



HOW DO YOU KEEP UP WITH EVOLVING ENVIRONMENTAL REGULATIONS?



WE KNOW  
**HOW**

How do you determine the environmental fate of a chemical substance? How do you measure below 1 part per trillion? How do you perform a study that has never been done? EAG knows how to translate guidelines into study designs to deliver the specific, reliable data regulators expect.

## Environmental Testing Services

EAG Laboratories has brought together the most respected brands in environmental science to offer you a better choice for outsourced contract research services. With over 140 years of combined experience, EAG companies (Wildlife International, PTRL West, PTRL Europe and ABC Laboratories) deliver aquatic, avian, and terrestrial toxicology services in AAALAC-accredited, GLP-compliant environments and the full range of environmental fate and metabolism testing required by the global agricultural, pharmaceutical, consumer product and chemical industries.

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### METHOD DEVELOPMENT & METHOD VALIDATION

Our laboratories accommodate stringent and extended requirements from a range of regulatory agencies (EPA, EU/OECD, SANCO, REACH, TSCA etc.).

If necessary, methods can be tailored in order to address analytical challenges to specific complex matrices (e.g., sediment; tissue; salt water). With service lines in environmental fate and metabolism, environmental toxicology, plant science and residue chemistry, our experienced staff can provide the know how to meet your development and validation needs.

### ENVIRONMENTAL FATE

EAG draws on more than 40 years of analytical expertise identifying and quantifying test substances in soil, water and other complex matrices to provide complete environmental fate testing services. We maintain a veteran staff of analytical chemists, structural elucidation chemists and study directors who are well versed in U.S., Canadian, E.U. and Japanese test guidelines.

### PLANT & ANIMAL METABOLISM

With decades of experience and state-of-the-art instrumentation, we deliver sensitive, robust methods, reliable data and repeatable results. Our plant and animal metabolism studies include study protocol development, preparation of radiolabeled test substance formulations and identification of metabolites.

### PRODUCT CHEMISTRY AND ANALYTICAL SUPPORT

EAG conducts product development studies in response to chemical and physical analysis requirements for product chemistry under Good Laboratory Practices (GLPs). We offer physical and chemical analyses required to characterize active ingredients, product components and their degradants, with ample capacity for storage stability studies and use of radiolabeled materials ( $^{14}\text{C}$  and  $^3\text{H}$ ) as needed.

### RESIDUE CHEMISTRY

EAG offers the crop protection industry unparalleled know-how in the challenging discipline of residue chemistry. With almost 40 years of experience, our expertise enables us to problem solve, integrate field and analytical phases, and provide results for your regulatory needs.

### FIELD MANAGEMENT

EAG offers field-to-final report project management for studies to demonstrate human and environmental safety. As on-site study directors, our Field Managers bring decades of study design, protocol development, analytical oversight, and GLP/QA compliance expertise across a variety of field management study types.

### AQUATIC TOXICOLOGY

EAG provides the full complement of aquatic ecotoxicological testing services required to demonstrate the specific, acute and chronic effects of chemicals for global product submissions. Static, semi-static and flow-through test systems with stringent environmental monitoring and control are in place to provide a wide variety of testing capabilities with freshwater and marine invertebrates and fish

## TERRESTRIAL TOXICOLOGY

EAG's expert ecotoxicological and terrestrial toxicology testing services assess the acute and chronic effects of chemicals on amphibians, earthworms, honeybee and select non-target insects, as well as freshwater and marine invertebrates and fish.

## AVIAN TOXICOLOGY

Our scientists have unparalleled skill in performing avian acute and reproduction studies, as well as the ability to develop and conduct specialty studies designed to meet client-specific needs. In addition to northern bobwhite, Japanese quail (*Coturnix*), mallard, zebra finch and canary, we perform studies with other species such as chickens, house sparrows, pigeons and partridge.

## POLLINATOR TESTING

EAG will help your company anticipate, interpret and comply with the emerging US EPA and EU testing guidance for honeybees and other pollinators. Our scientists are at the forefront of refining and developing new techniques with expanded capacity and expertise to address laboratory based pollinator testing requirements.



