

LPGC - The Fast Way to Speed Up Your Multiresidue Pesticide Analysis for Foods!

Jana R Hepner, Jaap de Zeeuw, Kristi Sellers, and Joseph Konschnik; Restek Corporation

Introduction

Food testing labs need fast turn-around times to analyze samples submitted for multiresidue pesticide analysis and deliver accurate results. Now, they can take advantage of their mass spectrometer's vacuum to give their gas chromatography workflow a significant speed boost. Installing a new factory-coupled column set allows the vacuum in the MS detector to lower the pressure inside the analytical GC column, which results in run times three, or more times faster than a conventional GC-MS column configuration. The technique is called low-pressure gas chromatography (LPGC).

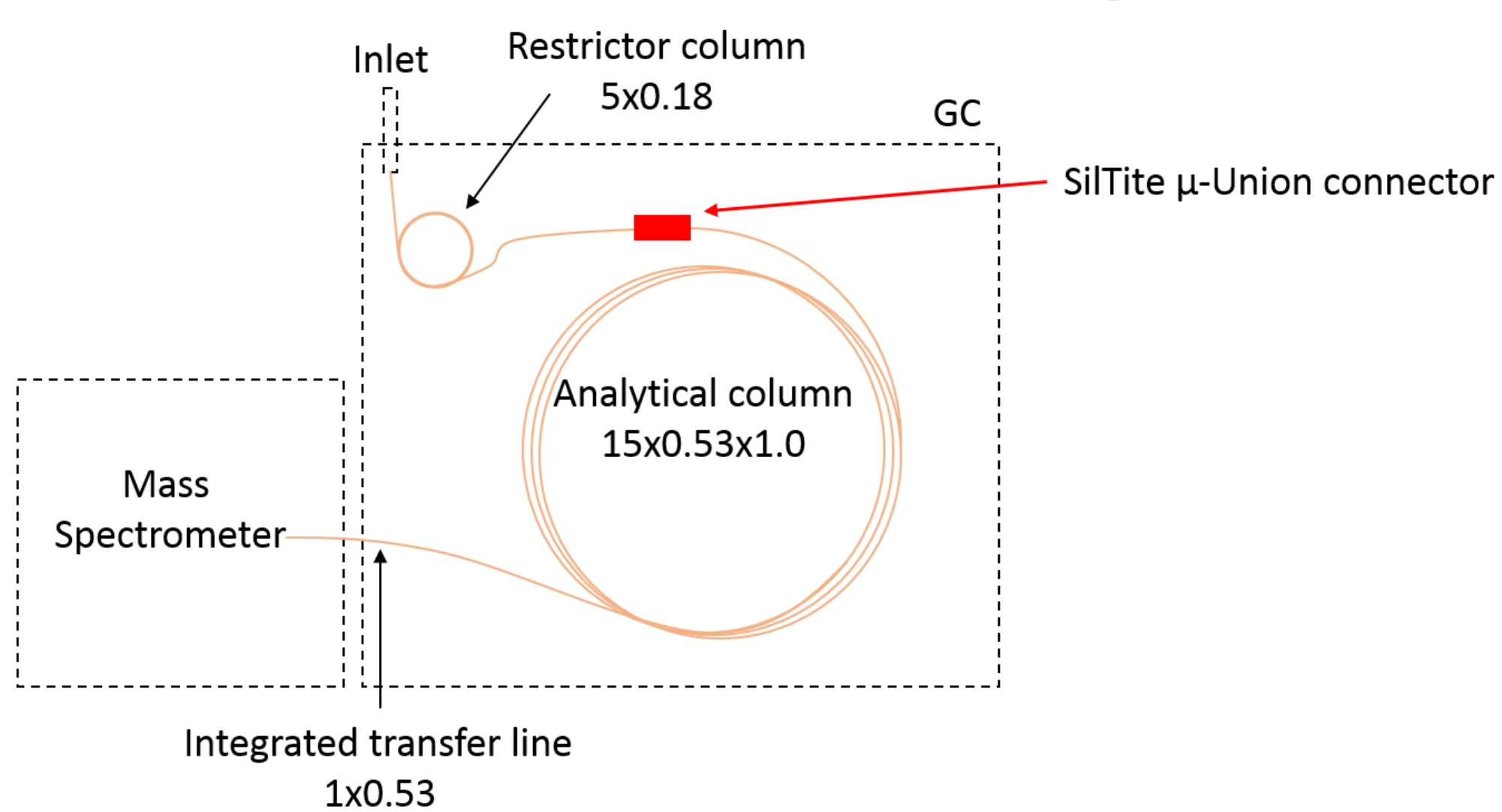
Advantages of LPGC

- Fast analysis with short 0.53 mm capillaries**
