partners FNV, VNO-NCV and CNV and was financed by the Dutch Ministry of Social Affairs and Employment. This document provides guidance on how to organize a safe workplace when working with nanomaterials and nanoproducts.

This guidance has been developed by employers and employees with combined forces. This guidance is not all-inclusive but attempts to support employers and employees who work with nanomaterials in their design of suitable control measures to organize a safe workplace according to the current state of knowledge on health and safety issues of nanomaterials. A more general awareness raising on "nano-risks" is a secondary aim.

This guidance aims to support working safely with engineered nanomaterials and is not developed to support the managing of occupational health risks arising as a consequence of any non intentionally released nanomaterials such as e.g. diesel exhaust or welding fume.

Above all, it is important to emphasize that the existing legislation for working with hazardous substances does apply always. In those cases in which the parent material of the nanomaterial in its bulk-form has been classified as CMR2 substance, or the nanomaterial itself does show CMR (carcinogenic, mutagenic, reproduction toxic) characteristics, the appropriate legislation for working with this type of substance should always be met. The most stringent measures prescribed in those cases should be leading.

After completion of the various steps of the control strategy described here, an employer should have a sound and solid basis for the development of the risk management of nanomaterials as required for working with hazardous substances in national and EU legislation. Communication with employees can proceed i.e. via regular toolbox meetings or work instructions or by developing information brochures or flyers. When (new) NMP are introduced in the company, possibly substituting bulk substances, this is a good moment for instructing employees about good work practices, possible risks and risk management measures they should take.

The EFSA guidance sets out the considerations for risk assessment of engineered nanomaterials that may arise from their specific characteristics and properties.

European Food safety Authority Publishes Nanotechnology Guidance For Food And Feed Assessment

The European Food Safety Authority (EFSA) has published a guidance document for the risk assessment of engineered nanomaterial (ENM) applications in food and feed. The guidance is the work of EFSA's Scientific Committee and is the first of its kind to give practical guidance for addressing potential risks arising from applications of nanoscience and nanotechnologies in the food and feed chain. The guidance covers risk assessments for food and feed applications including food additives, enzymes, flavourings, food contact materials, novel foods, feed additives and pesticides.

The EFSA guidance, prepared in response to a request from the European Commission, sets out the considerations for risk assessment of ENM that may arise from their specific characteristics and properties. Importantly, the ENM guidance complements existing guidance documents for substances and products submitted for risk assessment in view of their possible authorisation in food and feed. It stipulates the additional data needed for the physical and chemical characterisation of ENM in comparison with conventional applications and outlines different toxicity testing approaches to be followed by applicants.

Commenting on the publication of the EFSA guidance, Professor Vittorio Silano, Chair of EFSA's Scientific Committee explained, "A thorough characterisation of the engineered nanomaterials followed by adequate toxicity testing is essential for the risk assessment of these applications. Yet we recognise uncertainties related to the suitability of certain existing test methodologies and the availability of data for ENM applications in food and feed. The guidance makes recommendations about how risk assessments should reflect these uncertainties for food and feed applications."

To assist with the practical use of the guidance, six scenarios are presented which outline different toxicity testing approaches. For each scenario, the guidance indicates the type of testing required.

EFSA conducted a public consultation on its preparatory work, acknowledging the importance of developing risk assessment methodologies in this field to support innovation whilst ensuring the safety of food and feed. In total 256 comments were received from 36 organisations spanning from academia, NGOs, industry to Member State and international authorities. All of these contributions were considered and incorporated into the guidance document where appropriate.

Risk assessment of engineered nanomaterials is under fast development and consequently, in keeping with EFSA's commitment to review its guidance for risk assessment on an ongoing basis, this work will be revised as appropriate.

Documents (pdf):

– Guidance on the risk assessment of the application of nanoscience and nanotechnologies in the food and feed chain

– Outcome of the public consultation on the draft scientific opinion on Guidance on risk assessment concerning potential risks arising from applications of nanoscience and nanotechnologies to food and feed

EU Research Center Contributes To Risk Assessment Of Selected Nanomaterials

Scientists from the Institute for Health and Consumer Protection (IHCP) of the European Commission's Joint Research Centre (JRC) performed basic risk assessments for four types of nanomaterials: fullerenes, carbon nanotubes, nano-silver and metal-oxides (nano-titanium dioxide and nano-zinc oxide) following the methodology described in the REACH guidance.

The assessments were based on a comprehensive and critical scientific review of the health and environmental safety concerns of these specific nanomaterials (ENRHES Final Report).

