Overview

Purpose

This poster describes the analysis of several challenging pesticides from green tea samples using GC-MS/MS and acetonitrile as final extraction solvent. The compounds analyzed are representatives of various classes of pesticides, such as carboxamids, OC, OP, pyrethroids, aromatic, phenylamides. QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) is a well-known approach used for the extraction and clean-up of pesticide residues in various matrices. Typically, the final extraction solvent is acetonitrile. Direct injection of acetonitrile extracts can be problematic in GC-MS compared to LC-MS because of poor focusing of chromatographic peaks due to the high polarity of acetonitrile. Limitations on injection volumes due to the high expansion coefficient of acetonitrile and contamination of the system by matrix co-extractives [1]. Here we present a simple and robust analytical method which employs low volume splitless injections of acetonitrile sample extracts and the selectivity of the Thermo Scientific™ TSQ™ 8000 triple quadrupole GC-MS/MS instrument. With this approach, pesticide target reporting limits of <0.01 mg/kg can be achieved. This also overcomes the problems associated with the thermal expansion of acetonitrile and reduces the amount of matrix injected.

Methods

Green tea samples have been extracted using a typical QuEChERS procedure, and the final extracts were mixed with a mixture of 19 pesticides at levels corresponding to 0.005 to 0.5 mg/kg. The analysis was done by GC-MS/MS using a Thermo Scientific™ method. Data processing and reporting is performed by using the Thermo Scientific™ TraceFinder™ software with one SRM transition per compound and the selectivity of the Thermo Scientific Pesticide Compound Database (CDB) containing >=600 with retention times and pre-optimized SRMs.

Results

This method describes the methodology used for the multi-residue pesticides analysis in green tea using acetonitrile as final extraction solvent and splitless injections of low sample volume. The performance of the TSQ 8000 GC-MS/MS system was evaluated by assessing the sensitivity, linearity and reproducibility of the targeted compounds in green tea samples.

Methods

Sample Preparation

Organically grown green tea leaves (Pure Tea Ltd., Radstock, UK) were used for the experiments described below. For the QuEChERS, 2 g of green tea was weighted and hydrated for 30 min in 10 mL deionized water. Acetonitrile (10 mL) was added followed by 4 g MgSO4 and 1g NaCl. After centrifugation step (10K rpm for 5 min), 6 mL of the supernatant was transferred to a dSPE tube containing 1200 mg MgSO4, 400 mg PSA, 400 mg C18 and 400 mg GCB. This mixture was vortexed and centrifuged and 5 mL of the supernatant was used for the Thermo Scientific™ TraceFinder™ software with one SRM transition per compound.

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Introduction

QuEChERS involves an initial step when a few grams of the sample are extracted with acetonitrile followed by a clean-up step (with dispersive-SPE) used to remove, to a certain extent, matrix co-extractives [1]. Here we present a simple and robust analytical method which employs low volume splitless injections of acetonitrile sample extracts and the selectivity of the Thermo Scientific™ TSQ™ 8000 triple quadrupole GC-MS/MS instrument. With this approach, pesticide target reporting limits of <0.01 mg/kg can be achieved. This also overcomes the problems associated with the thermal expansion of acetonitrile and reduces the amount of matrix injected.

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