

series	cap color	membrane	pore size	part #
eXtremelFV®	●	PVDF	0.2µm	85531

Screening and Quantitation of 250 Pesticides in Apple, Cranberry, Orange, Vegetable and White Grape Juices using the eXtremelFV® by LC-MS/MS

Z. Yang, L. Maljers, Bruker, Chemical & Applied Markets (CAM) Division. "Screening and Quantitation of 250 Pesticides in Fruit Juices with Positive/Negative Switching LC-MS/MS." Poster presented as part of NACRW-FPRW Conference, St. Petersburg, FL., 20-23 July 2014.

Abstract

A study was conducted using the Bruker EVOQ for the analysis of 250 pesticides in store-bought juice using one method and simple sample preparation using the Thomson eXtremelFV®s in a dilute-and-shoot approach without sample enrichment. LC-MS/MS operated in Multiple Reaction Monitoring (MRM) mode with dual scan Electrospray Ionization (ESI) is widely used for polar, semi-volatile, and thermally labile pesticides in food testing. The Bruker EVOQ Elite LC-Triple Quadrupole System provides fast positive/negative switching, allowing for simultaneous determination of positive and negative co-eluting compounds numbering in the hundreds. Simple sample preparation is explored using Thomson eXtremelFV®s for sample clean-up instead of lengthy alternatives like SPE or centrifugation followed by liquid-liquid extraction.

Equipment

- EVOQ Elite Triple Quadrupole Mass Spectrometer
- Bruker UHPLC
- CTC Autosampler
- Source: HESI
- Spray Voltage Positive: 4000V
- Spray Voltage Negative: 4000V
- Column: YMC-Pack ODS-AQ 3µm
- Column Temperature: 40°C
- Injection Volume: 30µL
- Mobile Phase:
 - Mobile Phase A: 5mM Ammonium Fluoride in Water
 - Mobile Phase B: Methanol
 - Gradient:

Sample Preparation

1. Pipette 50µL of store-bought apple juice and 450µL of solvent (10% Methanol/ 90% Water) directly into the outer shell of Thomson eXtremelFV®, 0.2µm PVDF.
2. Partially depress the eXtremelFV® plunger and vortex.
3. Depress the completely and load onto the autosampler.

Results

Table 1. Store-bought fruit juice test results.

Fruit Juice	Apple Juice	Orange Juice	Cranberry Juice	White Grape Juice	Vegetable Juice
Pesticide	µg/L (ppb)				
Azoxystrobin	ND	ND	0.32	ND	0.48
Boscalid	ND	ND	0.16	ND	ND
Carbaryl	ND	0.39	1.47	ND	ND
Carbofuran	ND	0.14	ND	NDd	ND
Dimethoate	ND	0.30	ND	ND	ND
Imidacloprid	ND	ND	0.60	ND	0.20
Mandipropanid	ND	ND	0.59	ND	ND
Metalaxyl	ND	ND	0.21	ND	ND
Methoxyfenozide	ND	ND	ND	ND	0.84
Tebuconazole	ND	ND	0.32	ND	ND
Thiabendazole	1.8	ND	ND	ND	ND

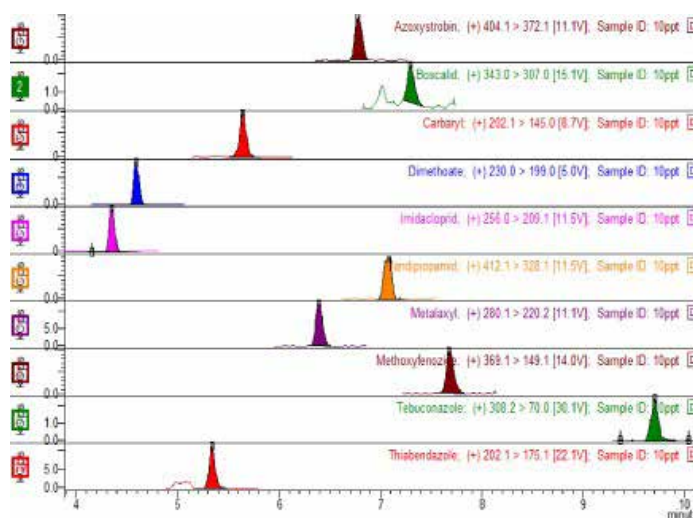


Fig 1. Chromatogram of a 0.01ppb standard solution containing the compounds listed in Table 1 This is equivalent to 0.1ppb in juice.

Conclusion

The calibration on triplicate injections showed excellent linearity and response factor RSD over 3 orders, range using the Thomson eXtremelFV® for sample preparation. Pesticides were detected in store-bought apple, orange, cranberry and vegetable juices.

- Good linearity
- Sensitivity and response factor
- RSD for positive and negative co-eluting pesticides

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