

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

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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 (typically 4% H₃PO₄ is used)
 - Add internal standard solution if desired
2. Prepare the SOLA SPE for sample loading
 - Wash with 2 × 100 μ L of methanol (optional)
 - Wash with 2 × 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 × 100 μ L of 5% ammonium hydroxide in water. This removes salts, bases, proteins, carbohydrates.
 - Wash with 2 × 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 × 25 μ L (SOLA μ) or \geq 2 × 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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