

2010

Mixing & Blending



Geno/Grinder®

QuEChERS

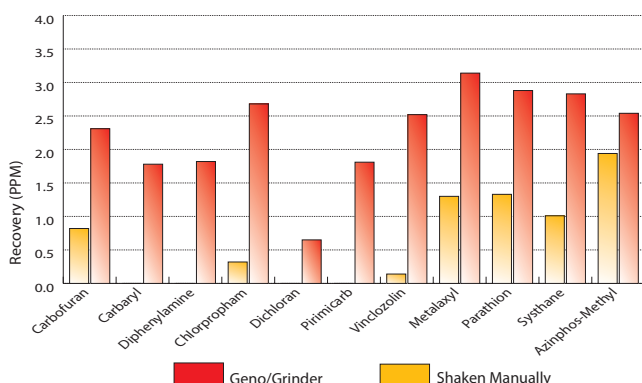


Programmable homogenizer/shaker that provides effective extraction of pesticide residues



- Quick** Processes samples in < 1 minute.
- Unique** Rapid up-and-down shaking motion ensures thorough mixing.
- Easy** Set the timer and operating rate, then push the start button.
- Consistent** Samples are all shaken in exactly the same manner.
- High-throughput** 50mL vials, up to 16.
15mL, up to 24; 2mL, up to 48.
- Effective** Ensures thorough extraction of pesticides from matrix.
- Rugged** Designed for repeated runs. Built to last.
- Safe** Lid interlock halts operation immediately if lid is opened.

Strawberry



Geno/Grinder increased pesticide recovery in study of fortified fruit

In a recent study, samples of strawberry were fortified with 5 ppm of CAL-CARB-13 (SPEX CertiPrep) and prepared according to AOAC method 2007.01. One set of samples was shaken by hand, the other was shaken on the Geno/Grinder using 2-3 ceramic grinding cylinders per tube. Following clean up, samples were analyzed by GC-MS. For all pesticides detected, higher recoveries were obtained for the samples prepared using the Geno/Grinder than for those prepared manually. Results are shown graphically on the left.

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Accessories for QuEChERS



Large clamp assembly for the 2010 Geno/Grinder. Accepts 15 & 50 mL centrifuge tubes.



Holders for Centrifuge tubes constructed from rugged PE foam. Available in 2, 15 and 50 mL centrifuge tubes.



Ceramic grinding cylinders aid with the mixing and homogenization of samples. Recommended use of 2 cylinders per centrifuge tube.



50 mL LDPE round-bottomed tubes aid in the mixing with ceramic grinding media. Impact resistant design.



Full range of pesticide standards accredited to ISO 17025 and Guide 34. For GC, GC-MS, and HPLC.

Exclusively From:
SPEX CertiPrep[®]

Item No.	Quantity Per Pack	Description/Reagents
2199	1	Large Clamp, for use with 15 and 50 mL centrifuge tubes
2196-16-PE	1	Foam holder for 50 mL. Holds 16.
2197	1	Foam holder for 15 mL tubes. Holds 24.
2300	1	Foam holder for 2 mL tubes. Holds 48.
2254-PE-48	16	LDPE round-bottomed tubes
2183	100	3/8" x 7/8" angle-cut, ceramic grinding cylinder for 50 mL tubes
2184	100	5/16" x 5/8" angle-cut, ceramic grinding cylinder for 15 mL tubes
2185	100	5/32" x 5/16" angle-cut, ceramic grinding cylinder for 15 mL tubes

Increased Pesticide Recovery in Fruit and Vegetable Products using the Geno/Grinder® with the QuEChERS Method



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Abstract

Samples prepared for pesticide analysis according to the QuEChERS method are typically combined with solvent and buffering salts, then mixed by shaking for 1 min. by hand. In this study, GC-MS results of samples prepared using the standard, manual QuEChERS methods were compared with results for samples mechanically mixed using the Geno/Grinder.



Experiment 1

Sample Preparation

- Fresh strawberries, apples, and celery cut into small chunks (¼ - ½ in).
- Spiked with 5 ppm of a solution of CAL-CARB 13 (a mix of 13 common pesticides, Spex CertiPrep) and refrigerated overnight.

