

Based on the laboratory report from **Nectar Spectra Laboratories** in Barcelona, Spain, for Sample ID **L737** (Alias: "*mdma chill*"), here is a detailed chemical purity and structural analysis.

Executive Summary

- **Identified Substance:** MDMA Hydrochloride (HCl).
- **Absolute Purity:** 90.1%.
- **Isomeric Ratio:** 50:50 Racemic mixture (SSS and SR\$ enantiomers).
- **Adulterants/Cuts:** None detected (Negative for MDA, Caffeine, and 2C-B).
- **Analytical Profile:** Exceptionally clean organic profile with no visible chemical adulteration or organic synthesis cross-contamination resolved on the instruments.

Comprehensive Analytical Breakdown

1. Purity & Quantification (HPLC-DAD + NMR)

The reported purity of **90.1%** is an averaged calculation derived from two highly definitive quantitative techniques: High-Performance Liquid Chromatography with Diode-Array Detection (HPLC-DAD) and Proton Nuclear Magnetic Resonance (^1H -NMR).

- **Achiral HPLC Run:** The sample chromatogram shows a single, sharp target peak at a Retention Time (RT) of **4.839 minutes**. The integration shows an **Area % of 100.00%** for this organic fraction (excluding the internal standard at 12.779 minutes). This indicates that 100% of the UV-active organic compounds extracted and processed through this column is MDMA.
- **Quantitative Software Calculation:** The specialized MassHunter software calculation mapped the MDMA curve to a final concentration of **90.2270%** relative to the internal standard.

2. Isomeric Profile (Chiral HPLC)

MDMA exists as two stereoisomers: SSS-MDMA (typically responsible for the entactogenic and stimulant effects) and SR\$-MDMA.

- A secondary chiral chromatography method (O A CHIRAL.M) successfully separated the enantiomers.
- **Peak 1 (SR\$-MDMA):** Resolved at RT 8.624 minutes with an integration area of 2063.
- **Peak 2 (SSS-MDMA):** Resolved at RT 9.357 minutes with an integration area of 2056.
- The nearly identical peak areas confirm a textbook **50:50 racemic mixture**, which is characteristic of standard, classic safrole- or PMK-based chemical synthesis.

3. Adulterant & Impurity Screening

The laboratory specifically calibrated and screened the sample against common bulking agents, active adulterants, and synthesis byproducts:

- **MDA (Tenamfetamine):** Not Detected (0.0000%).
- **Caffeine:** Not Detected (ND %).
- **2C-B:** Not Detected (0.0000%).

Spectroscopic Verification

1. Proton NMR (400.20 MHz in D₂O)

The ¹H-NMR spectrum provides an unambiguous structural fingerprint of MDMA HCl, displaying a beautifully clean baseline with zero unexpected companion peaks:

- **δ 8.36 ppm**: Singlet corresponding to the Calcium Formate internal standard.
- **δ 6.69–6.81 ppm (Integration ~3.07)**: The aromatic cluster representing the 3 protons on the benzene ring.
- **δ 5.88 ppm (Integration ~2.04)**: The highly characteristic sharp singlet of the 2 protons on the methylenedioxy bridge (–O–CH₂–O–).
- **δ 2.61 ppm (Integration ~3.06)**: The sharp singlet representing the 3 protons of the N-methyl group (–NH–CH₃).
- **δ 1.18–1.19 ppm (Integration ~3.07)**: The clear doublet representing the 3 protons on the terminal α-methyl group.

2. FTIR Spectrometry

The Fourier-Transform Infrared spectrum matches the standard reference standard for high-purity MDMA hydrochloride:

- **2485.44 cm⁻¹**: A strong amine salt band characteristic of secondary amine hydrochloride salts (R₂NH⁺Cl⁻ stretching).
- **1488.61 cm⁻¹ & 1246.19 cm⁻¹**: Intensely sharp peaks representing the asymmetric stretching vibrations of the aromatic C–O–C ether bonds from the methylenedioxy ring.
- **1031.69 cm⁻¹**: Strong symmetric C–O stretching band.

What the Remaining ~9.9% Represents

Because the achiral HPLC area shows 100% organic purity for the target peak, the remaining 9.9% of the mass is **not** an active drug adulterant (like caffeine, speed, or ketamine) or a toxic organic byproduct. Instead, it safely consists of:

- Residual moisture/water weight (hygroscopic bound water common to hydrochloride salts).
- Inorganic salts or synthesis leftovers that do not absorb UV light or dissolve/register in the organic mobile phases (such as sodium chloride or leftover binding elements if it was crushed from a pressed tablet).

Note: For a consumer product, an absolute purity of 90.1% MDMA HCl is considered remarkably high and exceptionally clean.