

Supporting development and production with elemental analysis in life sciences and beyond

The central analytics laboratory at Merck KGaA in Darmstadt, Germany, provides its services to researchers and production units inside the Merck Group across the globe. Dr. Sven Traxel, Laboratory Manager of the Element Analytics group, and his team of 14 co-workers operate a total of 10 ICP-MS instruments to answer questions around the elemental composition of a large range of samples. Dr Traxel and his team have been assessing the suitability of the Thermo Scientific[™] ICAP[™] MSX ICP-MS as a tool to support their analysis. As a central resource providing analysis as a service to the global R&D organization inside Merck, the team is collaborating with all parts of the organization, across all business fields and regions. Typically, around 3,000 analysis requests are handled per year, mostly to support development and troubleshooting in the field of elemental analysis.

"Many people assume that Merck KGaA is a pharmaceutical company," says Dr. Sven Traxel, "but there are also other sectors.

There are of course special drug products, for example, in the field of oncology or a large product range to support life sciences, but there are also products such as liquid crystals, OLEDs and semiconductor materials, used in electronics, as well as specialty chemicals and pigments."

This means a large variety in sample matrices, alongside different approaches to sample preparation, including microwave assisted digestions, but also open vessel digestions using different types of acids.

On a normal day, sample preparation would take most of the available time, with the analysis overnight, as it is more effective this way. In some cases, however, especially for new or unknown samples, it is important to be able to intervene and modify the sample preparation or analysis method if needed. "This is something that has really changed over the years since I started to manage this group," states Dr. Traxel.

"I have nearly measured 1,500 samples, and I still see similar performance as to what I saw on day one after installation"

-Niklas Brenner

thermo scientific

Niklas Brenner is one of the ICP-MS experts in the group, in charge of developing new methods or adapting already existing methods and performing the measurements. He has already had experience with a Thermo Scientific[™] iCAP[™] Q ICP-MS in a previous job and a wide experience with other instruments. "The comparability of results between the iCAP MSX ICP-MS and other instruments we have in the laboratory is really good."

When running such a wide range of sample types, including highly demanding mixtures of inorganic salts, organic compounds and modifiers as found, for example, in cell culture media, instrument maintenance becomes a critical step in keeping up performance and ensuring reliable data quality. Argon Gas Dilution (AGD) is a means to reduce matrix effects and allow for a higher number of samples to be run before cleaning of the cones is required. "I wasn't used to Argon Gas Dilution, but I have nearly measured 1,500 samples, and I still see similar performance as to what I saw on day one after installation," says Niklas Brenner. Even though the use of Argon Gas Dilution leads to a slight reduction of the system's sensitivity compared to no dilution, this does not mean a sacrifice in the laboratory's ability to achieve required detection limits. "We have used the dilution level 5 as it provided the best compromise for most of our samples. Only for specific sample types, like ultrapure acids or other chemicals, I had used no dilution or even the sensitivity mode of the system."

Routine maintenance is usually a reason for downtime in the laboratory, especially for labs handling heavy matrices, in this case inorganic salts or complex mixtures of multiple components. Although it can be planned for, performing routine maintenance of the cones may require 2–3 hours every week, including the retuning of the instrument.

"I have not cleaned the iCAP MSX ICP-MS even once since I have started testing it, and of course colleagues are asking me how this is possible," says Niklas Brenner. "We do see some slightly increased backgrounds now for some elements but can still reach the required levels for all elements." Dr. Sven Traxel adds: "What was really impressive is how the iCAP MSX ICP-MS handled cell culture media. When we measure those with other instruments we have to clean afterwards; with the iCAP MSX ICP-MS we could immediately continue with the analysis of other samples."

Thermo Scientific[™] Qtegra[™] Intelligent Scientific Data Solution Software for the iCAP MX Series ICP-MS provides a new tool for testing laboratories to better understand which maintenance should be performed at a given moment. With its intuitive and user-centric layout, it provides a series of features that enable simplified operation, with reduced training requirements and an exhaustive feature set for quality control and compliance in GxP-regulated requirements.

"Qtegra ISDS Software is outstanding for me," states Niklas Brenner. "What I really like is the performance monitoring, which allows me to see how the instrument performed over time. This is really good in case of an audit of the laboratory. Also, the Maintenance Tab can be helpful and is a nice addition to have."

Overall, the iCAP MSX ICP-MS left a strong impression on the team at Merck KGaA in Darmstadt, not only in the central analytics laboratory but also for other groups performing elemental analysis as part of regular quality control testing.

"I liked the iCAP Q ICP-MS instrument a lot back then, and learned to like other instruments we have in the lab, but what I particularly like about the new iCAP MSX ICP-MS is that is a quiet instrument. If you run a few instruments in a laboratory, it would be a lot quieter in the lab."

"Laboratory space in modern laboratories is very expensive," concludes Dr. Sven Traxel, "and the iCAP MSX ICP-MS does not need much space in the lab compared to other instruments."

Learn more at thermofisher.com/icp-ms

General Laboratory Equipment – Not For Diagnostic Procedures © 2024 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. This information is presented as an example of the capabilities of Thermo Fisher Scientific products. It is not intended to encourage use of these products in any manner that might infringe the intellectual property rights of others. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details. **CS003219 1024**

thermo scientific