

Investigation of isotopic effect using supercritical fluid chromatography 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 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 is obtained when using various chiral and achiral columns through supercritical fluid chromatography.

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