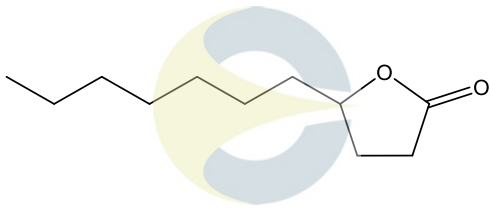


Certificate of Analysis
For Laboratory Use Only

PRODUCT NAME	gamma-Undecalactone	Structure 
PART NUMBER	00021242	
STANDARD TYPE	Analytical Standard (AS)	
LOT NUMBER	00021242-240	
REPORT NUMBER	CDXA-RSS-5725-01	
SAMPLE NUMBER	CDXA-13-5601	
DATE OF SAMPLE	08/16/2013	
DATE OF RE-EVALUATION	01/03/2020	
DATE OF REPORT	01/23/2020	

CHEMICAL NAMES	4-Hydroxyundecanoic acid lactone; 4-Undecanolide; 5-Heptyldihydro-2(3H)-furanone; γ-Heptyl-γ-butyrolactone; γ-Undecanolide; Persicol
CHEMICAL FORMULA	C ₁₁ H ₂₀ O ₂
MOLECULAR WEIGHT (MW)	184.28
CHEMICAL FAMILY	Lactones
CAS NUMBER	[104-67-6]
EC#(EINECS)	203-225-4
RTECS	YQ2485000

ANALYTICAL RESULTS

TEST	METHOD	SPECIFICATION	RESULT
GC	0.700.10.2.METH140	NA	99.2%
Mass Spectrum	0.700.10.2.METH140	Conforms	Conforms
Appearance	NA	NA	Liquid

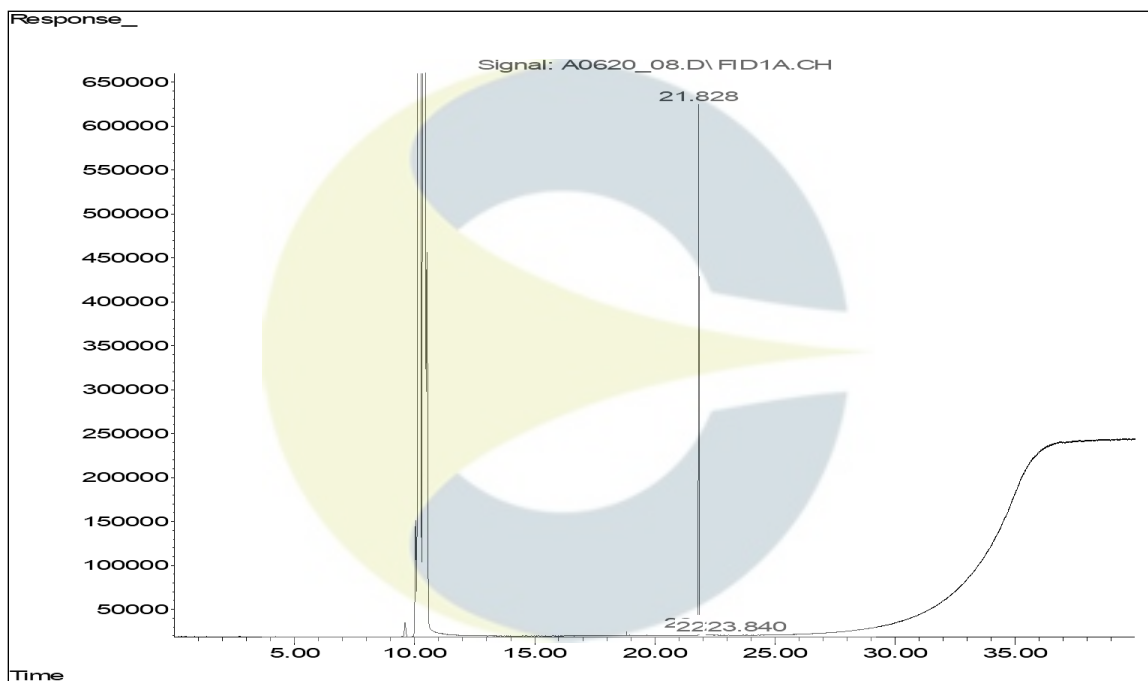
STORAGE CONDITIONS

STORAGE	+4 °C in a dry place.
EXPIRATION DATE	01/2025 under the above conditions.

