



OIL & GAS

Near real-time bacteria monitoring in Oil & Gas operations

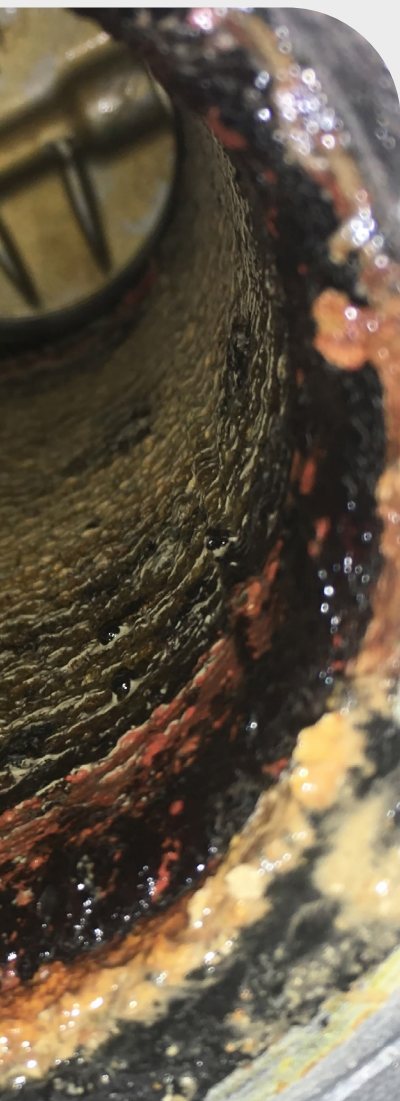
Comprehensive and accurate assessment of bacterial populations introduction.

BactiQuant

INTRODUCTION

Bacterial contamination in Oil & Gas operations can lead to flow assurance issues and unhealthy environments, making monitoring and controlling bacterial growth essential

However, traditional bacterial detection methods are cumbersome and time consuming, making them unsuitable for an operational environment that requires rapid decision-making.



To address this limitation, this study presents a portable field technology for fluorometric determination of hydrolase activity to identify and monitor bacterial contamination in operations in near real-time.

The enzyme method is simple, robust, and comprehensively assesses total bacterial presence in complex environmental samples. This technology can help operators avoid excessive use of biocides, adjust the biocide treatment regime according to actual "near real-time" data on bacterial contamination levels, and evaluate numerous treatment regimes that generally require months to perform.

INTRODUCTION

Controlling bacterial contamination in Oil & Gas operations is of utmost importance as it can lead to corrosion in oil production facilities, resulting in higher operating costs, reduced revenue, and serious environmental and health hazards.

Biocides are often used to control and neutralize bacteria, but their use without a systematic approach can be expensive and have negative environmental impacts. One of the challenges of designing and maintaining an efficient biocide treatment strategy is accessing relevant "near real-time" data on bacterial presence and activity.

The traditional methods used to monitor bacteria in Oil & Gas operations are elaborate and characterized by long analysis times, making them unsuitable for an operational environment that requires rapid decision-making. Tools that address these limitations are thus in high demand.



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BactiQuant Mobile Lab offers a quick and comprehensive assessment of bacterial contamination levels.

The enzyme method used in this study, BactiQuant, measures hydrolase activity as a proxy for bacterial contamination levels. The analysis is performed in three simple steps



Bacteria is concentrated on a filter



Analysis chemistry is added directly to the filter house



Enzyme activity is measured using a fluorometer

The fluorophore released upon hydrolyzation of a fluorogenic enzyme substrate is released extracellularly and can be measured directly, reducing the analysis time from days to minutes.

The bacteria are concentrated in a water sample in a sterile filter unit. Analysis chemistry is then added directly to the filter house, which is flushed with analysis liquid into a plastic cuvette. The extracellular fluorogenic compound is determined using a portable field fluorometer.

The signal produced is directly proportional to the number of bacteria. A significant advantage of this technology is that it provides a comprehensive assessment of total bacterial presence in complex environmental samples.

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To demonstrate the application of the technology, an agreement between Perenco Oil and Bactiquant was made to showcase an oil field in Congo dealing with the potential micro-bacterial activity.

Samples were taken at wellheads to identify the source of bacterial activity. Producer wellheads were sampled for fluids coming from the reservoir and entering the first stage separator, where gas, oil, and water separate.

If a reservoir is sour, the water in the wellhead will contain hydrogen sulfide (H₂S) and organic

acids, which can provide an environment conducive to bacterial growth.

The portable field fluorometric technology identified a bacterial contamination issue related to a failed biocide injection pump, allowing the platform manager to initiate relevant mitigation of the problem.

CONCLUSION

The field portable fluorometric technology, Mobile Lab provides a simple, robust, and near real-time method of identifying and monitoring bacterial contamination in Oil & Gas operations

The technology can help operators avoid excessive use of biocides, adjust the biocide treatment regime according to actual "near real-time" data on bacterial contamination levels, and evaluate numerous treatment regimes that would usually require months to perform. The technology can also provide a comprehensive assessment of total bacterial presence in complex environmental samples, making it an essential tool in maintaining flow assurance and avoiding unhealthy environments in Oil & Gas operations.



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