

Food safety

TSQ 9610 GC-MS/MS delivers increased instrument uptime and productivity to analytical testing labs

“The TSQ 9610 GC-MS/MS is a very robust, high-sensitivity system that is easy to operate and maintain. It is a great routine testing instrument for high-throughput labs.”

—Katie Banaszewski, NOW Foods



Thermo Scientific TSQ 9610 GC-MS/MS

Food safety analytical testing laboratories face several challenges when analyzing pesticides in food products. They must be able to confidently detect an ever-expanding list of compounds at low detection limits in a variety of complex matrices. Additionally, meeting their aggressive turnaround times to be able to ship the product quickly and satisfy high customer demand is quite challenging. NOW Foods, based in Bloomingdale, Illinois, USA, faces these challenges in their in-house testing lab to ensure only the highest quality products reach their customers. NOW Foods tests raw ingredients and finished products to ensure their safety and quality.

Katie Banaszewski, the Director of Quality at NOW Foods, explained, “The high-quality standards at NOW call for methods able to detect minute amounts of contaminants, but that cannot be achieved without adequate instrumentation. NOW Foods has launched the pesticide residue testing program in 2019, and our staff has been utilizing GC-MS/MS and LC-MS/MS to cover a scope of about 500 residues.”

The team at NOW Foods biggest challenge is chasing the unknown. Banaszewski explained, “As manufacturers of quality products, we constantly have to stay ahead of the curve as

some raw material vendors try to utilize sophisticated ways to adulterate their products. Although we implement a stringent vendor qualification program to protect the safety of our customers, we always must be on high alert. That means implementing orthogonal approaches when analyzing contaminants or when determining the identity of a material.” NOW Foods use both GC-MS/MS and LC-MS/MS to cover a wide spectrum of analytes to stay ahead of the unknown.

