

USING THE SCANSTATION® IN FOOD INDUSTRY STUDY PERFORMED ON SYMPHONY AND TBX MEDIA

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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 plated samples on Symphony and TBX media.

Results :

A. Symphony media

Protocol: these analyses was performed at Biokar (a culture media manufacturer) at their Picardie site (France) after plating yeast and mold pure strains on Symphony medium.

A.1. Manual vs. ScanStation® enumeration comparison

For each microorganism, the following tables show the manual and automatic readings of colonies after growth on Symphony medium. The value of these readings is reported in counted CFU log. The difference between manual and automatic has been calculated and the difference of 3.0 log (absolute value) has been selected as a threshold for statistical significance.

• *Penicillium*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manuel	ISS	
2962	1.73	1.61	0.12
2963	0.70	0.78	0.08
2994	2.00	1.73	0.26
2995	1.15	1.11	0.03

• *Zygosaccharomyces*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
3006	1.36	1.64	0.58
2974	2.72	2.58	0.14
2975	1.74	1.74	0.00

• *Aspergillus*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2964	1.88	1.64	0.23
2965	1.08	1.00	0.08

• *Mucor*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2998	2.36	2.20	0.16
2966	0.70	1.00	0.30

• *Torulopsis*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2971	2.57	2.56	0.01
3003	2.30	2.37	0.07

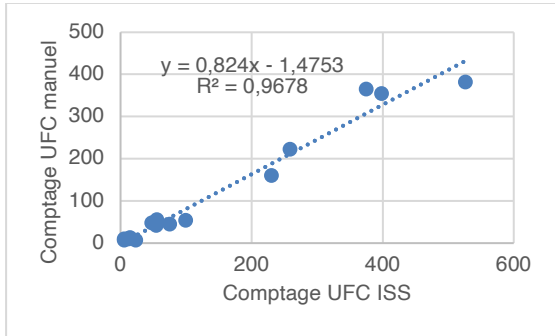
• *Saccharomyces*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
2973	2.41	2.35	0.06
3005	1.67	1.67	0.00

• *Candida*

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manual	ISS	
3001	2.60	2.55	0.05
2968	2.41	2.33	0.08

The majority of the results does not exceed the CFU 0.3 log threshold. These results do not show significant difference between the two enumeration modes. Furthermore, the following graph shows the correlation summarizing of all manual and **ScanStation®** enumerations performed on Symphony medium:

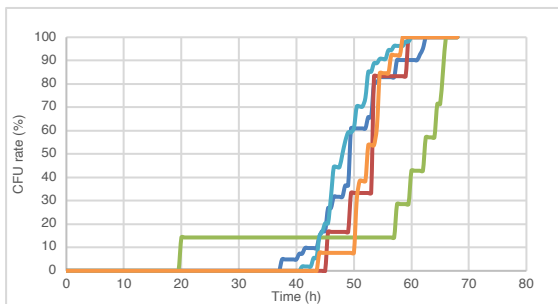


The coefficient correlation R^2 shows a value close to 1, meaning there is close to no difference between manual and **ScanStation®** enumeration.

A.2. Microbial load graph in real time

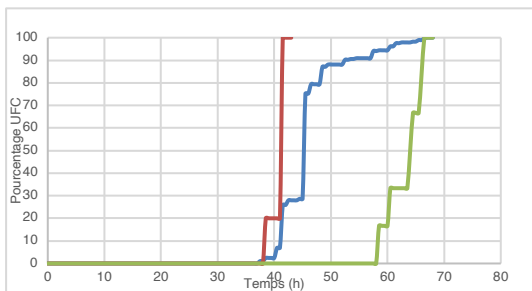
Graphs of real time growth have also been drawn for each microorganism. A time to result (TTR) has been implemented when the CFU value reached 85% of the final result.

