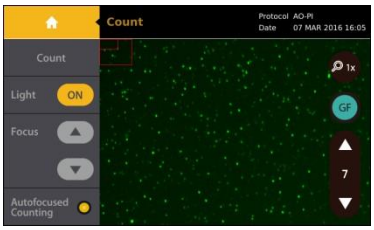
logos biosystems

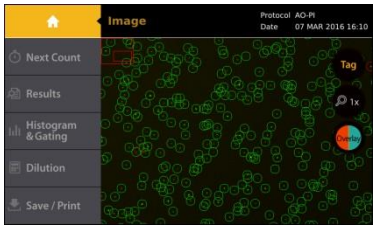
application note

A comparison of yeast cell counting methods:
LUNA-II YF™ Automated Yeast Cell Counter vs. flow cytometry vs. hemocytometer

Introduction

Yeast is essential to the beer and wine industries as it converts carbohydrates into CO_2 and alcohol in a process known as fermentation. Accurate yeast cell counts are crucial for initiating and monitoring the fermentation process. The standard yeast counting method recommended by the American Society of Brewing Chemists (ASBC) involves a hemocytometer and a microscope. Although it is a simple procedure, it is labor-intensive and prone to user-to-user variability. Flow cytometry is another option but requires expensive equipment, more reagents, and extensive training. The LUNA-II YF™ Automated Yeast Cell Counter from Logos Biosystems was developed to be a simple and reproducible solution for yeast cell counting. This application note compares the three methods here.





LUNA-II YF™ Automated Yeast Cell Counter

The LUNA-II YF™ Automated Yeast Cell Counter is a fully automated solution for yeast cell counting and viability analysis that fits on any benchtop. Dual fluorescence optics, an autofocusing liquid lens, and a proven counting algorithm produce cell count and viability data in just 15 seconds, doing away with the subjectivity and time of manual cell counting. The LUNA-II YF™ eliminates the subjectivity of operator judgment and guarantees that cells are counted with the same criteria between counts and users. Data may be transferred to a USB drive or printed on an external printer for effortless recordkeeping. The LUNA-II YF™ also generates comprehensive PDF reports with count data, protocols, corresponding cell images, and relevant histograms.

Accuracy compared to a flow cytometer

To evaluate the accuracy of the LUNA-II YF™, cell counts were compared to those obtained with the BD FACSCalibur™ flow cytometer (BD Biosciences). Serial dilutions of *Saccharomyces cerevisiae* were counted in triplicate. For the LUNA-II YF™, yeast cells were labeled with Acridine Orange/Propidium Iodide Stain, loaded into a disposable PhotonSlide™, and counted with the default AO-PI protocol. For the flow cytometer, yeast cells were labeled with a thiazole orange/propidium iodide stain and standard beads were added to help determine cell concentration. There was no significant difference between the LUNA-II YF™ and the flow cytometer in determining cell concentration (Fig 1) or cell viability (Fig 2), demonstrating the accuracy and reliability of the LUNA-II YF™.

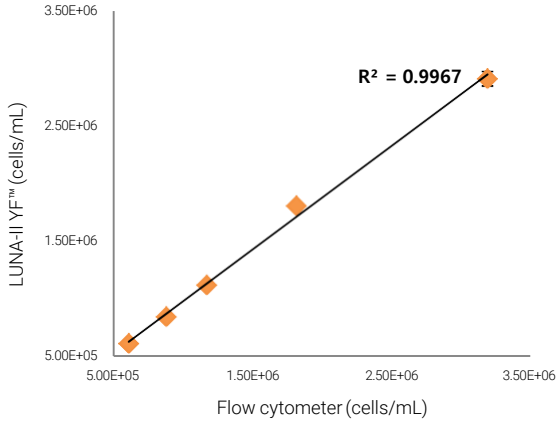


Figure 1. Comparison of the yeast cell concentration results from the LUNA-II YF™ and a flow cytometer.

