

Extraction of hydrophobic weak acids from complex liquid samples with SOLA SAX SPE

Author

Thermo Fisher Scientific

Keywords

Solid Phase Extraction (SPE), small molecule purification, extraction of hydrophobic weak acids

Introduction

Thermo Scientific™ SOLA™ is a solid-phase extraction (SPE) cartridge featuring mixed-mode polymeric sorbent and a fritless design for sample sizes up to 500 μL . It is available in SOLA 10 mg and Thermo Scientific™ SOLA μ ™ 2 mg formats. The fritless design reduces hold-up volume and improves consistency of extraction. The SOLA SAX has reversed-phase (RP) and strong anion exchange (SAX) functions. The typical use is for the extraction of polar acids and hydrophobic weak acids from complex liquid samples.

Important notes

- Maximum loading capacity is ~10% of sorbent weight for RP and 0.8 meq/g for Ion Exchange
- Sample should be processed through the cartridge at about 1 mL/min; too high a flow can lead to inconsistent results
- The volumes given are typical, and should be optimized for the analyte and matrix of interest

Materials required

- Methanol, LCMS grade
- 2% formic acid in methanol, LCMS grade
- 5% ammonium hydroxide in water, LCMS grade
- 10–30% acetonitrile in water (optional), LCMS grade
- SPE vacuum manifold, vacuum regulator, vacuum pump
- 96-well collection plate, appropriate to final extract volume, 25–200 μL per sample
- Waste-collection tray or plate, ~1800 μL per sample
- Pipettes and tips

Protocol

1. Prepare the sample for extraction
 - Dilute viscous samples (e.g., plasma) 1:1 with water
 - When the analytes bind to matrix proteins, 1:1 dilution with 10–30% aqueous acetonitrile can improve recovery
 - Adjust to a pH \geq pKa + 2 as necessary to ionize the analytes
 - Add internal standard solution if desired
2. Prepare the SOLA SPE for sample loading
 - Wash with 2 \times 100 μ L of methanol (optional)
 - Wash with 2 \times 100 μ L of 5% ammonium hydroxide in water. Do not let cartridge dry before loading sample.
3. Load the sample onto the SOLA SPE at a flowrate of about 1 mL/min
 - Up to 800 μ L of prepared sample
4. Wash away interferences
 - Wash with 2 \times 100 μ L of 5% ammonium hydroxide in water. This removes salts, bases, proteins, carbohydrates.
 - Wash with 2 \times 100 μ L of methanol. This removes hydrophobic, neutral and basic matrix components. Alkaline methanol can improve recovery of acid analytes for some cases. Let cartridge dry a few minutes before elution.
5. Collect analyte fraction in the sample well plate
 - Elute with \geq 2 \times 25 μ L (SOLA μ) or \geq 2 \times 100 μ L (SOLA) of 2% formic acid in methanol. Elute each aliquot initially by gravity then apply vacuum/pressure to ensure all solvent is eluted from the cartridge.
6. Post-extraction
 - If necessary, evaporate and re-constitute in a compatible solvent
 - For RP-LC analysis, dilute to \leq 50% organic solvent

Related products

Description	Part Number
Thermo Scientific™ Hypersep™ Universal SPE Vacuum Manifold, for 96-well plate or 24/48 cartridges	60104-230
Thermo Scientific™ Hypersep™ Vacuum Pump, European version	60104-241
Thermo Scientific™ Hypersep™ Vacuum Pump, North American version	60104-243

Current versions of product instructions are available at separatedbyexperience.com/chromexpert

Learn more about SOLA and SOLA μ Solid Phase Extraction at thermofisher.com/solaspe

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