From the results of the ENRHES project and follow up investigations, JRC-IHCP scientists, together with colleagues from Edinburgh University and the Institute of Occupational Medicine, have published a number of papers (listed below) on human health and environmental hazards and safety.

1) Analysis of currently available data for characterising the risk of engineered nanomaterials to the environment and human Health – Lessons learned from four case studies.

2) Review of carbon nanotubes toxicity and exposure – assessment of the feasibility and challenges for human health risk assessment based on open literature.

3) Nano–silver - feasibility and challenges for human health risk assessment based on open literature.

4) Review of fullerene toxicity and exposure – a human health risk assessment appraisal based on open literature.

5) Nano titanium–dioxide - feasibility and challenges for human health risk assessment based on open literature.

6) The biological mechanisms and physicochemical characteristics responsible for driving fullerene toxicity.

7) A critical review of the biological mechanisms underlying the in vivo and in vitro toxicity of carbon nanotubes; the contribution of physicochemical characteristics.

8) Identification of the mechanisms that drive the toxicity of TiO2 particulates; the contribution of physicochemical characteristics.

9) A review of the in vivo and in vitro toxicity of silver and gold particulates: particle attributes and biological mechanisms responsible for the observed toxicity.

UK Health Watchdog Publishes Risk Management Basics For Occupational Use Of Nanomaterials

The occupational use of nanomaterials is regulated under the Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended). COSHH requires employers to protect workers from exposure to harmful substances in the workplace. Embodying the principles of proportionality and risk assessment, COSHH enables employers to make a valid decision about the measures necessary to prevent or adequately control the exposure of their employees.

Due to the chemical and physical properties of some nanomaterials, and depending on how they are handled or used they can give to a risk of fire and explosion. If so, then the principle legislation applying to the control of substances that can cause fires and explosions in the workplace is the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).

The key requirements in DSEAR are that risks from dangerous substances are assessed and eliminated or reduced so far as is reasonably practicable. Again the principle of risk assessment applies under these regulations.

The REACH regulation is the key EU/UK legislation which covers the full life cycle of chemicals including nano-sized ones.

Sensible risk management

HSE believe that risk management should be about practical steps to protect people from real harm and suffering - not bureaucratic back covering. If you believe some of the stories you hear, health and safety is all about stopping any activity that might possibly lead to harm. This is not our vision of sensible health and safety - we want to save lives, not stop them. Our approach is to seek a balance between the unachievable aim of absolute safety and the kind of poor management of risk that damages lives and the economy.

There are gaps in knowledge and understanding about the hazards to health and safety posed by nanomaterials. Many nanomaterials have not been fully evaluated. This should not stop risk management but a sensible precautionary approach should be taken to the risk management. More information on this can be found on HSE's website at United Kingdom Interdepartmental Liaison Group on Risk Assessment (UK-ILGRA).

What is risk assessment?

A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

COSHH relies on having good information about the hazardous nature of materials, the effectiveness of control approaches and easy ways to monitor exposure. When carrying out a risk/COSHH assessment for nanomaterials it may be that the information available is incomplete or incorrect. HSE recognises this and expects employers to apply a precautionary approach to the risk management and assessment which must be reviewed regularly in the light of any new hazard information being available.

COSHH assessments

Employers need to carry out a COSHH assessment on the materials being used. Legally, in workplaces that have five or more workers, a record must be made of the assessment, but it makes sense even with fewer than five workers, that some kind of record is made of the steps taken and any significant findings.

It is important with nanomaterials that a list of the actions taken to control the risks to health is made - steps taken to identify the risk, how that possible risk to health is being controlled and how this will be reviewed.

Remember to check that all controls are effective and continue to work and that associated operating instructions are up to date, are continually reviewed and include information on the hazardous properties.

The absence of knowledge about the health hazards of new nanomaterials introduces significant uncertainty into any risk assessment - implement precautionary controls when working with them.

Potential health concerns

Nanotechnology is an emerging field. It is expected to be the basis of much technological innovation in the 21st century. However, along with any new innovation there come uncertainties as to whether the unique properties of engineered nanomaterials pose an occupational health risk.

Gaps in our knowledge about the factors that are essential for predicting health risks such as routes of exposure, translocation of nanomaterial once inside the body, and the interaction of the nanomaterial with the body's biological systems are not yet fully understood.

Assessment of health risks arising from exposure to nanomaterials or other substances requires understanding of the intrinsic toxicity of the substance, the levels of exposure (by inhalation, by ingestion or through the skin) that may occur and any relationship between exposure and health effects. More data is needed on the health risks associated with exposure to engineered nanomaterials.

Where nanomaterials have an uncertain or not clearly defined toxicology and unless, or until, sound evidence is available on the hazards from inhalation, ingestion, or absorption a precautionary approach should be taken to the risk management.

