

Salmonella Serotyping with Clear Safety™

With *Salmonella* serotype information, food safety professionals can begin to track and trend recurring serotypes of *Salmonella* and potentially link a contamination event to a source. This has resounding implications for mapping a manufacturing process and making faster, more informed decisions that impact not only consumer safety but also operational efficiencies and the bottom line.

The Disadvantages of Traditional Serology

Today, traditional *Salmonella* serotyping is a time-consuming, labor-intensive process that requires trained technicians, the management of various reagents and consumables, and exposes the laboratory to additional contamination. The result is also highly dependent on the strain's ability to express the antigens being detected and ultimately the technician's ability to subjectively "tease out" the serotype in the presence of competing organisms. Whether performed at an in-house laboratory or through a service provider, the cost (as high as \$185/sample¹) and long time-to-result diminish the value that serotype information can provide to an establishment.

Molecular solutions are available that target genetic regions responsible for serotype antigens. However, they are more expensive and require pure cultures for analysis, which do not improve the total time to result.

Serotyping with Clear Safety

With Clear Safety, you can detect up to 40 unique serotypes in an enriched sample in about 24 hours. The Clear Safety platform is flexible, allowing you to test for specific combinations of serotypes and can even detect commonly used controls strains and elucidate cross-contamination. With next-generation sequencing (NGS) technology, Clear Safety gives you more information to make faster, better decisions for your customers and your brand.

Reportable *Salmonella* Serotypes with Clear Safety

I 4,[5],12:i:-	Blockley	Heidelberg	Muenchen	Saintpaul
Abaetetuba	Braenderup	Infantis	Newport	Schwarzengrund
Agona	Cerro	Javiana	Oranienburg	Senftenberg
Alachua	Derby	Johannesburg	Panama	Stanley
Albany	Dublin	Kentucky	Paratyphi B	Thompson
Anatum	Enteritidis	Mbandaka	Poona	Typhi
Bareilly	Give	Mississippi	Reading	Typhimurium
Berta	Hadar	Montevideo	Rissen	Virchow

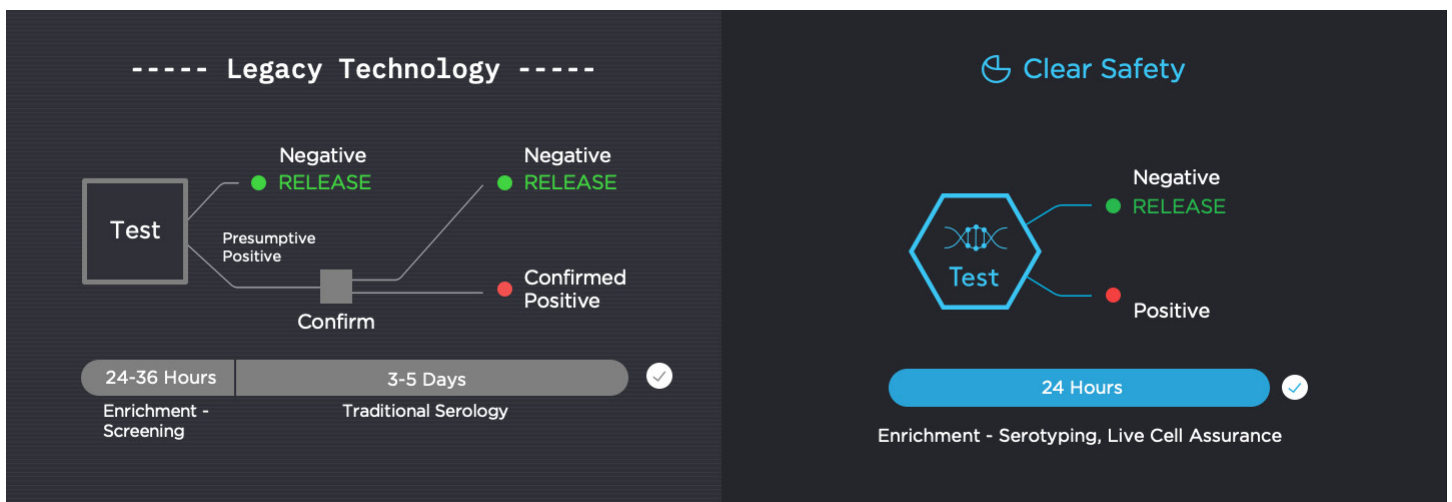
¹ Guard J, Sanchez-Ingunza R, Morales C, Stewart T, Liljebjelke K, Kessel J, Ingram K, Jones D, Jackson C, Fedorka-Cray P, Frye J, Gast R, Hinton A, Jr. 2012. Comparison of dkgB-linked intergenic sequence ribotyping to DNA microarray hybridization for assigning serotype to *Salmonella enterica*. FEMS Microbiol Lett 337:61-72. <http://dx.doi.org/10.1111/1574-6968.12010>.

