

FOODBORNE PATHOGEN DETECTION

From Farm to Fork





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 Massargy Platform Simplicity meets clarity in result interpretation for genetic testing Bacterial Foodborne Pathogens foodborne illness 	D1. D2.		
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Figure 1: MassARRAY[®] System

Built on MALDI-TOF technology, where the nucleotide mass is precisely measured. The system offers optimized throughput and significantly reduced turnaround times, providing major benefits.





Transfer a small volume of PCR product to a single pad

on SpectroCHIP® array



Figure 3: The mass difference generated by a single base extension can be detected by MassARRAY.

Figure 2: A workflow system starts with multiplex end-point PCR followed by a single base extension reaction.

D2. FROM FARM TO FORK



Foodborne illness, also commonly referred to as food poisoning, frequently results from the consumption of food contaminated by bacteria or their toxins. Various types of foodborne illnesses exist, with several factors influencing symptoms and severity. The WHO, USFDA, and CDC have issued preventive control measures to regulate the retail and food service segments in response to specific bacterial foodborne pathogens.



- Salmonella enterica
- Campylobacter spp.
- Escherichia coli
- Listeria monocytogenes
- Enterococcus spp.

FDA U.S. FOOD & DRUG ADMINISTRATION



- Shigella spp.
- Staphylococcus aureus
- Clostridium perfringens
- Vibrio spp.
- Yersinia spp.



Campylobacter Clostridium perfringens Listeria monocytogenes

*Photo credit : Centers for Disease Control and Prevention (CDC)

03. BACTERIAL FOODBORNE PANEL

MassARRAY

- Multiplex PCR for specific amplicon
- Single base extension with specific primers
- m/z detection
- \$
- Rapid
- Sensitivity and specificity
- High-througput

Targeted NGS



- PCR of specific target
- Numerous mutations
 detected

WGS



- NGS of entire genome
- Detect all putative mutations

- \$\$
- Time consuming
- Bioinformatic needed
- \$\$\$
- Time consuming
- Bioinformatic needed

GETTING START

- Ready-to-use pre-design panel
- Reagents & primers validated
- ✓ Reliable platform
- ✓ No bioinformaticist required

TESTING BEGINS

- S Efficient workflow to
- minimized resources
- Ø Well proven protocols
- ✓ Rapid analysis
- ✓ Minimized waste



HIGH-THROUGHPUT

- Able to process 1000+ of samples daily
- Automated and pre-setup
- 🧭 Workflow to make scaling up
- Keep up with growing demand

EXPANSION

- custom panel is available Ø Continue success into
- additional focus area <u>
 Ability</u> to apply multiple panels
 - using a single instrument

THE ART OF Pathogen Detection







MASSARRAY-BASED BACTERIAL DETECTION ASSAY

10 BACTERIAL FOODBORNE PATHOGENS IN A SINGLE REACTION

- 🔊 Salmonella spp.
- 🔊 Campylobacter coli
- 🔊 Campylobacter jejuni
- 🔊 Listeria monocytogenes
- 🔊 Escherichia coli and Shigella spp.
- 🔎 Enterococcus faecalis

%Specificity = $\frac{true \ negative}{true \ negative + false \ negative} \times 100$

- 🔊 Enterococcus faecium
- Staphylococcus aureus
- Clostridium perfringens







Figure 5: Enterococcus faecium, Salmonella spp., and Campylobacter jejuni were identified in a single assay. The circles represent the mass-to-charge ratio (m/z) of unextended primers (UEP), while the arrows indicate the mass spectral peak corresponding to the extended base, facilitating bacterial identification.

12 gDNA samples of ref bacteria18 strains of ref bacteria67 bacterial lab strains

Sensitivity 99% Specificity 100%

100% Sensitivity Specificity

103 field samples

MASSARRAY-BASED For Bacterial ID.



BACTERIAL **BACTERIAL FOODBORNE** PANEL

Extraction kit

MagPurix or QuickExtract

PCR & Sigle Base Extension Reagents

- EconoTaq Polymerase
- Specific primers for DNA amplification & single base extension

Data Analysis

- Pre-config data processing
- Assay Report

Intellectual Property

Registered under trade secrets KRRN 115896 and KRRN 126614

Ref. Publication

 N.Suebwonsa et al., MassARRAY: A High-throughput Solution for rapid detection of foodborne pathogens in real-world setting, Front. Microbiol., vol 15 -2024, doi.org/10.3389/fmicb.2024.1403579

HAT'S E offer

MassARRAY System Platform

- · Works with standard 96 and 384 well plates
- Supports diverse applications, allowing labs to consolidate tests onto a single platform
- Well-proven for the accurate and reproducible results illustrated in over 4,000 publications

Maximum Productivity



Operate from one to thousands of samples with varying applications on a single system

🚯 Simple Workflow

Combining automation, minimal hands-on time and on-board data analysis

Broad Multiplexing

Target up to 50 specific DNA variants in a single PCR reaction and run up to 96 or 384 samples on a single SpectroCHIP® Array



Cost-effective

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