

| series     | cap color | membrane | pore size | part # |
|------------|-----------|----------|-----------|--------|
| eXtremeFV® | ●         | PVDF     | 0.2µm     | 85531  |

## Screening and Quantitation of 250 Pesticides in Apple, Cranberry, Orange, Vegetable and White Grape Juices using the eXtremeFV® 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 eXtremeFV®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 eXtremeFV®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:

| Time | %A | %B  | Flow (µL/min) |
|------|----|-----|---------------|
| 0.00 | 90 | 10  | 400           |
| 0.20 | 90 | 10  | 400           |
| 2.00 | 30 | 70  | 400           |
| 10.0 | 0  | 100 | 400           |
| 15.0 | 0  | 100 | 400           |
| 15.1 | 90 | 10  | 500           |
| 18.0 | 90 | 10  | 400           |

### 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 eXtremeFV®, 0.2µm PVDF.
2. Partially depress the eXtremeFV® 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 |
|------------------|-------------------|--------------|-----------------|-------------------|-----------------|
| <b>Pesticide</b> | <b>µg/L (ppb)</b> |              |                 |                   |                 |
| 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            |
| Mandipropamid    | 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.

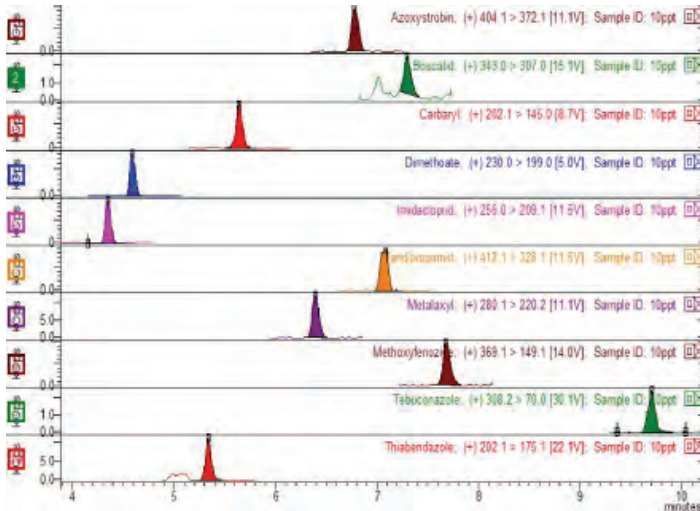


Fig 3. Total Ion Chromatograms for all juices

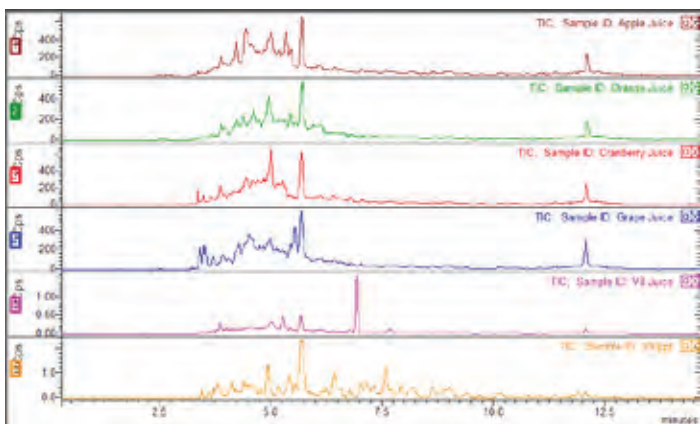
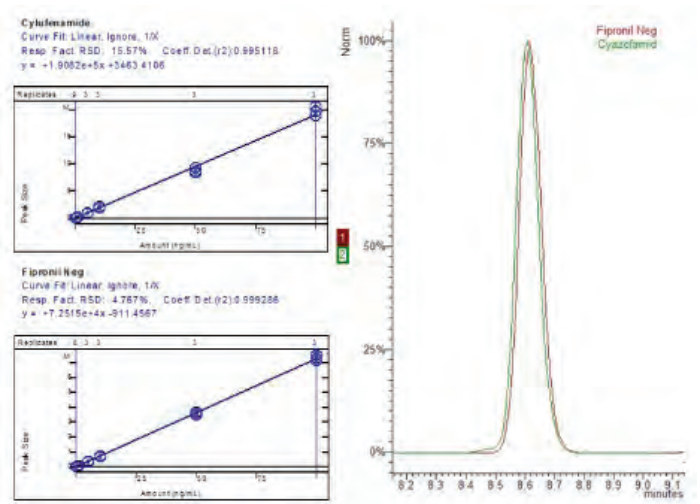


Fig 2. Calibration curve of negative pesticide Fipronil (left top) and positive pesticide Cyazofamid (left bottom), and their co-eluting plots (right).



## Conclusion

The calibration on triplicate injections showed excellent linearity and response factor RSD over 3 orders, range using the Thomson eXtremeIFV® 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