



The Connecticut Agricultural Experiment Station

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NANOPARTICLES MAY ACCUMULATE IN THE FOOD CHAIN

New Haven, CT - In a paper published in *Environmental Science and Technology* (<http://dx.doi.org/10.1021/es503792f>) and presented at the recent 3rd Annual Sustainable Nanotechnology Organization (<http://www.susnano.org>) Conference in Boston MA (Nov. 2-4, 2014), Connecticut Agricultural Experiment Station (CAES) scientists reported on the movement and bioaccumulation of engineered nanoparticles (NP) from soil into the food chain. Specifically, the team showed that zucchini plants accumulated cerium dioxide, a nanoparticle commonly used in consumer products, from soil to a much greater extent than the non-nanoparticle form of the metal. This greater metal content in the plant led to higher cerium levels in crickets that consumed zucchini and in spiders that consumed the crickets. Importantly, nanoparticle-specific regulatory guidelines generally do not exist. Dr. Jason C. White, lead investigator on this USDA-funded study, noted that “Our most significant finding was that although transfer of the metal from soil to the food chain was modest, the values were significantly higher for the nanoparticle as compared to the non-nanoparticle form. This is a result that has not been observed before and was not expected. In addition, this nanoparticle accumulation in the plant significantly reduced plant growth.”

Nanotechnology is the field of science and engineering that manipulates materials at the nanometer (one billionth of a meter) scale, and is projected to achieve a \$3 trillion dollar market value by the year 2020. The potential or actual applications of nanotechnology include disease treatment, drug delivery, medical devices, electronics, textiles, cosmetics, food packaging and agriculture. In the United States there are over 1600 commercially available products that have some aspect of nanotechnology, including nanoparticle components in their design or formulation. The scientific community is concerned that the widespread and increasing use of nanotechnology has occurred without a full understanding of the fate and effects of these engineered nanoparticles in the environment. Research at CAES is addressing agricultural systems, with a focus on food safety and overall ecosystem effects.

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