

Case Study

Münster's Chemical and Veterinary Analytical Institute

Münster's Chemical and Veterinary Analytical Institute selects Thermo Scientific Exactive LC-MS and DFS high resolution GC-MS to ensure food safety through fast, effective and cost-efficient analysis



The Münster's Chemical and Veterinary Analytical Institute

Introduction

The Chemical and Veterinary Analytical Institute based in Münsterland-Emscher-Lippe (CVUA-MEL) is the central, official laboratory for food and feed control in the Rhineland region of Germany. Founded in 2009, the organization has since completed a merger with a smaller lab based in Recklinghausen. With almost 300 staff across the two locations, the Institute houses 46 scientists specializing in food chemistry, veterinary medicine, molecular biology, chemistry and physics.



Thermo Scientific
DFS high resolution GC-MS



Thermo Scientific Exactive LC-MS coupled
with Thermo Scientific Transcend TLX

The CVUA-MEL is separated into two departments: one specializes in animal disease, pathology and epizootics; and the other focuses on the analysis of food and feed. The CVUA-MEL provides interpretation of analytical results in line with the requirements of EU legislation, support for the control authorities to enforce the legislation, and general commentary on both federal and new, EU-wide legislation via the Ministry of Consumer Protection.

Professor Dr. Peter Fürst, (head of the Department Special instrumental analyses) at CVUA-MEL, runs the Food and Feed Control department located at the Münster site. This department currently has 30 staff members with seven scientists working in four specialty laboratories. Fürst works primarily in the special analytical laboratory which deals with the analysis of dioxins in food, feed and human samples such as breast milk. The remaining three laboratories address other key areas of food and feed control, including pesticide analysis, elements determination and the development of new analytical methodologies in liquid chromatography.

The analyses performed by Fürst and his team help to ensure food safety for an increasingly health-conscious consumer audience. In order to ensure public health, potentially hazardous residues and contaminants are put under vigorous scrutiny. Similarly, strict authorization procedures for new additives and crops for feed and food production are in place and must be interpreted and adhered to. To achieve all

this in the most efficient, accurate and cost-effective manner, the CVUA-MEL needs to use instruments that are highly-sensitive, accurate and accessible.

Vendor Selection/Installation

The CVUA-MEL team required extremely high-resolution, high-sensitivity instruments that could quickly and accurately analyze samples for small compounds such as dioxins, PCBs and pesticides. Working for a public sector organization, CVUA-MEL issued a call for tender. CVUA-MEL advertised their requirements and invited vendors from across Europe to apply. Instruments submitted for consideration were assessed against stipulated criteria. Applicants were also invited to undertake sample testing and submit their results for comparison.

Prior to issuing its call for tender, CVUA-MEL was not familiar with the Thermo Scientific Exactive LC-MS coupled with TLX for online sample preparation. However, the Exactive's high-resolution power, up to 100,000, along with its ability to run pre-programmed, targeted screening of samples without the need for extraction or clean up convinced the team it was the ideal tool for their needs.

As one of the first organizations to purchase the instrument, CVUA-MEL's selection of the DFS GC-MS occurred during the same call to tender process. A key, unique selling point of the DFS GC-MS was its full method versatility and optional incorporation of two GCs for column separations. This

feature was particularly relevant to the dioxin analysis lab at CVIA-MEL. Current EU legislation (1881/2006) sets a maximum level of dioxins and dioxin-like PCBs in individual foodstuffs. Fürst states, "In keeping with the EU legislation our lab must analyze levels of dioxins in food stuff as well as the sum of dioxin-like PCBs in food and feed. The separation of dioxin compounds is usually fairly straightforward, but unfortunately the separation of dioxin-like PCBs is more complex as there are some overlaps, meaning we can not use the same column. The key appeal of the DFS GC-MS is that we can use one GC column on the left for the PCB analysis and a GC column on the right for the dioxin analysis and leave them overnight, unattended and set at different temperature conditions."

The Benefits

Since introducing the Exactive™ LC-MS and the DFS high resolution GC-MS into his laboratories in 2008, Dr. Fürst has witnessed a significant increase in throughput as well as an improvement in the accuracy of results produced.

The Exactive LC-MS system has been particularly useful in providing efficient, automated screening of urine samples taken from farms. Due to new EU legislation, a stipulated number of samples in specific regions must be analyzed in order to detect illegal drugs in animals and to ensure that withdrawal periods are being upheld by farmers. However, when farmers become aware that screening is taking place, many immediately stop any ongoing activity that does not conform with food safety regulations. As a result, the number of negative samples that are screened is high. Fürst explains, "We needed an automated screening system that could get rid of all the negative samples, quickly and efficiently."

The purchase of the Exactive with TLX has eliminated much of the manual work of extracting and cleaning compounds. The urine can simply be diluted and injected directly into the TLX. The system removes any superfluous compounds, traps the compounds of interest, and then transfers them to the Exactive, which powerfully and quickly detects the compounds for which it has been pre-programmed. Fürst enthuses, "The beauty of the Exactive, aside from its powerful screening ability, is that the system can be set to work overnight and unattended. This frees our lab technicians to devote their valuable time to developing new methodologies rather than spending time repeating laborious processes. It also

means that the screening process itself is accelerated, resulting in higher throughput. In addition, the Exactive system is a reasonably priced benchtop instrument which, despite delivering the power of a larger instrument, requires minimal space in the laboratory."

Since the implementation of the DFS GC-MS, the analysis of dioxins, PCBs, flame retardants and pesticides in Fürst's analytical lab has been greatly improved. The versatile nature of the DFS GC-MS, with its optional two GCs for column separations, provides the unique ability to simultaneously run two separate screenings at different temperatures while it is unattended, greatly increasing screening speed and overall throughput. The unparalleled, high-resolution capabilities of the DFS have also greatly increased the accuracy of the laboratory's trace and target compound analysis. Fürst comments, "Since installing these instruments two years ago we have experienced great results and significantly increased sample throughput. Both instruments have become extremely important in our laboratory as they significantly reduce analysis time, and their high accuracy and sensitivity ensure the food entering the market is safe. Additionally, the training required for both the Exactive and the DFS has proven to be minimal. Once initial in-house training has been provided, both machines are accessible and easy to use."

Conclusion

As a government organization, CVUA-MEL is using both the market leading Exactive LC-MS and the DFS high resolution GC-MS to ensure that European legislation on Food and Feed Control is upheld, while throughput is maximized and the health of consumers is protected. The laboratory has benefited from the use of these instruments achieving substantial time and cost savings, with sample throughput significantly greater and more accurate than was previously possible.

When embarking on the tender process, CVUA-MEL sought the specification and purchase of the ideal instrument for food safety applications in their Food and Feed Control department. CVUA-MEL did not anticipate the significant additional benefits including an extended working day – due to analyses being run overnight, improved staff productivity and improved speed for screening. Overall, the decision to purchase Thermo Scientific instruments exceeded expectations once they were implemented.

Fürst concludes, "Thermo Fisher is one of the biggest providers of scientific instruments in the world. The company is continuously innovative and has been responsible for the invention of well-regarded mass spectrometry technology. Despite being aware of Thermo Fisher's highly regarded reputation, we selected the Exactive LC-MS and the DFS high resolution GC-MS based on their individual merits as excellent instruments that could uniquely fulfill all our requirements. Both these instruments have significantly improved our ability to ensure the safety of food and feed products and safeguard consumers from dangerous pesticides."

For the latest information about Thermo Fisher Scientific solutions and the wide range of applications for food safety, please call 800-532-4752, e-mail or visit www.thermoscientific.com/foodsafety.

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