

## Environmental Toxicology

Smithers Viscient's environmental testing laboratories offer a variety of ecotoxicology programs in the areas of aquatic (freshwater and marine) and terrestrial species. Specific areas of expertise include, aquatic macrophyte and algal growth, plant vegetative vigor, seedling emergence and germination, earthworm acute and chronic, beneficial insect studies, fish and invertebrate acute studies, early life-stage and life-cycle exposures, in both aquatic and sediment environments, as well as customized studies to meet your regulatory testing needs.

Our scientists are knowledgeable in testing problematic (e.g., hydrolytically unstable, highly sorptive, volatile, low solubility) materials and analytically confirming exposure levels in low parts per trillion (ppt) range in a variety of sediment, soil and aquatic matrices. Smithers Viscient has demonstrated experience with over 150 species and is well-recognized for its work arthropods, invertebrates, bees, earthworms, a variety of fish species and amphibians. Some stocks of test organisms have been continuously maintained in in-house cultures for over forty years.

We have the experience and capabilities to provide a wide variety of tests to meet guideline requirements. Our expertise, dedicated staff, and experience with unique testing methodologies make Smithers Viscient the ideal choice in environmental toxicology testing.

### Aquatic Toxicology

Senior research biologists at Smithers Viscient average over twenty years in professional experience with fish and invertebrate full life-cycle studies (including two-generation studies), inhibition of shell deposition in mollusks, sediment testing, and static and flow-through testing.

Smithers Viscient regularly develops novel methodologies, apparatus and culture techniques in order to provide customized testing strategies. Our staff is experienced in measuring unique or non-standard endpoints as well as designing innovative tech-



niques to accommodate poorly soluble, highly reactive and/or highly volatile test substances. We offer the following aquatic toxicology testing services with fish, invertebrates and plants:

- Acute Studies
- Subchronic Studies (Early Life Stage)
- Chronic Studies
- Endocrine Disruption Studies (Fish Screening, Amphibian Metamorphosis (AMA), fish partial life cycle (PLC), Fish Sexual Development Testing (FSDT), and multi-generational studies)
- Microcosms
- Customized Studies

Smithers Viscient maintains 70 outdoor ponds (2.3 x 2.3 m) for microcosms or aquatic plant exposures.

### Terrestrial Toxicology

Smithers Viscient offers a full terrestrial toxicology testing program with studies routinely performed on test organisms including terrestrial plants, plant metabolism, beneficial arthropods, birds, terrestrial insects and invertebrates, earthworms and soil microflora. Smithers Viscient's sophisticated chemistry instrumentation and environmental fate laboratories enable staff to incorporate analytical chemistry and residue analysis that is particularly beneficial in the higher tier tests.

Smithers Viscient has the expertise to design unique, customized studies to meet your specific testing needs. Smithers Viscient's Wareham laboratory maintains two free-standing greenhouses with a growing area of over 100 m<sup>2</sup>. Smithers Viscient was one of the first laboratories to introduce reproduction tests with the red manure worm. In addition, we developed a test system for honeybee research which closely simulates natural organism behavior observed within the hive by allowing for direct and continuous contact between the test organisms (worker bees) and a queen bee.

### Sediment Toxicology

Smithers Viscient has conducted sediment toxicity and spiked bioassays since 1987. We routinely perform whole sediment acute and chronic studies for invertebrates in both fresh and salt water. In addition, Smithers Viscient has vast experience in sediment water chironomid studies using either spiked sediment or spiked water. Smithers Viscient can also customize studies to meet specific objectives: bioaccumulation exposures with oligochaetes, polychaetes and clams; Sediment Toxicity Identification Evaluations (TIE); outdoor sediment exposures/microcosms.



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