

Nanoscale silver: No silver lining?

September 9 2008

Widespread use of nanoscale silver will challenge regulatory agencies to balance important potential benefits against the possibility of significant environmental risk, highlighting the need to identify research priorities concerning this emerging technology, according to a new report released today by the Project on Emerging Nanotechnologies (PEN).

But existing information about the impact of silver on the environment offers a starting point for some assessments of nanosilver, the report argues. See www.nanotechproject.org/n/silver to obtain a copy of the report.

The issue of assessing the risks posed by nanoscale silver was highlighted after the Environmental Protection Agency's (EPA) San Francisco office earlier this year imposed a landmark fine of over \$200,000 on a California company selling computer keyboards and mice coated with nanosilver. EPA issued the fine on the grounds that the products should have been registered under federal pesticide law because of the company's germ-killing claims.

Similar fines have not been imposed since, but the action is increasing attention on the potential risks posed by nanoscale silver and oversight of nanotechnology as a whole. There currently are more than 200 manufacturer-identified nanosilver products on the market and contained in the online nanotechnology consumer products inventory maintained by PEN —everything from baby carriages and air filters to athletic socks and coin-operated washing machines. See www.nanotechproject.org/consumer to search the inventory.

Silver itself is classified as an environmental hazard by EPA because it is more toxic to aquatic plants and animals than any metal except mercury. Even if a nanoparticle itself is not especially toxic, silver nanoparticles increase the effectiveness of delivering toxic silver ions to locations where they can cause toxicity.

"We need not assume that because nano is new, we have no scientific basis for managing risks," says Dr. Samuel N. Luoma, the author of the PEN report *Silver Nanotechnologies and The Environment: Old Problems or New Challenges?*, which also offers a dozen lessons concerning silver in general that can be followed for managing the potential environmental risks posed by nanosilver. "Our existing knowledge of silver in the environment provides a starting point for some assessments, and points toward some of the new questions raised by the unique properties for nanoparticles that need to be addressed through new research."

The mass of silver dispersed to the environment from new products could be substantial if one product, or a combination of such products, becomes widespread.

"The silver that went into wastewaters when millions of people had their photographs developed taught us that small additions of silver to the environment make a big difference," says Dr. Luoma, a former senior researcher with the U.S. Geological Survey who now leads science policy coordination for the John Muir Institute of the Environment at the University of California, Davis. "Perhaps more significant, we have no means of detecting nanosilver in the environment once it is released, even if concentrations rise to levels that are toxic to aquatic ecosystems."

The U.S. federal government has invested only a small percentage of its overall nanotechnology research funding in understanding the risks posed by nanomaterials, according to an analysis conducted earlier this year by PEN

(<http://www.nanotechproject.org/news/archive/ehs-update/>), further highlighting the need for more research on the potential risks posed by nanomaterials. In addition, laws and institutions shaped in the mid-20th Century are not likely to succeed in addressing 21st-Century problems.

"Silver is an old problem, and nanosilver is a new challenge. The scope of the new challenge is not yet clear because it is uncertain how much nanosilver is now used as an antimicrobial in commercial and consumer products, and because new uses are likely to be discovered in the future," says J. Clarence Davies, a PEN senior adviser and a former EPA policy official. "Regardless of the scope of the nanosilver problem, it underscores the need for more risk research and new approaches to oversight to deal with new technologies and problems of the new century."

Source: Project on Emerging Nanotechnologies

Citation: Nanoscale silver: No silver lining? (2008, September 9) retrieved 2 May 2024 from <https://phys.org/news/2008-09-nanoscale-silver-lining.html>

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