 - Short analysis times
 - Increased sensitivity
 - Higher capacity
- Peak width enough for any type of MS**
- Lower elution temperatures**
 - Elution at 50-80°C lower temperatures
 - Lower bleed (compared to other thick film columns)
- Standard injection techniques, high volume injections**

Overcoming Limitations of LPGC

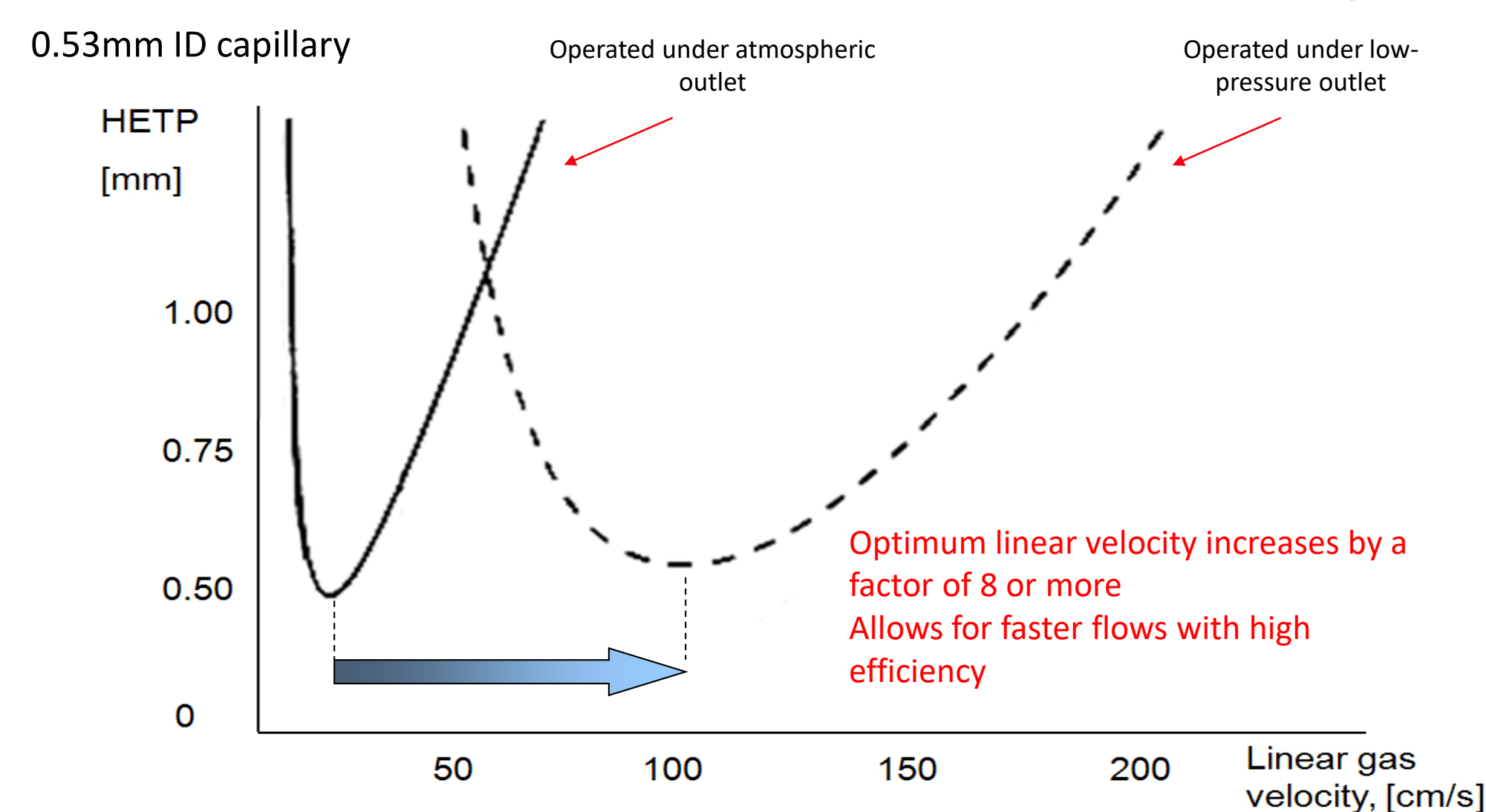
- Loss of theoretical plates (compared to conventional column)**
 - Can be mitigated by selective detection by MS
- Higher bleed from thicker film**
 - Lower elution temperatures
- Greater potential for leaks**
 - Pre-connected, leak-free tested column set
- More complicated to cut analytical column**
 - Less need to cut column
- Need for MS instrument under vacuum**
- Rapid oven heating needed for optimal performance**
 - Either 220 V instrument or accelerator oven insert