### EXPANDED POLLINATOR TESTING

Our newest pollinator laboratory in sunny Gainesville, Florida is located at the optimal latitude for culturing larval stock and allows testing 10 months out of the year. This means triple the capacity compared with facilities in cooler climates, and greater flexibility in scheduling your testing programs.

## SUPPORTING ALL PHASES OF YOUR PRODUCT LIFECYCLE



### PRODUCT INNOVATION & IMPROVEMENT

EAG offers the broad-based, multi-disciplinary environmental testing expertise required to successfully register and re-register agrochemicals. We offer the full suite of product chemistry; avian, terrestrial and aquatic toxicology; soil and aquatic field dissipation studies; residue chemistry; environmental fate and metabolism studies; as well as laboratory pollinator testing required by global regulators. Our in-house custom radiolabeling services streamline testing program execution with GLP-compliant <sup>14</sup>C labeled material.



### MANUFACTURING & SUPPLY CHAIN SUPPORT

No scientific services company has more experience evaluating, testing and comparing active ingredients, finished products and packaging. Whether you are evaluating a new supplier, require confirmation of feedstock to a particular specification, or want to de-formulate a suspected counterfeit product, ask EAG.



### QUALITY ASSURANCE

From 5-batch analysis to independent laboratory validations and elemental analysis by ICP-MS, EAG supports all types of agrochemical quality assurance activities. We efficiently deliver Certificates of Analysis for active ingredients and formulations, and analytical reference standards and metabolites as part of the QA process.



### INVESTIGATION & TROUBLESHOOTING

When things don't go as expected, you need solid science on your side. EAG has decades of experience understanding the cause of undesired outcomes. Our scientists are experts at developing innovative approaches to answer complex questions. Whether you're concerned about finished product stability, impacts on beneficial organisms or the reproductive performance of non-target plants and insects, EAG can help.



### CONSULTING & LITIGATION

EAG's experience extends beyond the laboratory and into the court room. We maintain a team of litigation experts who assist clients with trial preparation, depositions and expert witness testimony. EAG scientists have extensive experience supporting cases involving intellectual property, product liability and insurance claims, as well as evaluating the scientific validity of technical publications, media reports and other claims for government institutions and private industry.



### REGULATORY COMPLIANCE

Since the 1970s, EAG scientists have participated heavily in the scientific discussions that helped shape today's guidelines. We have contributed GLP data for US EPA, OECD, PMRA and JMAFF applications for some of the world's most widely used pesticides, herbicides and fungicides. And our regulatory inspection record is unblemished: no EAG facility has ever been cited for GLP violation.



## PRODUCT CHEMISTRY

Product Identity, Composition and Analysis

- Analysis of impurities, including metals analysis
- Preliminary analysis
- Certified limits
- Analytical enforcement method, including method transfers, refinements, and validations
- Submittal of samples
- Certificates of analysis

Physical and Chemical Properties Determination (including, but not limited to)

- Color, physical state, odor and pH
- Melting/boiling points
- Density (liquids and solids)
- Solubility (water and organic solvents)
- Fat solubility
- Dissociation constants in water
- Partition coefficient (n-Octanol/water)
- Stability to temperature, metals and metal ions
- Oxidation/reduction and chemical incompatibility
- Storage stability (accelerated and multi-year at various temperatures, including warehouse conditions)
- Corrosion characteristics
- Viscosity (rate, yield and viscosity curves)
- Miscibility
- Flammability/flashpoint/flame extension
- Surface tension
- UV/Visible absorption and spectral characterization (MS, IR, NMR)
- Vapor pressure
- CIPAC formulation properties