Serotyping: Clear Safety vs. Other Methods

	Traditional Serotyping Methods	Rapid Serotyping Methods	Clear Safety
Turnaround Time	3 to 5 days after initial screen result	3+ days after initial screen result	Serotype detection after primary enrichment (about 24 hours)
Results	Subjective calls	Objective answers	Objective, easy-to-read answers
Testing Source	Pure culture required	Pure culture required	Serotyping conducted directly from enriched samples
Automation	Currently unavailable	Limited automation after pure culture obtained	High-throughput robotics that eliminate labor and subjective errors

How Serotyping Works with Clear Safety

Within roughly 24 hours, food safety professionals can receive test results at the genus level for the presence or absence of *Salmonella*, at the species level for *Salmonella bongori* and *Salmonella enterica*, and at the serotype level. Furthermore, customers do not have to test for all 40 serotypes available on the Clear Safety platform. Instead, they can choose which serotypes are most applicable for their test runs.



Key Benefits of Serotyping with Clear Safety

- **Cost Effective:** With Clear Safety, Salmonella screening and serotyping are conducted at the same time, using the same assays, media, and consumables. As a result, our serotyping tests help your company to improve its bottom line.
- **Fast Turnaround Time:** Salmonella serotyping can be conducted in about 24 hours, enabling you to act faster when a contamination event occurs.
- **Highest Accuracy:** Using NGS, we look at multiple regions of the genome in order to correctly identify serotypes.
- **Clear Results:** We simplify the process. Rather than relying on an expert eye to analyze colonies, we give you objective, easy-to-read results, saving you time and removing subjectivity.
- **Multiple Serovars:** Unlike traditional serology, Clear Safety can detect multiple serovars at the same time, thus providing more complete information about your samples.
- **Flexible Assays:** Choose your level of specificity. Test for any combination of Salmonella species and available serotypes.

Sample Serotyping Results with Clear Safety

The screenshot displays a web interface for Salmonella serotyping results. At the top, there are tabs for 'Samples' and 'Reports'. The main content area is titled 'sero -1001 Product serotype'. A notification box indicates a 'Positive Result detected January 2, 2019' for Salmonella enterica, serotype Mbandaka. Below this, the 'Result Specificity' section shows 'Salmonella enterica Mbandaka'. The 'Sample Details' section provides information on the product serotype ('santa clara'), sampling location, date arrived ('December 27, 2018'), and date sample collected ('December 6, 2018'). The 'Tests Performed' section lists various Salmonella species and serotypes, with 'enterica' and 'Mbandaka' highlighted.

Genus	Species	Serotypes Detected
Salmonella	enterica	Mbandaka

Product serotype	December 27, 2018	December 6, 2018
Product	Date Arrived	Date Sample Collected
santa clara	23	
Sampling Location	Lot	

Salmonella Species	enterica				
bongori	Alachua	Albany	Anatum	Bareilly	Berta
Agona	Cerro	Derby	Dublin	Enteritidis	Give
Blockley	Heidelberg	I 4,[5],12:-	Infantis	Javiana	Johannesburg
Hadar	Mbandaka	Mississippi	Montevideo	Muenchen	Newport
Kentucky	Panama	Paratyphi B	Poona	Reading	Rissen
Oranienburg	Schwarzengrund	Senftenberg	Stanley	Thompson	Typhi
Saintpaul	Virchow				
Typhimurium					
Enterica Serotypes					

Want to Learn More?

Contact us at inquiries@clearlabs.com