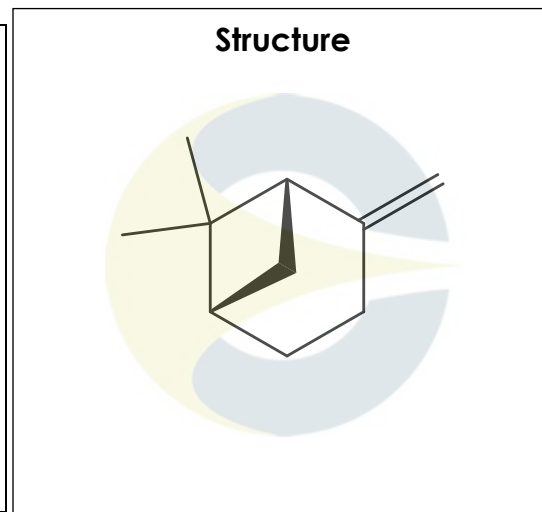


Certificate of Analysis
For Laboratory Use Only

PRODUCT NAME	(-)-beta-Pinene
PART NUMBER	00016837
STANDARD TYPE	Analytical Standard (AS)
LOT NUMBER	00016837-732
REPORT NUMBER	CDXA-RSS-5003-03
SAMPLE NUMBER	CDXA-12-3253
DATE OF SAMPLE	05/25/2012
DATE OF RE-EVALUATION	06/15/2016 (1 st); 03/03/2021 (2 nd)
DATE OF REPORT	03/12/2021



CHEMICAL NAMES	(1S,5S)-6,6-Dimethyl-2-methylenebicyclo(3.1.1)heptane; (-)-Nopinene; (-)-2(10)-Pinene; (1S)-(-)-β-Pinene
CHEMICAL FORMULA	C ₁₀ H ₁₆
MOLECULAR WEIGHT (MW)	136.23
CHEMICAL FAMILY	Monoterpenes
CAS NUMBER	[18172-67-3]
EC#(EINECS)	242-060-2
RTECS	DT5077020

ANALYTICAL RESULTS

TEST	METHOD	SPECIFICATION	RESULT
GC	0.700.10.2.METH140	≥ 75%	98.9%
Mass Spectrum	0.700.10.2.METH140	Conforms	Conforms
Appearance	NA	NA	Clear liquid

