AGILENT CASE STUDY

# AGILENT GC COLUMNS FOR EFFICIENCIES IN CUSTOMIZED CORK ANALYSIS SOLUTION

**Example custom solution – the cork project**

Ellutia offers various innovative custom solutions, created for customers' needs. These custom solutions are offered across a multitude of markets, and can help companies whose challenges require custom chromatography instrumentation. An example application is cork analysis. Ellutia has developed a solution for a manufacturer of natural corks with a nondetectable TCA guarantee (a nondetectable TCA guarantee means that if any TCA remains in a cork, it is below the detection threshold of 0.5 ng/L). The presence of the chemical analyte 2,4,6-Trichloroanisole (TCA) is the chief cause of cork taint (corked wine). Preserving the integrity of cork and wine is crucial in the wine packaging sector, where cork is the preferred closure for fine wines.

Ellutia is a world-renowned expert in gas chromatography (GC) instruments, and has been providing innovative solutions to diverse analytical challenges for over two decades. Ellutia's significant expertise in gas chromatography enables the company to create customized solutions for its customers' individual needs. The company is working with a leading cork manufacturer to supply GC instrumentation and solutions. Ellutia is on a continual quest to improve its GC solution and has embarked on a private label partnership with Agilent Technologies for operational efficiencies in the analysis of Trichloranisole (TCA) in corks.

## Profile

Ellutia is an independent manufacturer of innovative chromatography instruments. Formerly known as Cambridge Scientific Instruments Ltd, established in 1994, the company renamed as Ellutia Chromatography Solutions in 2010, and now has divisions in the UK, USA, and Germany. Since then, Ellutia has gone from strength to strength, and supplies its light, compact, yet highly sensitive GCs to a broad range of markets including education, brewing, materials testing, and forensics. To supplement its own proprietary product range, Ellutia has incorporated the best available external technologies to enhance its product portfolio. It also offers a wide range of products including autosamplers, GC inlets, detectors, analyzers, software, hardware, and accessories.

Ellutia prides itself on its personalized, responsive service, and its ability to provide customized solutions to its customers' challenges. Offering an ideal combination of agility and speed of service with a global outlook, and industry-shaping technological innovations, Ellutia has become the partner of choice for hundreds of customers.

## The importance of TCA analysis

Improvements in cork and winemaking methodology strive to lower the incidence of wine faults (undesirable smells or tastes found in a bottle of wine). Natural cork is the seal of choice for fine wine manufacturers. As a natural product, its composition provides a unique blend of oxygen and phenolic analytes, which allows wines to age correctly. Cork is also naturally elastic, ensuring a secure inviolable seal. Alternative artificial seals, such as synthetic stoppers or aluminum screw caps, can result in oxidation and reduction of the wine. Bottle stoppers are usually considered to be responsible if any wine faults occur.

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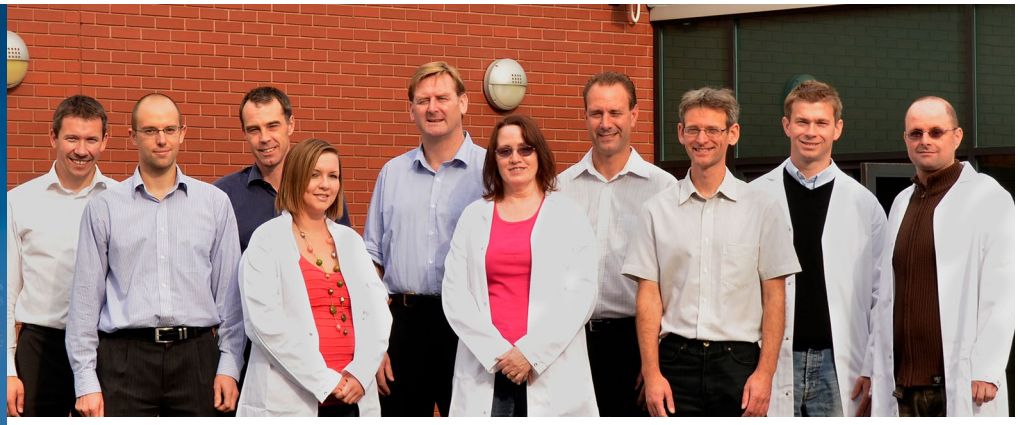
*"Agilent gave Ellutia exactly what we wanted in a much shorter lead time, and with good cost margins. Reputation was a major factor in our decision to partner with Agilent. We knew that the columns would work so this removed the risk factor. Agilent's knowledge was also crucial."*

**DR MARK LANDON**



Despite the remarkable qualities of cork, it is prone to the naturally occurring chemical analyte TCA. The analyte can be found in various other sources, such as drinking water, coffee, beer, vegetables, fruit, wood, and soil. Corks containing high levels of TCA can cause cork taint, contributing to some undesirable wine faults. Cork taint can affect wines irrespective of price and quality level. For cork producers and wine manufacturers the ability to guarantee TCA-free cork has obvious benefits, including an impact on revenues. Wine producers are willing to invest in TCA analysis. It enables them to challenge returns of faulty wines and questionable wine quality issues.

