



BLOG

Microbial Counting

The Usage of QUANTOM Tx™ and Automated Microbial Counting

QUANTOM Tx™ Microbial Counter

Precise colony enumeration and identification of bacterial pathogens are fundamental in today's clinical and microbiological studies. Research involving microorganisms such as bacteria often entails accurate colony counting and detailed assessment of the pathogen in theory. While manual cell counting remains a typical practice in laboratories, implementing it is challenging for high-throughput procedures due to its inconsistent results and low speed. Automated colony counting has been of rising interest in the past decade as it transformed the process of manual colony enumeration from tedious to more reliable and consistent. The principal drive of leading companies in biotechnology as Logos Biosystems is keeping up with the advances in microbiological research, facilitating its conduction, ensuring its accuracy, and maintaining its reliability.

Logos Biosystems' innovative machine QUANTOM Tx™ is an automated fluorescence-stained microbial cell counter encompassing automated fluorescence imaging and analysis of bacterial pathogens. As opposed to the time-consuming manual counting, QUANTOM Tx™ delivers speedy counts performed in 30 seconds per sample.

The manual counting of bacterial colony-forming units (CFUs) is a standard practice in microbiological research. It is carried by aliquoting a small amount of bacterial liquid culture followed by plating out multiple sequential dilutions onto Petri dishes containing culture medium. Once the incubation is fulfilled in appropriate conditions for the tested microorganism, the colonies are enumerated to obtain the CFU number. Although manual counting is a classic way of measuring colony-forming units CFUs, it can also be automatically counted. The major limitation of CFU is that it can only count culturable populations.

Counting with the QUANTOM Tx™

1. Mix cells with stain and loading buffer. Load into a counting slide.

2. Spin the slide in the QUANTOM™ Centrifuge.

3. Put the slide in the QUANTOM Tx™. Press Count.

4. Review data.



Despite being a gold standard, manual counting of bacteria is time-consuming and prone to human error as there are higher chances of analyzing only high dilutions of the initial bacterial culture since they have fewer colonies to count. As a result, minor counting errors in low-count assays negatively impacts the calculated concentration in the initial bacterial liquid medium. In addition, elevated numbers of CFUs on a Petri dish can lead to deceptive results due to the overcrowded bacteria.

On the other hand, QUANTOM Tx™ closes the gap left by the tedious task of manual counting by performing precise cell counting and detailed analysis of bacterial concentrations. This automated fluorescence-stained microbial cell counter executes viability measurements and can count cells as small as 0.3µm and results in exact microbial cell counts. As opposed to manual colony counting methods, QUANTOM Tx™ provides a flexible counting range and the ability to capture up to 10 fields of view at once. In addition, it has a special kit for counting viable bacterial cells hence obliterating the variability and unreliability of CFU technique.

Interestingly, QUANTOM Tx™ counts a wide range of gram-positive and gram-negative bacteria that includes and not limited to:

Gram Negative	Gram Positive
Alcaligenes Faecalis	Bacillus Coagulans
Comamonas Terrigena	Bacillus Lentus
Enterobacter Aerogenes	Bacillus Lichenformis
Enterobacter Cloacae	Bacillus Mycoides
Escherichia Coli	Lactobacillus Casei
Pseudomonas Fluorescens	
Proteus mirabilis	
Pseudomonas stutzeri	
Serratia marcescens	

On a side note, [Logos Biosystems](#) continually test for additional microbes that can be counted using their automated machine. Not only that [QUANTOM Tx™](#) renovated the time-consuming manual colony counting into a time-efficient procedure, but it also delivers real-time analysis of data by its sensitive image sensor and processor and customizable data reports.

Moreover, the usage of flow cytometry in quantifying the number of bacterial cells is a previously reported method. Bacterial organisms get analyzed in a suspension with specific fluorescent dyes that usually indicate the presence of bacterial cells and detect their viability. Despite being a rapid method, using flow cytometry may be limited by its requirements for costly dyes, expensive equipment, and solely specialized technicians for operation.

On the contrary, [QUANTOM Tx™](#) is user-friendly and can be operated smoothly in a lab by any scientist or researcher using four simple steps. First, a microbial cell suspension is prepared by mixing the bacterial sample with [QUANTOM Tx™ Total Cell Staining Dye](#) and [QUANTOM Tx™ Total Cell Staining Enhancer](#), followed by adding [QUANTOM Tx™ Cell loading Buffer I](#) and loading an aliquot into a [QUANTOM Tx™ M50 Cell Counting Slide](#). Once the sample is ready, centrifugation is carried out by [QUANTOM Tx™ Centrifuge machine](#). Next, bacterial counting is done after inserting the slide into the [QUANTOM Tx™ slide port](#). Finally, data review and export are conducted automatically and appear on the screen. Reports, graphs, imaging, and dilution calculations can all be performed, saved, and printed based on the researcher's preference.

The reason why centrifugation is necessary for microbial detection in food and water systems is that bacterial cells tend to be suspended at varying Z-positions. By centrifuging all the cells onto a single plane, we can capture clear and focused images using [QUANTOM Tx™](#). Accurate cell counting is certainly important for making informed decisions based on reliable data, and for achieving consistent and reproducible results in a wide range of applications.

Recently, several researchers reviewed the usage of QUANTOM Tx™ for quantifying microbial populations and described it as an *"excellent tool"* for bacterial enumeration as it effectively updated their experiments from time-consuming to time-efficient compared with hemocytometer counting. Also, QUANTOM Tx™ was recommended by researchers because it is *"easy to work with, even for beginners"* which highlights the user-friendly features instilled by Logos Biosystems to simplify research protocols. In addition to being described as reliable and accurate, using QUANTOM Tx™ was commended by an infectious disease research institute for its "intuitive software and amazing after-sales care."

Moreover, QUANTOM Tx™ was used in a recent study to explore the antimicrobial effect of Carbon Nanodots-ZnO (CND-ZnO) nanocomposite synthesized by *Sargassum horneri*. Two strains of gram-positive bacteria and three strains of gram-negative bacteria were selected to detect CND-ZnO's antibacterial activity. The QUANTOM Tx™'s accurate bacterial counting capabilities were used to help determine the CFUs, which enabled the researchers to adjust all bacterial strains to an identical volume.

In conclusion, QUANTOM Tx™ by Logos Biosystems enables automated identification and enumeration of individual bacterial cells. The process is made rapid and accurate due to the ability of QUANTOM Tx™ sophisticated counting algorithm to detect single microbial cells regardless of their diverse arrangements and morphologies, making it a leading first-of-a-kind bacterial cell counter.

Reference

1. Breed RS, Dotterrell WD. The number of colonies allowable on satisfactory agar plates. J Bacteriol. 1916;1(3):321–331. doi:10.1128/jb.1.3.321-331.1916
2. Kim KW, Chung D, Jung SH, Kwon YM, Kim JYH, Baek K. Antimicrobial effect of carbon nanodots–ZnO nanocomposite synthesized using *Sargassum horneri*. J Mar Sci Eng. 2022;10(10):1546. doi:10.3390/jmse10101546
3. Logos Biosystems. QUANTOM Tx™ Microbial Cell Counter [Internet]. SelectScience; [cited 2026 Jun 23]. Available from: <https://www.selectscience.net/product/quantom-tx-microbial-cell-counter>