

### SCANSTATION® PERFORMANCE STUDY PERFORMED WITH *SALMONELLA* AND *LISTERIA*

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Unit: ScanStation®

#### Objective:

The aim of this study is to assess the performance of the **ScanStation®** (ISS) by comparing manual and automatic enumeration of *Salmonella typhimurium* and *Listeria monocytogenes* pure cultures.

#### Protocol:

For each plate, a pure strain of *Salmonella typhimurium* was plated on PCA, TSA, Casein or VRBG media, and a pure strain of *Listeria monocytogenes* on PCA or Casein.

#### Results:

##### A. *Salmonella typhimurium*

##### A.1. Manual vs. ScanStation® enumeration comparison

For each medium, the following tables show the manual and automatic readings of *S. typhimurium* colonies after growth.

The values of these readings are reported in counted Colony Forming Unit (CFU) log. The difference between manual and automatic has been calculated and the difference of 0.3 log (absolute value) has been selected as a threshold for statistical significance.

##### • On PCA medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2527	2.42	2.41	0.01
2530	1.18	1.18	0.00
2561	1.04	1.04	0.00
2564	2.28	2.26	0.01
2651	2.58	2.58	0.00
2653	1.56	1.53	0.02

##### • On TSA medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2650	2.58	2.56	0.02
2652	1.62	1.61	0.01

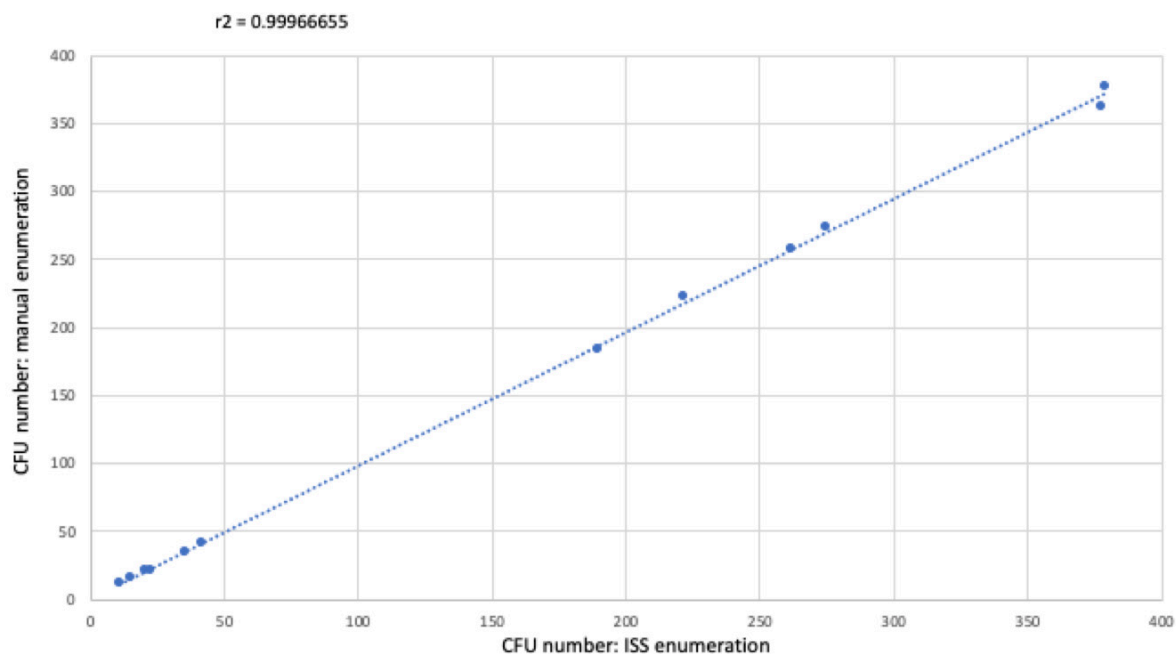
##### • On Casein medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2529	2.44	2.44	0.00
2563	1.36	1.32	0.04

##### • On VRBG medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2528	2.35	2.35	0.00
2562	1.32	1.32	0.00

The calculated difference for all of the samples is close to 0. These results do not show significant difference between the two enumeration modes. Furthermore, the following graph shows the correlation summarizing all manual and **ScanStation®** enumerations performed with *S. typhimurium*:

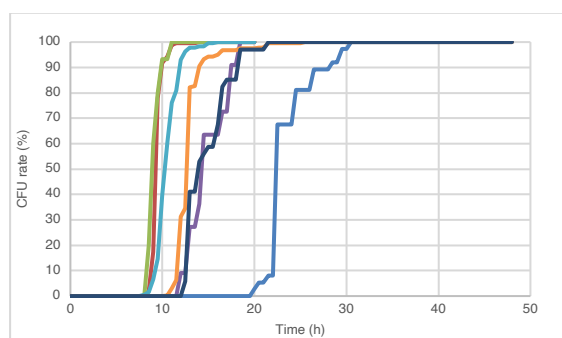


The correlation coefficient  $R^2$  shows a value close to 1, meaning there is not significance variation between manual and ScanStation® enumeration.

