

## Rapid, Portable And Cost-Effective Yeast Cell Viability And Concentration Analysis Using Lensfree On-Chip Microscopy And Machine Learning

Tech ID: 27515 / UC Case 2017-093-0

### SUMMARY

UCLA researchers in the Department of Electrical Engineering have developed a new portable device to rapidly measure yeast cell viability and concentration using a lab-on-chip design.

### BACKGROUND

Yeast cells are frequently used in the alcoholic beverage and baking industry to make beer, wine, and bread. Recently, biofuel production using yeast has emerged to replace fossil fuels. Monitoring the concentration and viability of yeast cells allows for fine-tuning of fermentation parameters, which is crucial for both research laboratories and the industry. Therefore, biofuel, alcoholic beverage and baking industries can benefit from a rapid and cost-effective yeast viability and concentration analysis method. Current methods to test yeast viability are time-consuming, large form factor, and require expensive equipment.

### INNOVATION

UCLA researchers led by Prof. Aydogan Ozcan have developed a novel portable lab-on-chip lens free microscope system to monitor yeast cell viability and concentration. Furthermore, the device utilizes machine learning algorithms to process images, eliminating user subjectivity, and reducing acquisition and analysis time. These dual developments have allowed for the development of the Automated Yeast Analysis Platform technology, which yields data that agrees well with current gold-standard technologies.

### ADVANTAGES

- ▶ Small form factor/portable design
- ▶ Rapid testing if yeast cell viability and concentration
- ▶ Low-cost instrument compared to gold standard technologies (i.e. hemocytometer or flow cytometry)

### RELATED MATERIALS

- ▶ [Rapid, portable and cost-effective yeast cell viability and concentration analysis using lensfree on-chip microscopy and machine learning.](#) Alborz Feizi, Alon Greenbaum, and Aydogan Ozcan. Lab on a Chip. Sept. 2016

### PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,320,362	05/03/2022	2017-093

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### INVENTORS

- ▶ Ozcan, Aydogan

### OTHER INFORMATION

#### KEYWORDS

Yeast cell viability, yeast cell concentration, haemocytometer, fermentation, yeast, brewers' yeast, lab-on-chip, microfluidics, machine learning, imaging, cell imaging, cell quantification, dead or alive assay, cell concentration

#### CATEGORIZED AS

- ▶ **Biotechnology**
  - ▶ Food
  - ▶ Industrial/ Energy
  - ▶ Other
- ▶ **Energy**
  - ▶ Bioenergy
- ▶ **Nanotechnology**
  - ▶ NanoBio
  - ▶ Other
  - ▶ Tools and Devices
- ▶ **Sensors & Instrumentation**
  - ▶ Analytical
  - ▶ Biosensors
  - ▶ Other
  - ▶ Process Control

#### RELATED CASES

2017-093-0

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Automated Semen Analysis Using Holographic Imaging
- ▶ Low-Cost And Portable Uv Holographic Microscope For High-Contrast Protein Crystal Imaging
- ▶ Extended Depth-Of-Field In Holographic Image Reconstruction Using Deep Learning-Based Auto-Focusing And Phase-Recovery
- ▶ Detection and Spatial Mapping of Mercury Contamination in Water Samples Using a Smart-Phone
- ▶ Computational Cytometer Based On Magnetically-Modulated Coherent Imaging And Deep Learning
- ▶ Lensfree Tomographic Imaging
- ▶ Single Molecule Imaging and Sizing of DNA on a Cell Phone
- ▶ Cross-Modality Deep Learning Brings Bright-Field Microscopy Contrast To Holography
- ▶ Microscopic Color Imaging And Calibration
- ▶ Quantification Of Plant Chlorophyll Content Using Google Glass
- ▶ Holographic Opto-Fluidic Microscopy
- ▶ Design Of Task-Specific Optical Systems Using Broadband Diffractive Neural Networks
- ▶ Ultra-Large Field-of-View Fluorescent Imaging Using a Flatbed Scanner
- ▶ Revolutionizing Micro-Array Technologies: A Microscopy Method and System Incorporating Nanofeatures
- ▶ Tunable Vapor-Condensed Nano-Lenses

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