Samples prepared as follows:

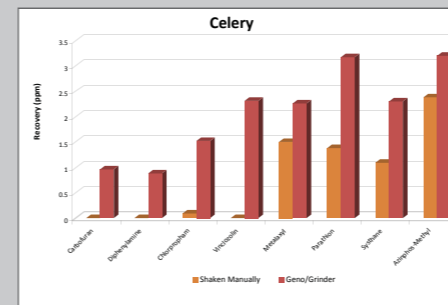
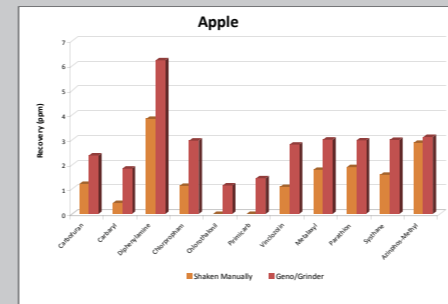
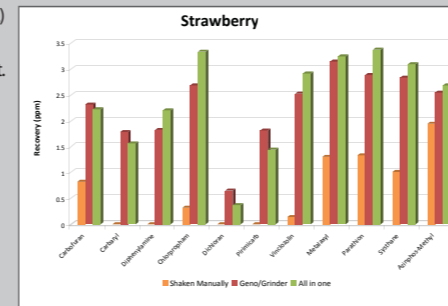
	Sample Set A	Sample Set B
Homogenization	Single-serve blender	Geno/Grinder @ 1500 strokes/min. in 50 ml tubes, using 3 ceramic grinding cylinders
Add Solvent	15 ml Acetonitrile (1% Acetic Acid)	15 ml Acetonitrile (1% Acetic Acid)
Add Salts	6 g MgSO ₄ 1.5 g NaOAC	6 g MgSO ₄ 1.5 g NaOAC
Shake	1 min. by hand	1 min. on Geno/Grinder at 1500 spm
Centrifuge	3 min. @ 3500 rpm	3 min. @ 3500 rpm

- For strawberry, a third set of samples was prepared: spiked strawberry chunks were ground in the presence of the solvent and salts (All in one).

Clean Up and Analysis

- Removed supernatant liquid from each sample.
- Treated with PSA (25mg/ml extract), and GCB (5mg/ml extract).
- Mix:
 - Set A: shaken 30 sec. by hand.
 - Set B: shaken 30 sec. at 1500 spm on Geno/Grinder.
- Centrifuged all samples at 3200 rpm for 1 min.
- Removed supernatant liquid.
- Evaporated samples to near dryness.
- Brought total volume to 1 ml in toluene.
- Analyzed by GC-MS using a SCAN method.

Results



Experiment 2

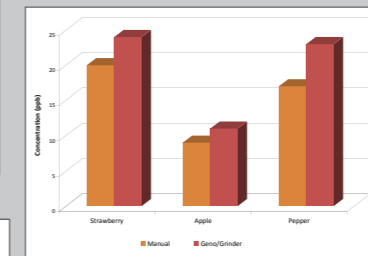
Sample Preparation

- Produce samples obtained in homogenized form from UC Davis (IR-4 Project).
- Samples contained known pesticides in unknown concentrations.
- Samples prepared in 50 ml centrifuge tubes:

Matrix	Pesticide	Sample Size	ACN (1% Acetic Acid)	MgSO ₄	Salt 2
Strawberry	Flutianil	15 g	15 ml	6 g	1.5 g NaOAC
Apple	Flutianil	15 g	15 ml	6 g	1.5 g NaOAC
Green Pepper	Etoxazole	15 g	15 ml	6 g	1 g NaCl

- Shaking method:
 - Sample set A: 1 min. by hand
 - Sample set B: 1 min. on Geno/Grinder at 1500 spm using 2 ceramic grinding cylinders per 50 ml tube.
- Centrifuged samples: 3 min. @ 3500 rpm.
- Clean up as in Experiment 1 using PSA, GCB, and MgSO₄.
- Analyzed by GC-MS using a SIM method.

Results



Matrix	Manual			Geno/Grinder			Increase using Geno/Grinder (%)
	Conc. (ppb)	Std. Dev.	RSD (%)	Conc. (ppb)	Std. Dev.	RSD (%)	
Strawberry	20	1.0	5	24	1.7	7	20
Apple	9	0.8	9	11	1.4	12	18
Green Pepper	17	2.5	15	23	2.4	10	35

Conclusions

- Pesticide recovery increased in all cases when the Geno/Grinder was used to shake samples (≥ 18%).
- Use of the Geno/Grinding gives improved sample mixing and pesticide extraction.
- Soft fruit can be homogenized in the presence of solvent and salts.
 - In Experiment 1, recovery was as good or better for strawberries when homogenized in the presence of solvents or salts.

GC-MS Conditions

- HP 5890-GC
 - HP-5 capillary column (30 m x 0.25 μm)
 - Injection volume: 2.0 μL
 - Program: 70°C, 1 min; 20°C/min up to 230°C
 - Inlet: Splitless
 - Initial temp: 250°C
 - Purge: 50.0 ml/min for 2.00 min
 - Total flow: 54.0 ml/min
- 5972-MSD
 - SCAN & SIM acquisition methods
 - EM voltage: 2600
 - Scan range: 35-450 m/z

Acknowledgement

Special thanks to Dr. Matt Hengel, UC Davis for providing homogenized material used in Experiment 2.