## A.2. Microbial load graph in real time

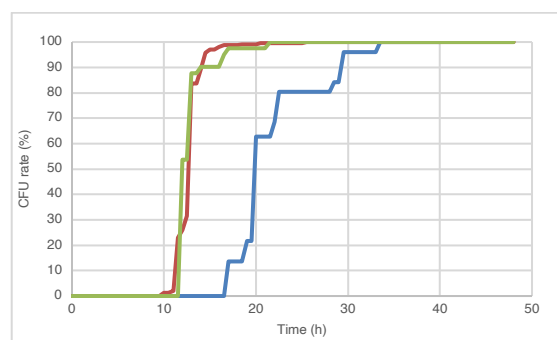
Graphs of real time growth of *S. typhimurium* have also been drawn for each medium. A time to result (TTR) has been implemented when the CFU value reached 85% of the final result.

### • On PCA medium



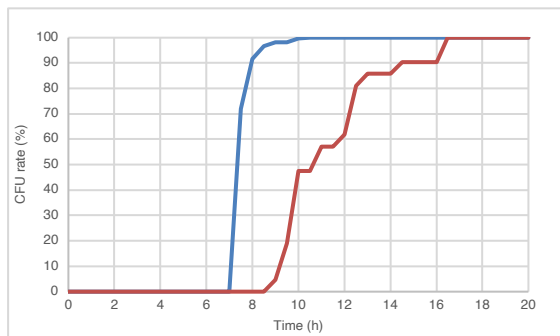
Value of average 85% TTR= 15.35 h

### • On TSA medium



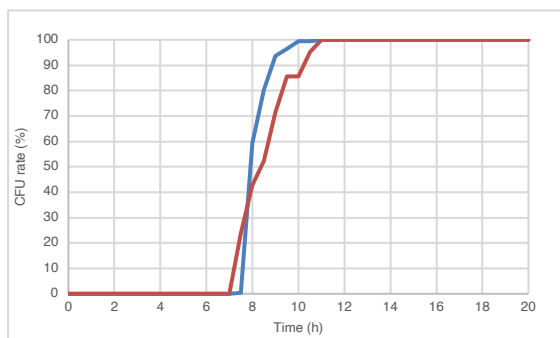
Value of average 85% TTR= 18.53 h

- On Casein medium



Value of average 85% TTR= 10.37 h

- On VRBG medium



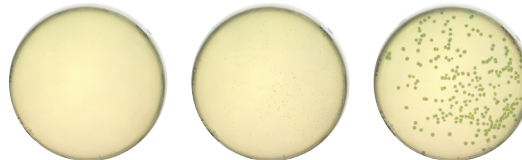
Value of average 85% TTR= 9.12 h

TTR reading of *S. typhimurium* growth on PCA, TSA, Casein and VRBG media allows enumeration result anticipation and therefore it gives the possibility to the user to define in advance a corrective action, if necessary.

For example, knowing that the 85% TTR of *S. typhimurium* is 15.35 h, a user reading 170 colonies at  $t = 15.35$  h could estimate the total number of CFU for that sample to be 200 CFU. The exact total will be confirmed at the end of the incubation.

The precision of the average 85% TTR can be increased by the user by running a significant number of samples in the same conditions.

### A.3. Representative photos of a real time *S. typhimurium* growth on PCA medium



Example of sample 2527 at  $t = 0$ ,  $t = 6$  h and  $t = 17$  h

## B. *Listeria monocytogenes*

### B.1. Manual vs. ScanStation® enumeration comparison

For each medium, the following tables show the manual and automatic readings of *L. monocytogenes* colonies after growth. The values of these readings are reported in counted CFU log. The difference between manual and automatic has been calculated and the difference of 0.3 log (absolute value) has been selected as a threshold for statistical significance.

