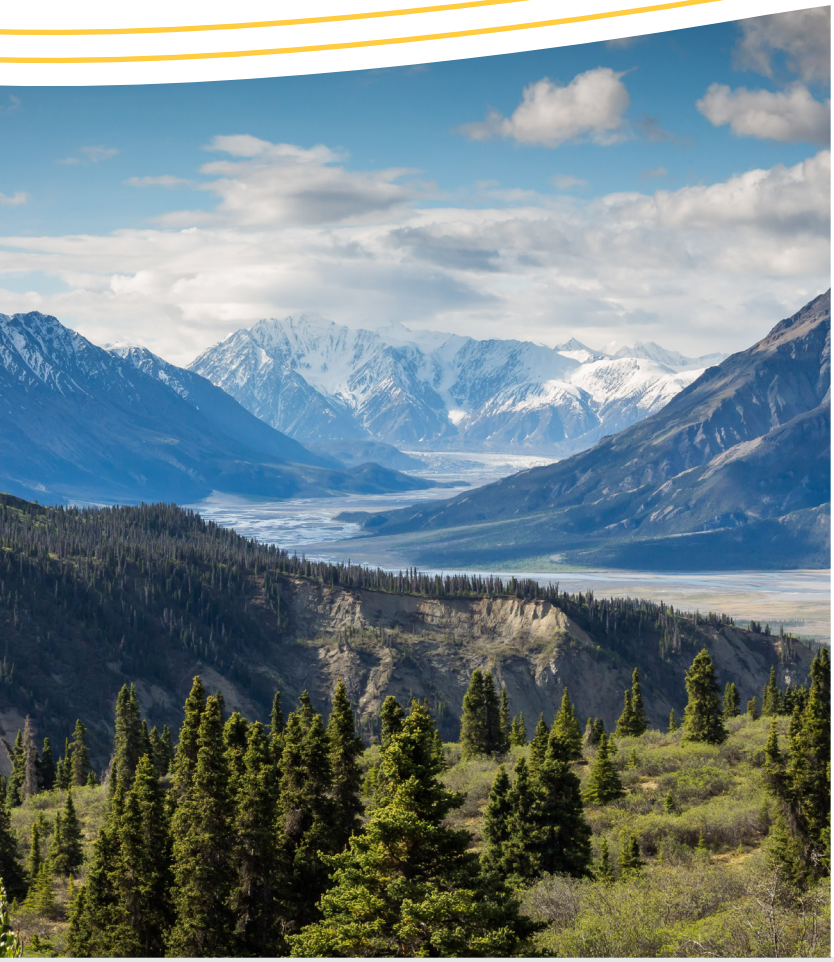
SMITHERS
ACCURATE DATA • ON TIME • HIGH TOUCH



Environmental Fate & Metabolism Testing

The Environmental Fate and Metabolism team at Smithers includes internationally recognized experts in environmental fate, biodegradation, bioconcentration, and plant and animal metabolism. With dedicated laboratories, best-in-class equipment, and a staff strong in global guidelines, Smithers has extensive experience in assessing the environmental challenges associated with product development for the crop protection, pharmaceutical, and industrial and specialty chemical industries.

Smithers has provided environmental risk services for over 50 years, with our Environmental Fate and Metabolism study directors averaging >15 years of experience.

Equipment and instrumentation includes:

- *Walk-in environmental chambers, Suntest photolysis chambers, laminar flow hoods, autoclaves, TOC analyzer*
- *Flow-through radiodetectors, 96-well MicroBeta® Scintillation Counter, and phosphorImager detectors*
- *Agilent, Shimadzu, Waters HPLC systems including 2D-HPLC*
- *ThermoFisher Scientific Orbitrap Eclipse™ Tribrid™ and SciEx TripleTOF® 5600 instruments for metabolite identification and characterization*

Study types offered include:

- *Biodegradation*
- *Soil / Sludge Toxicity*
- *Adsorption-Desorption*
- *Fresh and Aged Column Leaching*
- *Transformation in Soil and Sediments*
- *Surface Water Mineralization*
- *Hydrolysis and Aqueous / Soil Photolysis*
- *Bioconcentration and Bioaccumulation*
- *Fish Metabolism*
- *Plant and Animal Metabolism*
- In Vitro *Comparative Metabolism*
- *Other* In Vitro *and Screening Studies*
- *Tailored and Higher-Tiered Testing*
- *In-House GLP Soil Characterization*
- *Use of Radiolabeled or Non-Radiolabeled Test Substances*
- *Analysis of conventional and genetically modified crops*

Environmental Fate & Metabolism Testing

Environmental Fate and Biodegradation Studies

These studies provide information on the fate and persistence of a chemical or mixture of chemicals in the environment. Smithers conducts the full range of standardized biodegradation tests, including ready, inherent, and ultimate biodegradation in complex matrices including activated sludge from sewage treatment plants, water, sediment and soil.

We offer comprehensive environmental fate testing services to quantify and identify test substances and their degradation products in all environmental compartments. Our experts are on hand to advise on study design, including use of non-radiolabeled test substance where appropriate.

Bioconcentration Studies

Bioconcentration studies measure the bioaccumulation of test substances in fish tissue through determination of the bioconcentration factor (BCF). BCF is a comparison of the chemical absorption levels of the test substance in fish tissue to their levels in surrounding water. We offer a variety of cold and warm water testing species. Studies provide information of the rate of uptake, time to steady state, total residues bioaccumulated, and information on the metabolic pathway. Non-radiolabeled studies can be performed.

Plant and Animal Metabolism Studies

Metabolism studies are conducted to determine the nature of residues and the test substance's metabolic pathways in plants and animals. Metabolism in rotational crop studies are conducted to determine the nature and amount of pesticide residue in rotational crops used as human food or livestock feed. Our plant metabolism experts conduct in-life phase on site in our greenhouses or in the field with trusted partner laboratories.

We conduct the in-life phase of other common metabolism studies — in rat, goat, and poultry — at partner labs as well.

We work with clients to design and plan every detail of a study to best meet the product development and/or regulatory compliance needs. Our scientists will typically serve as study directors.

Fish metabolism studies at Smithers are conducted by analyzing and identifying residues in fish tissues.

Analytical phases of metabolism studies are performed in our laboratories by expert and experienced staff.

In Vitro Studies

Our experts conduct *in vitro* studies using plant and animal cell cultures, and small-scale laboratory *in vivo* investigations utilizing specialized techniques including stem injection or vacuum infiltration. In addition, we also offer *in vitro* metabolism for early metabolism indications and *in vitro* species comparison studies.

Global Knowledge

Smithers has experience in meeting regulatory requirements for approval by EPA, FDA, JMAFF, PMRA, EFSA, ECHA, IBAMA and other global regulatory agencies.

Both standard guideline and higher-tiered environmental studies conducted for over 50 years

Ongoing investment in latest analytical technologies and capabilities

Established, customer-focused teams committed to building strong partnerships to ensure successful study outcomes

Environmental Risk Sciences Division
infoERS@smithers.com
www.smithers.com

Harrogate, U.K.
Tel: +44 (0) 1423 532 710

Tokyo, Japan
Tel: +81 (3) 6862 7082

Wareham, Massachusetts, U.S.A.
Tel: +1 508 295 2550

SMITHERS
ACCURATE DATA • ON TIME • HIGH TOUCH