

Quality control needs to move beyond the standard

New Food interviews Adam Zakaria, Quality Manager at Fuller's Brewery, on how consumer expectations have evolved when it comes to consistency, and why microbiology and the right equipment are key to the perfect brew.

THE GLOBAL beer market is growing at a pacy rate; valued at more than \$605 million in 2020, projections suggest its size will reach over \$816 million by 2030.¹ However, despite its popularity, consumers are picky folk – what was once considered 'good enough' has evolved. Quality – and consistent quality at that – is now mission critical. Despite most recognising this, what might be less well-known is the role microbiology can play in achieving this high level of consistency.

Generally, the subject of microbiology in the food industry is associated with safety; and of course, the Asahi Group does rely on microbial tests to ensure its products are safe for

consumption. However, due to alcohol being quite a 'hostile' environment and Asahi beer having a low pH (around 4.0), pathogens are actually a relatively low risk for this brewer. What is more of an issue are spoilage organisms that have the potential to influence the end product.

"We're very consumer-focused," Adam Zakaria,

Quality Manager at Fuller's Brewery, now part of Asahi Group, told *New Food*. "Knowing the microbial status of our products enables us to deliver a consistent experience for consumers in terms of flavour, aroma and also appearance. If you have unwanted spoilage organisms, there's potential for those desirable characteristics to be negatively influenced."



Looking for beer spoilers

So how does a spoilage organism manifest in a beverage such as beer?

"The consumer generally expects what we would describe as a 'bright' pint of beer – so with good clarity," Zakaria said. "Particularly for bottled or kegged beer and where it's been filtered, it should have a really nice, polished appearance. If you have an infection in there, the clarity will start to go and you get this haze – that's the first sign, even before the flavour alters."

Zakaria explained that the company has a two-pronged approach to its on-site microbiology testing:

1. Broad microbiology testing as an indicator of plant hygiene
2. Final product release testing.

The main organisms Asahi tests for are wild yeast species – so that's generally non-*Saccharomyces* species, acetic acid bacteria and lactic acid bacteria. Further up the brewing process, Zakaria's team might look for *Megasphaera* and other similar organisms, but generally the focus on final pack will be those three.

"Some of the work we do uses a generic WL nutrient agar that will grow absolutely everything, and is a better indicator of overall plant hygiene," Zakaria continued. In other words, if you've got anything

growing at all on generic media, you can be pretty certain that your cleaning isn't up to scratch and you need a better process in place. As such, Asahi conducts an element of broad microbiology testing solely to indicate the effectiveness of cleaning processes in its plant.

The process and what happens when spoilage is detected

If beer spoilers are detected in the final pack, Asahi's standard process is to hold the line. "We would recheck to validate the initial results," confirmed Zakaria. "We also have a 'forcing test' which is kind of an in-situ incubation of the product to proliferate any infections that are in there." This is, in basic terms, an acid test which determines whether the stock will be okay in its pack, in the marketplace. However, this takes a little longer because it's a test that needs to be conducted over several weeks, thus to simulate the shelf life of a product.

"If your plate microbiology is all clear, you don't need to wait for the stock release; you must still do the tests, but you don't need to wait for the results," he explained. "And in the worst-case scenario, stock doesn't get released."

Asahi UK's 'forcing room' is set at 28-30 degrees. "We take just sealed final pack samples that haven't been tampered with it all," Zakaria told *New Food*, "and

place them in conditions that are ideal for the propagation of any spoilage organisms. It is a very simple test in terms of actual equipment and the process that goes into it, but it takes some time."

He continued: "We have small containers that we decant our large packs (keg and cask samples) into, but the bottles and cans go in as they are.

"We use vacuum filtration through a manifold (0.2-micron membranes) for our filtered samples and then plate these onto an agar. For unfiltered and smaller volumes, we use the pour plate method."

The Asahi team looks for signs of spoilage, such as that aforementioned haze formation.

"We can measure the turbidity of the sample," Zakaria added, "and if we do see any sediment formation, those samples can then be plated out in the micro-lab – that's really helped accelerate the process."

