

SFE Application

#511

Extraction of PAHs from Soil

Introduction

Supercritical CO₂ alone easily dissolves polyaromatic hydrocarbons (PAHs) from spiked matrices, but not from weathered, aged samples. The addition of a small amount of co-solvent is necessary to displace the PAHs from the surface of a weathered sample for complete extraction.



The addition of a fixed quantity of methanol to standard reference material prior to supercritical CO₂ extraction shows increased recoveries of PAHs when compared to US EPA liquid/solid extraction techniques.

Equipment

- ✓ Applied Separations' *Spe-ed* SFE Supercritical Extraction System

Materials

- ✓ Standard Reference Material (PAHs in Soil)
- ✓ SFE grade CO₂
- ✓ C18 Collection cartridge (1g/6mL #12007)
- ✓ Pesticide grade methanol

Method

Place 0.5g of soil/sediment into a 1mL extraction vessel and add 100µL of methanol. Extract sample at specified conditions.

Extraction Conditions

Extraction vessel:	1mL
Sample:	0.5 g
Pressure:	7000 psi
Temperature:	80°C
CO ₂ Flow Rate:	2L/min (gas)
Collection:	SPE cartridge 1g/6mL C18
Static:	10 minutes
Dynamic:	30 minutes
SPE Rinse:	5mL methanol spiked with internal standard

Results

SFE Recoveries of PAHs from Soil Certified by Soxhlet

	Certified (mg/kg)	SFE (mg/kg)
Naphthalene	32	31
Acenaphthene	19	17
Phenanthrene	1618	1573
Anthracene	422	493
Benzo(bk)flouranthene	152	180

Analysis

GC-MS

Conclusion

A fixed quantity of co-solvent addition to a soil sample prior to extraction gave excellent results with 100µL of methanol added. Only small quantities of methanol are required to displace the PAH analytes from the soil matrix and do not desorb the analyte from the solid phase extraction cartridge used to trap the analyte.

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