interscience

APPLICATION NOTE

SCAN® 1200 PERFORMANCE EVALUATION

Objective

The aim is to evaluate the Scan 1200® performance by comparing manual enumerations and automatic enumerations. For an optimal comparison, Petri dishes were plated and incubated in our R&D laboratory using standard methods to reproduce common laboratories conditions.

The same user then counted the colonies with a Scan® 1200 and using a manual method in order to obtain results which could be used to evaluate the accuracy of the Scan®.

This document also includes a study concerning time analysis per plate and an estimation of time spent per day by laboratories.

Material and methods

Protocol

- Bacteria samples were obtained by dissolving referenced pastilles (Bioréférence® from "Institut Pasteur") in peptone water.
- Samples were diluted in order not to attain more than 300 colonies per plate (maximum authorized by ISO norms).
- 0.5 or 1mL of samples were spread onto each plate.
- Inoculated plates were incubated at ~30-37°C for ~24-72h, depending on the microorganism.
- Scan® 1200 version V5 software was used to enumerate colonies.
- One member of the interscience R&D laboratory counted colonies on same plates.
- ISO 7218:2007 norm was used to compare manual and automatic method for each plate.

Results

Results were obtained with a total of:

- 6 microorganisms:

Bacillus cereus (ATCC 11778)

Escherichia coli (ATCC 8739)

Lactobacillus casei var. rhamnosus

Pseudomonas aeruginosa (ATCC 902)

Saccharomyces cerevisiae

Penicillium roqueforti

- 502 Petri dishes, 7 different:

P.C.A

Mac Conkey

V.R.B.L

E.M.B

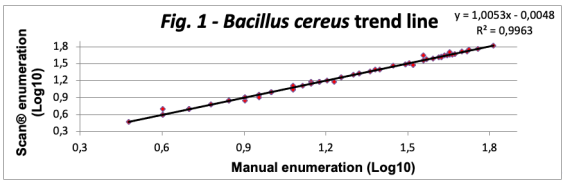
T.B.X

M.R.S

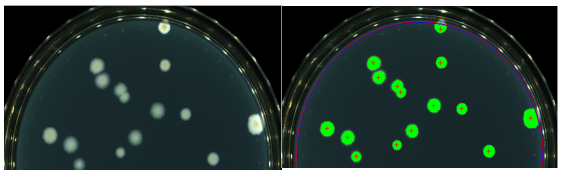
Sabouraud agar

- More than 45,000 colonies counted using both manual method and Scan® method.

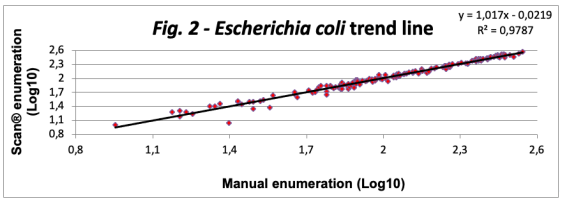
This high number of tests guarantees a high-quality statistical study.



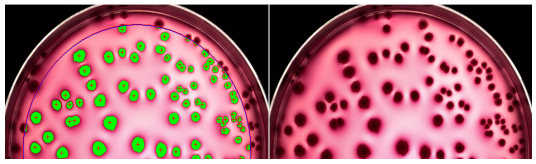
Mean log value difference between methods is **-0.001** (0.33%) and R² is **0.9963**



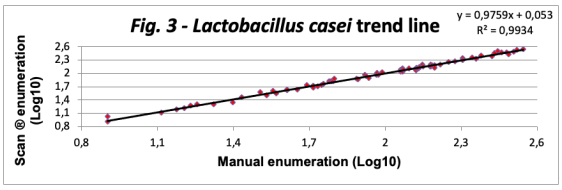
(*B. cereus* – P.C.A, 24h at 37°C)



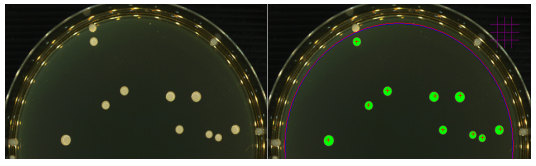
Mean log value difference between methods is **-0.012** (2.91%) and R² is **0.9787**



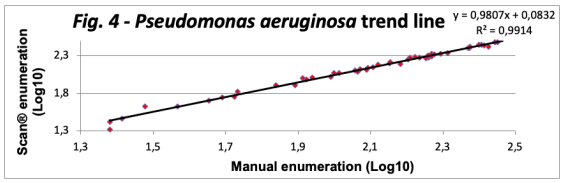
(*E. coli* – V.R.B.L, 24h at 37°C)



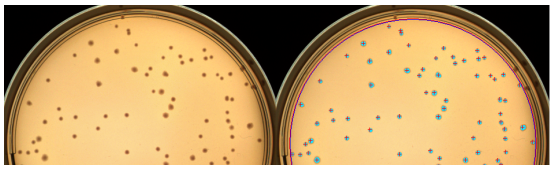
Mean log value difference between methods is **-0.006** (1.44%) and R² is **0.9934**