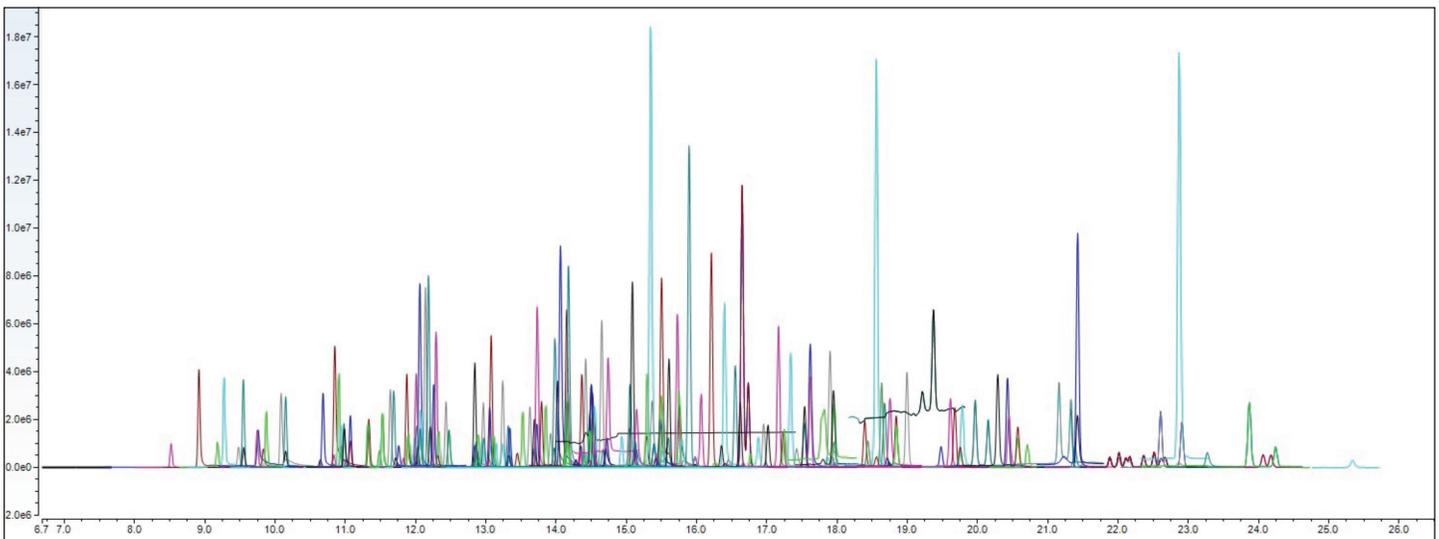


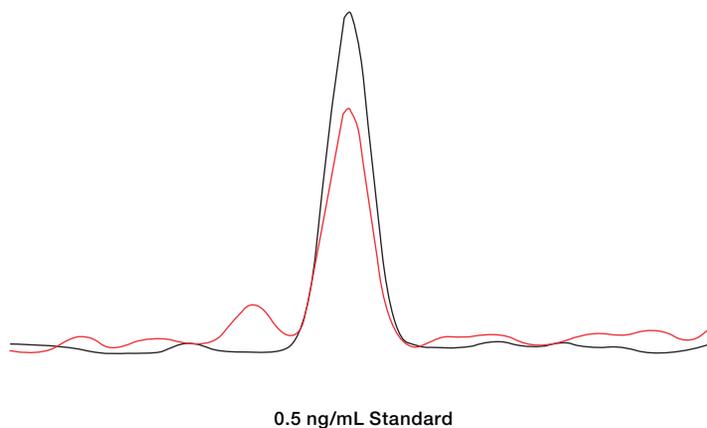
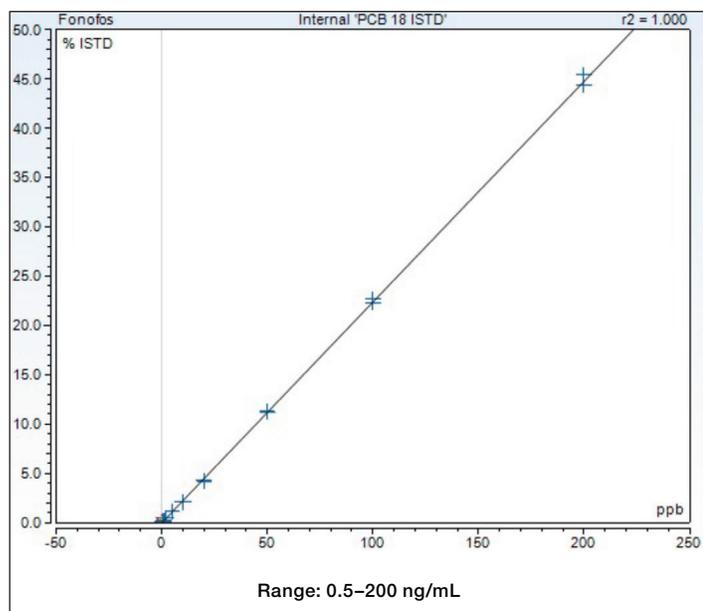
Figure 1. Timed SRM acquisition for analysis of 200+ pesticides at 50 ppb in a single run on the TSQ 9610 GC-MS/MS system

“Our collaboration with Thermo Fisher Scientific has been great. The continuous support and guidance have been invaluable and helped us with the development of improved methodology, which we are planning on implementing in our laboratories in the near future as well as sharing it with the industry.”

—Katie Banaszewski, NOW Foods

The method development team must develop customized methods for complex matrices to ensure the harmful contaminants are confidently detected and accurately quantified to protect the customers from potential exposure. Banaszewski gave more detail on this, “Since our sample matrices range from simple, single component vitamins to complex, multi-component botanical formulations, methods for the analysis of actives or contaminants had to be developed specifically for those matrices to ensure accuracy.” Once these methods are developed, they are used to analyze hundreds of samples per day to support production. She elaborated on the challenges with previous instrumentation in the laboratory, “Besides the challenges associated with compound detection due to the botanical matrix interferences, instrument sensitivity and robustness were areas where we saw some opportunities for improvement. In a laboratory supporting production, time is of the essence, and instrument downtime caused by maintenance often resulted in delays in data release.”

NOW Foods recently added the Thermo Scientific™ TSQ™ 9610 GC-MS/MS system to their laboratory and implemented it in their pesticide workflow. This has allowed the laboratory to increase the instrument uptime thanks to the NeverVent™ technology and the NeverVent Advance Electron Ionization (AEI) source. This technology allows the ionization source to be cleaned, filaments to be replaced, and analytical column to be changed without venting the instrument. Banaszewski explained how this impacted the laboratory, “The addition of the NeverVent technology to the AEI source drastically improved the instrument uptime. It is a major time and cost saving improvement.”



Fonofos

Figure 2. Calibration for fonofos between 0.5 and 200 ng/mL with 0.5 ng/mL chromatogram analyzed on the TSQ 9610 GC-MS/MS system

“Thermo Scientific instruments are considered the most advanced and robust laboratory instruments, but more importantly, the service, technical expertise, and support that Thermo Fisher Scientific offers is superior to their competitors.”

—Katie Banaszewski, NOW Foods

In addition, the laboratory has benefitted from an increase in sensitivity and robustness on the TSQ 9610 GC-MS/MS system. Banaszewski elaborated, “The enhanced sensitivity of the instrument aided with the identification and quantitation of residues we weren’t able to detect previously; thus, it improved our confidence in ensuring safety of the products we manufacture.” The instrument was also seamlessly integrated into the laboratory workflow and the analysts were up and running on the system quickly with minimal training. She explained, “It is a very robust, high-sensitivity system that is easy to operate and maintain.”

In the future, NOW Foods will continue to chase the unknown and add more compounds to their pesticide screening program. Banaszewski described, “The work on contaminants in various matrices will continue for years to come. As we look closer at the toxicological aspect of various chemical residues, we will need to modify our methods to reach the ultra-low detection limits while we expand the scope to search for a larger number of residues.” NOW Foods will continue to work Thermo Fisher Scientific and

contribute to product development feedback. She elaborated, “Ensuring the safety of products is our top priority as a company. Having a collaborator such as Thermo Fisher Scientific allows us to stay in the loop when it comes to the technological advances they continuously work on.”

