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Improved *Salmonella* Detection from PPS using Multiplex PCR Methodology

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INTRODUCTION

To reduce the occurrence of foodborne salmonellosis, the primary production environment must be addressed as a key contamination source[1]. Traditional detection methods for primary production samples (PPS) are challenging to use and confirm presence of *Salmonella* genus only.

These studies compared the Thermo Scientific™ RapidFinder™ Salmonella Species, Typhimurium and Enteritidis Multiplex Flex PCR Kit (RapidFinder Multiplex) to ISO 6579-1:2017 for the detection of *Salmonella* serovars from (PPS).

METHODS

Figure 1. RapidFinder Salmonella species, Typhimurium and Enteritidis PCR Kit testing method used during both studies

Day 0

- Enrich 25 g PPS sample in 225 mL Thermo Scientific™ Oxoid™ TT Broth and incubate 37±1°C for 16 hours

Day 1

- Transfer 1 mL enrichment into 9 mL Thermo Scientific™ Buffered Peptone Water (BPW) (ISO) and incubate at 37±1°C for 4-6 hours
- Perform Immunomagnetic separation and lysis using the Thermo Scientific™ KingFisher™ Flex Purification System (Figure 4)
- Perform PCR using the Applied Biosystems™ QuantStudio™ 5 Food Safety System
- Streak 10 µL enrichment onto Thermo Scientific™ *Brilliance*™ Salmonella Agar for confirmation

Day 2

- Confirm positive results and perform extended confirmation protocol with subculture in RVS if required

In the initial study, conducted at ADRIA Développement, Quimper, France, 57 PPS were infected with *Salmonella* and processed according to the RapidFinder Multiplex method (Figure 1). A replicate data set was processed according to the ISO method, as an unpaired study. Up to 20 isolated colonies were confirmed for the RapidFinder Multiplex method and 5 for the reference method.

In the second study, a commercial poultry producer processed 13 *Salmonella*-spiked PPS and ten unspiked samples, including those with natural contamination, according to the RapidFinder Multiplex method. A replicate data set was tested for the ISO method, as an unpaired study.

STUDY 1 RESULTS

Figure 2. *Salmonella*-coinfected samples confirmed by RapidFinder Multiplex and ISO 6579-1:2017

Out of all spiked materials, 37 pairs of samples were confirmed to contain *Salmonella*. The RapidFinder Multiplex method confirmed 6 more *Salmonella* isolates from the spiked samples than the ISO method (Figure 2).

The RapidFinder Multiplex method detected more cases of co-infection than the ISO method, including three dual infections and one triple infection.

STUDY 2 RESULTS

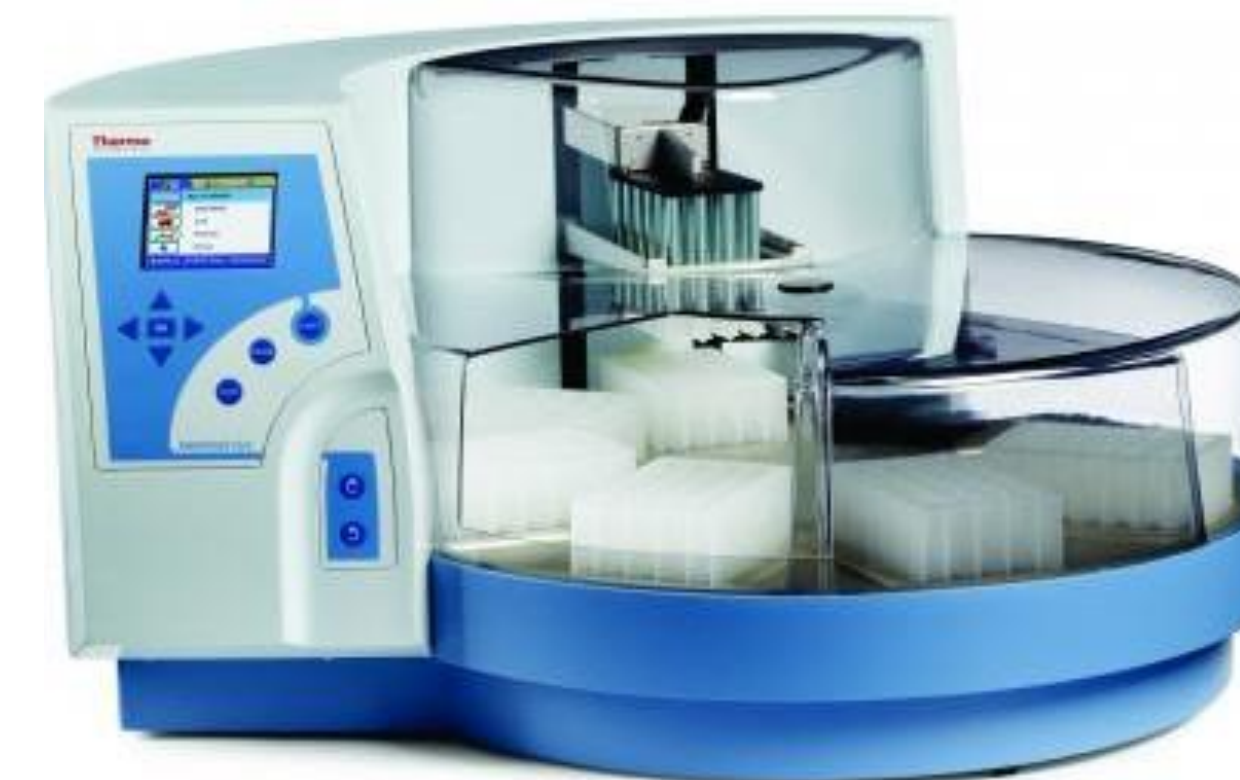
Figure 3. *Salmonella*-positive results from the RapidFinder Multiplex and ISO 6579-1:2017

Target	RapidFinder Multiplex	ISO 6579-1:2017
Salmonella species	16	14
Salmonella Enteritidis	2	-
Salmonella Typhimurium	8	-

The RapidFinder Multiplex method confirmed *Salmonella* in 16 out of 23 samples; six of these positive results came from unspiked samples. The ISO method confirmed *Salmonella* in 14 out of 23 samples.

The RapidFinder Multiplex method confirmed *Salmonella* in 60% of naturally contaminated unspiked samples; the ISO method confirmed only 40%.

Figure 4. KingFisher Flex Purification System



The KingFisher Flex Purification System purifies samples and performs lysis with a single automated script.

CONCLUSIONS

Superior performance compared to reference method

- These studies demonstrated superior *Salmonella* detection and identification following the RapidFinder Multiplex method compared to ISO 6579-1:2017.

High accuracy

- The RapidFinder Multiplex method enables higher accuracy in identifying coinfected samples.

Shorter time to result

- The RapidFinder Multiplex method obtains a shortened time to presumptive result in under 22 hours, days faster than reference methods.

REFERENCES

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TRADEMARKS/LICENSING

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