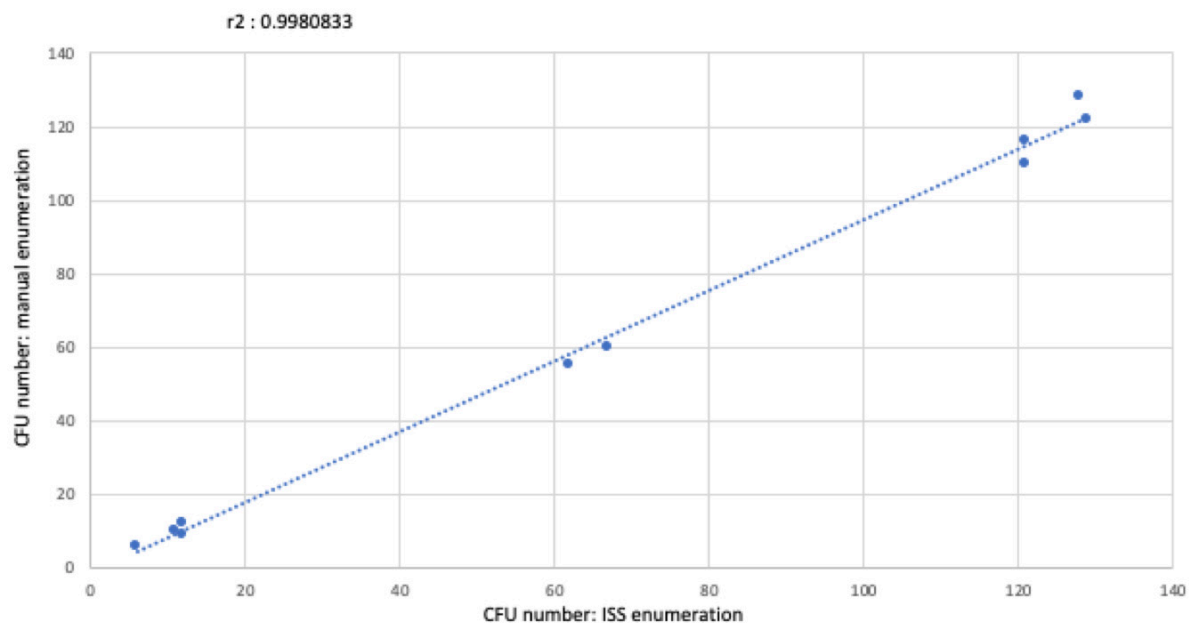
- On PCA medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2523	2.08	2.06	0.02
2525	0.78	0.78	0.00
2557	1.04	1.00	0.04
2559	2.11	2.11	0.00
2705	1.79	1.74	0.05
2704	1.83	1.78	0.05

- On Casein medium

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2524	2.08	2.04	0.04
2526	1.08	0.95	0.12
2558	1.08	1.08	0.00
2560	2.11	2.09	0.02

The calculated difference for all of the samples is close to 0. These results do not show significant difference between the two enumeration modes. Furthermore, the following graph shows the correlation summarizing all manual and **ScanStation®** enumerations performed with *L. monocytogenes*:

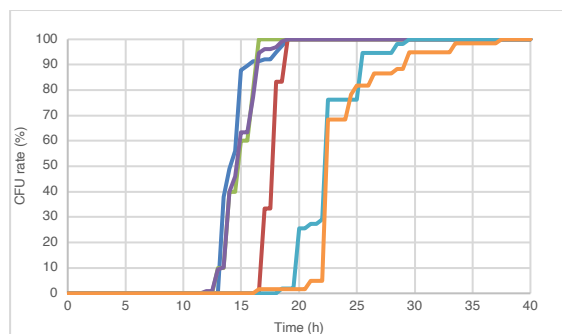


The correlation coefficient  $R^2$  shows a value close to 1, meaning there is not significance variation between manual and **ScanStation®** enumeration.

## B.2. Microbial load graph in real time

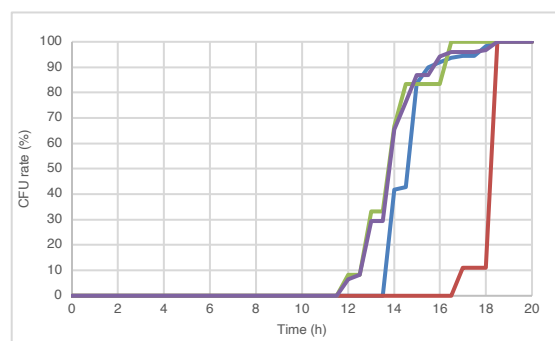
Graphs of real time growth of *L. monocytogenes* have also been drawn for each medium. A time to result (TTR) has been implemented when the CFU value reached 85 % of the final of the final result.

### • On PCA medium



Value of average 85% TTR = 19.54 h

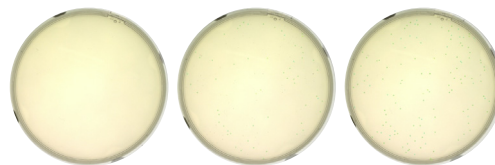
### • On Casein medium



Value of average 85% TTR = 16.12 h

TTR reading of *L. monocytogenes* growth on PCA and Casein media allows enumeration result anticipation and therefore it gives the possibility to the user to define in advance a corrective action, if necessary. For example, knowing that the 85% TTR of *L. monocytogenes* is 19.54 h, a user reading 170 colonies at  $t = 19.54$  h could estimate the total number of CFU for that sample to be 200 CFU. The exact total will be confirmed at the end of the incubation. The precision of the average 85% TTR can be increased by the user by running a significant number of samples in the same conditions.

### B.3. Representative photos of a real time *L. monocytogenes* growth on PCA medium



Example of sample 2559 at  $t = 0$ ,  $t = 11.5$  h and  $t = 17$