

Are silver nanoparticles safe?

Implications for health, the environment and microbial resistance



Silver is widely used for its antibacterial activity in medical and consumer products because of its broad range of activity and lower toxicity compared to other bactericides.

More and more products use silver as nanoparticles because it has a better bactericidal activity, and therefore lower amounts may be applied. Are these nanoparticles safe for your health and for the environment? Could microorganisms become resistant to the effects of silver?

→ WHAT ARE NANOPARTICLES?

Nanoparticles refer to very small sized materials and components that have at least one dimension in the size range of 1 - 100 nanometre (one nanometre is one millionth of a millimetre). Due to their size, these materials may specifically interact with human cells and tissues. The evaluation of the possible impact on human health of nanoparticles is an on-going process.

→ WHICH TYPES OF CONSUMER PRODUCTS CONTAIN NANOSILVER?

Food packaging materials, food supplements (for the moment not allowed in the EU, unless specifically authorized), textiles, electronics, household appliances, cosmetics, medical devices, water disinfectants and room sprays are just

some examples of products containing nanosilver. Currently, products containing nanosilver are difficult to track as they are marketed under numerous brand names. Moreover, current labelling regulations, with a few exceptions, do not specifically require listing nanomaterial as a constituent.

→ WHAT ARE THE EFFECTS ON HEALTH?

The toxicity of silver, including nanoparticles of silver, to humans is generally low. Skin contact with textiles containing silver is one of the main ways people are exposed to silver nanoparticles. In general, consumer products release only small amounts of silver, not resulting in significant health effects.

→ WHAT ARE THE ENVIRONMENTAL EFFECTS?

Silver in the environment comes from its many uses in industry, in medical applications, in water disinfection and in consumer products. Silver as nanoparticle represents only a small fraction of the total amount of silver that enters into the environment. However, silver in this form may be more readily absorbed by some species, posing a potential problem.

In Europe, silver compounds from textiles and cosmetics have the greatest environmental exposure when the water used to wash them or rinse them off is handled at wastewater treatment plants. Subsequent silver release from these wastewater treatment plants to ground and surface waters is expected to be low. Nevertheless, silver release at concentrations toxic to some aquatic organisms is possible, although unlikely.

→ WHAT ARE THE IMPLICATIONS FOR MICROBIAL RESISTANCE?

Some studies indicate that in some occasions (in in vitro studies, but not confirmed in in situ studies), bacteria could become resistant to the antibacterial effect of silver in general. It is however currently not possible to estimate whether or not the use of silver nanoparticles increases antimicrobial resistance. This serious knowledge gap needs further research.

Given the widespread and increasing use of products containing nanosilver, both consumers and the environment are exposed to new sources of silver. Although there have been no clear adverse effects associated with exposure to silver, additional effects caused by the use of silver nanoparticles cannot be ruled out and should be further evaluated.

This fact sheet is based on the opinion of the independent Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR): 'Nanosilver: safety, health and environmental effects and role in antimicrobial resistance' (June 2014).

This opinion is available at:
http://ec.europa.eu/health/scientific_committees/emerging/opinions/index_en.htm