

Full details

All details held on the selected case study are shown below.

Went live on	Title	Reference
30 Jun 2010	Managing nanoparticle wastes from consumer products	SID0273

Synopsis

A new discovery about nanoparticle behaviour in sewage treatment plants will improve the environmental management of nanoparticle wastes from foods, cosmetics, medicines and other products.

Description

A new understanding of how nanoparticles behave in sewage treatment plants may help to improve the environmental management of nanoparticle wastes from foods, cosmetics, medicines, cleaners and personal care products.

The work, funded under NERC's Environmental Nanoscience Initiative (ENI), was carried out by scientists from the Centre for Ecology & Hydrology (CEH). They worked with the Science and Technology Facilities Council's ISIS Neutron Source, along with colleagues from King's College London and Oxford University. The team studied how certain nanoparticles behave in wastewater and identified a potential way to help remove them during primary sewage treatment.

The project focused on silica nanoparticles, which are commonly found in consumer products and routinely discharged into wastewater. It simulated primary sewage treatment to show that coating silica nanoparticles with a detergent-like material (surfactant) made the nanoparticles interact with components of the sewage to form a solid sludge. This sludge could then be separated from the wastewater and disposed of. In contrast, uncoated nanoparticles remained dispersed in the wastewater and were therefore likely to continue through the effluent stream.

The work has already resulted in a patent application being filed.

"Our research shows that the surface chemistry of nanoparticles influences their likely removal during primary sewage treatment. By adding a coating which modifies that surface chemistry, it may be possible to re-route their journey through sewage treatment plants," says project member Dr Helen Jarvie from the Centre for Ecology & Hydrology.

It's estimated that each year more than a million tonnes of silica nanoparticles are used in consumer

products. A large proportion of these are washed down the drain into the sewers, making sewage treatment plants a major gateway for nanoparticles to enter the aquatic environment.

"Building on these results, further work is now planned to examine the behavior of a wider range of nanoparticles, with different classes of surfactants, in wastewaters," says Jarvie.

This nanoparticle research was published in the November 2009 issue of Environmental Science and Technology - 'Fate of Silica Nanoparticles in Simulated Primary Wastewater Treatment'

(ENI is a programme to investigate the potential environmental effects of nanotechnology. It is a partnership between the Department for the Environment, Farming and Rural Affairs (Defra), the Environment Agency, the US Environmental Protection Agency, the Engineering and Physical Sciences Research Council and NERC.)

The research was supported by NERC's Environmental Nanoscience Initiative.

References and links

Hyperlinks

1. [ISIS - Managing nanoparticle waste in sewage](#)
2. [NERC - Environmental Nanoscience Initiative homepage](#)
3. [Planet Earth Online - Way to remove nanoparticles from sewage found](#)

Impacts

Research and funding

Funding type

Research Programme

Date of research

November 2007 - November 2008

Researchers at Universities

Grant reference

[NE/E014585/1](#)

Investigator

Professor M Lawrence

King's College London, Pharmaceutical Sciences

Co-investigator

Dr HP Jarvie

NERC Centre for Ecology and Hydrology, Acreman

Co-investigator

Dr SM King

STFC - Laboratories, ISIS Pulsed Neutron & Muon Source

Research and Collaborative Centres

Centre	Centre for Ecology and Hydrology
Classification	
Science themes	Environment, pollution and human health, Technologies
Science areas	Freshwater, Terrestrial
Policy areas	Biodiversity, Environmental technology, Pollution, Waste, Water, Health
Keywords	Environment, Health, Nanoscience, Risk, Water quality

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