

## BIOTECHNOLOGY

# ACCELERATING INNOVATION FROM LAB TO TABLE



Accelerate development timelines, control costs and support faster product registration with Battelle's agricultural biotechnology services. We are advancing agrobioscience with existing methodologies and novel technologies to support the development needs of our clients. We provide an integrated approach to research, development and regulatory compliance to help you move to market quickly while controlling costs and risks.

### MOLECULAR AND ANALYTICAL CAPABILITIES

We offer deep expertise in the biosciences from our team of experienced molecular, cellular biology and microbiologists, coupled with extensive experience in biotech research, development, and testing for the pharmaceutical industry and biodefense community.

- Recombinant DNA technology, Sanger and NextGen genomic sequencing
  - Genomics
  - Metagenomics
  - Bioinformatics
- Radiobiological Southern blotting
- Bacterial or Viral Vector construction/design
- Northern blotting
- RNA quantification
  - RT-PCR
  - Quantitative Real-time PCR (qPCR)
  - Gene arrays
- Protein characterization, sequencing & mapping by high resolution mass spectrometry
- Recombinant protein expression, production and purification

- Single or multiplex immunoassay protein identification detection and quantification
  - ELISA
  - Western blot
  - Multiarray platform technologies
- Molecular toxicology/toxicogenomics

### DEVELOPMENT AND REGULATORY SUPPORT

Ensure that your products are ready for market with comprehensive analytical services.

- Nutritional chemistry and compositional analysis
- Sample preparation and analysis
  - Milling, grinding, extraction, of soil and crop matrices
  - Sample homogenization, sample stability, preservation, purity
- New and existing method or assay development
- Assay evaluation and validation
- Studies are compliant with GLP and OECD guidelines

### What's Next?

Put the people of Battelle to work for you today.



# BATTELLE

**OUR METHODS**

We have a comprehensive and flexible portfolio of technology platforms for all your agricultural biotechnology needs.

- Quantitative Realtime PCR, Applied Biosystems®
- Gene arrays, Affymetrix®
- Luminex®, and Meso Scale Discovery™ (MSD) Multiarray platform technologies
- GC/MS, LC/MS, LC/MS/MS, Q-TOF, AB Sciex, ThermoFisher, Waters, etc.
- HPLC, and UPLC, Agilent
- NextGen Sequencing, Ion-Torrent

**TESTING GMOS FOR ALLERGEN POTENTIAL**

GMOs (Genetically Modified Organisms) have the potential to vastly improve our food supply with products that are more nutritious, productive, sustainable or transportable. But before new GMO foods hit the grocery store aisle, developers must show that the new plant does not produce unexpected proteins that could induce an allergic response in susceptible individuals. Battelle provides accurate, defensible data to help developers move through the GMO registration process quickly and efficiently. Our advanced analytical and bioinformatic techniques can also provide clients with a comparative, complete compositional analysis for a nutritional profile.

**CASE STUDY: TESTING GMOS FOR ALLERGEN POTENTIAL**

**CHALLENGE**

GMOs (Genetically Modified Organisms) have the potential to vastly improve our food supply with products that are more nutritious, productive, sustainable or transportable. But new GMOs are subject to intensive regulatory review before they can hit the grocery store aisles.

In order to prove that a GMO is safe, Agrosience developers need to be able to prove that the new plant does not produce unexpected proteins that could induce an allergic response in susceptible individuals. To test for allergenic potential, developers need to be able to answer several questions: what proteins or peptides are produced as a result of the inserted genetic sequence? Are they different than those produced in the non-GMO/parent form of the organism? And if so, do they match any proteins known to produce an allergic response in humans?

**SOLUTION**

Testing for potential allergens begins with a comprehensive analysis at the genetic level of the organism (by Sanger or NextGen sequencing chemistries or radiologic Southern blotting) to ensure the transgene has been incorporated or retained within the genome. Gene expression levels can be quantified by qPCR methodologies coupled with protein expression levels detected by standard or multiplex immunoassays. To determine the allergy risk potential, we use an advanced bioinformatics approach to compare the recombinant protein sequence against a comprehensive database of known allergens.

**RESULTS**

Battelle provides accurate, defensible data to help support clients in the registration of their GMO products quickly and efficiently. Our labs are fully compliant with Good Laboratory Practice Standards (GLPS) to meet the most stringent requirements for U.S. or European product registration. Our advanced analytical, immunobiological and bioinformatic techniques provide developers with a complete nutritional profile as well as an allergy risk assessment. The final result? Farmers and consumers have access to safe, new food products that will meet the needs of the 21st century.

Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries. For more information, visit [www.battelle.org](http://www.battelle.org).

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