BrewMonitor at Bond Brothers Beer Company

Real-Time, Comprehensive Fermentation Monitoring Helps Brewer Ensure Consistency in Flagship Brands and Stay Ahead of Costly Fermentation Problems

Data-Driven Craft Beer Fermentation to Simplify Quality Control

Based in Cary, North Carolina, Bond Brothers Beer Company focuses on high-quality beers, exploring both "old school classics and new school originals." The brewery has received some impressive accolades since opening in 2015, including winning Best American-Style Sour Ale at the Great American Beer Festival, and being named USA Today's "Best New Brewery in 2017." Bond Brothers has a small physical footprint but big aspirations, as the team leverages a wealth of brewing and business experience to continue their success. With annual growth on their minds, the team is always on the lookout for opportunities to improve efficiency, drive creativity, and improve quality, as they offer a memorable line of beers for enthusiasts in the Triangle area (Raleigh/Durham/Chapel Hill) and across North Carolina.

Operating a ten-barrel system with 20 fermentation vessels, the brewing team works out of a single location that houses both brewery operations and a taproom. Throughout the year, the Bond Brothers team offers a rotating selection of limited-release beers to satisfy craft beer aficionados. But like many brewers, much of their focus is on the flagship beers that constitute a significant portion of the company's regional appeal, and as a result, revenue for the business. With virtually all of their distribution in kegs, which removes most packaging variables, they experience a direct correlation between the quality of fermentation and its impact on the flavor of their beers. In short, for the Bond Brothers brewing team, consistency in their flagship beers is top of mind, every day.

Whit Baker, Brewmaster with Bond Brothers, is an experienced brewer and manager. And, as a partner in the business, he is very sensitive to the relationship between flavor stability and positive business growth. He also acts as an evangelist for beer flavor integrity in general, teaching flavor analysis for the brewing industry at Wake Tech Community College, among other educational outreach efforts. So, when Whit first met the Precision Fermentation team, he was immediately interested to learn how real-time fermentation monitoring could improve Bond Brothers' operations, products, and business.

Benefits

- **Remote fermentation monitoring saves time & effort**
- **Real-time data streamlines troubleshooting of problem fermentations and helps prevent future issues**
- **Detailed fermentation data enables highly efficient quality control, requiring fewer man-hours, and enabling better results**
- **Real-time visibility highlights problems much sooner, saving significant tank-time and cost**

> A lot of the nuances of keeping a flagship beer 'on-brand' heavily depend on how consistent you can be. At Bond Brothers, we pay special attention to pH because of how much it influences flavor, but overall, it's about hitting the same numbers at the same times. If you do not have real-time fermentation data, then you're always going to be shooting in the dark.
>
> *- Whit Baker, Partner/Brewmaster, Bond Brothers Beer Company*

BREWMONITOR™ SYSTEM

The Challenge: Solving Problem Fermentations and Managing Ongoing Beer Quality

Whit is a busy brewer and manager and finds his days divided between juggling brands to put on the market, meeting with distribution clients, ordering ingredients, creating recipes, managing operations in the brewery, and more. Through it all, he says that one of his top challenges every day is, simply put, quality. He explained, "How do you define quality? How do you maintain it, and how do you project it? At Bond Brothers, we make technically high-level beer with little packaging, so while managing oxidative and storage problems is easy for us, producing consistent beer with no classical off-flavors is really my main focus, day to day."

Maintaining Whit's high standards for flavor and consistency is where Bond Brothers' brewing intersects with its business goals, and in early 2018, the team had been noticing some problems with their flagship IPA brand. "About every third batch or so, we noticed a huge variance in yeast behavior," he remarked. "We tried to fix it by taking data once every day or every three days. But there was still variability across yeast generations, and even as we took extra cell counts, the esters seemed unusually high versus other batches. We were confused about why this was happening."

Inconsistancy in ester production is a very difficult issue when it impacts an IPA brand, but in particular for one of Bond Brothers' flagships. The team suspected that the yeast provider was the issue, but experimental efforts to determine this conclusively proved to be difficult and time consuming.

The Solution: How Continuous Sampling and Real-Time Fermentation Monitoring Helps Bond Brothers

Whit learned about Precision Fermentation in 2018 and put an early version of the BrewMonitor System into production soon thereafter, starting with a single tank. Since then, he has not looked back, because real-time fermentation data has helped him to improve Bond Brothers' product and processes in a number of ways.

First, he was able to quickly identify the source of the flavor variances the team had been observing in their flagship IPA. "The problem was a function of lag time, and this was hard to measure previously," he said. "In a level tank you can 'see' lag time, and with a full tank there is blow-off into overflow. But if the tank is not full or not going from zero to 100, it's difficult to understand the issue. However, when you have measurements like gravity, DO, and pH, you can see the exact moment when the problem starts. We had been observing the effects for some time, but with BrewMonitor we were able to quantitatively test with new yeast and get to the root cause immediately. When we switched to new yeast, we saw that lag time was cut in half and gravity was dropping at a sharper rate than with the previous yeast provider. Much better outcome."

Real-time monitoring also provided significant time savings. He noted, "Without BrewMonitor, it would have taken two to three times longer to figure out our yeast issue. We're relatively small, but even much larger breweries do not have anything close to real-time measurements. It's a really powerful tool for our team."

Whit sees substantial value in using BrewMonitor as a primary quality control tool, especially for his flagship brands. He continued, "If you're looking to put your beer out in a wider variety of locations or really dial in a particular flagship beer, then that's where BrewMonitor can really help, because a lot of the nuances of keeping a flagship beer 'on-brand' heavily depend on how consistent you can be. At Bond Brothers, we pay special attention to pH because of how much it influences flavor, but overall, it's about hitting the same numbers at the same times. If you do not have real-time data, then you're always going to be shooting in the dark."

He is also impressed by how BrewMonitor can reduce the ongoing impact of problem fermentations. He explained, "Bond Brothers is in the zone where we want to establish a pattern with the BrewMonitor System and then continue monitoring to make sure that future batches match that pattern. Getting the actual numbers means we can catch issues faster. Running BrewMonitor just before you pitch allows you to make adjustments. And, once something does go bad, you have much more powerful data to go back in time to see why it went bad, and fix it going forward."

He sees additional business benefits for this technology across the industry. He explained, "We are still relatively small, but for a regional brewery running at maximum capacity, it can cost you more money to let a problem beer ferment out and realize that there is a problem after it is fermented. With BrewMonitor, you can see in the first 48 hours whether the batch is going according to plan or not, and then if it's not, pull for further testing or even dump if necessary. This can save a larger brewer a lot of money."

Beyond flagship brands, the Bond Brothers team also uses BrewMonitor to help manage quality for other beers that it intends to repeat. Ensuring that successive batches taste the same every time is very important, and real-time data makes this much easier than ever. But Whit concludes that his favorite aspect of using the system is the ability to check fermentation status anywhere, anytime. "When I first learned about the system, I was excited about the measurements, but I did not know how excited I would be about being able to check my fermentations online, anytime, and from any location. If I think something's gone wrong, BrewMonitor saves me the emotional stress of worrying about it at home. Instead of going in, I can just look it up!"