

## Improving eluent purity in LC-MS-analysis – experiences from using a trapping column

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With the ever-increasing sensitivity of modern LC-MS instruments, it is increasingly important to use clean utensils, reagents, and solvents, such that impurities in the eluents are kept at a minimum. Impurities in the eluents can typically be observed as either increased background signal, increased ion suppression, and chromatographic peaks when using gradient elution – all negatively affecting the analytical performance and requiring extra resources.

Eluent impurities can originate from a variety of sources, and in our experience, the impurity pattern can change with each new bottle of eluent, caused by both batch-to-batch variation of the sourced reagents and solvents, and by the in-house handling of the eluents. With the aim of minimizing the level of impurities, we have explored inline cleanup as part of the LC flow path by installing a short C18 “trapping column” in the aqueous flow path prior to the mixer on a binary-LC-pump system. The column is installed between the vent/purge valve and the mixer, such that (i) lipophilic impurities in the aqueous eluent will be trapped, and not enter the remaining flow path, (ii) while the aqueous eluent can be exchanged as per usual, and (iii) without affecting the gradient elution and retention times.

Here we present the initial experiences using a “trapping column” in our LC-TOF-MS based screening, and we will show it to be an effective and simple approach for significantly reducing the observed background signals and peaks, without affecting the gradient analysis.

While it is an effective and simple principle, the setup does have noteworthy disadvantages due to the added complexity. First, the trapping column needs to be regenerated or exchanged when it is saturated and insufficiently traps contaminants. Secondly, the effectiveness of the trapping column can mask a contaminated batch of eluent during the system-suitability testing, only for it to become visible during the following analysis run. Tricks for how to handle and overcome these pitfalls will be shown.

Adding a trapping column to the binary pump is an efficient way to clean lipophilic contaminants in the aqueous eluent and the concept could be applicable to more methods.