

QuEChERS Video Notes 2011

QuEChERS Video

Introduction

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The QuEChERS name stands for Quick, Easy, Cheap, Effective, Rugged, and Safe—it has revolutionized multiresidue, multiclass pesticide analysis.

The QuEChERS Steps

The steps of QuEChERS are as follows:

1. Acetonitrile salting-out extraction of a sample in an aqueous environment.
2. Liquid-solid extraction—dispersive Solid Phase Extraction or d-SPE—which removes the majority of the remaining matrix interferences.
3. Step three involves analyses by tandem technique like LC/MS/MS, GC/MS, or GC/MS/MS.

Step 1: Homogenizing the Sample & Creating the Aqueous Environment

1. Chop and grind the sample.
2. Weigh a specific amount of the ground sample into 50 mL centrifuge tube.
3. **Although many fruit and vegetable samples contain sufficient water**, dry samples present a problem. To create an aqueous environment, we must add water to the “dry sample”. Weigh a portion of the amount than requested in the QuEChERS methodology. Add water to compensate for the difference in weight and to allow for the required aqueous environment.
4. Don't forget to vortex your sample if you add water—best practice calls for the use of two ceramic homogenizers.
5. Remember to add spiking solution if the sample is being used for Quality Control and/or Internal Standard, and vortex.
6. Next, add the acetonitrile required in the QuEChERS procedure. This will be equal in volume to the total weight of the sample.
7. Vortex the sample for 30 seconds and then add the pre-mixed, pre-weighed salt packets to the sample in the 50 mL centrifuge tube.
8. Cap and shake vigorously for 1 minute as defined by the QuEChERS method—then centrifuge for 5 minutes at 4000 rpm.

There are three versions of the QuEChERS method: non-buffered, AOAC, and EN. Request a free copy of Agilent's QuEChERS poster at www.agilent.com/chem/QuEChERSposter or view the poster in .pdf format at www.agilent.com/chem/QuEChERSpdf.

Visit www.agilent.com/chem/QuEChERSdemo to watch our first QuEChERS video regarding fresh fruits and vegetables.

The Resulting Layers

The resulting sample will show three layers:

1. The top layer is acetonitrile and the extracted compounds of interest.
2. The middle layer contains the remaining solids from the sample.
3. The lower layer is aqueous, containing the excess salts from extraction salt packed.

Step 2: Dispersive SPE of the Extract

Transfer the appropriate volume of the top acetonitrile layer to a pre-weighed dispersive SPE tube.

Reference the QuEChERS Standard Operating Procedures available at www.agilent.com/chem/QuEChERS SOP for specific transfer volume for the method.

The dispersive-SPE will contain magnesium sulfate as a drying agent and SPE material which will remove matrix interferences.

Vortex the d-SPE tube containing the extract for one minute. Then, centrifuge.

Step 3: Analyze

Step three of the QuEChERS method involves analyzing the results.

Dilution is important during analysis—if you're running a reversed-phase LC/MS/MS analysis, you will need to be at a low organic percentage to analyze the sample without introducing chromatographic anomalies.

Summary & Methods

The original QuEChERS publication was released in 2003. The QuEChERS sample preparation technique was validated in 2005 with updates to the methodology in 2007.

There are validated methods for both the AOAC International and the European Committee Standardization.

Agilent now offers a universal dSPE kit which offers the best overall matrix cleanup. You can also visit www.agilent.com/chem/dSPE to learn more about matrix-specific dispersive SPE kits.