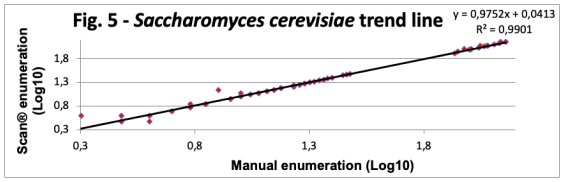
(*L. casei* – M.R.S, 72h at 37°C)



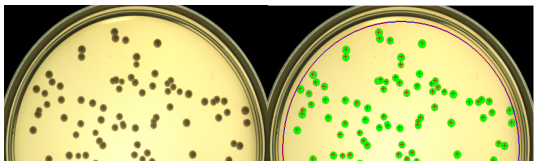
Mean log value difference between methods is **-0.05** (10.40%) and R² is **0.9914**



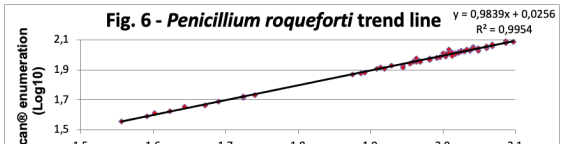
(*P. aeruginosa* – Mac Conkey, 24h at 37°C)



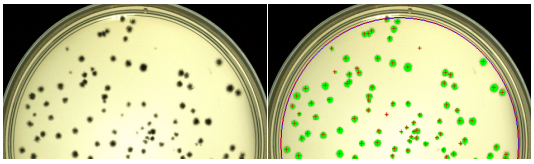
Mean log value difference between methods is **-0.009** (2.04%) and R² is **0.9901**



(*P. roqueforti* – Sabouraud agar, 72h at 30°C)



Mean log value difference between methods is **0.006** (1.33%) and R² is **0.9954**



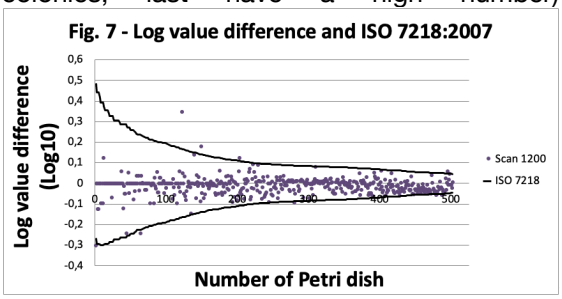
(*P. roqueforti* – Sabouraud agar, 72h at 30°C)

The lower correlation coefficient is 0.9787 so we can conclude that the results obtained with the Scan® 1200 match those using manual enumeration in standard conditions.

Below is another illustration (figure n°7) to evaluate Scan® results following ISO norm 7218:2007 (“Microbiology of food and animal feeding stuffs -- General rules for microbiological examinations”).

Each manual enumeration has been associated with a confidence range at 95%. It means that automatic enumeration should be within this range. In the following illustration, Scan® 1200 performances have been tested with those intervals (dark line) for every plate (502).

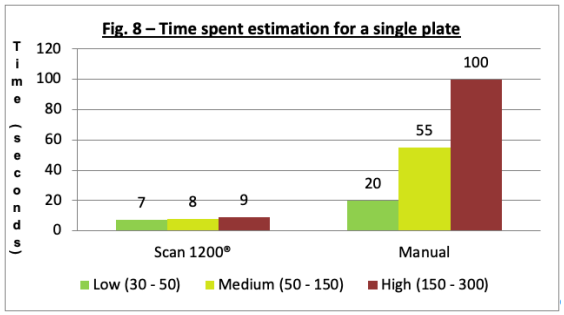
(First Petri dishes have a low number of colonies, last have a high number)



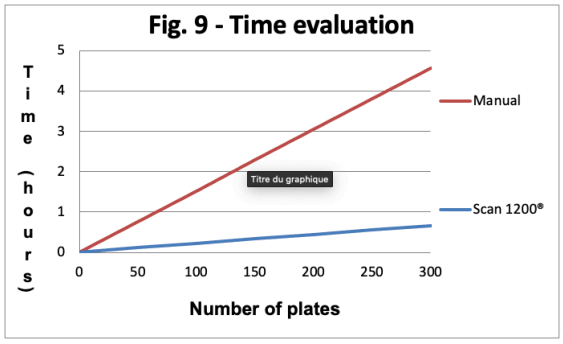
Only 8 points were not within the range so **only 1.59%** of enumerations do not match with ISO norm 7218:2007. In practice, this result indicates **good colony detection**.

Time analysis

For one single plate, the following figure (n° 8) shows the time spent, depending on how many colonies must be count in this plate, writing the result and preparing the next plate:



Estimation per day for a laboratory with a single user counting common plates (50 – 150 colonies) manually and the same person using Scan® 1200:



The more Petri dish must be analyzed, the more time is spent by laboratories. As you can see, Scan® 1200 is offering faster method.

Conclusion

Tests are showing by many ways (trend line, correlation coefficient, mean log value difference and ISO 7218:2007) that Scan® 1200 is:

- Enumerating faster (about **80% time reduction**).
- Counting as well as a common user (strong relationship between the two methods with an average **difference of 2.35% per plate**).

Scan® 1200 is an excellent tool for laboratories which need to count high number of plates, with precision, without wasting a lot of time.

All results can be saved into specific files (called sessions) that contain all plates photographs and enumerations, guaranteeing quality analysis with a perfect traceability.