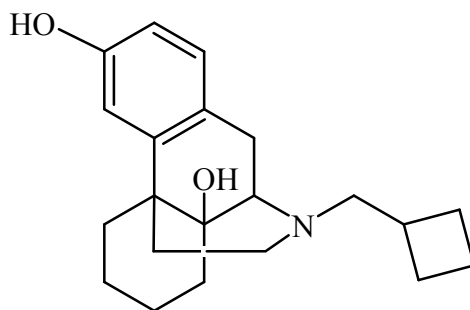




Butorphanol

The Drug Enforcement Administration's Special Testing and Research Laboratory generated this monograph using structurally confirmed reference material.



1. GENERAL INFORMATION

IUPAC Name: 17-(cyclobutylmethyl)morphinan-3,14-diol

CAS#: 42408-82-2 (base)

Synonyms: NA

Source: DEA Reference Material Collection

Appearance: white powder (tartrate)

UV_{max}(nm): NA

2. CHEMICAL AND PHYSICAL DATA

2.1 CHEMICAL DATA

Form	Chemical Formula	Molecular Weight	Melting Point (°C)
Base	C ₂₁ H ₂₉ NO ₂	327.46	NA
Tartrate	C ₂₁ H ₂₉ NO ₂ · C ₄ H ₆ O ₆	477.55	226 (decomposes)



Butorphanol



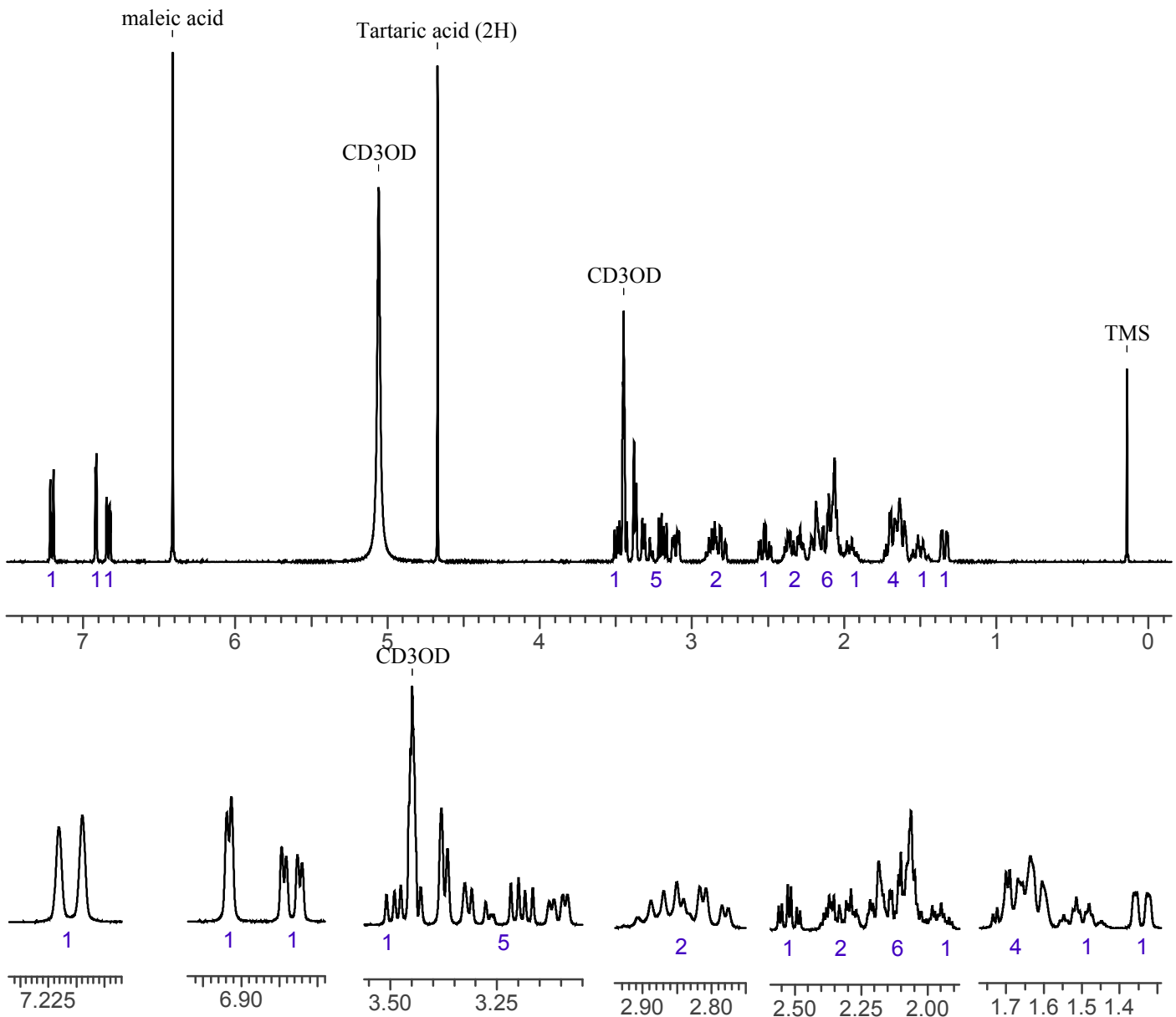
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3. QUALITATIVE DATA

3.1 NUCLEAR MAGNETIC RESONANCE

Sample Preparation: Dilute analyte to ~12mg/mL in CD₃OD containing TMS for 0 ppm reference and maleic acid as quantitative internal standard.

