

Purge metals from HPLC system using EDTA - How To

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⚠ Important: BEFORE ATTEMPTING PASSIVATION OF YOUR HPLC SYSTEM (REMOVING METALS) PLEASE REMOVE HPLC COLUMN.

In LC-MS applications, trace metal ions can significantly interfere with analyte detection by forming chelates or engaging in other unwanted interactions. These effects often manifest as distorted peak shapes, reduced sensitivity, or inconsistent retention times—especially for compounds with phosphate groups, carboxylic acids, or other metal-binding functionalities.

If you suspect metal contamination is affecting your results, follow this proven protocol to purge metals from your HPLC system and prevent further interference:

Step-by-Step Protocol

1. Prepare Metal-Chelating Mobile Phases

Add 5–10 μM (micromolar) of EDTA to both the A and B solvents of your mobile phase.

⚠ Important: Ensure the concentration is micromolar, not millimolar. Higher concentrations can cause precipitation, damage to the column, or ion suppression in MS detection.

2. Purge the System Thoroughly

Flush the entire HPLC system—including pump heads, tubing, and injector—with the modified mobile phases containing EDTA to displace any loosely bound metal ions.

After this step the mobile phases should be replaced to ones free from EDTA.

⚠ Note: In certain cases, it can be beneficial to include a very low concentration of EDTA in your mobile phases to help chelate and remove residual metal ions from the system. The system should be flushed again and this procedure needs to be repeated periodically.

3. Once the system is free of metal contamination, you can prepare your mobile phases as follows :

- Add 5–10 μM (micromolar) of EDTA to both the A and B solvents in your mobile phase.

This small addition can improve reproducibility and peak shape, especially when working with metal-sensitive analytes.

4. Treat with Nitric Acid.

The entire HPLC system can be also passivated (purged for metal ions) using strong nitric, phosphoric acid or citric acid. For detailed procedure please contact the manufacturer of your HPLC system.

5. Treat the Sample.

Add 100 μM EDTA directly to your sample solution. This helps chelate any metal ions present in the sample matrix that could otherwise interfere with analyte detection.

Precondition the Column. Before injecting your sample, inject a plug of 100 μ M EDTA onto the column. This step helps remove any residual metal ions that may be adsorbed onto the stationary phase surface, ensuring a cleaner baseline and more consistent peak shapes.

Additional Notes for Advanced Users

- **Column Compatibility:** Cogent TYPE-C™ silica hydride columns are generally robust, but always verify compatibility with chelating agents, especially if using other column chemistries.
- **System Maintenance:** Consider periodic metal ion passivation of your LC system if you routinely analyze metal-sensitive compounds.
- **Detection Considerations:** EDTA is MS-compatible at low concentrations, but always validate for your specific method and analyte class.



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