• *Penicilium*



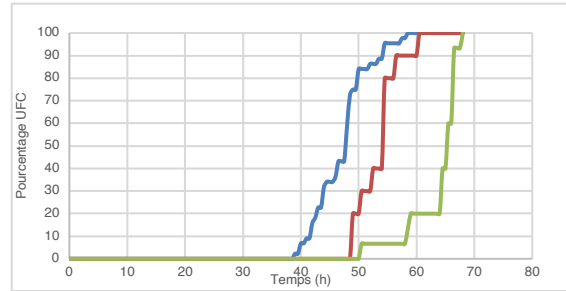
Value of average 85% TTR = 57 h

• *Zygosaccharomyces*



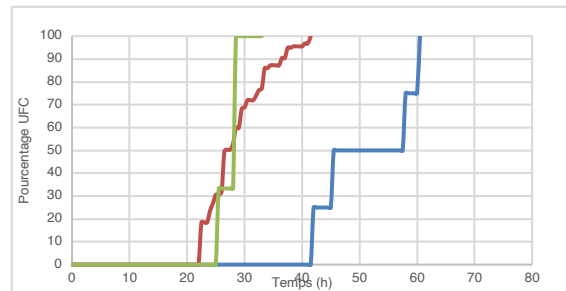
Value of average 85% TTR = 48.5 h

• *Aspergillus*



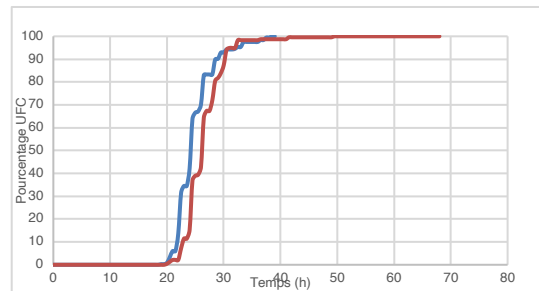
Value of average 85% TTR= 56 h

• *Mucor*



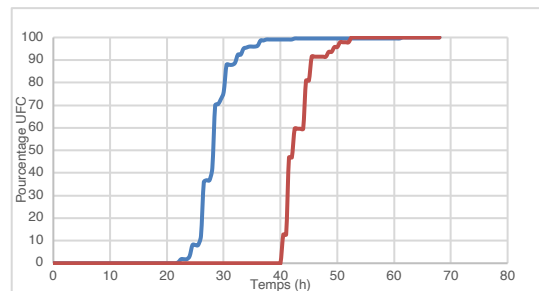
Value of average 85% TTR = 33.5 h

• *Torulopsis*



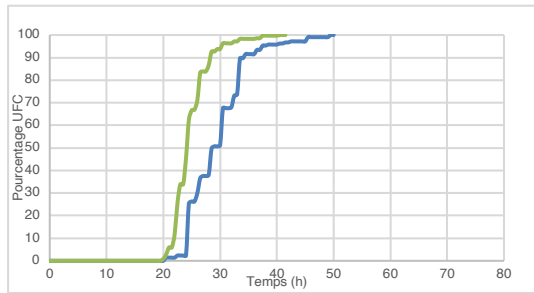
Value of average 85% TTR = 29.25 h

• *Saccharomyces*



Value of average 85% TTR = 38 h

• **Candida**



Value of average 85% TTR = 30.75 h

TTR reading allows enumeration result anticipation on Symphony medium 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 *Candida* is 30.75 h, a user reading 170 colonies at t = 30.75 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 microorganism growth on Symphony medium



Example of *Aspergillus* (sample 2965) at t = 0, t = 49.5 h and t = 65 h

B. TBX medium

Protocol: these analyses were performed with naturally contaminated samples from different customers. The growth of beta-Glucuronidase-positive *Escherichia coli* on TBX medium was therefore consistent with typical stress condition frequently encountered during daily bacterial analysis.

