http://www.epa.gov/opp00001/about/intheworks/nanotechnology.htm
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About Pesticides

Pesticide issues in the works: nanotechnology, the science of small

Current as of July 2008

We hear the term nanotechnology frequently but may not know what it really means. Nanotechnology is the understanding and control of matter at dimensions of one to 100 nanometers. A nanometer is one billionth of a meter. Or, to put it another way, there are 25,400,000 nanometers in an inch.

Nano-sized materials or nanomaterials can have fundamentally different physical properties than their larger-sized counterparts, and these differences often enable nanoscale materials to be used in new and valuable ways. Nanotechnology has the potential to change and improve many sectors of the global economy from consumer products to health care, transportation, energy, agriculture and the environment. Some examples include invisible sunscreens, stronger golf clubs, and water- and stain-resistant clothing.

Other issues in the works:

- Honey bee colony collapse disorder
- Pesticide volatilization

Questions on Pesticides?

- National Pesticide Information Center (NPIC) 1-800-858-7378
  EXIT Disclaimer

Resources

- Science Policy Council: Nanotechnology White Paper
- Nanoscale Materials Stewardship Program (NMSP)

Regulating nanotechnology as pesticides

Nanotechnology can also be used to develop products that control pests, such as microorganisms on surfaces. EPA regulates products intended to control pests under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). EPA has in place a stringent evaluation and registration (i.e., licensing) program for all pesticides that are distributed or sold in the United States. Producers of pesticide products must submit scientific and technical data for review by EPA to ensure that the use of a pesticide will not generally cause unreasonable adverse effects on human health or the environment.

FIFRA and EPA's implementing regulations provide an effective framework for regulating pesticide products that are a product of nanotechnology or that contain nanoscale materials. However, the special properties that make nanoscale materials of potentially great benefit also can present new challenges for risk assessment and decision-making. For instance, their small size may allow them to pass through cell membranes or the blood-brain barrier, possibly resulting in unintended effects. EPA is currently examining potential hazard, exposure, policy, regulatory, and international issues that may be associated with pesticides that are a product of nanotechnology or that contain nanoscale materials.

What EPA is doing

EPA has met with several companies to discuss requirements for some specific nanoscale materials being considered for use as pesticides; however, no formal application has been submitted. EPA strongly recommends that companies contact EPA's pesticide registration Ombudsmen to arrange a pre-application conference as early as possible in

What you see is not always what it seems

Some materials, like silver, have inherent pesticidal properties but are not always used as pesticides. For example a serving platter or a pair of earrings may be plated in silver, but the purpose is aesthetic not antimicrobial. Nanoscale silver products may raise even more issues. Recently, EPA received a petition asking that the Agency regulate all nanoscale silver products as pesticides under FIFRA. EPA is currently reviewing the

the development of any pesticide that would be a product of nanotechnology or that would contain nanoscale material. During pre-application conferences, a company should provide EPA with information on:

- how the pesticide is made,
- how it is proposed to be used, and
- how people and the environment may be exposed to the product.

EPA addresses these basic questions in the evaluation of any pesticide – regardless of the materials and methods by which it is made. However, because nanoscale materials may have special properties, EPA's data requirements may need to be tailored to the specific characteristics of the product under consideration.

petition.

In addition, not all pesticides containing silver are nanotechnology. Samsung was marketing a washing machine that relied on a silver ion generator and made claims that it sanitized clothes. Samsung also stated that the washing machines involved nanotechnology, but they subsequently removed that claim. EPA published a Federal Register notice to clarify the regulatory status under FIFRA of ion generating equipment, which had historically been considered as a device that did not require registration as a pesticide. The Agency reconsidered this policy and determined that this equipment would require registration as a pesticide because it incorporates a substance for which pesticidal claims are made.

Most public inquiries EPA has received concern the use of pesticides allegedly containing nanoscale materials, such as nanosilver, to control microorganisms on surfaces. However, not all products containing silver, whether nanoscale or not, are pesticides. Any product containing silver – in any form – that makes claims to control pests must first be evaluated and registered by EPA to ensure it meets the FIFRA human health and environmental safety standards before it can be distributed or sold.

For more information

More information on EPA nanotechnology efforts and federal government nanotechnology research:

- National Nanotechnology Initiative
- EPA White Paper on Nanotechnology, (136 pp, 4 MB, About PDF)
- EPA Nanotechnology Research
- Draft EPA Nanotechnology Research Strategy, (76 pp, 1 MB, About PDF)
- Nanotechnology under the Toxic Substances Control Act
- EPA Nanoscale Materials Stewardship Program