## ENVIRONMENTAL FATE

- Metabolism and rates in soils and sediments: aerobic, anaerobic, and aquatic (with and without <sup>14</sup>C labeling)
- Soil sorption and mobility: adsorption/desorption and column leaching studies
- Soil volatility
- Tobacco pyrolysis
- Hydrolysis: at various pH values and temperatures
- Photolysis
- Adsorption/desorption
- Aerobic and anaerobic aquatic sediment metabolism
- Aerobic and anaerobic soil metabolism
- Soil column leaching
- Mineralization in surface water
- Biodegradability of chemicals discharged in wastewater
- Ready and inherent biodegradability
- Degradation in manure
- Soil microorganisms
- Nitrogen and carbon transformation
- Metabolite/degradation product ID
- Volatilization from soil and plant surfaces, radiolabeled or non-labelled
- Field environmental fate

## AQUATIC TOXICOLOGY

- Acute and chronic tests (growth, life cycle, early life stage, sub acute, etc.)
- Bioaccumulation: Bioconcentration and biomagnification with fish, oysters and others on request
- Non-GLP screening tests (e.g. product screening)
- Aquatic Plants and Algae
- Acute and chronic testing with sediment/organisms
- Endocrine Effects Testing

## TERRESTRIAL TOXICOLOGY

- Terrestrial Plant, Tier I and Tier II with crop and non-crop species
- Higher Tier Terrestrial plant and invertebrates testing
- Soil Invertebrates

## FIELD MANAGEMENT

- Terrestrial field dissipation
- Aquatic dissipation
- Magnitude of residue and decline
- Magnitude of residue in processed commodities
- Field collection and residue analysis of pollen and nectar
- Storage stability
- Dislodgeable foliar residue
- Turf transferable residue
- Worker exposure/re-entry
- Field accumulation rotational crops
- Import tolerance

## POLLINATOR TESTING

EAG pollinator testing capabilities include all five core studies required by the US EPA:

- Adult HB contact (US EPA 850.3020, OECD 214)
- Adult HB oral (OECD 213)
- Adult chronic (proposed new OECD guideline)
- Larval acute – 7 day (OECD 237)
- Larval chronic – 22 day (proposed new OECD guideline); developing method
- Adult HB foliage residue (US EPA 850.3030)
- Adult HB pathogenicity (US EPA 885.4380)

## AVIAN TOXICOLOGY

- Acute oral toxicity – including sequential LD50s
- Subacute dietary toxicity studies – including passerines
- Pathogenicity and toxicity studies for the testing of biopesticides
- Food avoidance/repellency studies with treated seeds and granules
- Reproduction studies
- Adjusted designs to address specific risk assessment issues
- Studies to screen and/or test for potential endocrine effects
- Multi-generation reproduction studies with endocrine endpoints
- Hen delayed neurotoxicity studies
- Poultry feeding and metabolism studies
- Residue and metabolism studies in avian species
- Chemistry support
- Custom designed studies

## PLANT & ANIMAL METABOLISM

- Nature of residue – plant
- Confined accumulation in rotational crops
- Nature of residue – livestock
- Bioaccumulation in fish and metabolism in fish
- Rat ADME
  - Metabolism of test substance in rats
  - Pharmacokinetics
  - Tissue distribution
  - Bile cannulation
  - Dermal absorption of pesticides
- In Vitro ADME
  - Hepatocytes (fresh cryopreserved)
  - Microsomes
  - S9
- Multi-site GLP experience/expertise
- Comprehensive plant/confined rotational crop studies
- Animal metabolism studies: rat, goat, hen and fish
- In-house custom synthesis of radiolabeled compounds (<sup>14</sup>C, <sup>3</sup>H), stable labeled analog compounds (<sup>13</sup>C, <sup>15</sup>N, <sup>2</sup>H) and metabolites

## RESIDUE CHEMISTRY

- Independent laboratory validation (ILV) under US EPA and EU guidelines
- Sample milling
- Analytical methods development, optimization, and validation
- Magnitude of residue, including rotational crop and decline studies
- Storage stability studies
- Processed commodities
- Terrestrial field dissipation
- Aquatic field dissipation
- Dislodgeable foliar residues
- Turf transferable residues
- Groundwater and surface water studies
- Worker and occupational exposure
- Animal feeding studies
- Fish and shellfish residue studies
- Import tolerance
- Laboratory-scale fumigation studies
- Pollen and nectar