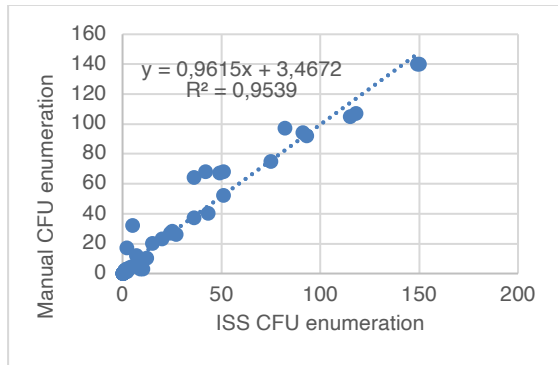
B.1. Manual vs. ScanStation® enumeration comparison

The following tables show the manual and automatic reading of *E. coli* colonies after growth on TBX medium. The value of this

reading is 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.

Sample number	Enumeration (CFU log)		Difference (absolute value)
	Manuel	ISS	
4042	0.95	0.90	0.05
4044	0.00	0.00	0.00
4058	0.48	0.48	0.00
4059	0.00	0.00	0.00
4061	0.30	0.48	0.18
4064	0.85	1.08	0.23
4066	0.30	0.00	0.30
5370	0.60	0.60	0.00
5371	1.97	1.96	0.00
5372	2.07	2.03	0.04
5373	2.18	2.15	0.03
5374	2.17	2.15	0.03
5375	2.06	2.02	0.04
5411	1.63	1.60	0.03
5436	0.95	0.48	0.48
5437	1.00	0.95	0.05
5438	1.00	0.48	0.52
5440	0.30	1.23	0.93
5441	0.70	1.51	0.81
5442	1.08	1.00	0.08
5456	1.69	1.83	0.14
5457	1.71	1.72	0.01
5458	1.96	1.97	0.01
5459	1.91	1.99	0.07
5460	1.40	1.45	0.05
5461	1.56	1.57	0.01
5468	1.88	1.88	0.00
5469	1.62	1.83	0.21
5470	1.38	1.43	0.05
5471	1.43	1.41	0.02
5472	1.30	1.36	0.06
5473	1.18	1.30	0.12
5474	1.71	1.83	0.12
5497	1.56	1.81	0.25
4046	0.30	0.48	0.18
4030	0.00	0.30	0.30
4031	0.00	0.30	0.30
4033	0.30	0.00	0.30

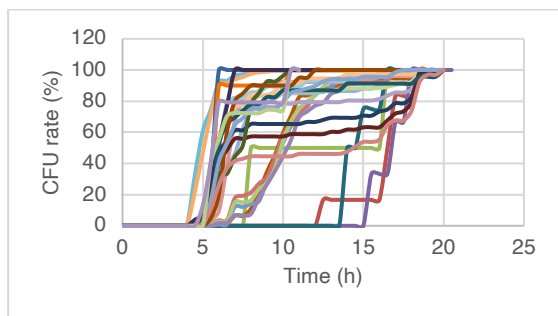
The majority of the results does not exceed the CFU 0.3 log threshold. These results do not show significant difference. Furthermore, the following graph shows the correlation summarizing of all manual and **ScanStation**® enumerations of *E. coli* growth on TBX medium:



The coefficient correlation R^2 shows a value close to 1, meaning there is close to no difference between manual and **ScanStation**® enumeration.

B.2. Bacterial load graph in real time

The graphs of real time growth have also been performed for each sample. A time to result (TTR) has been implemented when the CFU value reached 85% of the final result.



Value of average 85% TTR= 10.5 h

The time of first detection varies from 5h to 15.5h. This interval is explained by the intrinsic conditions of the plated samples. Indeed, these samples were analyzed following real laboratory conditions and therefore suffered from different stress conditions with a different impact on bacterial growth. However, TTR reading still allows *E. coli* result anticipation on TBX medium and therefore it gives the

possibility to the user to define in advance a corrective action, if necessary.

B.3. Representative photos of a real time *E. coli* growth on TBX medium



Example of the sample 2965 at t = 0, t = 9h and t = 17h