NANO-SILVER AND THE ENVIRONMENT: A PRELIMINARY TERRESTRIAL ECOTOXICITY TEST

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Abstract: Nanotechnology, nanomaterials and nanoparticles are words that have created quite a buzz amongst the consumer and environmental communities. Strides have been made in the research of commonly used nanomaterials. Nanosized silver (nano-Ag) is a highly commercialized nanomaterial because of its antimicrobial/antibiotic properties. Toothbrushes, band-aids, and socks are just a few of consumer products that contain nano-Ag. To address lingering concerns on human and environmental risks, further exploration is warranted. The aim of this study was to perform a series of sub-acute soil toxicity tests on earthworms (Eisenia fetida), a terrestrial invertebrate, with four nano-Ag particle sizes (10 nm, 35 nm, 90-210 nm, and 1.5-2.5 μm) at 0, 0.1, 1, 100, & 1000 mg/kg. Sexually mature earthworms (0.35-0.65 g; n=10; 5 replicates) were added to the nano-Ag-spiked soils for 7 days. Earthworm survival and nano-Ag bioaccumulation will be analyzed. The next steps include sub-chronic soil toxicity tests, soil avoidance/behavioral tests and laboratory exposures utilizing filter paper. Additional research will be conducted to test under alternative environmental fates. These tests will be important in support of nanomaterial ecological risk assessments to protect consumers and the environment.

Keywords: Nanomaterials, Silver, Earthworms, Soil, Ecological risk assessment.