

Improving Your Beverage Quality Control Process

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In an interview with *New Food's* Editor, Tricia Vail from Sartorius explains challenges and solutions to improve the quality in beverage quality control processes.

The beverage testing industry is in a unique position, having to finely balance between quality and turnaround. As such quality control (QC) is a crucial aspect – not just in terms of meeting expectations but also to ensure a product is safe for consumption. Sensory investigation and microbiological analysis are among the biggest focuses when it comes to QC. In an interview with Tricia Vail, Regional Business Manager for Microbiology and Filtration at Sartorius, we find out why...



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Q: What determines a high-quality beverage?

A high-quality beverage always comes down to a personal touch and that will differ for each type of drink. It's about the aroma, the colour, the clarity, the mouthfeel, and sometimes even the sound of the beverage when it is first opened. If any one of these characteristics are different than what the user is expecting, there is a high risk that they go on to the next beverage.

Q: What are the biggest challenges for a beverage producer?

There are so many aspects and never enough time to have look at all of them. From high quality raw materials to fully trained personnel and qualified testing methods, each of these must work together and when one starts to slip that is when things go wrong.

As a beverage producer, it all starts with passionate, fully trained and qualified experts. Without these people on the production floor, in the QC labs, in shipping or in your tasting rooms, you will lose the passion and love for the craft. Keeping that 'thirst' alive is key to making your beverage the best it can be.

The raw materials needed are a given; what is often overlooked is the assurance that these materials being used are within the specifications that were requested. For example, when buying hops for brewing beer having excessive moisture can lead to a spoilage contamination, inefficient yeast fermentation, or even excessive hop creep. By analysing a sample of the hops for moisture content with an instrument such as the Sartorius Moisture Analyzer MA160, wasted beer can be avoided and the lot of hops rejected. Besides, who wants to pay for excess water when that is not what you want?

This leads to the necessity of having qualified methods to ensure that the raw materials, production processes and finished goods all meet your specifications to ensure the customers' desires. Without having these qualified methods and products in your QC testing laboratories, the assurance for a high-quality beverage on the market is low and the brand will suffer for it.

Q: How can taste be influenced and enhanced through quality control?

Taste and mouthfeel are an essential aspect of QC; without proper testing how can you know for certain that your beverage meets your specifications and your customers' expectations? There are two major fields to QC – analytical and microbiology – along with a smaller lesser discussed area – physical.

QC analytical testing is typically the first and easiest laboratory to set up. The methods are clear, precise and developed. From a laboratory water system like the Sartorius Arium® Lab Water System to an HPLC system, set up of the analytical or chemistry testing laboratory can be quick and easy. From there, to perform testing such as alcohol by volume (ABV) or syrup concentration or mineral composition can be done using analytical instrumentation and sample preparation devices such as Minisart® Syringe Filters.

QC microbiology testing, although key, is often overlooked and mysterious. If anything is going to go wrong with a production run, more often than not, it will be this laboratory that will find it. The QC microbiology laboratory is where the spoilage microorganisms are detected, where the yeast titres are determined, where water testing is conducted. The best part about QC microbiology and beverages is that most beverages are filterable; by using a

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Biosart® 100 Monitor or Biosart® 250 funnel and a Nutrient Pad Set any spoilage microorganism can be detected. Once you know you have a spoilage microorganism and what type it is, you will most likely know where it has come from and how to get rid of it. Unless it is a beer stone, in which case, just cut that out of your system, install new piping and set up a robust prevention program.

One important but often neglected area is QC physical testing. Using large pore size membrane filters, laboratories will test the product to ensure there is not any barrel/wood fragments in the product which can be detrimental. These large pore size membrane filters can also help to remove floc haze which can be seen after having the beverages sit on the shelf after some time. Floc haze and wood fragments do not necessarily affect taste, however, they are unsightly which can be off putting. After all we do ‘taste’ with our eyes.

Q: If implementation of a QC programme is not in place what is the potential impact on the company and the brand?

Often small start-up beverage companies do not have a QC programme in place nor are they required to do so. Each country has different criteria as to when a QC programme is mandatory so check with your local authorities to determine your ‘when’.

Regardless of when, the sooner you start to implement a QC programme into your production process, the easier it will be for the whole organisation to adopt to it. It will also simplify the process of making the necessary changes as your facility evolves.

Having flexibility within your site to find and mitigate these quality challenges as they arise will help you to prepare for

the regulatory authorities – they will show up for an inspection.

Q: What solutions does Sartorius offer to improve product quality and safety? How do they work?

Sartorius has two divisions which work together to offer a range of products for the beverage industry; these stretch from the beginning of the process to the final product and everything in between. These products comply with Food Contact Compliance (FCC) and Hazard Analysis Critical Control Point (HACCP) to ensure that all beverages have contaminants removed and have verification that those contaminants are removed, as well as meeting other regulatory requirements.

