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Non-invasive Monitoring of Cell Culture Health via Sampling of Bioreactor VOC Emissions

Tech ID: 30107 / UC Case 2019-447-0

ABSTRACT

Researchers at the University of California, Davis have developed a device that can capture, analyze, and monitor volatile organic compounds (VOCs) emitted by cell cultures through a bioreactor exhaust line – thus eliminating the need to contact the cell culture directly.

FULL DESCRIPTION

Bioreactors are sterile environments often used for cell culture growth. Current methods to monitor cell culture health and growth inside the reactor include extracting a sample of the culture from the reactor every day. This monitoring process requires the cell culture and its media to come into direct contact with sampling devices, putting the entire culture at risk for inadvertent infection. Such pathogen contamination compromises the sterile environment of the bioreactor and therefore could ruin the entire culture.

Researchers at the University of California, Davis have developed a device that can monitor the volatile organic compounds emitted by cell cultures. For normal cell respiration, bioreactors pass air into the reactor and circulate it out through an exhaust. The device samples the exhaust gas VOCs, which are a normal by-product of cell metabolism. These VOC emissions can then be correlated against known standards to monitor and analyze both cell growth rates and overall bioreactor health. Monitoring these gases can thus help identify any adverse conditions within the bioreactor, perhaps allowing adjustments to be made that would improve the ongoing reactor environment in near real-time.

APPLICATIONS

- ▶ Monitoring cell culture environments in bioreactors

FEATURES/BENEFITS

- ▶ Eliminates a contact point that has potential for introducing contamination
- ▶ Can assist with optimizing reactor conditions in near real-time

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2020039244	12/17/2020	2019-447

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Heated Dynamic Headspace Sampling Device for Volatile Organic Compounds \(VOCs\) from a Surface](#)

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OTHER INFORMATION

KEYWORDS

Cell culture, Volatile organic compounds, Bioreactors, Process analytical technologies

CATEGORIZED AS

- ▶ **Medical**
 - ▶ Stem Cell
- ▶ **Research Tools**
 - ▶ Bioinformatics
 - ▶ Cell Lines
- ▶ **Sensors & Instrumentation**
 - ▶ Biosensors

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