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ONE POT EXTRACTION METHOD FOR MULTIRESIDUE AND POLAR PESTICIDES ANALYSIS: GREEN CHEMISTRY APPROACH CUTTING TIME AND COSTS

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Sample preparation methods can pose challenges depending on the physicochemical properties of the pesticides under analysis. Polar compounds, exhibiting higher polarity compared to those detected in multiresidue methods, present unique hurdles such as lower sensitivity, matrix interferents, and the requirement of chromatographic columns with diverse retention mechanisms for detection when it does not use the derivatization approach. In this study, we successfully extracted polar pesticides alongside those typically analyzed in multiresidue methods using a single extraction solvent of acetonitrile and water. For polar compounds like glyphosate, glufosinate, AMPA, fosetyl-Al, maleic hydrazine, and ethephon, a 500 µL aliquot was filtered and analyzed using an Acclaim Trinity Q1 column (2.1 x 100 mm, 3 µm). Subsequently, QuEChERS EN 15662 extraction salts were added to the same centrifuge tube for partitioning and cleaned up with PSA. This facilitated the preparation of samples for determination of other compounds by GC-MS/MS and UPLC-MS/MS. Liquid chromatography coupled with tandem mass spectrometry was employed for detecting both polar and multiresidue pesticides. Although extra caution was needed, such as periodic cleaning runs for the column. The polar method was validated with accuracy ranging between 86% and 129%, and coefficients of variation (CV%) below 19% interday at 0.05 mg/kg, and between 67% and 111% (CV% 18) interday at 0.2 mg/kg. Verification of an additional 273 pesticides yielded accuracy rates of 52% to 137% (CV% 20.3) at 0.02 mg/kg. Sharing the extraction method led to reduced preparation time, solvent consumption, and streamlined laboratory workflows. Overall, the results underscore the efficacy of this extraction method, offering a faster and more cost-effective alternative for integrating polar compounds into laboratory routines.