

응용 자료

Xevo TQ-GC: Run Extended Sample Sets Without User Intervention

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Abstract

In this application brief, see how the Xevo TQ-GC has produced consistent results for pesticide analysis over an extended period of time, without the need for intervention by the user.

Benefits

- Learn how the Xevo™ TQ-GC can produce consistent results in sample extracts
- Achieve system reproducibility throughout extended data sets

Introduction

Generating reproducible and reliable results is a standard requirement in laboratories involved with determination of pesticide residues in food. One of the challenges faced by such laboratories is instrument robustness – maintaining a consistent response when running multiple injections of complex food extracts. Instrument downtime and prolonged cleaning protocols can cause delays in sample turnaround times. Fluctuations in performance during a run can render the data unusable requiring the repeat analysis of samples and possibly even re-extraction and preparation leading to significant delays and increased costs.

Results and Discussion

Organic white grape was purchased from a local retailer and after homogenization, a QuEChERS extraction and dispersive SPE clean-up was performed, following the CEN 15662 method. An internal standard was used to correct the peak response for any injection discrepancies. The grape extract was spiked with five pesticides at 0.01 mg/kg (the default MRL for pesticide analysis) and injected 200 times, which equates to the time needed to run six typical batches concurrently without intervention (5 days). No manual intervention or retuning of the instrument was performed during this experiment.

The repeatability of peak response over this period of time remained excellent for all five compounds (RSDs <10%). The uncorrected peak areas from injection 1 and injection 200 were assessed for each pesticide. The decrease in peak areas were found to be <17% for all five compounds. This shows that the 0.01 mg/kg level can be reached easily even after extensive use of Waters Xevo TQ-GC.

The data for all five pesticides was taken and an assessment of reproducibility of the retention times and ion ratios were made. The retention time repeatability was excellent and found to be below 1% RSD, or within 0.01 minutes for all compounds. The ion ratios which should fall within 30% of the reference, in accordance with SANTE guidelines for pesticides in food,¹ were consistent and <8% RSD.

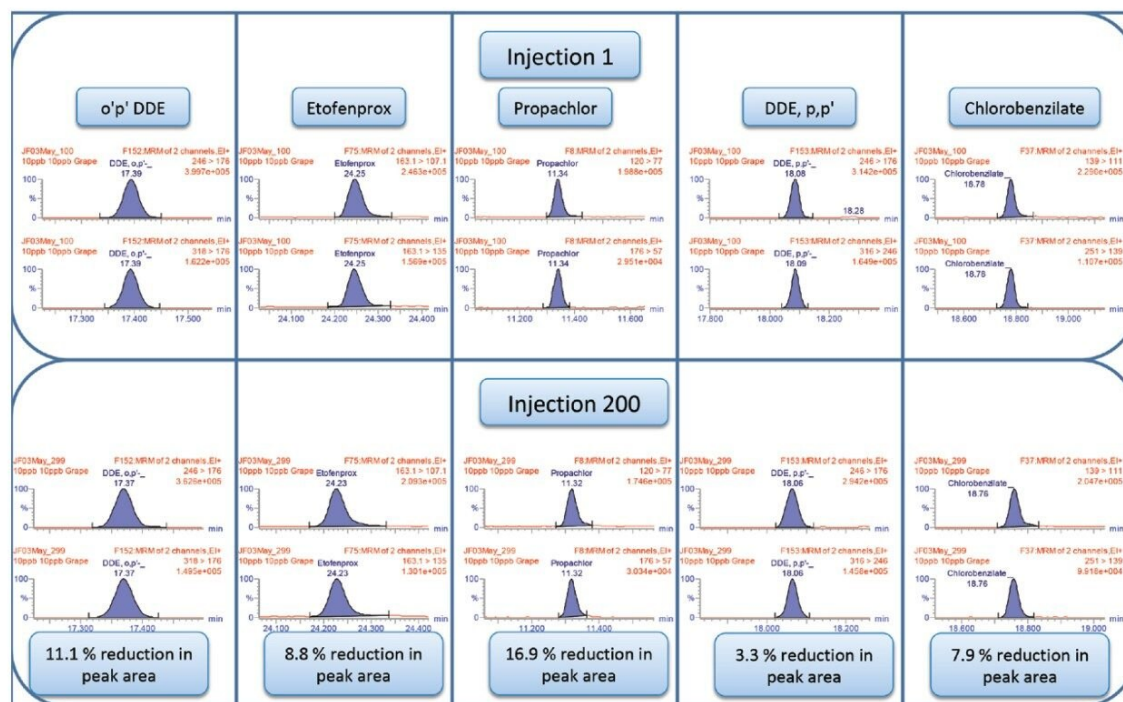


Figure 1. Repeatability from replicate ($n=200$) injection of grape extract containing five pesticides at 0.01 mg/kg.