Restek's LPGC setup

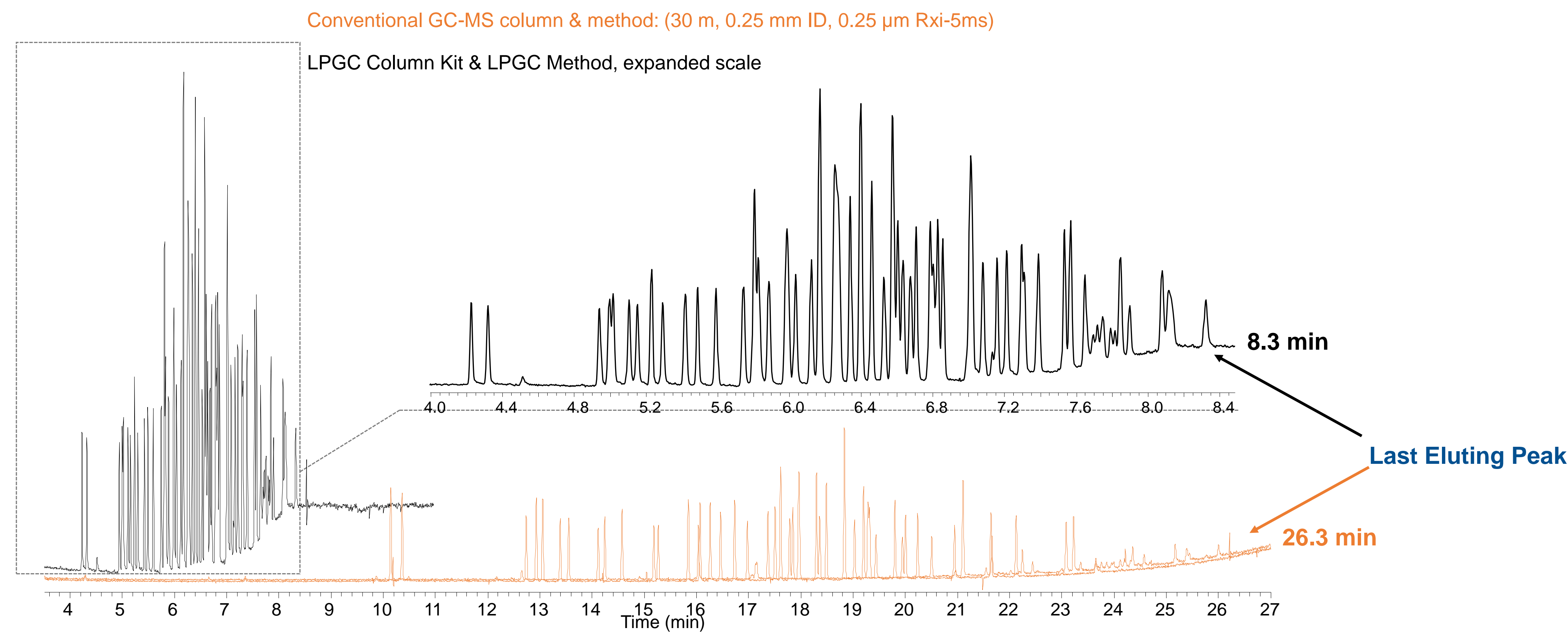


Delivered pre-connected in the box
Only extra consumable needed is 0.8 mm vespel/graphite ferrule for MS transfer line

