A40 Separation and Identification of Methamphetamine Enantiomers Via N - (trifluoroacetyl)prolyl chloride (TPC) and (S)-(+)-a-Methoxy-a-(trifluoromethyl) phenylacetic acid (MTP) derivatization

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After attending this presentation, attendees will gain knowledge of the different methamphetamine synthesis methods, different enantiomer ratio depending on synthetic routes, and methamphetamine derivatization using chiral reagents.

The presentation will impact the forensic community by understanding changes in methamphetamine enantiomer ratio due to enforcement regulation resulting in changes of precursors and synthetic methods.

Methamphetamine has historically been considered the main “drug of choice” in Wyoming.

Recent federal and state regulations restricting easy access to precursors for the methamphetamine synthesis and the placing of synthesis reagents on the controlled list in Wyoming state statutes has helped drop the amount of methamphetamine cases by 30%. Nevertheless the problem is still of great concern.

Since the endogenous sources of methamphetamine are limited, smuggling this drug from different geographical locations is the most popular resource for supply.

Three neuralgic transportation routes: I-80 from San Francisco to Chicago, I-90 from Seattle to Boston and I-25 intersecting those two beginning at El Paso and connecting I-90 at Buffalo WY supply the majority of methamphetamine.

Although Wyoming Statutes regulate the unlawful possession of “any isomer of methamphetamine”, our laboratory needed to establish a method for identifying the enantiomeric composition of seized methamphetamine samples.

Since the reduction of l-ephedrine or d-pseudoephedrine yields the enantiomerically pure d-methamphetamine, and the reductive amination of phenylacetone yields racemic d, l-methamphetamine, the enantiomer ratio is relevant because it reflects the species of precursors and reagents used for the synthesis, the origin and synthetic method.

Usually, enantiomeric ratio of methamphetamine is measured using GC/MS method. Methamphetamine is converted to diastereoisomers with chiral-derivatization reagents and separated by gas chromatography with a nonchiral column.

The best known derivatization reagents in literature: N- (trifluoroacetyl)prolyl chloride (TPC) and (S)-(+)-α-Methoxy -α- (trifluoromethyl)phenylacetic acid MTPA were used. The enantiomeric enrichment with D-tartaric acid and subsequent derivatization with BSTFA with TMCS before analysis will be tried as well. The convenience, simplicity and speed of the different methods will be compared.

Methamphetamine, Enantiomer Ratio, Chiral Derivatization

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