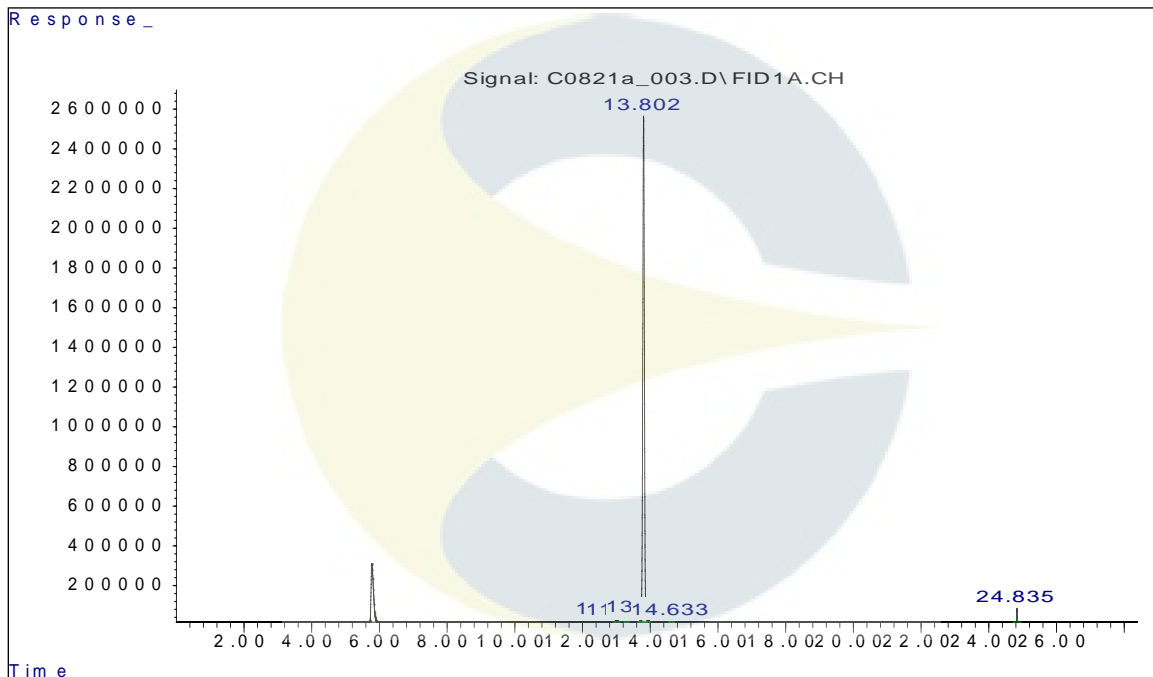
STORAGE CONDITIONS

STORAGE	+4 °C in a dry place.
EXPIRATION DATE	03/2026 under the above conditions.

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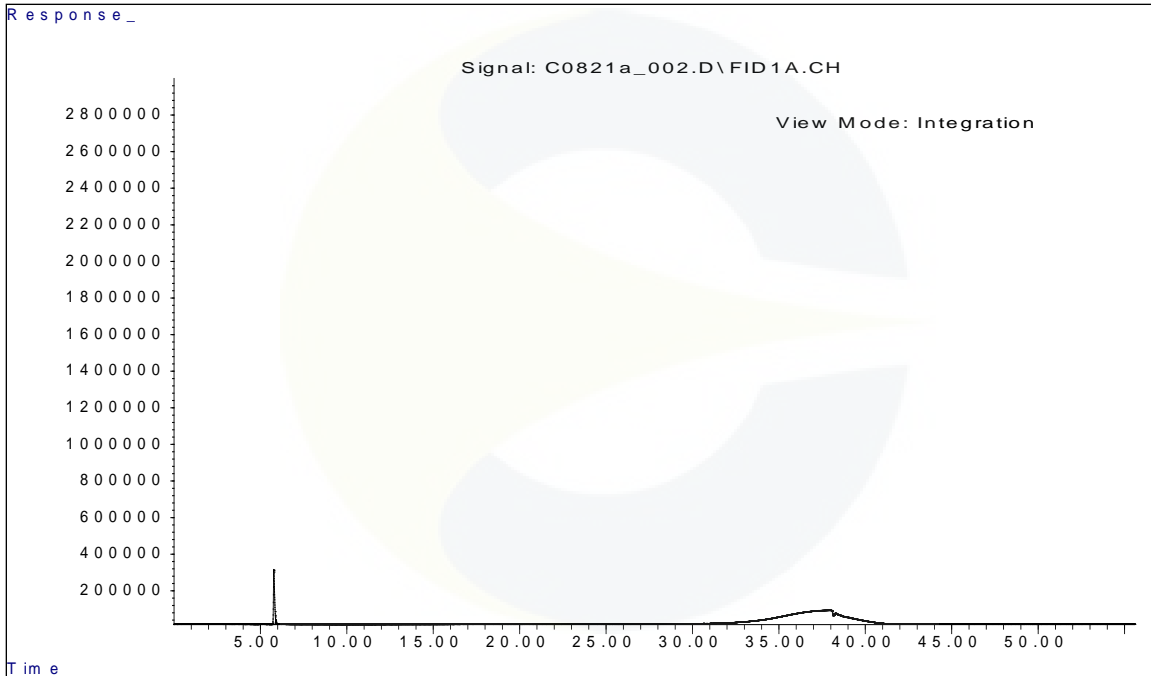
ANALYTICAL CONDITIONS

