

Determination of Pesticides in Strawberries Using QuEChERS Extraction, Quick QuEChERS Clean-Up and GC/MS Detection



UCT Part Numbers

ECQUEU750CT-MP

4000 mg magnesium sulfate,
1000 mg sodium chloride,
500 mg sodium citrate dibasic
sesquihydrate and 1000 mg
sodium citrate
tribasic dihydrate

ECPURMPSMC

Quick QuEChERS push-through
cartridge containing 110 mg
MgSO₄ and 180 mg PSA

Procedure:

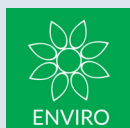
1. Extraction

- Add thoroughly homogenized strawberry sample (10 g) to a 50-mL centrifuge tube.
- Add 10 mL acetonitrile.
- Add the contents of pouch **ECQUEU750CT-MP**.
- Immediately shake vigorously for 1 min.
- Centrifuge at ≥ 3000 rcf for 5 min ($\leq 20^\circ\text{C}$).
- Supernatant is ready for clean-up.

2. Quick QuEChERS Clean-Up

- Load 1 mL of supernatant into a disposable syringe.
- Pass the supernatant slowly through a Quick QuEChERS push-through cartridge (**ECPURMPSMC**).
- Collect 0.5 mL of purified extract directly into a GC autosampler vial.
- Add triphenyl phosphite (200 ng/mL) as internal standard (can use alternative ISTD).
- Samples are ready for GC/MS analysis.

3. GC/MS Detection



Thermo TRACE GC Ultra gas chromatograph coupled to a Thermo ISQ single quadrupole mass spectrometer and TriPlus autosampler.

GC-MS Conditions	
Column	Restek Rtx-5MS, 30 m x 0.25 mm x 0.25 μ m
Carrier Gas	Helium
Flow Rate	1.2 mL/min
Ramp	55°C hold for 1 min; 20°C/min to 300°C; hold for 4 min
Injection Volume	1 μ L
Injection mode	Splitless
Injector Temperature	220 °C
Ion Source Temperature	200 °C
Transfer Line Temperature	250 °C
MS Operation	SIM and Full Scan



Clean-up of Strawberry Extract with Quick QuEChERS Cartridge

Accuracy and Precision Data

Compound	200 ng/mL (n = 5)		500 ng/mL (n = 5)		Overall Recovery
Semi-volatiles	Recovery (%)	RSD (%)	Recovery (%)	RSD (%)	(n=10) (%)
DDE	83.5	6.76	90.1	5.25	86.8
DDD	79.9	6.38	86.3	5.20	83.1
DDT	84.2	3.62	91.0	5.27	87.6
α -Lindane	91.2	4.60	107.5	12.01	99.3
β -Lindane	87.6	11.29	94.7	3.28	91.2
γ -Lindane	89.4	5.92	107.8	9.07	98.6
δ -Lindane	88.3	5.67	97.6	3.59	92.9
cis-Chlordane	87.0	7.14	96.0	2.24	91.5
trans-Chlordane	78.3	13.22	95.9	6.43	87.1
Heptachlor	80.3	5.89	93.9	1.73	87.1
Heptachlor-epoxide	94.5	5.24	101.1	3.86	97.8
Endosulfan-sulfate	94.1	8.34	102.0	2.56	98.0
Endosulfan I	88.9	8.93	99.8	4.06	94.4
Endosulfan II	97.4	4.39	102.3	8.74	99.8
Aldrin	83.3	4.41	97.3	4.60	90.3
Dieldrin	79.8	8.61	95.6	5.50	87.7
Endrin	84.8	6.30	93.5	3.52	89.2
Endrin-ketone	95.4	6.00	96.7	6.29	96.0
Methoxychlor	89.0	8.78	89.7	9.14	89.4
Organophosphates					
Dichlorvos	80.5	6.88	91.1	3.78	85.8
Chlorpyrifos	78.4	7.20	84.7	7.10	81.6
Mevinphos	66.1	5.23	68.8	21.12	67.5
Ethoprop	81.4	5.99	91.0	5.12	86.2
Paraoxon-methyl	65.2	8.89	72.1	7.30	68.7
Stirofos	67.9	12.06	77.3	5.49	72.6
Disulfoton-sulfone	56.6	9.10	74.4	4.73	65.5

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