

## USDA PDP Analytical Methods

Laboratories participating in the PDP program use a modified version of the QuEChERS (Quick, Easy, Cheap, Effective, Rugged, and Safe) method to extract pesticides and pesticide residues from tested commodities. The QuEChERS method was originally developed at the USDA Agricultural Research Service (ARS) Eastern Regional Research Center in Wyndmoor, Pennsylvania by Michelangelo Anastassiades, Steve Lehotay, et al (1) to extract residues from fruit and vegetable samples with a multi-residue method (MRM) for pesticide screening. The exact method used by participating laboratories can vary depending on commodity; however, all follow the same basic steps. A homogenized sample is added to an extraction vessel with an acetonitrile/acetic acid mixture. Salts are added and vortexed into the mixture before being centrifuged. The addition of the salts helps promote separation of the water phase, promotes pesticide elution to the organic phase, and buffers the solution for better recovery of pH-sensitive residues. The supernatant is decanted off and concentrated under nitrogen stream. The samples are further cleaned up by solid phase extraction (SPE). These newer methods are considerably less time-intensive and generate significantly less hazardous waste compared to previously used methods. Detection methods used include gas chromatography coupled with tandem mass spectrometry (GC-MS/MS) and liquid chromatography (LC-MS/MS). These detection methods allow for accurate detection in the parts per billion (ppb) range.

Additional information on a specific method is available on request.

- (1) Anastassiades M. and Lehotay S.J.; **Fast and easy multiresidue method employing acetonitrile extraction/partitioning and "dispersive solid-phase extraction" for the determination of pesticide residues in produce.** *J. of AOAC International*, **2003**, 86, 412-431.