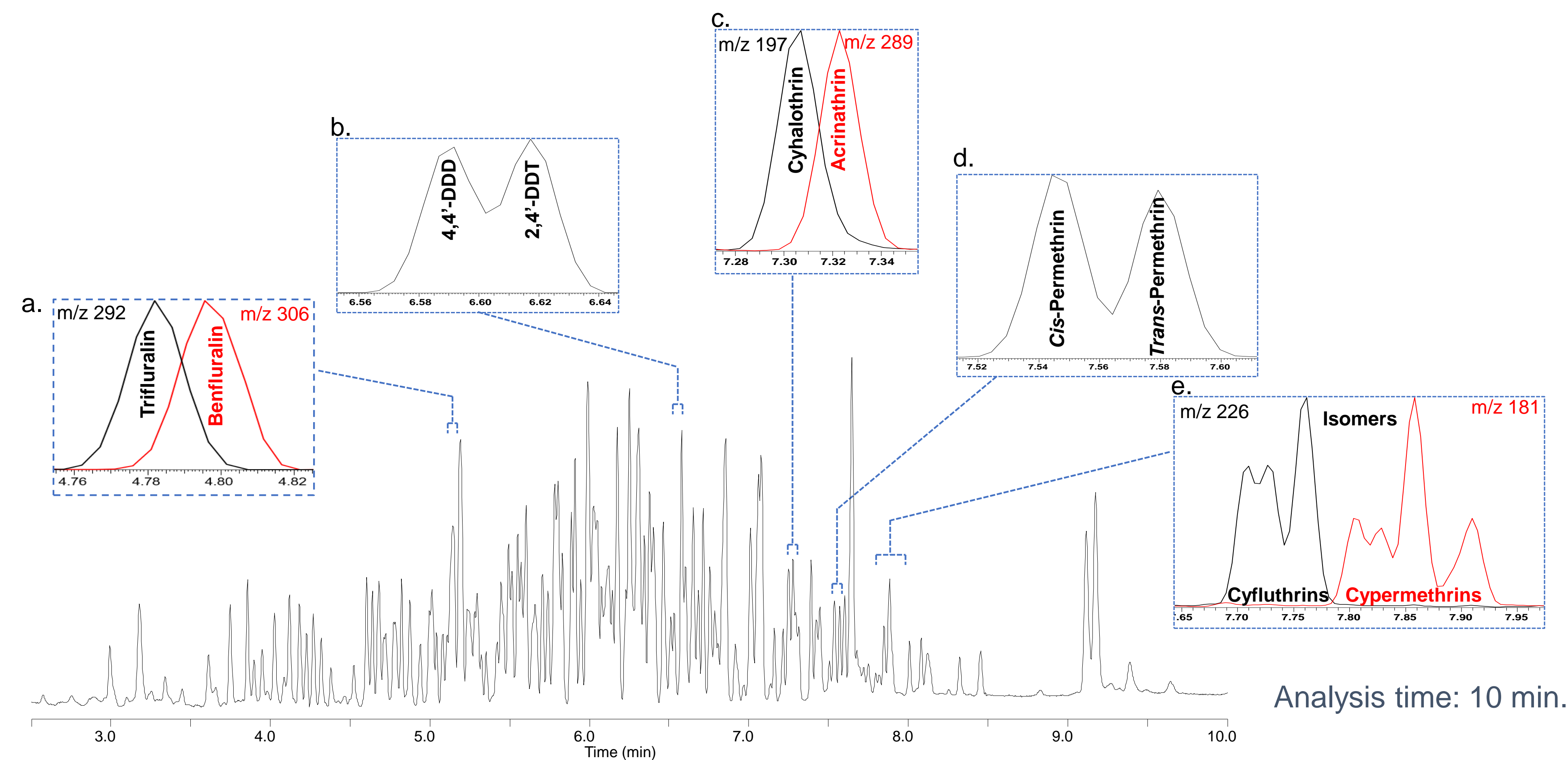
LPGC and Optimum Linear Velocity



Comparison of Conventional Analysis and LPGC

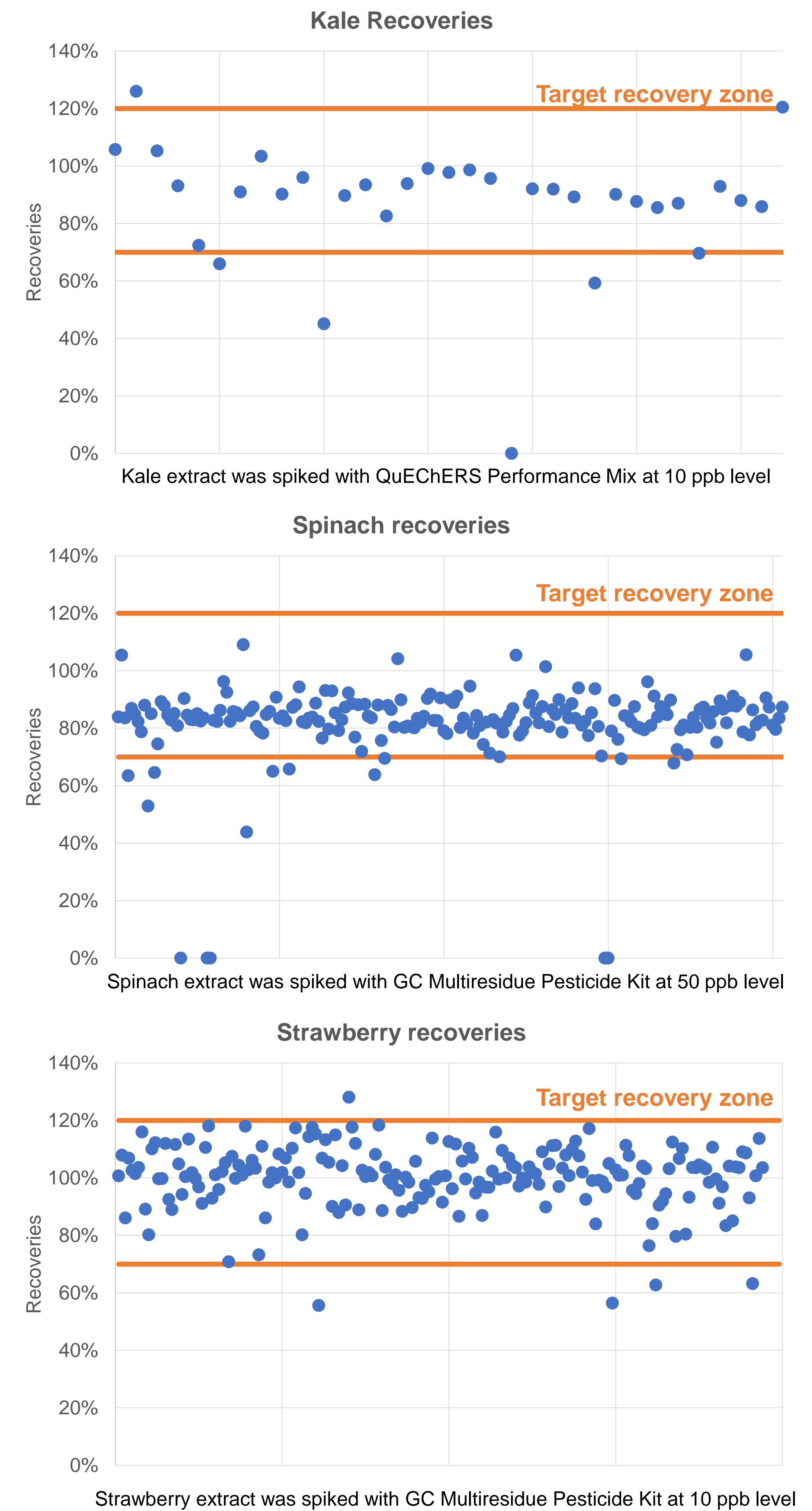


203 Pesticides in Strawberries using LPGC kit

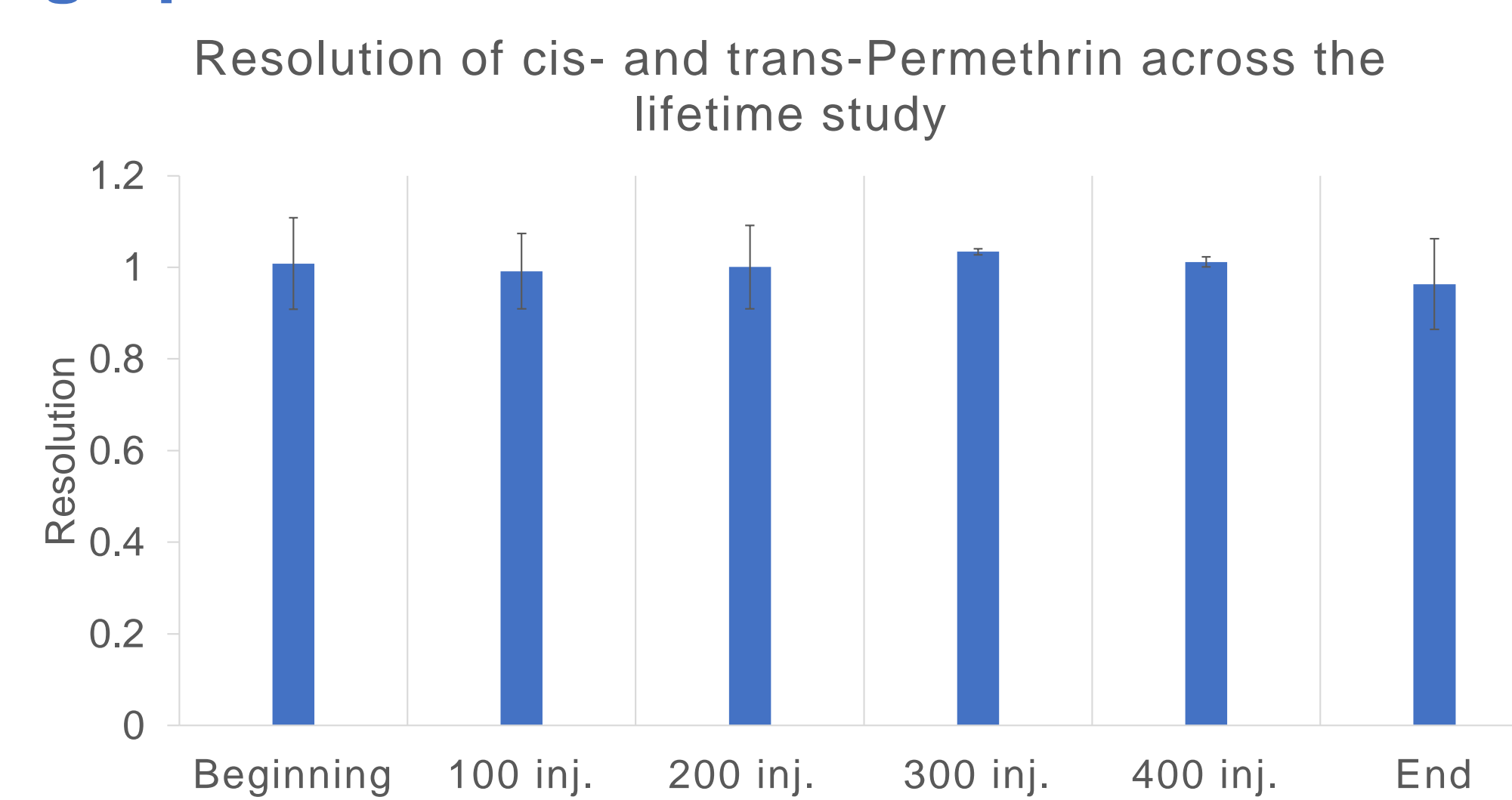
