

Brewers Craft Disruptive Quality Standard Using the Latest Molecular Technologies

- Increase detection sensitivity by 10x
- Accelerate turnaround time by 6x
- Reduce cost per sample by 20x



Masthead Brewing Co. uses Quantabio's Q qPCR cyclers for quality control in order to minimize loss and detect contamination.



The team at the award-winning Masthead Brewing Company in Cleveland, OH, are transforming the way craft breweries think about microbiology testing. They are applying the latest advances in Quantabio's qPCR technologies to detect microbial contaminants faster, easier and cheaper. QC testing can be run across more potential contamination sites in the production process due to the significantly reduced assay costs and test durations. Earlier and more accurate detection minimizes loss and prevents contaminated product from leaving the facility. The results have been so positive, the team at Masthead recently spun out a separate company called Midwest Microbio to help other breweries adopt on-site qPCR testing.

We recently caught up with Frank Luther, CEO of both Masthead Brewery and Midwest Microbio, to discuss his vision for transforming the way craft breweries approach QA/QC testing and how his team and others are using Quantabio products to identify spoilage organisms.

Born in a Brewery

We were often sitting there on packaging day, hoping the final QC test results would come back clean so that we could

move forward with the packaging process. These tests could take between 4 hours and 2 days. Our previous traditional culture methods and DNA detection kits were also expensive – having an ongoing combined cost of more than \$40,000 per year. If that wasn't enough, the results were very inconsistent and often inaccurate due to the many false positives or false negatives. For a local brewery, this was simply not a viable long-term testing methodology for us. We needed a more accurate and affordable turnkey solution that enabled us to process samples faster.

Our fortunes turned when we were able to hire Aras Klimas as our new principal biochemist. He brought a lot of experience with other brewery testing platforms. Aras began researching the latest technologies and attending local industry conferences. During the Ohio Bioscience Expo & Showcase, Aras discovered the Quantabio PerfeCta® SYBR® Green FastMix and Q cycler combination. He couldn't believe the compact Q cycler could process up to 48 samples, detect 2-fold expression level differences and yield results in as little as 25 minutes without any calibration. He was intrigued and immediately began thinking about how he could apply this technology in our brewery.



Sample to Data in 1.5 Hours

When we purchased the Q, we knew this was not going to be an easy plug-and-play process. There would need to be extensive research to identify specific genes and DNA targets that were going to work best for identifying these bacteria and yeasts. I just didn't realize how extensive the development process would be.

In total, the team logged more than 5,000 hours over a 9-month period clicking through the BLAST Database for reference gene sequences, looking at different targeted regions, and testing and retesting them empirically to improve the process.

On top of developing qPCR assays that work, we also spent a lot of time designing and developing sample prep extraction and purification workflows that are easier and faster than traditional approaches, which can take several hours. We needed to ensure that we were getting a pure DNA sample that's not going to cause false positives or false negatives.

After all these improvements and enhancements, we can now go from sample to data in an hour and a half. There are 20-30 minutes of sample prep and a 56-minute run on the Q using 40 cycles.

True Game Changer for Beer Industry

We quickly realized that we had an on-site QC testing process that could truly change the beer industry. Our annual spending on consumables for all of these qPCR tests is now between \$1,500 - \$2,000 (600 tests per year). So, we are now running more tests and generating more accurate results in less than two hours for 20x less cost per sample.

After all of the team's hard work, we now have a portfolio of 21 assays for the various spoilers found in beer. Our four main

assays all have been validated to be ten times more sensitive compared to previous culture methods or PCR kits available. Essentially, the Q enables us to run 12 samples individually or run six samples in duplicate for all beer spoilers.

Fast forward to the second half of 2019 and we are now helping a handful of breweries nationwide adopt this same qPCR testing process. Midwest Microbio's first client was Saucy Brew Works located just down the road from us in Cleveland, OH. Saucy's Brew Master and Co-owner Eric Anderson has always been obsessed with quality, and we thought our process would really help him with his wide variety of experimental beers and next-generation hybrids.

When we first presented our approach, Eric and his team thought the concept was revolutionary. The fact that this same methodology is already proven in other industries made them even more intrigued.

After purchasing our qPCR system, the Saucy Team was quick to realize that, from a business perspective, this new testing process was a no-brainer.

Saucy is now paying under \$4 per sample tested compared to what was previously more than \$75 to test for all microorganisms in each sample. Additionally, the sensitivity and specificity of the real-time qPCR assays have eliminated the false negatives and positives they were previously encountering. They are now getting more accurate test results for a fraction of the time and cost.

The Quantabio Q paired with the Midwest Microbio qPCR system is an essential tool for any brewery. This industry leading system can save you up to 2x on time, up to 20x on costs, and strengthen your QA program with superior detection thresholds.