Overview

Purpose

This poster describes the analysis of several challenging pesticides from green tea samples using GC-MS/MS and acetonitrile as extraction solvent. The compounds analyzed are representatives of various classes of pesticides, such as carbamates, organophosphates, and pyrethroids.

Methods

Green tea samples were extracted using a typical QuEChERS protocol, and the final extracts were spiked 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 timed SRM detection method on the TSQ 8000 instrument, employing two SRM transitions for each pesticide compound in a typical MRM method setup. Data processing and reporting was performed by using the Thermo Scientific™ TraceFinder™ software with one optimized SRM transition for quantification and the second one for ion ratio confirmation of the positively identified pesticide compounds.

Results

The described method can be confidently used for the routine analysis of pesticides in green tea, often considered as a model compound for the analysis of polar matrices. The samples have been extracted using a typical QuEChERS protocol, and the final extracts were spiked at 10 ppb level (2 pg on column). The results of this experiment show excellent coefficients of variation (%RSD) with minimum values of 4.3% for Boscalid, maximum of 12.6% for Chlorfenapyr and an overall average value of 8.3% (Figure 4).

Conclusion

The QuEChERS-GC-MS/MS multi-residue method described here allows for rapid and accurate monitoring of GC amenable pesticides in green tea extracts using acetonitrile as final solvent without the need of an additional solvent exchange step. Low volume spiltless injection of the green tea sample extracts overcomes the problems associated with the thermal expansion of acetonitrile and reduces the amount of matrix injected. The instrument LOD was assessed by repeatedly (n = 20) injecting the 10 ppb (0.01 mg/kg) calibration standard taking into account the student’s critical values for the corresponding degrees of freedom (99% confidence), the concentration of each native compound, and %RSD. The results of this test show excellent LODs for the pesticides analyzed with values between 1 ppb (200 fg on column) (Boscalid) - 3 ppb (600 fg on column) (Chlortrione) (Figure 4).

Repeatability

Peak area repeatability was assessed using n = 20 replicate injections of the green tea extracts spiked at 10 ppb level (2 pg on column). The results of this experiment show excellent coefficients of variation (%RSD) with minimum values of 4.3% for Boscalid, maximum of 12.6% for Chlortrione and an overall average value of 8.3% (Figure 4).

References