DSEAR Assessments

When the nanomaterial is combustible, for example many carbon based or metallic materials, it will be necessary to assess whether the way it is to be processed or the quantities handled could create a fire or explosion risk. DSEAR requires an assessment to be carried out whenever dangerous substances, including combustible dusts or fine particles, are used in the workplace in order to determine the appropriate prevention and mitigation measures to control the risks. Further information on the DSEAR risk assessment can be found in the Dangerous Substances and Explosive Atmospheres - Approved Code of Practice and Guidance L138.

FSA Publishes Report Of Consumers' Views On Food Nanotechnologies

The Food Standards Agency (FSA) in the UK has published a report of consumers' views on the use of nanotechnology in food and food packaging – "FSA Citizens' Forums: Nanotechnology and food" (pdf). The focus group research, which asked participants about their views on nanotechnology in late 2010 and early 2011, was carried out as part of the FSA's programme of work on nanotechnology. The main findings of the research are that:

- Participants' reactions to nanotechnology and food reflected a variety of concerns. These included whether this was a necessary development, whose interests would be served by it and whether the benefits outweighed the perceived risks.
- Acceptance around the use of nanotechnology was conditional. For instance, participants were more positive about the use of nanotechnology to reduce the salt or fat content of foods without adversely affecting the taste or texture of food. However, participants were negative towards the use of nanotechnology for what they perceived to be 'trivial' purposes, such as using nanotechnology to develop new flavours and textures.
- Participants were relatively more open to the use of nanotechnology in food packaging, and readily identified the potential benefits of extended shelf life and waste reduction. However, participants questioned whether consumers would receive the benefits of nanotechnology or whether these developments would be of most benefit to the food industry.
- The current way of regulating nanotechnologies in foods, the European Novel Foods Regulation, provided participants with a degree of confidence that the framework in place ensured the safety of nanotechnology in foods. However, questions were raised about the ability to predict long-term health effects of nanotechnology in food, and whether wider social and environmental implications would be taken into account.
- To provide further confidence in the use of nanotechnology in foods, participants wanted transparency about the developments, including more information to be provided to them. A register of foods that use nanotechnology established by a body independent from industry and Government was received positively. The introduction of an 'n' label for nanotech foods was also proposed, although it was recognised by participants that consumers might not use or understand this information without complementary education and awareness raising.

The consumer research was undertaken by TNS-BMRB between November 2010 and February 2011. Research was undertaken in six areas, with 120 members of the public recruited to reflect a cross-section of society. Research was conducted in three waves and was deliberative – with materials and information provided to participants to enable an informed debate.

Upcoming Events
Looking At The Risky Side Of Nano

Dilemmas of Choice. Responsibility in Nanotechnology Development
June 6-7, 2011, Rovigo (Italy)
The workshop is aimed at presenting and debating contributions from different disciplines on several issues concerning the relationship between nanotechnology innovation and responsibility.

Nanotech Conference & Expo 2011
June 13-16, 2011, Boston, MA (USA)
Nanotech 2011 is the world's largest annual nano-technology conference and expo. The "Energy & Environment" track deals with environment, health and safety issues as well as cleantech and greentech issues.

Nano and REACH Workshop
June 23, 2011, Brussels (Belgium)
The aim of workshop is predominately divided into two objectives; to give an update on Cefic's ongoing and future activities and to provide the participants with a state of affairs on EU policy developments.

Nanotechnology - Occupational and Environmental Health
August 9-12, 2011, Boston, MA (USA)
This symposium will provide a high quality of professional presentations to scientists and engineers who wish to promote and communicate the interaction between technical advances and societal, occupational and environmental impacts in the field of nanotechnology research.

Size Matters
September 21-22, 2011, Saarbrücken (Germany)
Does high-tech bring about human enhancement? The second round of the NanoBioNet Conference on the ethical challenges of nanotechnology.

Governance and Ethics of Nanosciences and Nano-technologies
October 20-21, 2011, Warsaw (Poland)
The conference will have a particular focus on the EC Code of Conduct for responsible nano-sciences and nanotechnologies research, and activities of Member States concerning implementation of the Code will be presented and discussed. Stakeholders opinions will be heard as well.

3rd Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies
November 7-10, 2011, Tempe, AZ (USA)
S.NET represents diverse communities, viewpoints, and methodologies in the social sciences and humanities. It welcomes contributions from scientists and engineers that advance the critical reflection of nanotechnologies and related developments.