Instrument: 400 MHz NMR spectrometer
Parameters: Spectral width: at least containing -3 ppm through 13 ppm
Pulse angle: 90°
Delay between pulses: 45 seconds
1H NMR: Butorphanol Tartrate Lot# K1L363, CD₃OD, 400MHz





Butorphanol



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3.2 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Sample Preparation: Dilute analyte ~4 mg/mL into methanol.

Instrument: Agilent gas chromatograph operated in split mode with MS detector
Column: HP-5; 30m x 0.25 mm x 0.25 μ m
Carrier Gas: Helium at 1.5 mL/min
Temperatures: Injector: 280°C

MSD transfer line: 280°C

MS Source: 230°C

MS Quad: 150°C

Oven program:

1) 100°C initial temperature for 1.0 min

2) Ramp to 280°C at 12 °C/min

3) Hold final temperature for 9.0 min

Injection Parameters: Split Ratio = 25:1, 1 μ L injected

MS Parameters: Mass scan range: 30-550 amu

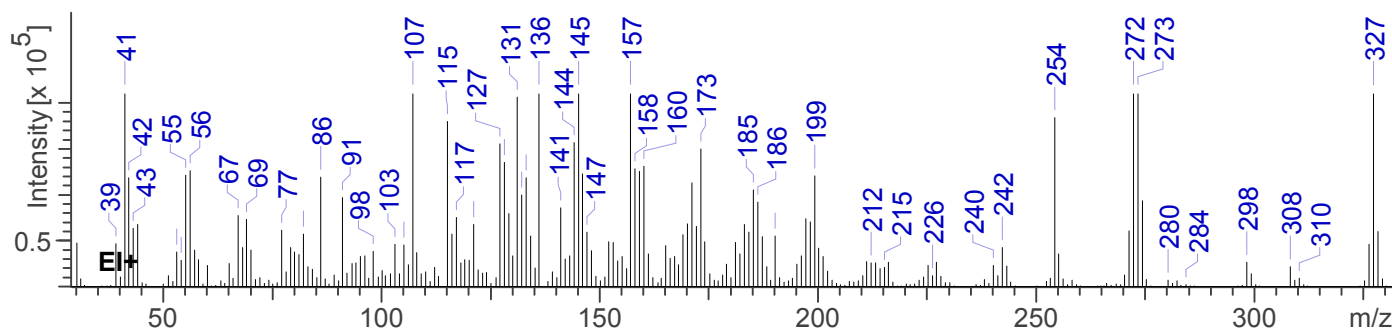
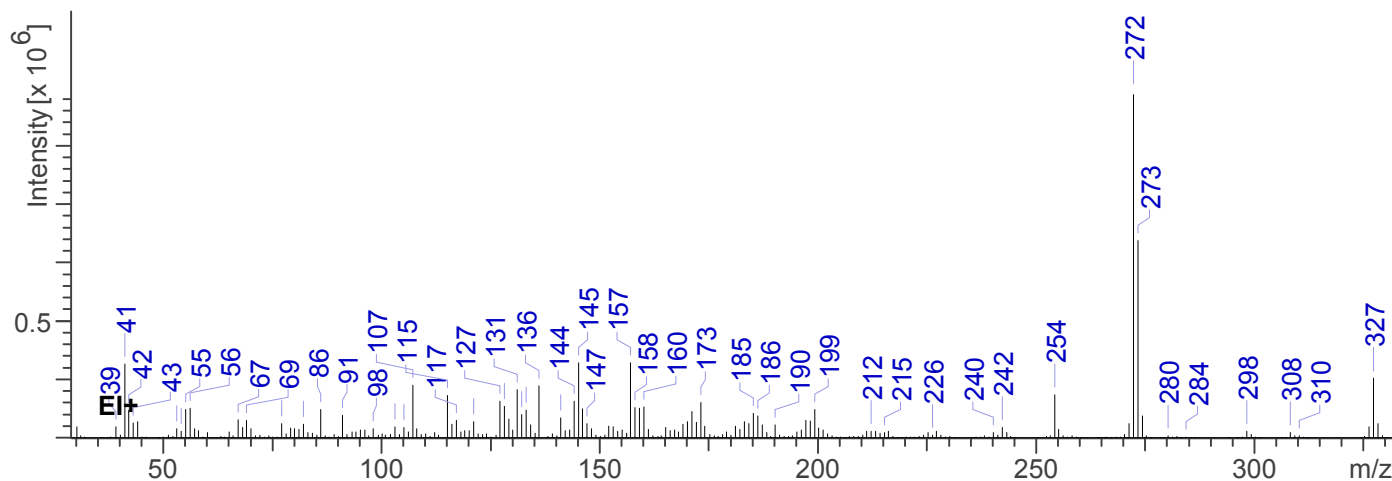
Threshold: 250

Tune file: stune.u

Acquisition mode: scan

Retention Time: 17.188 min

EI Mass Spectrum: Butorphanol Tartrate Lot# K1L363





Butorphanol



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3.3 INFRARED SPECTROSCOPY (FTIR)

Instrument: FTIR (SensIR Dura-Scope ATR Accessory)

Scan Parameters:
Number of scans: 32
Number of background scans: 32
Resolution: 4 cm^{-1}
Sample gain: 1
Aperture: 150

FTIR ATR (Diamond 1 Bounce): Butorphanol Tartrate Lot# K1L363

