

Improving Pesticide Data Quality Using a Certified MS Syringe Filter

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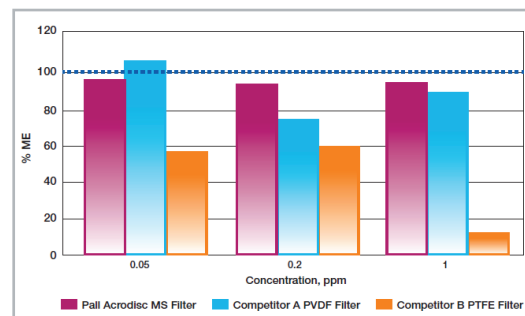


Pesticides are important to ensure a sustainable global food supply. However, the use of such compounds must be regulated to protect public health. In recent years, regulations have become more stringent evidenced by Maximum Residue Limits (MRL) getting lower as well as the elimination of some pesticides. To ensure pesticide application is in compliance with legislation, testing methods capable of assaying multiple analytes at detection and quantitation limits below the MRL, are crucial.

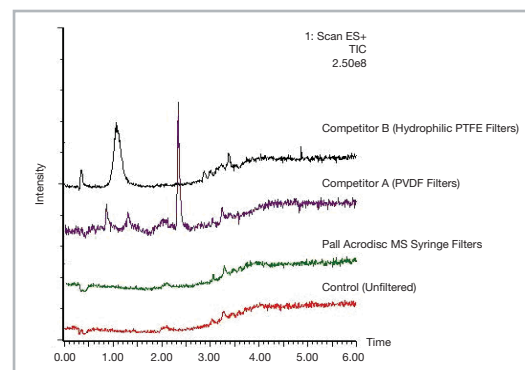
To meet the rigorous requirements of today's analyses, many labs are using liquid chromatography coupled with mass spectrometry (LC-MS). Samples and mobile phases used in this analyses should be filtered using a 0.2µm pore size membrane. Many mass spectrometry labs are reluctant to filter samples, due to concerns about the introduction of extraneous compounds which are extracted from the filter membrane or housing. Filter adhesives, if used, can also contribute to this issue. The extracted excipients can lead to false positives if the peak is misidentified as a pesticide. Also, if the extracted substance causes ion suppression or co-elutes with an analyte of interest, a false negative could result. According to SANCO requirements¹, for a method to be valid, it must have a false negative rate that is less than 5%. Also the desired false positive rate should be less than 5%. In addition, any extraneous peaks produced during the analysis must be carefully considered to prevent affecting data interpretation. Requirements specifically state that equipment used in the analysis, such as filter aids, must be thoroughly checked for interferences. Given this requirement, a filter with low extractables is essential in the analysis of pesticides.

Filtering samples and mobile phases are recommended to protect the liquid chromatograph by preventing particulates from blocking the column and therefore improving data quality. Filtering samples will reduce the matrix effect which can contribute to either the suppression or enhancement of analyte ionisation. The data in **Figure 1** shows how the Pall Acrodisc® MS certified syringe filter gives consistent performance across three concentrations. The competitors are inconsistent, showing suppression or enhancement, as shown at the 0.05ppm level for Competitor A.

The Pall Acrodisc MS certified filter doesn't yield extraneous compounds from leachables or extractables. The data presented shows that the sample prepared using the Pall Acrodisc MS filter matches the baseline profile of the unfiltered blank used as a control. Samples processed with competitor A's PVDF show a large peak at about 2.4 minutes as well as a few smaller peaks around one minute. Competitor B's PTFE filter



Note: Dashed lines on each chart (---) indicate no matrix effect (i.e. % ME = 100%).



Note: All chromatograms are displayed on the same scale.

shows a broad peak at one minute as well as something eluting in the void. There are also small anomalies at about three minutes, and another at five. Clearly something is being extracted from the filter housing and/or membrane.

Sample filtration is an important part of sample preparation in the analysis of pesticides. Due to the concern of extracted components, this practice is often avoided. The Pall Acrodisc MS syringe filter proves to be the best choice for improving data quality while protecting the analysis and the mass spectrometry system.

Pall Acrodisc MS syringe filters with WWPTFE (water-wettable polytetrafluoroethylene) membrane are available in both 13 and 25mm sizes.

References

- 1- Method Validation and Quality Control Procedures for Pesticide Residue Analysis in Food and Feed. SANCO, Document Number SANCO/12495/2011, obtained from http://ec.europa.eu/food/plant/plant_protection_products/guidance_documents/docs/qualcontrol_en.pdf
- 2- Data generated by Pall Corporation scientists Gilbert E. Tumambac, Weibing Ding, and Larry Scheer, Pall Corporation, Ann Arbor, MI, USA for application notes Reduction of Matrix Effects from Filter Effluents Using Pall Acrodisc® MS Syringe Filters for LCMS Sample Preparation and Low Extractable Syringe Filters for LCMS Applications