IN SHORT – PAPERS, INITIATIVES & UPDATES

REPORT: OECD review: Current developments/activities on the safety of manufactured nanomaterials

A newly released OECD document ("Current Developments/ Activities on the Safety of Manufactured Nanomaterials") provides a snapshot of information on current/planned activities related to the safety of manufactured nanomaterials in OECD member countries and other delegations that attended the 8th meeting of OECD's Working Party on Manufactured Nanomaterials (Paris France, 16-18 March 2011). There are also written reports on current activities from other International Organisations such as the ISO, the FAO and the WHO.

PAPER: Carbon black nanoparticles activate immune cells, causing cell death

Researchers from the University of Iowa Roy J. and Lucille A. Carver College of Medicine have found that inhaled carbon black nanoparticles create a double source of inflammation in the lungs. Their findings were published online in the *Journal of Biological Chemistry*. Martha Monick, Ph.D., UI professor of internal medicine, was lead author of the paper, "Induction of inflammasome dependent pyroptosis by carbon black nanoparticles", which outlined the results.

STANDARDS: ISO publishes new standard on nanomaterial risk evaluation

ISO/TR 13121:2011 describes a process for identifying, evaluating, addressing, making decisions about, and communicating the potential risks of developing and using manufactured nanomaterials, in order to protect the health and safety of the public, consumers, workers and the environment. ISO/TR 13121:2011 suggests methods organizations can use to be transparent and accountable in how they manage nanomaterials. It describes a process of organizing, documenting, and communicating what information organizations have about nanomaterials.

STATEMENT: Nanodermatology Society releases position statement on the safety of sunscreens

The Nanodermatology Society (NDS), a physician-led organization dedicated to the scientific and medical aspects of nanotechnology and dermatology, released its first position statement on the safety of nanotechnology in sunscreens. To address concerns, the NDS has conducted a rigorous review of the scientific literature regarding the use and safety of nano-sized ultraviolet blocking ingredients. The full text of this statement is available on the NDS web site, www.nanodermsociety.org.

REPORT: BASF Dialogforum Nano - Information and transparency along the product life cycle of nanomaterials

The report provides recommendations for general information tools for Civil Society Organisations (web / print, answering individual queries, employee / member information) and specific hints for information tools for churches and trade unions. The final report is available now (pdf).

GOVERNMENT: German Federal Institute for Risk Assessment repeats recommendation against use of nanosilver

In its opinion on toxicity aspects of nano silver, the Federal Institute for Risk Assessment (BfR) had recommended to waive the use of nano silver in foods and articles of daily use until the data situation allows for a final assessment of the health risks. In its Opinion No. 24/2010 BfR pointed out that for silver particles in the nanoscale (nano silver) there might be an toxicological effect profile with additional toxic effects which have not yet been described for silver so far.

STUDY: Public relatively unconcerned about nanotechnology risks

A new study ("Comparing nanoparticle risk perceptions to other known EHS risks") finds that the general public thinks getting a suntan poses a greater public health risk than nanotechnology or other nanoparticle applications. The study, from North Carolina State University, compared survey respondents' perceived risk of nanoparticles with 23 other public-health risks. The study is the first to compare the public's perception of the risks associated with nanoparticles to other environmental and health safety risks. Researchers found that nanoparticles are perceived as being a relatively low risk.

REPORT: NanoCode publishes synthesis report of stakeholder survey on EU Code of Conduct

The NanoCode Synthesis Report on its Stakeholder CoC Survey (pdf) provides the findings of the international, quantitative and qualitative NanoCode survey about the European Code of Conduct for Responsible Nanosciences and Nanotechnologies Research (EU-CoC). The results summarized in this report give insights into stakeholder's patterns of awareness, their expectations, attitudes and appraisals. The survey analyses the degree of compliance and commitment, identifies recommendations for the communication, possible incentives, disincentives and monitoring of the EU-CoC.

GUIDELINES: WHO is developing guidelines on nanomaterials and workers' health

The World Health Assembly identified exposure to nanomaterials as priority action for the Global Plan of Action on Workers Health, it adopted in 2007, and the WHO Global Network of Collaborating Centers in Occupational Health has selected this field as one of key focus of their activity. To address occupational risks of nanomaterials, WHO is developing Guidelines to "Protecting Workers from Potential Risks of Manufactured Nanomaterials" (WHO/NANOH). These Guidelines aim to facilitate improvements in occupational health and safety of workers potentially exposed to nanomaterials in a broad range of manufacturing and social environments. The guidelines will incorporate elements of risk assessment and risk management and contextual issues. Declarations of interest in supporting this project through other contributions are welcome and can be sent to nanohealth@who.int. Nanohealth Declaration of Interest Form (pdf)

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