

Mass Spectra of Select Benzyl- and Phenyl- Piperazine Designer Drugs

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ABSTRACT: The mass spectra of five piperazine designer drugs (N-benzylpiperazine, 1-(3,4-methylenedioxybenzyl)piperazine, 1-(3-trifluoromethylphenyl)piperazine, 1-(3-chlorophenyl)piperazine, and 1-(4-methoxyphenyl)piperazine) and their trimethylsilyl derivatives are presented.

KEYWORDS: Benzylpiperazines, Phenylpiperazines, Designer Drugs, Mass Spectrometry, Trimethylsilylation, Forensic Chemistry

Designer drugs of the benzyl- or phenyl- piperazine type, i.e., benzylpiperazine (BZP) itself, its methylenedioxy analogue 1-(3,4-methylenedioxybenzyl)piperazine (MDBP), 1-(3-trifluoromethylphenyl)piperazine (TFMPP), 1-(3-chlorophenyl)piperazine (mCPP), and 1-(4-methoxyphenyl)piperazine (MeOPP), recently have gained popularity and notoriety. Seizures have been made throughout the world (1-9), and a few fatalities have been reported (10-11). The increasing abuse of piperazines in the United States resulted in the temporary placement of BZP and TFMPP into Schedule I of the Controlled Substances Act (12). BZP was permanently scheduled in March, 2004 (13); however, TFMPP is currently not controlled in the United States.

Recently, many GC/MS studies on the metabolites of piperazines (i.e., from biological fluids) and/or their acetyl or heptafluorobutyryl derivatives have been published (14-24). However, most forensic drug laboratories perform GC/MS on the underivatized or trimethylsilylated derivatives of amine drugs. In Figures 1 and 2, the structures, electron-ionization mass spectra, and gas chromatographic retention indices (recorded on an Agilent GC-MSD 5972, HP-1 column, 12 m x 0.2 mm I.D., 100-310° C, 30° C/minute (25)) of the target piperazines and their trimethylsilyl derivatives are displayed. Additional data for these and several related piperazines will be published elsewhere (26-27).

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[Editor's Notes: * All issues of *Microgram* prior to January 2003 are law enforcement restricted. Selected references on the analysis of various piperazines were presented in *Microgram Bulletin* 2004;37(4):76.]

Figure 1: Structures, electron-ionization mass spectra, and gas chromatographic retention indices of underivatized piperazine-derived designer drugs.

Figure 2: Structures, electron-ionization mass spectra, and gas chromatographic retention indices of trimethylsilylated piperazine-derived designer drugs.

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