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Chromatographic separation of R/S-enantiomers of amphetamine and methamphetamine: Pathways of methamphetamine synthesis and detection in blood samples by qualitative enantioselective LC-MS/MS analysis

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Methamphetamine can be synthesized either enantiopure or in its racemic form. We separated (R)- and (S)-enantiomers of methamphetamineby LC-MS/MS, validation for qualitative detection was successful. Plasma samples of police cases from the german regions of Franconia and Northrhine revealed that in the majority of tested samples (> 99 %) only (S)-methamphetamine was detected.

Highlights

- Methamphetamine can be synthesized either enantiopure or in its racemic form.
- Separation of (R)- and (S)-enantiomers of methamphetamine eby LC-MS/MS
- succesful validation for qualitative detection
- 99 % of tested samples from Germany only (S)-methamphetamine was detected

Abstract:

Methamphetamine can be synthesized either enantiopure or in its racemic form. We separated (R)- and (S)-enantiomers of methamphetamine and amphetamine by a fast LC-MS/MS-method using a Lux® 3µm AMP 150 x 3,0 mm analytical column after simple protein precipitation with methanol . Sufficient resolution could be achieved. Method validation for qualitative detection showed limits of quantification < 5 ng/mL while only little (maximum 14.5 %) ion suppression could be shown. Stability in the processed sample could be achieved using isotopically labelled internal standards. Plasma samples of police cases from the german regions of Franconia and Northrhine revealed that in the majority of 106 tested samples (> 99 %) only (S)-methamphetamine was detected which leads to the conclusion that, in Germany, predominantly enantiopure (S)-methamphetamine is consumed which is synthesized via (1R,2S)-ephedrine or (1S,2S)-pseudoephedrine. However, racemic methamphetamine seems also to be on the market.