

# SCIENTIFIC & REGULATORY SUPPORT FOR NANOPESTICIDES

## Regulatory Services

The potential for nanomaterial applications has captured the imagination of innovative scientists and engineers across a wide range of disciplines, including chemistry, biology, medicine, and physics. Nanotechnology has ushered in a new and challenging era with expanding dimensions in the development of nanomaterials, such as those based on metals, metal oxides, carbon nanotubes, and graphene, to create nanopesticides. Additionally, there have been major achievements in the development and practical application of newer 'designer molecules' that are organically-based and derived from natural or synthetic biomolecules. One such area of recent focus has been the exploitation of unique characteristics of certain nanomaterials that have demonstrated novel or enhanced biocidal and/or agrochemical pesticide properties.

Nanomaterials used for pesticidal purposes are regulated in the US under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Characterization of the nanoproduct is a critical step in the process of applying for US EPA pesticidal product registration. Each product will require a unique set of characterization techniques to meet regulatory needs. The data requirements for a nanoproduct will also depend on the type of material and its physicochemical properties, e.g., whether it is a nanocomposite or a solution, a nanometal, nanometallic salt, or a carbon nanotube or graphene-based product.

At **toXcel**, our experienced scientific and regulatory staff are highly qualified to assist nanopesticide producers by developing cost-effective strategies for addressing the requirements of all federal and state registrations. A widely recognized leader in the field of nanopesticide regulation is Dr. Najm Shamim, **toXcel's** Director of Analytical and Environmental Chemistry. Dr. Shamim has extensive experience in dealing with regulatory aspects of FIFRA-based nanoproducts, from characterization to providing expert scientific opinions to meet environmental health and safety data requirements. He has participated in numerous meetings at the US EPA Office of Pesticide Programs and has made many presentations at American Chemical Society meetings on a wide range of regulatory and scientific issues surrounding registration of nanopesticide products. He recently published a book entitled, '*Sustainable Nanotechnology and the Environment: Advances and Achievements*' (Najm Shamim and Virender Sharma, co-editors; ACS Symposium Series 1124, 2013).

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