



Detects, Differentiates and Identifies:  
Multiple Foodborne Pathogens in One Test



Foodborne diseases are responsible for a wide range of illnesses and are a growing public health problem in both developed and developing countries. The key factors that led to the increasing number of food safety problems and rising consumer concerns are due to increased consumption of minimally process food, the globalization of the food supply and the mass production and distribution of ready-to-eat food. The World Health Organisation (WHO) reported that in industrialized countries, the percentage of the population suffering from foodborne diseases each year has been reported to be up to 30%. In the United States, the Centers for Disease Control and Prevention (CDC) estimates that there are 76 million cases of foodborne diseases, resulting in 325,000 hospitalizations and 5,000 deaths each year.

To date, current methodology to identify foodborne pathogens either for surveillance or to contain possible outbreaks requires much time and effort before they can be identified and this slows down the response time of health authorities.

To meet this need, Veredus offers a new solution: VereFoodborne™. This Lab-on-Chip application allows for rapid detection, differentiation and identification of major foodborne pathogens and is suitable for use even at point of need. This includes outbreak points, hospitals and food manufacturers.

**Robust and Time-tested Technologies:** Polymerase Chain Reaction (PCR) and microarray, provide the VereFoodborne™ chip the accuracy and sensitivity needed to provide answers in the shortest possible time.

## Advantages

- Multiple diagnostic tests on one chip
- Precise
- Ultra Fast
- Customisable
- Portable and easy-to-use
- Multiple security features for each chip
- Enables prompt action by food safety authorities to control foodborne epidemics
- Probes can be updated quickly to include new mutations of evolving strains and ensure wider coverage of detection

**Breakthrough Innovation:** The integration of two powerful molecular biological technologies enables the development of the VereFoodborne™ chip into a fast PCR-microarray based diagnostic test using the VerelD™ Biosystem to simultaneously detect, differentiate and identify selected biological agents all in a single test.

With the flexibility afforded by our customisable updates in our VereChip™ target panels, we are able to provide diagnostic and surveillance tools needed today and be ready for the next threat tomorrow. Veredus Laboratories, the future of diagnostics and surveillance, today.



## Specifications

- Detects foodborne pathogens using multiple gene targets and probes:
  1. *Bacillus cereus*
  2. *Campylobacter jejuni*
  3. *Clostridium perfringens*
  4. *Cronobacter sakazakii*
  5. *Listeria monocytogenes*
  6. *Salmonella* spp.
  7. *Escherichia coli*
  8. STEC (Shiga-toxin producing *Escherichia coli*)
  9. *Shigella* spp.
  10. *Shigella dysenteriae*
  11. *Staphylococcus aureus*
  12. *Vibrio cholerae*
  13. *Vibrio parahaemolyticus*
  14. NLV Geno Group I
  15. NLV Geno Group II
  16. Rota virus A
  17. Rota virus B
  18. Rota virus C
- Process controls on each chip:
  - a. RT-PCR/PCR: Positive control
  - b. Hybridization: Orientation and Hybridisation Probes
- Limit of detection: 100-500 copies of extracted genomic DNA or virus RNA
- Sample types\*: meat, fish, vegetables, milk, water, processed foods, stool or vomit sample  
\*pre-enrichment culture is required for some sample types.
- Every chip is 2D bar-coded, and measures 2.54cm x 7.62cm

## Features

- Optimized primer mix enables running of multiplex amplification reactions
- Able to run multiplex amplification reactions
- Multiple probes per target ensures reliable detection
- Small sample volume requirement
- Fast and programmable temperature ramp rate
- Fully customisable PCR/hybridization protocol
- Scalable for high throughput
- PCR yield is comparable to standard thermal cyclers
- 40% faster than conventional thermal cyclers
- Functional validation of RT-PCR/PCR is provided by an internal positive control
- Functional validation of hybridization for each assay is provided by an internal positive and negative hybridization controls
- Proprietary microfluidic interface: contact surfaces are biocompatible and do not inhibit the reaction processes
- Short time required for fluidic operations

## VerelD™ Biosystem



VerelD™ Biosystem combines molecular biology, microfluidics and microelectronics to bring the future of diagnostics and surveillance to you today. The VerelD™ Biosystem, along with the VereChip™, is a breakthrough in innovation, integrating two powerful molecular biological technologies: PCR and Microarray.

### VerelD™ Biosystem includes the following components:

1. Temperature Control System
2. Optical Reader
3. Biosystem Software
4. Bar Code Reader