Variability compared to a hemocytometer and flow cytometer

To compare the variability of cell concentrations obtained with the LUNA-II YF, flow cytometer, and hemocytometer, serial dilutions were prepared and counted in triplicate. To test the hemocytometer (Marienfeld), cell samples were mixed with an equal volume of 0.4% trypan blue stain. The cells were imaged with the iRiS™ Digital Cell Imaging System and the cells within the four corner squares of the Neubauer counting grids were counted. There is no significant difference in the total concentrations between any of the methods (Fig 3). However, the hemocytometer showed a higher variability from count to count whereas the LUNA-II YF™ and the flow cytometer were more consistent.

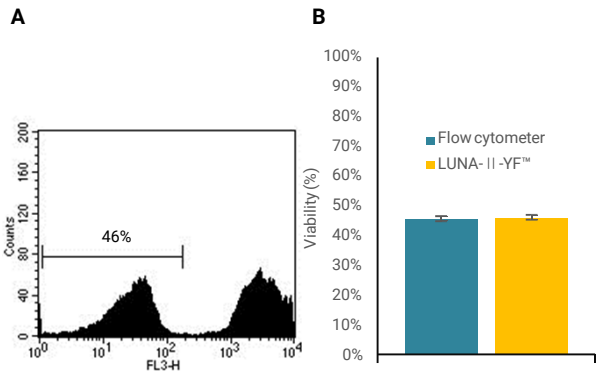


Figure 2. Comparison of the yeast viability results from the LUNA-II YF™ and flow cytometer. (A) Viability results measured by the flow cytometer. (B) There was no significant difference in the viability results obtained with the two instruments.

Summary

The LUNA-II YF™ Automated Yeast Cell Counter is a cost-efficient and simple alternative to expensive flow cytometers as well as being faster and more accurate than manual cell counting.

- **Simple** – cell count and viability data in just 15 seconds with a few taps on the touchscreen
- **Reliable** – no user-to-user variability
- **Accurate** – a tried, tested, and trusted cell counting algorithm
- **Convenient** – automatically generated data reports with cell images, histograms, protocols, and data

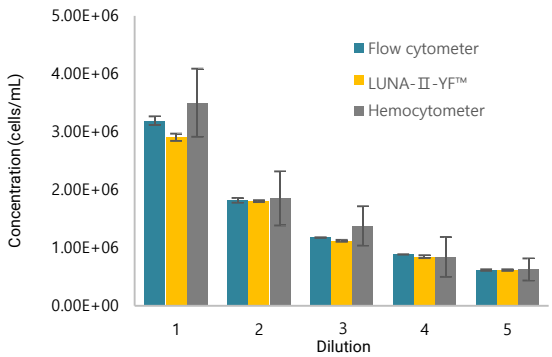


Figure 3. Comparison of the variability of results from a flow cytometer, the LUNA-II YF™, and a hemocytometer. The variability of results is greater for the hemocytometer than for the other two instruments.

Ordering Information

LUNA-II YF™ Automated Yeast Cell Counter			
Counter	L50001	LUNA-II YF™ Automated Yeast Cell Counter	1 unit
Slides	L12005	PhotonSlide™, 50 Slides	1 box
	L12006	PhotonSlide™, 500 Slides	10 boxes
	L12007	PhotonSlide™, 1000 Slides	20 boxes
	L12011	LUNA™ Reusable Slide	1 unit
	L12012	LUNA™ Reusable Slides	2 units
	L12014	LUNA™ Reusable Slide Coverslips	10 units
Reagents	F23001	Acridine Orange/Propidium Iodide Stain	2 x 0.5 mL
	F23002	Acridine Orange Stain	2 x 0.5 mL
	F23003	Propidium Iodide Stain	2 x 0.5 mL
	F23004	Propidium Iodide Stain for Yeast	2 x 0.5 mL
	F23211	Fluorescein Diacetate Stain	2 x 0.5 mL
	F23213	Fluorescence Signal Enhancer 1	2 x 0.5 mL
	F23212	Cell Dilution Buffer	5 x 20 mL
	F53002	Cell Dilution Buffer II	5 x 20 mL
	F23202	Yeast Viability Kit 1	1 kit
Beads	F23102	LUNA™ Fluorescence Calibration Beads	2 x 1 mL
Printer	P10001	LUNA™ Printer	1 unit

Find out more at www.logosbio.com

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