



Amorin TCA in Cork



Amorim uses next generation customised detection system by Ellutia to optimise cork analysis times

Amorim, based in Mozelos, Portugal, is the world's largest manufacturer of cork solutions. Amorim's signature appears on the cork stoppers of the best wines in the world and in many other everyday items, including: flooring and insulation, construction and transportation and design materials.

Preserving the integrity of cork and wine is crucial in the wine packaging sector, where cork is the preferred closure. The presence of the chemical analyte 2, 4, 6-Trichloroanisole (TCA) is the chief cause of cork taint (corked wine). The cork industry faced a significant challenge to develop a method to manufacture natural corks with a non-detectable TCA guarantee (a non-detectable TCA guarantee means that if any TCA remains in a cork, it is below the detection threshold of 0.5 ng/L).

As director of the research and development department at Amorim, Professor Miguel Cabral is responsible for improving the quality of natural cork use as cork stoppers. Professor Cabral explains their challenge:

“Guaranteeing that cork is 100% free from TCA has been a very big issue for a long time in the cork industry.”

As the leader of the natural cork industry, Amorim had to tackle this problem head on. We needed a solution to produce natural cork, with a non-detectable TCA guarantee.

Research confirms that globally, consumers prefer wine with cork stoppers. Studies show that consumers associate cork stoppers with the quality of the wine and regard artificial closures as a factor which devalues it. Made up of 800 million cells, a single natural cork stopper combines the inert nature of cork, its impermeability, flexibility, sealing capacity and resilience.

Next Generation Detection

Amorim approached a number of companies and universities with their problem. They were referred to Ellutia in 2008, due to the company's specialisation in tailor-made chromatography solutions. Ellutia took on the challenge to develop a solution that would result in a non-detectable TCA guarantee for Amorim's corks. Prior to this collaboration, there was no analytical system available that could analyse for TCA cork by cork.

Ellutia developed a customised solution that individually tests each wine cork for TCA, using rapid chromatography technology.

“Using this system, Amorim has been able to deliver the world's first fully natural cork with non-detectable TCA guarantee”

The machine, known as NDtech, can analyse each cork in seconds, and can detect any cork with more than 0.5 nanograms of TCA per litre (parts per trillion), which is automatically removed from the production line.

“Until now, no 100% natural cork producer has been able to screen each cork individually and guarantee non-detectable levels of TCA.” says Professor Cabral.





The unprecedented solution is the result of several years of research and development. Ellutia developed the first prototype in 2011 which would detect any cork with more than 5 nanograms of TCA per litre, taking 20 seconds to analyse each cork. Through experimental development work, this was progressively reduced to 2 nanograms of TCA per litre.

In 2015, the first industrial system was installed, made with 6 machines. Amorim and Ellutia surpassed the goal of detecting any cork with more than 1.5 nanograms of TCA per litre, enabling them to give a non-detectable TCA guarantee.

Since 2016, the machines work 24 hours a day, all year round, achieving analysis times of 20 seconds per cork.

Amorim has plans to further optimise the technology in partnership with Ellutia and reduce the analysis times further.

Challenges

One of the main obstacles Ellutia faced were the limitations of the current soak method of testing corks. In order to be able to prove that the new method of testing was more accurate than the test that was already being done, Ellutia had to work with Amorim to agree parameters between old and new testing results. However, due to

the limitations in the soak method, it was unlikely to ever be able to fully correlate results between the two methods of testing. Instead, the possible outcomes were analysed. If the presence of TCA was below 0.5 ng/l, this was considered a pass and above a fail:

Outcome 1: Soak Method Pass / Ellutia Method Pass

Outcome 2: Soak Method Pass / Ellutia Method Fail

Outcome 3: Soak Method Fail / Ellutia Method Fail

Outcome 4: Soak Method Fail / Ellutia Method Pass

From the four potential outcomes, only Outcome 4 would be unacceptable from a customer perspective: a cork that the Ellutia method said was clean but the soak method deemed contaminated. The systems were then optimised to ensure that no corks gave that result, rather than aiming for a perfect correlation between the two methods. The level of sensitivity was increased, taking into account potential variances in the soak test results. Today Amorim uses the Ellutia method as standard due to its confidence in the results. Externally however, the soak method is still widely used as the standard method for testing despite its limitations.

Another more practical challenge was moving the technology from the laboratory to the production line, working at maximum capacity on an industrial scale due to its technical nature and sensitivity. It required complex equipment and techniques to be developed to meet such short timeframes.

Professor Cabral explains “Gas chromatography instruments are ordinarily used in labs, not on production lines. It has been an enormous achievement to industrialise a robust solution, with the machines fully working 24/7.”

Working with Ellutia

The collaboration between Ellutia and Amorim since 2008 has proven highly successful. Professor Cabral describes the nature of the relationship:

“It has been a very positive experience working with Ellutia. They fully understand our needs and the direction we want to go in. They are tremendously innovative in how they work, producing solutions to extremely difficult challenges. Ellutia are incredibly imaginative and always achieve what they promise.”

Andrew James, Ellutia’s Marketing Director comments “We take great pride in developing close relationships with our customers to really offer the best analytical solutions to their challenges and meet their needs head on. For Amorim, it has been a real team effort from R&D through to production and we have all gone above and beyond to develop a brand new, one-of-a-kind system for cork analysis.

“We are delighted with the outcome, which is genuinely a revolution in TCA detection and is totally unique in the market.”

Future

Due to Amorim’s highly demanding standards, methods must constantly be improved. The collaboration between Amorim and Ellutia will continue with the aim of further reducing analysis times and simultaneously maximising capacity.

Professor Cabral explains some of the areas which they will focus on in the near future:

“Our next challenge is to work with Ellutia to further reduce the analysis time of each cork to 16 seconds in 2017, then eventually 10 seconds by the end of 2018. This will reduce analysis times by 50% and double our capacity.”

For more information about Ellutia please visit <https://www.ellutia.com/>, call us at +44 (0) 1353 669916 or email us at info@ellutia.com. For more information about NDtech, please visit: <http://www.amorim-cork.com/en/products/ndtech/>





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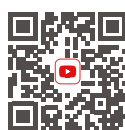


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