

## Effective Monitoring for Enantiomeric Forms of Methamphetamine and Related Compounds by LC-MS

Hugh Cramer, **Carmen T. Santasania**

Supelco/Sigma-Aldrich 595 North Harrison Road, Bellefonte, PA 16823

Methamphetamine is a powerful CNS stimulant that causes hypertension, tachycardia, feelings of increased confidence, sociability and energy resulting in extensive recreational abuse of this psychoactive drug. In addition, methamphetamine is extensively abused in sports due to increased mental alertness and suppression of fatigue that the drug produces (1). Following oral use, methamphetamine is rapidly absorbed and the effects usually start within 30 minutes and last for several hours, with an average half-life of 9 hours.

Although methamphetamine is a controlled substance (Class A in Europe and Schedule II in the USA), the L-isomer is used legally in several over the counter medicines (e.g.,

Vicks® VapoInhaler) and so, can alter the true level arising from drug abuse. Analysis is further complicated by the fact that L-methamphetamine is also a metabolite of certain therapeutic drugs such as selegiline, a treatment of early-onset Parkinson's disease, depression and dementia. Immunoassay does not differentiate between the legal and illicit versions and therefore will report a positive finding if either are detected in the specimen above cutoff concentrations. The same holds true for reverse-phase LC-MS techniques that are commonly used in toxicology for drug of abuse quantitation.

Currently, chiral gas chromatography and liquid chromatography methods are both available for this analysis. In this study, a chiral LC-MS method is presented as the method of choice because of its greater flexibility and coverage of a far wider range of compounds of clinical interest. In this work, an Astec CHIROBIOTIC V2 HPLC column based on bonded macrocyclic glycopeptides was chosen because of its compatibility with MS. This chiral stationary phase shows enantioselectivity in the polar ionic mode (high organic with additives). The presented work describes the chromatographic screening procedures used on urine samples for methamphetamine. Sample recoveries and detection limits for the method will also be presented. Finally, this described method will be used to determine other related enantiomeric compounds, similar in structure, to methamphetamine.

1. [Pharmacology](#)". *Methamphetamine*. *DrugBank*. University of Alberta. 8 February 2013. Retrieved 31 December 2013.