INSTRUMENT	AGILENT 6890N WITH FLAME IONIZATION DETECTOR (FID) AND AGILENT 5973N MASS SELECTIVE DETECTOR (MSD)
COLUMN	Phenomenex Zebron ZB-5plus, 30 m x 0.32 mm x 0.25 µm
CARRIER GAS	Helium
COLUMN TEMP.	Isothermic 40 °C for 5.0 minutes, then increasing at 10.0 °C/minute to 340 °C. Hold at 340 °C for 5.0 minutes.
FLOW RATE	2.0 mL/minute
INJECTOR TEMP.	300 °C
INJECTOR SPLIT RATIO	20:1
INJECTION VOL.	1.0 µL
INJECTION CONC.	8.3 mg/mL in Carbon Disulfide
DETECTION	FID (300 °C) & MSD (Transfer line 300 °C, Source 250 °C, Quad 200 °C)

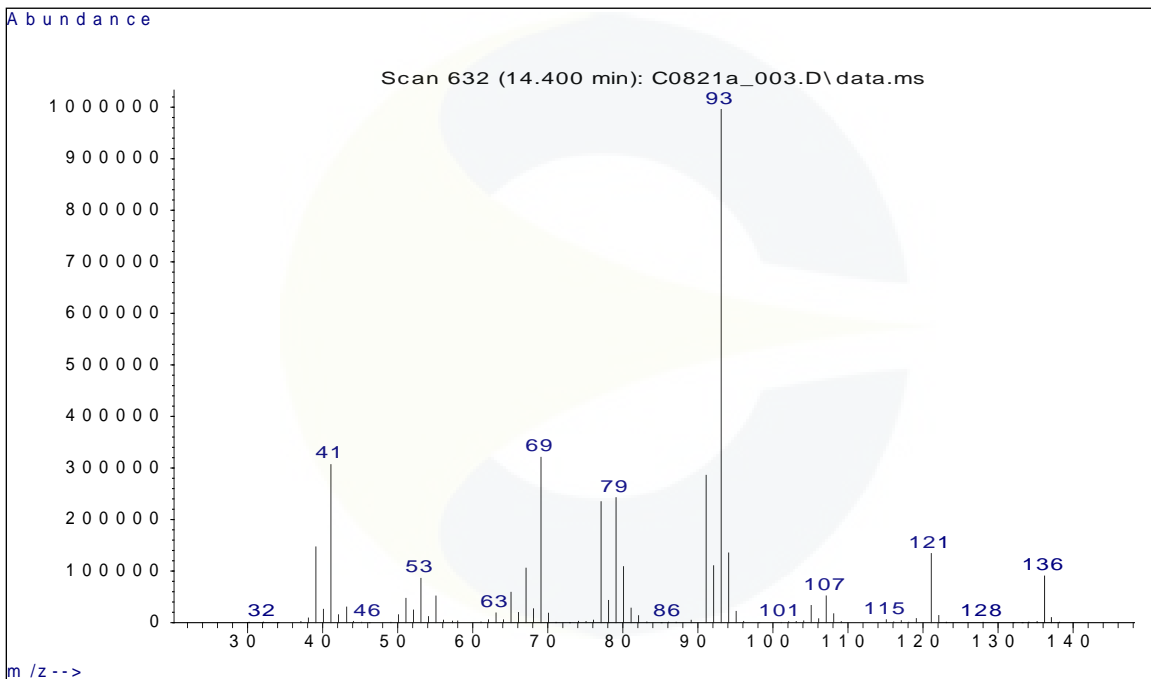
GC CHROMATOGRAM OF (-)-BETA-PINENE (CDXA-12-3253)


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GC CHROMATOGRAM OF DILUENT BLANK



MASS SPECTRUM OF (-)-BETA-PINENE (CDXA-12-3253)



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REVISION HISTORY

<u>Revision History</u>	<u>Date of Revision</u>	<u>Document/Changes</u>
00	06/05/2012	New report
01	05/07/2014	Updated purity and chromatograms
02	07/08/2016	Passed re-evaluation by GC/MS. Updated expiration date and chemical names.
03	03/12/2021	Passed second re-evaluation by GC/MS. Updated expiration date, analytical conditions, chromatograms, mass spectrum, and RTECS. Removed melting point.

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