

Sensitive determination of tetracycline antibiotics by liquid chromatography with fluorescence and mass spectrometric detection

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Tetracycline compounds present a broad spectrum of antibiotics widely used in medicine. Since their discovery, they have been used in the treatment of human diseases as well as in veterinary applications. However, their overuse in food-producing animals may express an adverse effect on human health and even induce selective resistance. Selected antibiotics from the class of tetracyclines have been analyzed using liquid chromatography with fluorescence detection (LC-FLU) and LC with mass spectrometric detection (LC-MS) on a core-shell C18 column. As majority systems nowadays rely on reversed-phase columns with water being the main component of the mobile phase, a simple replacement of H₂O with D₂O in the mobile phase enhanced the sensitivity for selected compounds by 10–200%. MS was used to unambiguously identify the separated compounds and to locate the labile hydrogen sites. Another way to increase the fluorescence intensity lied in the production of complex compounds of the tetracycline molecules and Mg²⁺ ions. Such simple yet effective approaches improved limits of detection and sensitivity and may be selectively exploited (on-demand) in the LC-FLU analysis of these compounds.