## Requirements

In 2010, a major cork manufacturer approached Ellutia with their TCA detection challenge. They needed help with their ambitious objective of being the only company to offer a "no TCA guarantee" with their natural corks for customers who required it. They were potentially losing business to synthetic and screw stoppers. Standard gas chromatography examination of corks can take up to 14 minutes, making it impossible to use on production lines. As a result, the cork producer was applying the technology in laboratory-controlled batch testing as part of its quality control measures for the 4.2 billion corks it produces each year. This testing limitation meant that only small numbers of the corks were ever tested, and always after production. The company needed a solution to improve the technology so it could be used in production to test each individual cork on the line.

Ellutia worked with the cork producer to establish rigorous production standards, and certified quality control methods. A custom Ellutia GC 200 series analyzer, which individually tests each wine cork on the line for TCA, using an unprecedented fast chromatography technology, was developed by Ellutia in partnership with the company.

## Project challenges

Ellutia had sold a significant number of these custom analyzers to the customer in Portugal for the analysis of corks. While this innovative solution met the specific analytical challenges, there was scope for improvement. All the original systems had been built using metal columns sourced from a chromatography columns manufacturer, via their UK distributor. All the custom analyzers had reached the point where preventative maintenance was required, and the columns needed to be replaced for new ones. Ellutia required 240 columns as soon as possible, and the current supplier was only able to commit to delivery within eight to 10 weeks. This lead time would have had a negative impact on the customer's testing schedule. There was also an extra challenge with the off-shelf columns. The column in use was tied with metal banding that was not suitable for the cork analyzer without modification. The off-shelf solution meant that Ellutia needed to manually unwind each column, and recoil and band in-house, taking considerable time from an already urgent replacement schedule.

## The Agilent Advantage

Companies invest a great deal of time and effort in building a brand and identity, ensuring that they are a reliable and well-trusted source in their customers' minds. The ability to augment current offerings with extra high-quality and proven products is crucial to move forward in business; however, a new product is often not justifiable or practical. Agilent's private label suite of products is developed based on decades of experience working with private label customers. The private label program offers unique incentives, not available elsewhere in the industry, which enables private label customers to strengthen their success.

Agilent offers a full portfolio of products to support lab safety, from solvent caps for different size solvent bottles, to waste containers, fittings, and more. Read the brochure available here for a full view of products and accessories.

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*" We had a supply challenge and needed a solution quickly for our customer. The off-shelf columns were also an issue – they needed to be altered to be fit for purpose. Agilent was able to make the units to our specifications – they can now be bought and installed straight away. We required over 100 units – a batch from our original supplier would have taken eight to 10 weeks – the new Agilent route would only take three weeks to delivery from placing the order – this timeframe even included specification details and customization."*

**DR MARK LANDON**

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*" All this was achievable: with the right attitude and will. Simply, Agilent enjoys solving these challenges, whereas Ellutia had experienced inflexibility before partnering with us. It is just about customer service."*

**DR ROB BUNN**

### Time and cost savings for private label solution

Ellutia approached Agilent Technologies due to its reputation and capabilities in private labeling to see if they could meet the short delivery schedule. Agilent discussed the column specifications, including the dimensions of the coil and banding with Ellutia. Agilent was able to provide a customized finished product tailored to meet their specific needs of flexibility and customization.

Agilent committed to deliver the columns in batches of 48 columns (6x8) every three weeks, at the required specifications and dimensions, and at a more competitive price. The initial shipment of 232 columns has now been fully shipped to Ellutia's customer.

### System improvements

The ability to simplify the instrument for Ellutia's customer was also a driving factor. The original system was operating under a different configuration, with waste columns from a different supplier. Using Agilent, Ellutia took the opportunity to standardize all eight columns (analytical and waste). Using one brand of columns throughout the production cycle makes system set up quick and easy. This commonality also means that fewer parts need to be bought.

In addition, compatible columns allow the system to work at its optimum performance, as gas flows through the columns the same way. TCA is one component of a complex matrix with lots of compounds present. There are challenges associated with false readings, resulting in clean corks being unnecessarily discarded. More importantly, contaminated corks may be missed, resulting in the cork manufacturer having to issue a refund to their wine producer customer. All columns must work to the same level and standard, otherwise the peak will vary due to different gas flows and pressures. The customer can now reliably turn around more corks, resulting in increased revenue.

