NEW SPE CARTRIDGE FOR RESIDUE ANALYSIS IN SPICES, TEAS, AND OTHER DRY COMMODITIES

The complexity of dried sample matrices, such as teas and spices, frequently poses a challenge to food chemists when analyzing for residues. These extracts, containing residual oils and pigments, can contaminate chromatographic systems and cause both instrument fouling as well as inaccurate or irreproducible results.

While the well-known and widely used QuEChERS cleanup approach is "Quick, Easy, Cheap, Effective, Rugged, and Safe," the use of bulk salts and adsorbents, along with shaking and centrifugation, often does not provide sufficient capacity/efficiency to remove the concentrated matrix interferences associated with these dry commodities.

Alternatively, solid phase extraction (SPE) cartridges, having a higher capacity/efficiency for matrix removal, are often used to remove these problematic interferences. Typically, along with other adsorbents, these SPE cartridges contain graphitized carbon black (GCB) for retention and removal of pigments from the extract. While the planar, graphitic surface of traditional GCB allows for excellent removal of chlorophyll and other pigments, it unfortunately also retains planar aromatic compounds such as planar pesticides. Typically toluene is often needed to recover the planar analytes. Consequently, toluene introduces additional problems later in the work up and analysis.

The multi-bed Supelclean™ Ultra 2400 SPE cartridges are designed for the cleanup of extracts from dry/difficult samples prior to pesticide residue analysis, typically performed by GC/MSMS and LC/MS/MS. These cartridges contain primary-secondary amine (PSA), C18, zirconia-coated silica (Z-Sep), and a specialized, spherical carbon. These adsorbents provide an optimal balance between analyte recovery and interference removal without the use of toluene.

The top bed of the Ultra 2400 cartridge contains a mixture of PSA/C18 and graphitized, spherical carbon. The PSA removes acidic interferences, the C18 retains some hydrophobic lipid interferences, and the carbon removes unwanted pigments. The specialized carbon adsorbent used in this cartridge was engineered to remove sufficient pigmentation while also allowing for acceptable recoveries of compounds with planar structures. The bottom bed of the cartridge contains Z-Sep, which removes remaining oily residues and provides additional pigment removal. As seen with the analysis of pesticides in turmeric, the cartridge can be used for cleanup of acetonitrile extracts to be analyzed by either GC or HPLC. To learn more and try a sample, visit sigma-aldrich.com/supelcleanultra.

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