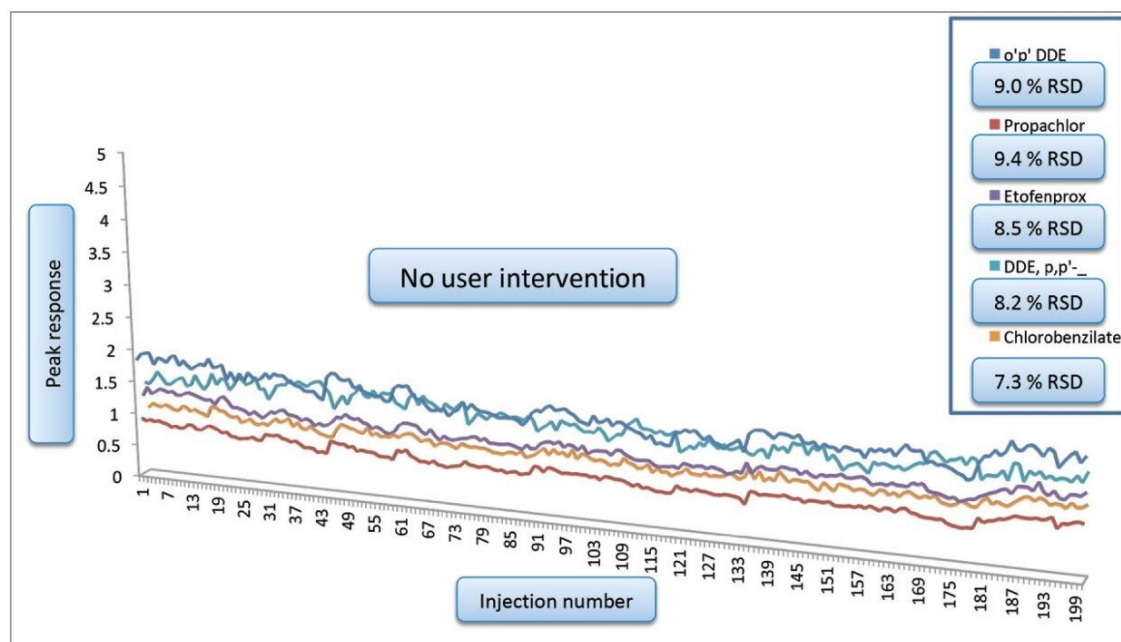


Figure 2. Minimal loss of uncorrected peak area for five pesticides at 0.01 mg/kg over 200 injections.

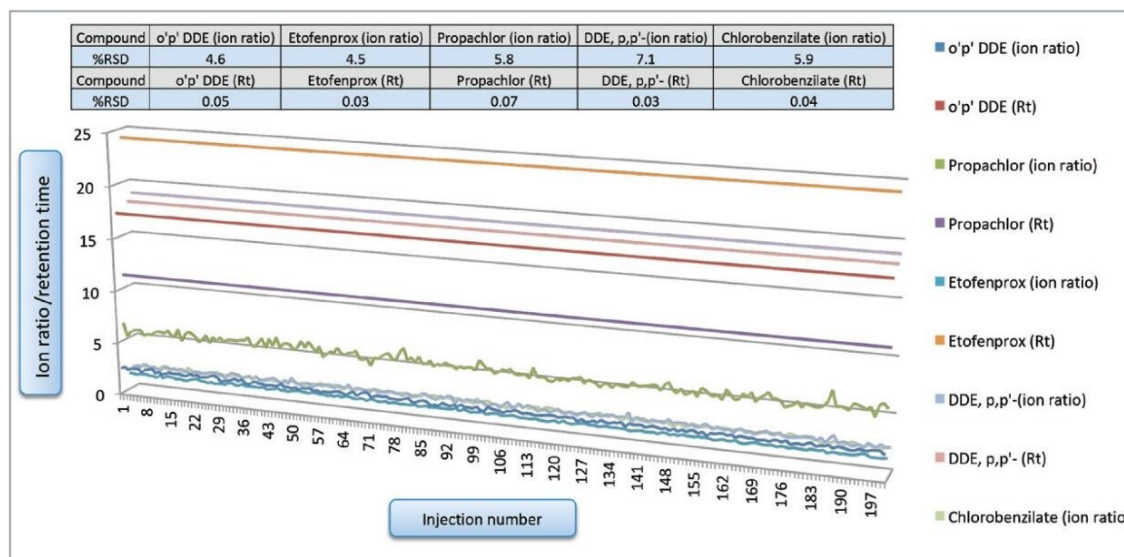


Figure 3. Repeatability of retention times and ion ratios from replicate (n=200) injection of grape extract spikes with five pesticides at 0.01 mg/kg.

Conclusion

The Xevo TQ-GC has been shown to produce consistent results over the tested period of time, without the need for intervention by the user. This experiment provides an indication that the operation of the system is efficient with a low frequency of down time for GC-related maintenance. By minimizing user intervention and delivering reliable results for extensive time periods, sample batch size could be increased maximizing laboratory throughput.

References

1. SANTE/11813/2017 21-22 November Rev.0.

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Xevo TQ-GC Mass Spectrometry System <<https://www.waters.com/waters/nav.htm?cid=134977323>>

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