

SIMULTANEOUS ENANTIOSELECTIVE ANALYSIS OF 2-, 3-, and 4-CHLORO-METHCATHINONES USING SUPERCRITICAL FLUID CHROMATOGRAPHY TANDEM MASS SPECTROMETRY (SFC-MS-MS)

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The primary objective of this study was to develop a simultaneous enantioselective method for the analysis of 2-, 3-, and 4-chloro-methcathinones in human biological samples using supercritical fluid chromatography tandem mass spectrometry (SFC-MS/MS).

Today, the number of new psychoactive drugs is constantly growing. Most of them are chiral substances, and several publications deal with the different pharmacological and toxicological properties of their enantiomers. Therefore, the role of enantioselective analysis in forensic examination is becoming increasingly important. 2-, 3-, and 4-chloro-methcathinones are new psychoactive substances. They are positional isomers of each other.

The supercritical fluid chromatography tandem mass spectrometry (SFC-MS/MS) method was developed for application to oral fluid samples collected by police during routine random traffic control in Belgium from January to November 2023.

The most powerful and widely used detector for clinical and toxicological analysis is the mass spectrometric detector. Due to its specificity and high sensitivity. However, it cannot distinguish enantiomers from each other, nor can differentiate between positional isomers. Therefore, the enantiomers and positional isomers require chromatographic separation before their detection in the mass spectrometer, to allow reliable identification and quantitative analysis of enantiomers and isomers.

The study describes the simultaneous chemical and enantiomeric separation of the abused substances 2-, 3-, and 4-chloro-methcathinones.

Based on the results of the experiment, using SFC-MS/MS, we can successfully carry out both chemical and enantioselective separation of the positional isomers of chloro-methcathinone, which is a rather difficult problem to solve.