MICROSOLV

Polypropylene Vial Reduced Protein Adsorption Compared to Glass - Tech Information

Date: 10-JUNE-2013 Last Updated: 2-FEBRUARY-2026

Selecting the right vial material is essential when working with proteins, peptides, and other adsorption-prone analytes. Traditional borosilicate glass vials can introduce significant recovery losses due to surface chemistry effects, while polypropylene offers a more inert alternative—provided the correct manufacturing practices are used.

1. Why Glass Vials Often Cause Protein and Peptide Loss

Standard borosilicate autosampler vials contain silanol groups on the glass surface as well as siloxane matrix effects. These are known to interact with:

- Proteins
- Peptides
- Basic analytes such as amines

These interactions lead to adsorption onto the glass surface, reducing analyte recovery, altering quantitation, and causing sample-to-sample variability.

In highly sensitive LC/MS or trace-level assays, even modest adsorption can produce measurable bias.

2. Why Polypropylene Is a Strong Choice for Protein-Sensitive Workflows

Polypropylene (PP) is inherently free of surface silanols and siloxane matrices, making it naturally resistant to protein and peptide adsorption. As a result, PP vials generally maintain:

- Higher analyte recovery
- Lower surface interaction
- More consistent response in LC, CE, and LC/MS workflows

This makes PP an excellent choice for biological samples, complex matrices, and basic compounds that otherwise bind to glass.

3. The Critical Caveat: Not All Polypropylene Vials Are Equal

Some polypropylene vials are manufactured on high-speed molding machines that require the use of mold-release agents. These additives can introduce significant problems:

- Extractables that contaminate samples
- Interference peaks in LC/MS
- Protein denaturation or destabilization

Such vials are *not* appropriate for sensitive protein work and can compromise both chromatography and MS results.

4. Why MicroSolv Mass-Spec-Compatible PP Vials Are Different

MICROSOLV's AQ brand of LC/MS-compatible PP vials are intentionally manufactured:

- Without mold-release agents
- On slower, controlled processes to avoid contamination
- Using plastics with very low extractables

This makes them significantly more suitable for:

- Protein and peptide analysis
- LC/MS workflows requiring ultra-low background
- Analysis of basic or adsorption-prone compounds
- These vials reduce the risk of artifacts, false peaks, or suppressed ionization due to extractables.

5. When to Choose Polypropylene vs. Glass

Choose Polypropylene when you need:

- Maximum protein or peptide recovery
- Minimization of adsorption or ionic interactions
- Reduced risk of LC/MS extractables (when using MS-compatible PP vials)
- Compatibility with biopolymers, nucleic acids, or hydrophobic biomolecules

Choose Glass when you need:

- Maximum inertness toward non-biological small molecules
- Crimp-cap stability for long-term sample storage
- Highest chemical solvent resistance

However, for proteins, peptides, and amine-containing analytes, PP typically delivers far more reliable performance.

Summary for Technical Users

MICROSOLV' AQ brand of polypropylene vials eliminate the silanol and siloxane-driven adsorption seen with glass, making them ideal for protein, peptide, and basic analyte workflows. However, only high-purity, mold-release-free polypropylene vials—such as MMICROSOLV's LCMS-compatible line—provide the low extractables and reliable performance required for modern high-sensitivity assays. Click HERE for ordering information and pictures of LCMS compatible plastic vials.

AUTOSAMPLER
VIALS AND CAPS

MicroSolv Technology Corporation
9158 Industrial Blvd. NE, Leland, NC 28451
Tel: (732) 380-8900
Fax: (910) 769-9435
Email: customers@mtc-usa.com
Website: www.mtc-usa.com