Even in the most extreme cases, disposing of the beer is thankfully not something that happens very often at Asahi. However, as Zakaria said, it is far better to control that stock and prevent it reaching the marketplace, than for it to end up in a potential product recall situation. "That's why we have such thorough quality control measures in place," he confirmed. >>

EXPERT VIEW



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What do I need from my incubator?

The marketplace for testing equipment can be confusing with so much choice on offer – so how do you know which incubator is best for your company? Angela Visgandis highlights key attributes to look out for.

An important piece of equipment for any microbiology laboratory is the incubator. Incubators have been designed to provide a safe and controlled environment for microbes to grow.

Of particular significance for the beverage industry is the requirement for incubators to have reliable temperature control and to ensure its uniformity; this is dependent on the microprocessor. Maintaining a consistent temperature reduces inconsistencies in microbial growth.

When looking to purchase an appropriate incubator, important factors to consider are:

- Safety features
- Temperature accuracy and stability
- Temperature deviation
- Capacity
- Airflow
- Adjustable shelving.

Paying careful attention to all of these details will ensure that you purchase the most suitable incubator for your application.

Thermo Scientific™ Heratherm™ Advanced Protocol Security Microbiological Incubators feature a smooth stainless steel inner chamber with easy-to-clean, rounded corners, and an intuitive user interface with a large fluorescent display. Units include an internal glass door that

allows samples to be viewed without impacting on temperature stability, as well as a lockable outer door. Units can also be stacked on top of each other to save space, and no tools or stacking devices are required.

Moreover, due to a decontamination cycle set at 140°C, contaminating microorganisms are reduced to a minimum. Sample safety is also enhanced with an automatic over- and under-temperature alarm to protect the samples and incubator.

When you're in the market for an incubator, consider these features, and raise your beverage quality control beyond the standard. It'll make all the difference.



The microbiology lab at Fuller's Brewery UK, featuring its Thermo Fisher Scientific Microbiological Incubator

The importance of reliability

Commenting on how its processes have improved, Zakaria said the equipment has been a major factor.

"Our previous incubator was much heavier; it was bigger but had less space inside it," he said. "We had real problems with temperature consistency too; and if I recall correctly, towards the end of its life, we even had electrical faults and it would trip out."

For incubators, Zakaria advised that reliability and consistent temperatures are key attributes. "With the Thermo Scientific incubator, that's what we get. It's been on constantly for about nine years, 24/7, and it's been as good as gold."

Zakaria also praised the incubator's size and environmental footprint – a valuable asset in these climate-conscious times. The incubator's capacity to carry more samples than the company's previous model has benefitted them tremendously, as increased efficiency has enabled Asahi to increase its output as its workload has grown.

Along with reliable equipment, Zakaria said he also depends on a reliable team. "I have a highly experienced team on the ground who I trust completely. But if an issue does occur, it gets escalated to me."

He continued: "Even when there's not an issue, we still have weekly reviews of the trend data." This data is extremely important as it indicates patterns and

allows Asahi to be proactive rather than reactive in its approach.

"The results we gather mean that we can be confident we haven't got beer spoilers in stock that we're releasing to the marketplace."

Zakaria explained that a lot of hard work has gone into developing the best possible environment in the brewer's internal lab. "We've got HEPA-filtered air intake into the lab itself; it's not quite the full clean room you'd find in pharma, but we have as many controls as we can, and obviously training and good procedures are key.

"We also take part in the BAPs scheme, which is the brewing analytes proficiency testing. So that's our positive control. We have negative controls, and we do environmental settle plates in the lab itself – essentially, we do as much as we can to validate the integrity of our results."

Competition in this market is fierce. Where a brewery may previously have sold the odd beer or ale that wasn't quite up to standard, those days, according to Zakaria, are gone. Consistency is key and consumer expectation is high – and you need both to thrive. Hands up, who knew that an incubator could help with that? 🍻

Adam Zakaria

Adam is the Quality Manager at the Griffin Brewery and has worked for Fuller's Brewery UK (now part of Asahi Group) for three years. With 15 years' experience as a quality assurance professional in the brewing industry, he has driven continuous improvement in quality by implementing new systems and methods, refurbishing laboratory facilities and building successful teams. Adam has a Biological Science degree from the University of East Anglia.



Reference

1. www.alliedmarketresearch.com/beer-market



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