### Delivering a guarantee

The new fast chromatography machine from Ellutia can analyze each cork on its customer production line in seconds. This speed shows a significant improvement over previous testing times with prior chromatography instruments that typically required up to 14 minutes for each batch of corks.

The high-precision screening technology can detect any cork with more than 0.5 ng/L of TCA, which will be automatically removed from the supply chain. As a result, all corks processed via the custom analyzer are nondetectable TCA guaranteed* (*releasable TCA content below the 0.5 ng/L quantification limit; analysis performed in accordance to ISO 20752). Through advances in scientific knowledge and technological innovation, it has been possible to progressively eliminate the presence of TCA in cork.

Until now, no cork producer has been able to guarantee an automated quality control system for natural cork stoppers that screen corks individually. It is now possible to examine an individual cork using Ellutia's sophisticated gas chromatography in just seconds, making the technology practical on a major industrial scale. Machines are in use on the production floor, delivering a guarantee to high-value customers.

The custom analyzer can detect any cork with more than 0.5 ng of TCA per liter. These corks are then removed from the production line automatically. According to the company, the level of precision necessary to meet this standard on an industrial scale for 100% of the corks examined is a major breakthrough. The detection threshold of 0.5 ng/L is the equivalent of one drop of water in 800 Olympic-size swimming pools. The custom analyzer will be used alongside existing preventive, curative, and quality control measures, including patented treatments used during production.

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*"Not only does Agilent's solution save us time and money, but it's also a neater solution for the customer – perfectly made, making it easier to install, plug-in, and operate. From an aesthetic perspective, it fits comfortably and looks professional."*

**DR MARK LANDON**

**Agilent cork project**

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From offline analysis to online testing of 40 million corks per annum (with plans to increase this number), the potential impact and scale of this project has no limits. As this is a paid for analysis, the cork manufacturer only runs it on one of its lines for those customers who choose to pay. However, this is a USP for the cork manufacturer. They can now win new customers from the fine wine sector with this guarantee, and they plan to extend the testing up 10-fold to 400 million corks per annum. Premium packaging also plays an important role in exporting wine to crucial markets such as the US and China.

## Benefits

The Agilent private label solution offers Ellutia time savings and efficiencies. The columns are delivered on an exceptionally quick timeframe, and are easier to use. The manual step of adapting the columns was taking over five minutes per column. For 60 instruments, each containing eight columns, that is a saving of over 40 hours. Now the columns can be taken out of the box and used straight away, offering savings on multiple levels for Ellutia and its customer.

Ellutia had specific customer requirements that needed to be met. Mark continues, "Agilent was willing to do something out of the ordinary – go the extra mile, and quickly escalated our challenge into a solution. They were flexible in terms of what we did need, such as shipping phases and volume specifications, and those we did not, such as excess packaging and large box sizes."

## Future projects

Agilent and Ellutia are now working on several other projects. The custom analyzer is initially being applied to top-end natural cork stoppers used to close some of the world's most valuable still wine brands. There is scope to extend the solution to other brands, including sparkling wine stoppers. Ellutia is also investigating other potential problem compounds.

Enhancements also include the ability to speed up the analysis to allow for higher throughput, and to make the detector more robust at lower levels. Future projects also include the potential to "positively tune" the cork to a specific wine to enhance the flavor. The enhancements are only possible with cork due to its natural properties.

Mark Landon concludes, "We're using Agilent columns in our new GC, and other projects, including R&D for specialized systems. Agilent brings value to our products – not just columns but the consumables stream too."

## Partnering with Agilent Technologies

Agilent is a leader in life sciences, diagnostics, and applied chemical markets. The company provides laboratories worldwide with instruments, services, consumables, applications, and expertise, enabling customers to gain the insights they seek. Agilent's expertise and trusted collaboration give them the highest confidence in our solutions.

Dr Robert Bunn, Agilent Technologies, comments, "Agilent has huge experience in manufacture and in solving customer problems. Our private label business brings this experience direct to customers. Working with Ellutia, there were no insurmountable problems: Ellutia needed a reliable source of supply. They needed someone who could respect and address the challenges of time to deliver for their customer, who needed to keep their TCA analysis running inline round the clock; they wanted to reduce the time required by the Ellutia team to physically customize the columns to meet the design needs."

For more information or to speak to a member of our team, email:
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To download our brochure or find out more about Agilent Private Label visit:
**www.agilent.com/chem/oem**



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