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LC–MS/MS DETERMINATION OF INSECTICIDE RESIDUES IN PEAR FRUITS ASSOCIATED WITH *CACOPSYLLA PYRI* MANAGEMENT

Tijana STOJANOVIĆ[1], Đ. NAĐ[1], A. ŽUNIĆ[1], D. MARINKOVIĆ[1], Vojislava BURSIĆ[1]

[1] University of Novi Sad, Faculty of Agriculture, Novi Sad, Serbia
Corresponding author: tijana.stojanovic@polj.edu.rs

Abstract

Pear psyllid, *Cacopsylla pyri* (L.), is a major constraint to pear production in Europe, including Serbia, because feeding on fruits and honeydew contamination reduce its quality and complicate crop protection. Chemical control therefore needs to be accompanied by reliable residue monitoring and measures that conserve natural enemies. This study describes a QuEChERS-based liquid chromatography–tandem mass spectrometry (LC–MS/MS) workflow for determining spirodiclofen, spirotetramat, spinetoram, deltamethrin, diflubenzuron, abamectin, and chlorantraniliprole in pear fruits. Sample preparation involved a 10 g test portion, internal-standard addition, extraction with 10 mL acetonitrile, salt-assisted partitioning, and dispersive solid-phase extraction. The reported instrumental procedure used electrospray ionization and multiple reaction monitoring, with matrix-matched calibration. According to the experimental summary, recoveries for the investigated pesticides were within 70–120%, coefficients of determination exceeded 0.99, and the limit of quantification was 0.01 mg/kg. The comparative chromatogram shows a fortified sample and four pear extracts with a prominent shared signal and fewer conspicuous secondary signals in the fruit extracts. These observations support a qualitative comparison of chromatographic profiles but do not establish pesticide identities or concentrations without transition-specific data. The experimental summary reports residues below the maximum residue limits applied in the original assessment; independent verification requires the individual concentrations and the applicable residue definitions and limits. The findings support the use of residue analysis alongside integrated pear psyllid management, while emphasizing the distinction between analytical performance, regulatory compliance, and dietary risk assessment.

Introduction

Cacopsylla pyri reduces pear marketability through feeding injury and honeydew contamination. Residue monitoring complements pest management and the conservation of natural enemies [1,2].

Objective: summarize the analytical workflow and reported performance, and compare the chromatographic profiles of four pear extracts.

Material and methods

Target panel: spirodiclofen, spirotetramat, spinetoram, deltamethrin, diflubenzuron, abamectin and chlorantraniliprole.

1 Extraction

10 g pear + internal standard + 10 mL acetonitrile. Add QuEChERS salts.

2 Centrifugation

5 min at 4,000 rpm. Transfer 6 mL extract for cleanup.

3 LC–MS/MS analysis

PSA, $MgSO_4$ and C18. Centrifuge again for 5 min at 4,000 rpm.

4 dSPE cleanup

Transfer 2 mL to a vial. MRM detection and matrix-matched calibration with an internal standard.



[1] Civolani et al. (2023). doi:10.1093/aesa/saad025
[2] Reeves et al. (2024). doi:10.1007/s10340-024-01772-3

Results and discussions

Analytical parameter	Reported result
Recovery	70–120%
Calibration	$R^2 > 0.99$
LOQ (each target)	0.01 mg/kg

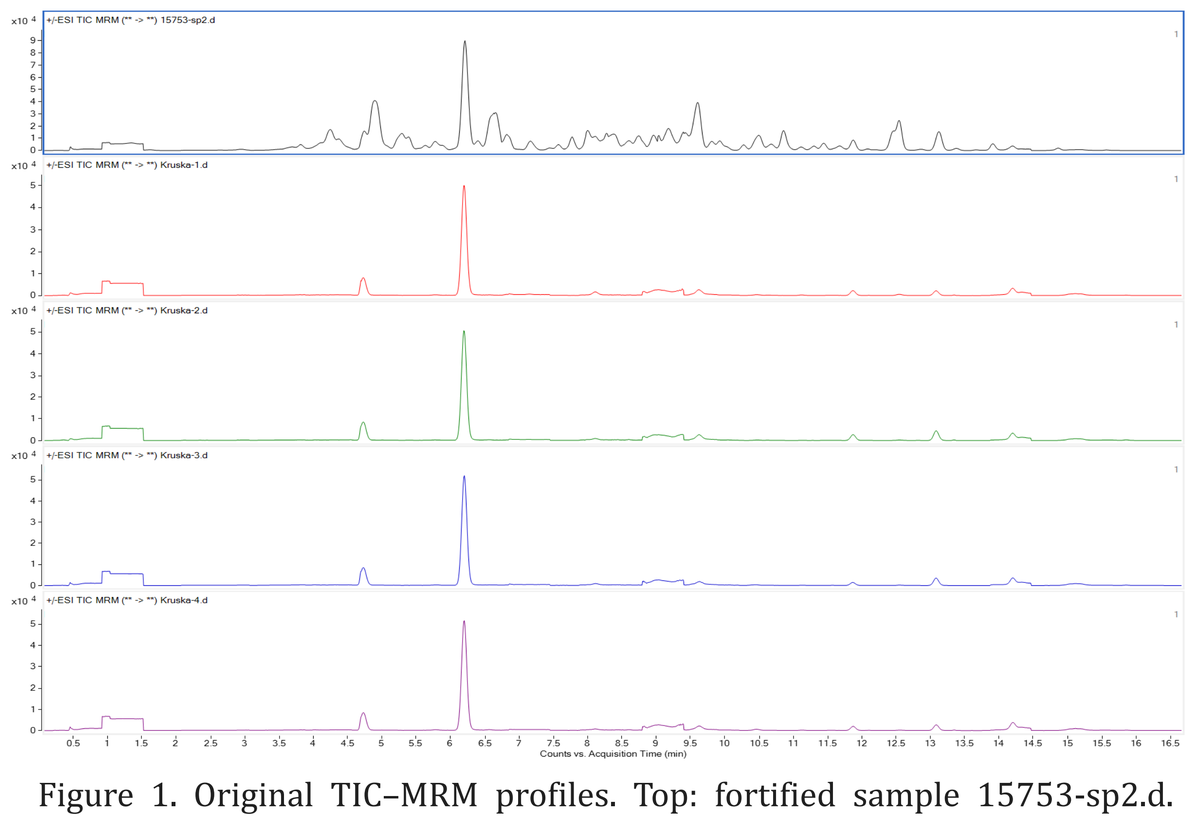


Figure 1. Original TIC–MRM profiles. Top: fortified sample 15753-sp2.d. Below: Kruska-1.d to Kruska-4.d. Peak labels do not identify individual pesticides.

The four pear extracts share a dominant signal near 6.2 min. Similar profiles do not establish equal concentrations. Analyte-specific transitions and calibration data are required for identification and quantification.

Conclusions

The reported sensitivity supports residue monitoring alongside integrated pear psyllid management. The study reports residues below the applied MRLs, but confirmation requires individual concentrations and applicable residue definitions. Chromatograms alone cannot establish compliance or dietary safety.