

# Liquid Chromatography-Tandem Mass Spectrometry Analysis of Opioids, Benzodiazepines, Cannabinoids, Amphetamines, and Cocaine in Biological and Other Specimens

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**REFERENCE:** McCurdy HH, Morrison AM, Holt LA: Liquid chromatography-tandem mass spectrometry analysis of opioids, benzodiazepines, cannabinoids, amphetamines, and cocaine in biological and other specimens; *Forensic Sci Rev* 20:45; 2008.

**ABSTRACT:** The use of liquid chromatography (LC) coupled with tandem mass spectrometry (MS/MS) or single-stage mass spectrometry (MS) is making significant inroads in the analyst's compendium of instrumentation available for the analysis of drugs in biological fluids, tissues, and other specimens of interest. LC/MS(/MS) has the unique capability of analyzing substances frequently not analyzable by any other means. Furthermore, LC/MS(/MS), particularly LC/MS/MS instrumentation, has shown a precipitous drop in cost, making it more accessible to the smaller laboratories. As such, an increasing number of methods for the analysis of drugs of abuse have been published using LC/MS(/MS) — in particular, those methods associated with LC/MS/MS. However, these methods are not without certain endemic problems/limitations such as ion source selection, matrix effects, endogenous interferences, and interlibrary matching of spectra. This review seeks to show what progress is being made to circumvent the perceived limitations of LC/MS(/MS). It presents methodologies for selected drugs of abuse (opioids, benzodiazepines, cannabinoids, cocaine, and the amphetamines) that have been developed in recent years for analysis in blood, urine, hair, and oral fluids, as well as certain other specimens. Emphasis is primarily directed toward those methodologies that have been developed recently for LC/MS/MS, but LC/MS methods are also addressed where appropriate.

**KEYWORDS:** Amphetamines, atmospheric pressure chemical ionization (APCI), benzodiazepines, biological specimens, cannabinoids, cocaine, electrospray ionization (ESI), ion suppression, liquid chromatography (LC), mass spectrometry (MS), opioids, tandem mass spectrometry (MS/MS).

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