

**SPME-HPLC/MS-MS: OVERCOMING MATRIX EFFECTS IN SOURCE WATERS FOR PPCP ANALYSIS**

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**ABSTRACT:** In recent years, pharmaceutical and personal care products (PPCPs) have been detected in diverse environments (including groundwater, river water, and municipal wastewater). In order to evaluate their environmental impact, PPCPs must first be accurately determined. In this study, we developed a LC-MS/MS method for the separation of 27 commonly used antibiotics spanning several classes (sulfonamides, fluoroquinolones, tetracyclines, and macrolides). While antibiotics can easily be determined in pure water, more complicated matrices (such as natural waters and wastewater) generate confounding matrix effects. Accordingly, we describe in this paper the development of solid phase microextraction (SPME) techniques for the determination of the given antibiotics, and evaluated whether SPME was successful in reducing matrix effects. While possessing lower sensitivity and higher method detection limits than the solid phase extraction (SPE) techniques we simultaneously developed for these antibiotics, the SPME processes had the advantage of being faster and generating less waste. For all antibiotics, we determined the optimum fiber assembly with which to perform the extraction, and found that Carbowax/Divinylbenzene fibers generally produced the optimal response. The SPME method was further optimized for sorption time (< 30 min), solution salinity (10% KCl), pH (~ 5), and static desorption time (< 35 min) for each antibiotic. Furthermore, in contrast to SPE, when the SPME method was applied to fortified wastewater samples, we were able to accurately determine the antibiotics that were present. Therefore, we concluded that SPME presented a viable method for overcoming matrix effects in environmental samples. Accordingly, we applied the SPME method to wastewater from septic systems as well as groundwater samples obtained down-gradient of the septic system, and the findings and significance of that survey will also be discussed here.

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