

Unprecedented power Molecular detection of *Megasphaera* & *Pectinatus* within hours at the brewery

THE CHALLENGE

Low oxygen environments create new risks

Control of oxygen is integral throughout the brewing process, and today's sophisticated equipment helps to minimize unwanted exposure. However, an unintended consequence of achieving low oxygen standards is an enhanced environment for survival of *Megasphaera* and *Pectinatus*. These organisms can produce a sulphuric odor, and turbidity or haziness in the finished product. Typically, extensive sanitation processes beyond a standard CIP are required to eradicate these bacteria.

Successful culturing of these strictly anaerobic microbes is challenging; even with careful plating practices, traditional methods can result in false negatives. Results from plating can take a week or longer by which time the organisms can proliferate and potentially cross-contaminate subsequent brews. Most PCR systems require a 2-day enrichment period and are therefore difficult to use as a quality release tool.

THE OPPORTUNITY

Accurate detection in under 3 hours

brewMAP, powered by Veriflow, is a game-changing molecular platform with unparalleled accuracy and ease of use for rapid detection of *Megasphaera* and *Pectinatus* at the brewery. The Veriflow non-enrichment method utilizes DNA Signature Capturing Technology to amplify and identify microbes, with results within three hours of sample collection. brewMAP is the only *Megasphaera* and *Pectinatus* detection tool that allows for actionable response to the threat of these damaging bacteria to prevent bottling or shipping at risk. Rapid detection reduces the risk of cross-contamination, and can mitigate the need for widespread sterilization of vessels and equipment.

THE SYSTEM

Simple and cost efficient deployment at your brewery

The system is comprised of a small, customized thermocycler, pre-aliquoted PCR reagent tubes, and proprietary buffers. Results are obtained in less than 3 hours via hand-held disposable cassette. brewMAP is ideally suited for both high volume and craft brewers – with a modest capital investment and affordable per-test cost. Sample collection and prep is simple and can be completed by brewery staff with minimal training.



Veriflow DNA Signature Capturing Technology

DNA Amplification	Proprietary reagents eliminate need for sample purification
DNA Identification	Proprietary DNA signature detection specifically targeting beer spoilers
Sample Preparation	No enrichment or purification steps required
Visualization of Results	Proprietary vertical flow mediated visualization of results for easy interpretation

"Traditional micro methods for plating *Megasphaera* and *Pectinatus* can take days to weeks, which is impractical for both quality assurance purposes and the quality control of our beer. We have implemented brewMAP into our routine testing protocol

in low alcohol/IBU brands alongside brewPAL to ensure our beer is free of these serious beer spoilers before it leaves the brewery."

— Drew Russey, PhD, Laboratory Manager,
Saint Arnold Brewing Company

PRIMARY BENEFITS OF brewMAP

- Accurate, sensitive, and specific to microbes that are challenging to detect through traditional testing methods
- Results in less than 3 hours minimizes the risk of wide-spread contamination
- Rapid on-site detection provides peace of mind against costly production down-time, product holds, or the prospect of extensive product recalls

brewMAP Performance Specifications	
Sensitivity (LOD)	10 CFU/ml
Time to Results	Less than 3 hours
Matrix Compatibility	Beer, environmental, liquid culture
Assay Configuration	Qualitative and semi-quantitative
Specification	<p><i>Megasphaera</i> species: <i>Megasphaera cerevisiae</i>, <i>Megasphaera paucivorans</i>, <i>Megasphaera sueciensis</i></p> <p><i>Pectinatus</i> species: <i>Pectinatus frisingensis</i>, <i>Pectinatus cerevisiiphilus</i>, <i>Pectinatus haikarae</i></p>

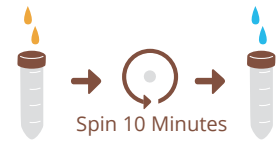
Test Protocol

DETECTION IS SIMPLE AND FAST

COLLECTION

Collect sample and centrifuge. Resuspend sample using provided proprietary Buffer A.

START - MINIMAL SAMPLE PREP



AMPLIFY

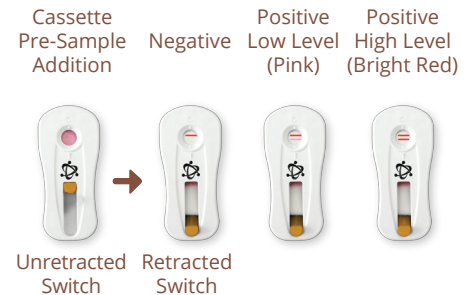
Transfer 5 ul of resuspended sample into provided PCR reagent tube. Place tube into Thermocycler and run program.

2.5 HOUR AMPLIFICATION



ANALYZE

Remove PCR Tube from Thermocycler and add proprietary Buffer B. Dispense PCR Tube contents onto test cassette window. Wait 3 minutes and retract test cassette switch to reveal test results. One line indicates negative result, two lines indicates semi-quantitative positive results.



ADDITIONAL TOOLS FOR YOUR BREWERY

Invisible Sentinel's portfolio of detection tools for breweries utilizes the same simple sampling, workflow, and equipment including the Veriflow Thermocycler. These tests are utilized throughout the brewing process, from post-boil to packaging as part of proactive quality management in the brewery.

brewPAL

Hop-Resistant *Pediococcus* and *Lactobacillus*

brewDEK

Brettanomyces/Dekkera species

brewBRUX

Brettanomyces Bruxellensis

brewLAP

Pediococcus and *Lactobacillus*

brewSTAT

For *Saccharomyces Diastaticus*

ITEM #	DESCRIPTION	SIZE
IS1034	brewMAP Complete Test System	1 Kit, 24 Tests
ISTC002	Veriflow Thermocycler	1 Unit

For more information or to place an order, please contact Invisible Sentinel at 215.966.6118 or www.invisiblesentinel.com

Invisible Sentinel, a global molecular solutions company, is dedicated to providing first-in-class microbial detection tools. The company's core technology, Veriflow, is a patented, game-changing platform that integrates molecular diagnostics, antibody design, and immunoassays. Veriflow technology is AOAC International Certified for foodborne pathogen detection, and is used globally by food manufacturers, 3rd party testing labs, and premium wineries along with craft breweries.