Conclusion

Ensuring the safety of their product is extremely important for in-house analytical testing laboratories. The TSQ 9610 GC-MS/MS offers significant advantages for targeted quantitative analysis in complex food matrices, including:

- Increased instrument uptime
- Sensitivity to give more confidence in results
- Minimized instrument training
- Increased asset utilization

All of these enable food safety analytical testing laboratories to adapt and stay ahead of analytical challenges.

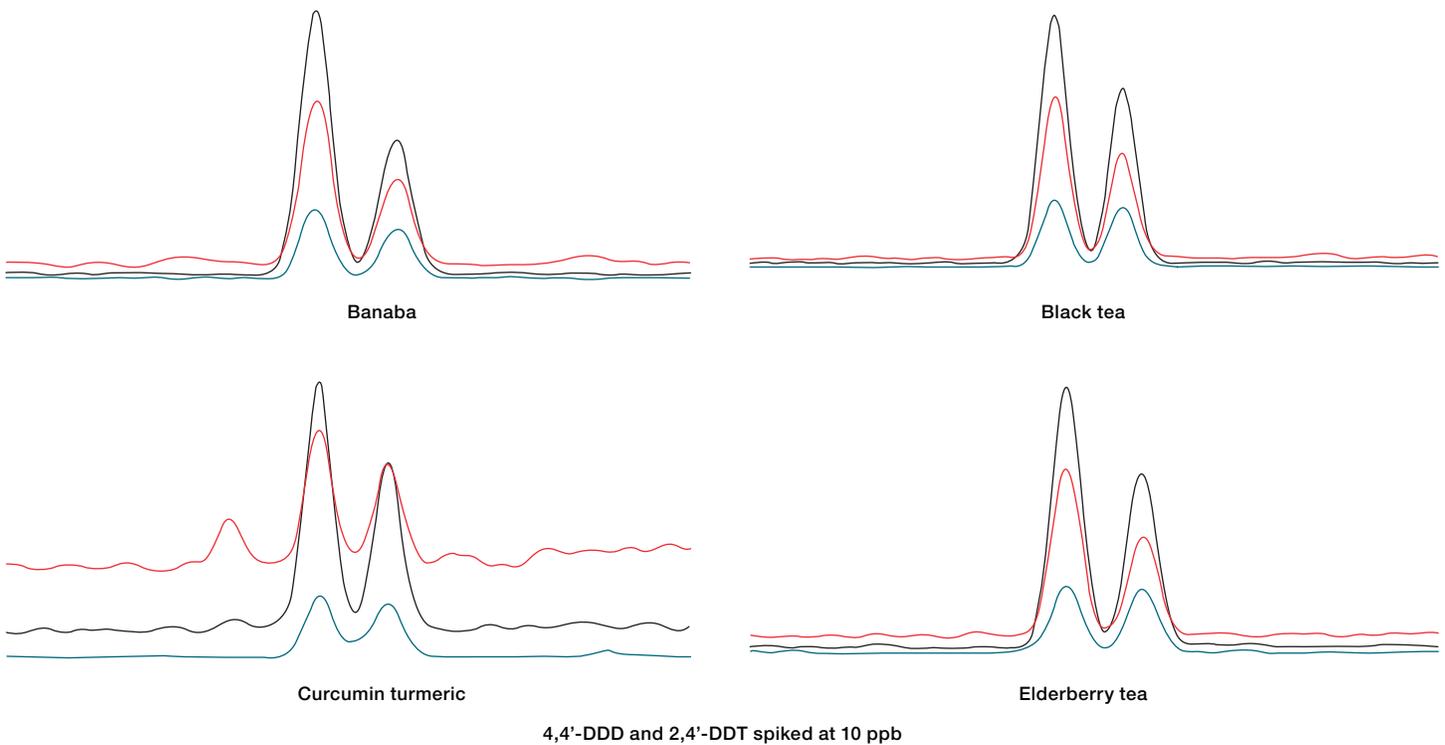


Figure 3. Analysis of four matrices spiked at 10 ppb with 4,4'-DDD and 2,4'-DDT using the TSQ 9610 GC-MS/MS system

About Katie Banaszewski

Katie Banaszewski is the Director of Quality at NOW Foods where she uses her 15 years of industry experience to mentor, lead, and inspire her team. She has led the development and implementation of a routine pesticide residue monitoring program and plays an integral role in growing the company's analytical capabilities. She focuses on exploring new scientific approaches to analytical challenges utilizing mass spectrometry and elemental analysis.



About NOW Foods

Founded by Elwood Richard in 1968, NOW Foods has grown from a small, family operation to a highly respected manufacturer of natural health products. Today, NOW manufactures and distributes over 1,500 dietary supplements, natural foods, sports nutrition, and personal care products. NOW's state-of-the-art manufacturing facility has been GMP certified since 2000, and its ISO 17025 accredited quality testing labs are among the best in the industry. The company has over 1,500 employees and its products are sold in more than 60 countries. NOW remains family owned and committed to its original mission: to provide value in products and services that empower people to lead healthier lives.



The method development team at NOW Foods

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