Automated Sample Preparation for Thermo Scientific SureTect PCR Assay workflows

Hanna Lehmusto¹, Marian Teye¹, Mika Silvennoinen¹, Milja Tikkanen¹, Feng Huang¹, Suvi Airikka¹, Jutta Kasurinen¹, Jani Holopainen¹, Nicole Prentice², Salman Zeitouni², (1) Thermo Fisher Scientific, Vantaa, Finland. (2) Thermo Fisher Scientific, Basingstoke, United Kingdom.

Introduction

The Thermo Scientific[™] SureTect[™] PCR System (Thermo Scientific[™] SureTect[™], SureCount[™] and RapidFinder[™] PCR Assays run on the Applied Biosystems[™] QuantStudio[™] 5 Food Safety PCR System with the Thermo Scientific RapidFinder Analysis software, Figure 1, or the Applied Biosystems[™] 7500 Fast Food Safety PCR System with Thermo Scientific[™] RapidFinder[™] Express software) enables detection and differentiation of the most common food pathogens from various food samples. As sample throughput increases, even with the simple and streamlined workflow of the SureTect PCR System, the number of repetitive tasks increases the risk for human error, and this can decrease the reliability of the results.

Figure 1. QuantStudio 5 Food Safety PCR System with SureTect PCR Assays



Automating the post enrichment PCR sample preparation steps of the SureTect PCR Assay workflow using the CyBio[®] FeliX liquid handing instrument (Figure 2) reduces the likelihood of errors at this stage and enables more efficient resource management as the hands-on time is decreased.

Figure 2. CyBio FeliX liquid handling instrument (image provided by Analyitik Jena GmbH)



Automated SureTect PCR Assay workflow

Utilize the CyBio FeliX liquid handling Instrument in the SureTect PCR Assay workflow to perform lysis and/or PCR plate setup from enriched samples ready for transfer to the QuantStudio 5.

Preparing the instrument is fast and simple. The walk-away automation and flexible programs enable maximum efficiency for the laboratory.

With a user-friendly interface and compact dual deck design, the CyBio FeliX liquid handling instrument enables efficient, accurate sample setup enabling your technicians to focus on other tasks and ensuring confidence in results.





Equivalency of the manual and automated workflows

An Equivalency study was performed using all SureTect PCR Assays and the RapidFinder Salmonella Multiplex PCR Assay with one to four different food matrices for each PCR Assay. Equivalency between manual and automated workflow was verified using post-enrichment inoculated samples. Risk for cross-contamination was evaluated using a checkerboard pattern of highly contaminated and negative samples.

The C_t values for the manual and automated PCR workflows were compared and the results showed equivalency between the workflows. Tables 1-3 present the C₊ analysis for SureTect Salmonella species, SureTect Listeria species and SureTect Listeria monocytogenes PCR Assay workflows. Comparison results obtained using other SureTect and RapidFinder PCR Assays also showed equivalency between the manual and automated workflows (data not shown).

Table 1. Results for SureTect Salmonella species PCR Assays

Food matrix	Organism	CFU/ml range	Ν	Manual Ct _{ave}	Automation Ct _{ave}	Ct _{dff}
Pork sausage	• S. Typhimurium	1.05x10 ⁵ -5.24x10 ⁵	62	35.93	34.97	0.96
Cocoa		1.20x10 ⁵ -5.99x10 ⁵	64	35.47	35.81	-0.34
Shelled egg	S. Enteritidis	9.37x10 ⁴ -4.68x10 ⁵	63	37.76	36.47	1.3

Table 2. Results for SureTect Listeria species PCR Assays

Food matrix	Organism	CFU/ml range	Ν	Manual Ct _{ave}	Automation Ct _{ave}	Ct _{dff}
Environmental sample	L. ivanovii	7.4x10 ⁴ -3.7x10 ⁵	62	32.59	33.61	-1.01
Smoked salmon		9.3x10 ⁴ -4.6x10 ⁵	64	32.5	33.53	-1.03
Cheese (>25% fat)		1.17x10 ⁵ -5.83x10 ⁵	64	33.36	33.39	-0.04

Table 3. Results for SureTect Listeria monocytogenes PCR Assays

Food matrix	Organism	CFU/ml range	N	Manual Ct _{ave}	Automation Ct _{ave}	Ct _{dff}
Environmental sample	L. monocytogenes	1.2x10 ⁵ -6.05x10 ⁵	64	35.04	35.84	-0.8
Smoked salmon		9.52x10 ⁴ -4.76x10 ⁵	60	36.39	36.1	0.3
Cheese (>25% fat)			64	35.38	36.71	-1.33

The results of the cross-contamination study showed that there is no increased risk for crosscontamination when comparing the automated and manual workflows (data not shown). Additionally, the automated workflow decreases the risk of cross-contamination linked to human error.

Benefits of automated sample preparation



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Thermo Fisher SCIENTLFLC

Time saving

- Minimal hands-on time with walk-away automation
- Fast run setup
- Plug and play instrument
- Low maintenance

Flexible

- Up to six different PCR Assays or Assay lots in one run
- Full or partial plate processing
- Choose complete workflow, lysis only or PCR setup only

Accuracy and traceability

- Increase pipetting accuracy
- Minimize human errors
- Barcoded sample entry

Space saving

- Compact design with unique 2-level deck design suitable for any laboratory
- 450 mm x 650 mm x 698 mm (depth x width x height)

Intuitive software

- Pre-programmed runs
- User friendly interface
- Single data entry

Eco friendly workflow

- Clever consumables for minimal waste
- Use same manual PCR reagents and plastics, no
- additional consumables needed

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