

Investigation of isotope effect using supercritical fluid chromatography coupled with tandem mass spectrometry

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The aim of the present study was to develop a method using supercritical fluid chromatography and tandem mass spectrometry (SFC-MS/MS) that would enable the separation of isotopologues from each other on both, chiral and achiral chromatographic columns using amphetamine, its derivatives and analogs as examples.

The conducted experiments demonstrated that a strong isotopic effect is achieved during the analysis of methamphetamine and its deuterated derivatives — specifically, a baseline separation was obtained when using various chiral and achiral columns in combination with supercritical fluid chromatography.

The nature of the isotopic effect (normal or inverse) depends on the chemical composition of the selector, the mobile phase and the structure of the compound. On some chiral columns we observed a correlation between the isotope effect and enantiomeric separation.