Whether it is using the Aquasart® PS for production water filtration or the Microsart® Microbiology manifold to conduct microbiology testing, these products will ensure your beverage is among the finest on the market.

Q: What is spoilage detection and how can it affect beverages?

Spoilage detection refers to spoilage microorganism detection which is very common within the beverage industry. As beverages are not sterile and there are strains of microorganisms which cause beverages to spoil and therefore have an off color, off taste, off odor, off mouthfeel, etc. In some beverages, they can be harmful to be ingested and will require a product recall. In other beverages, it is more detrimental to the brand than anything else.

For example, there is a fruit juice that was recalled many years ago due to a microorganism contamination. The company has since rectified this production challenge however, I still think about that particular product recall every time I see that fruit juice at the supermarket.

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Q: How can water contamination occur and what impact will it have?

When I get calls from beverage companies asking for help due to a contamination, my first question is always...“How is your water?” The answer is usually fine. With a bit more coercing, the answer is almost always, we don’t really test our water very often. Maybe once or twice a month (sometimes once a quarter!). “It’s just water. It’s fine.”

Water is essential to nearly all beverages and yet this is taken for granted so often. Clean water vs. Dirty water will make or break most beverages!

The composition of water is different in a large city as compared to well water in a rural area, there are even seasonal differences. The chemical composition is different, the microorganisms are different, the physical materials in the water are different. When you don’t treat the water, all of this “stuff” makes it’s way into your beverage and this will alter every aspect of the beverage as well as clog up the piping within the production line causing beer stones or biofilms both of which are nearly impossible to remove once they have made into your system.

Water is so essential and I cannot stress enough the importance to treat and test your water to make sure that this stays that the highest level of quality in your facility. Here are two examples of how water has made a difference to two companies:

A large beer company has two production sites. One, the primary site, is located in a major metropolitan city and the other production site is located in a rural site. The city site gets the water from the city water system whereas the rural site uses a well. Because the “brand” is known by the city production site, the rural production site “treats” its water to

match the chemical & physical characteristics of the city production site each day. This way, regardless of where the beer is made, the consumers will not know which site made the beer.

Another example is when I received a call from a spirit manufacturer who was experiencing floc haze and could not understand why this was happening. They had done all the QC testing on the production line, raw materials, oak barrels, etc yet when the product was in the bottles, they had severe floc haze. After an investigation, it turns out that their large proofing water tank what always “kept full” & “warm” too prepare for bottling but they never treated the water. Hence, a biofilm developed in the water tank so when they mixed the spirit with the water to get the right alcohol by volume, they were adding bacteria to the alcohol, the alcohol did it’s job by killing off the bacteria and the floc haze was all the killed bacteria floating. This spirit manufacturer now flushes and cleans the water tank monthly and tests the water for microorganisms daily.

Q: What is air monitoring and why is it important?

Air monitoring at the filling stations may seem a bit strange especially since most beverages are not filled in a clean room. In fact, most are filled inside of a warehouse like structure. With all that said, there is air being blown into the bottles, cans or kegs at time of filling and then these are capped. By testing this air, you can have additional data to show if there is any potential spoilage microorganisms which could potentially be in the beverage. Using the MD8 Airport Air System with the Gelatine Membrane Filters, you can use one membrane filter for your whole filling run and then place the Gelatine Membrane Filter on a microbiology media plate for microbial detection.

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Q: Define check weighing and how it can affect brand trust and cost?

Check weighing is one of the last QC tests conducted on the pre-packaged product like cans, bottles and kegs before final boxing and shipping. It is the measurement of the Net/Actual Content of the product, checked and compared with defined upper and lower tolerances in order to accept or discard the package, as per your specifications in the label/marketing. These specifications and tolerances are set by each country trade regulations and harmonized worldwide by the World Trade Organization for international trade purposes. The check weighing may be carried out by random sampling of pre-packages in a single batch or by weighing each bottle in line.

Want to know more about the solutions from **Sartorius**, please visit: www.sartorius.com/beverages



Tricia Vail has had two decades of experience in quality control microbiology and represents the US on several ISO, ASTM & AOAC committees in water, water reuse, air, cannabis and food products international regulatory committees. She currently works for Sartorius Corporation as Regional Business Manager for Microbiology and Filtration.

References

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Germany

Sartorius Lab Instruments GmbH & Co. KG
Otto-Brenner-Strasse 20
37079 Goettingen
Phone +49 551 308 0

USA

Sartorius Corporation
565 Johnson Avenue
Bohemia, NY 11716
Phone +1 631 254 4249
Toll-free +1 800 635 2906



For further contacts, visit
www.sartorius.com/beverages