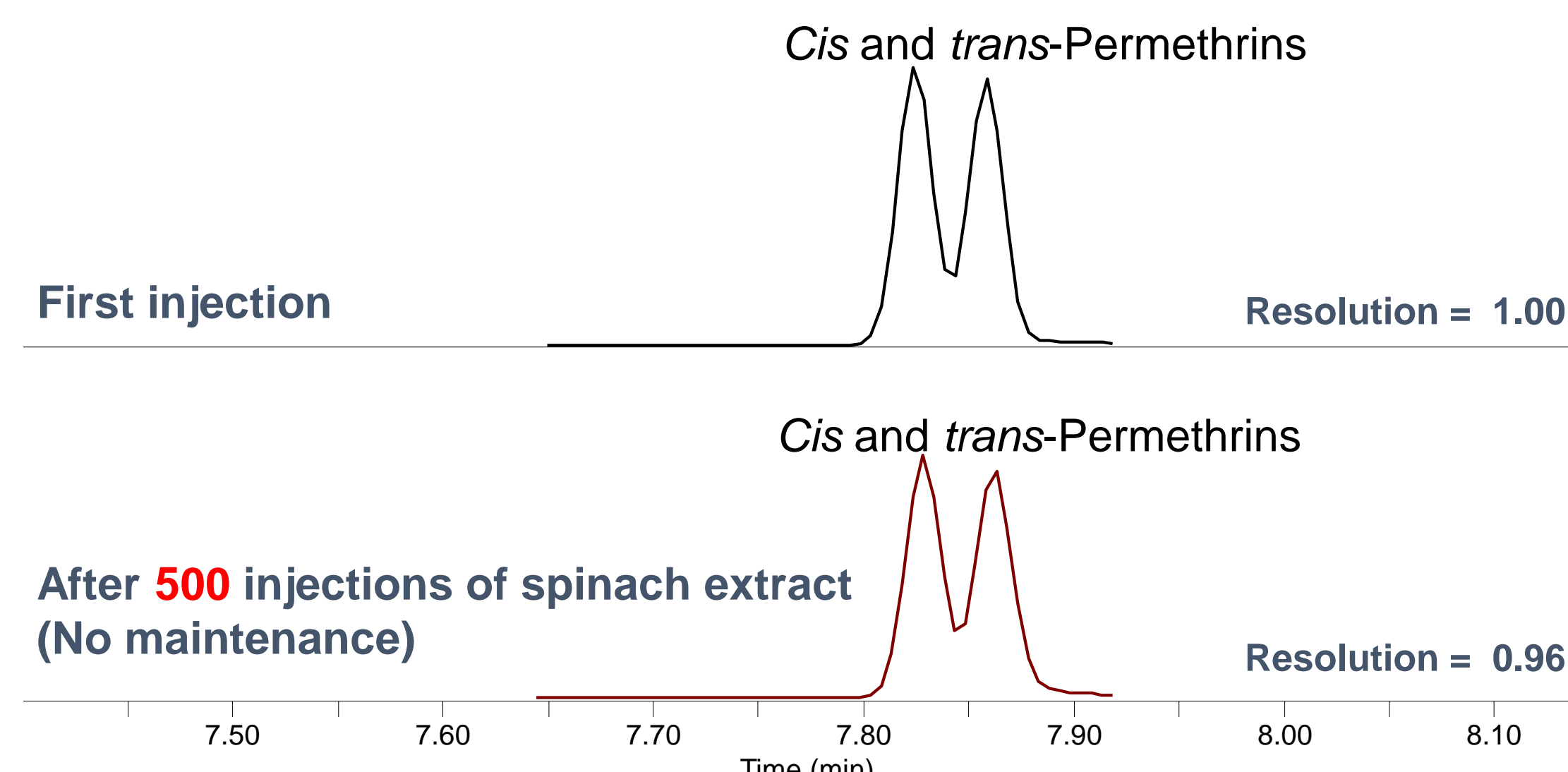


Oven: 80°C (1min), 35°C/min to 320°C (5 min); Flow: He, 2 mL/min.; Injection: 1μL Splitless; Sample: GC Multiresidue Pesticide Kit, Strawberries' QuEChERS extract

Applications in Fruit and Vegetables



Robustness Test Using Spinach Extract



Conclusions

- LPGC is a great tool for fast and robust analysis**
 - Generally 3-4x faster analysis
- Easy to Implement - No need to change instrumentation**
 - Only difference is the ferrule for MS transfer line
- Column set for pesticide analysis is easy to install**
 - Same as with most column installations
- Very versatile and can be used for more than pesticides**
 - PCBs, PAHs, PBDEs, etc.