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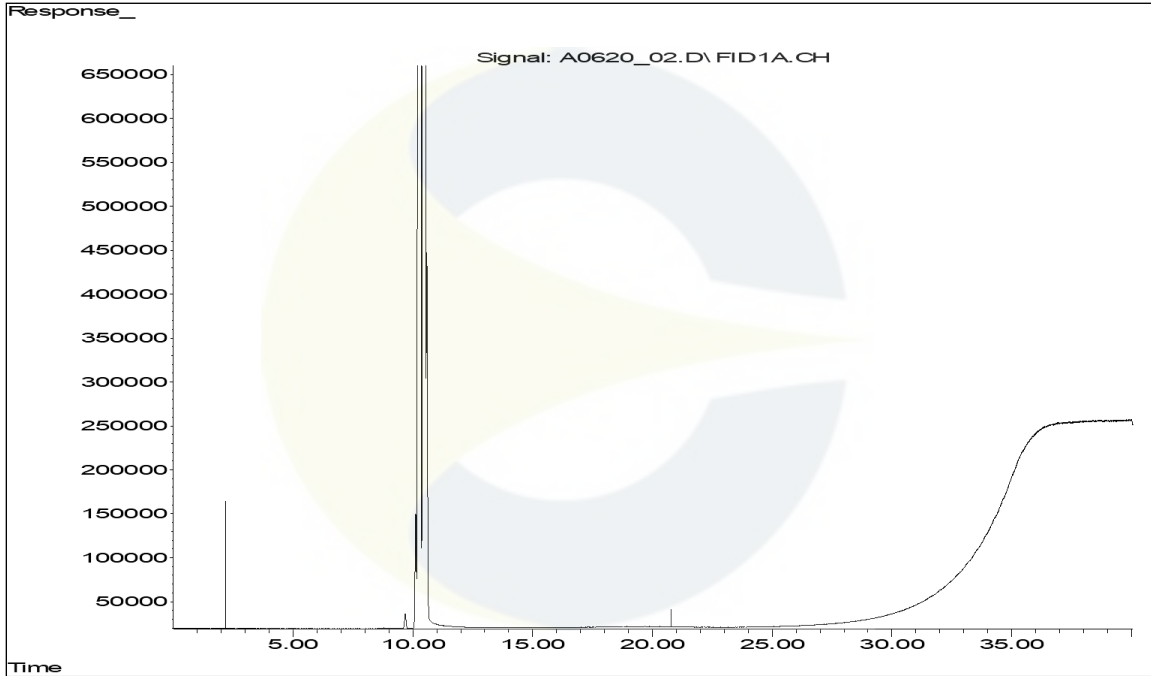
ANALYTICAL CONDITIONS

INSTRUMENT	AGILENT 6890N WITH FLAME IONIZATION DETECTOR (FID) AND AGILENT 5973N MASS SELECTIVE DETECTOR (MSD)
COLUMN	Phenomenex Zebron ZB-5HT Inferno, 30 m x 0.32 mm x 0.25 µm; connected to an MXT Y-union, connected to a Restek Siltek deactivated guard column: 10 m x 0.25 mm to FID; and a 5 m x 100 µm transfer line to MSD.
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.	1.7 mg/mL in CHCl ₃ : n-Hexane (50:50)
DETECTION	FID (350 °C) & MSD (Transfer line 300 °C, Source 250 °C, Quad 200 °C)

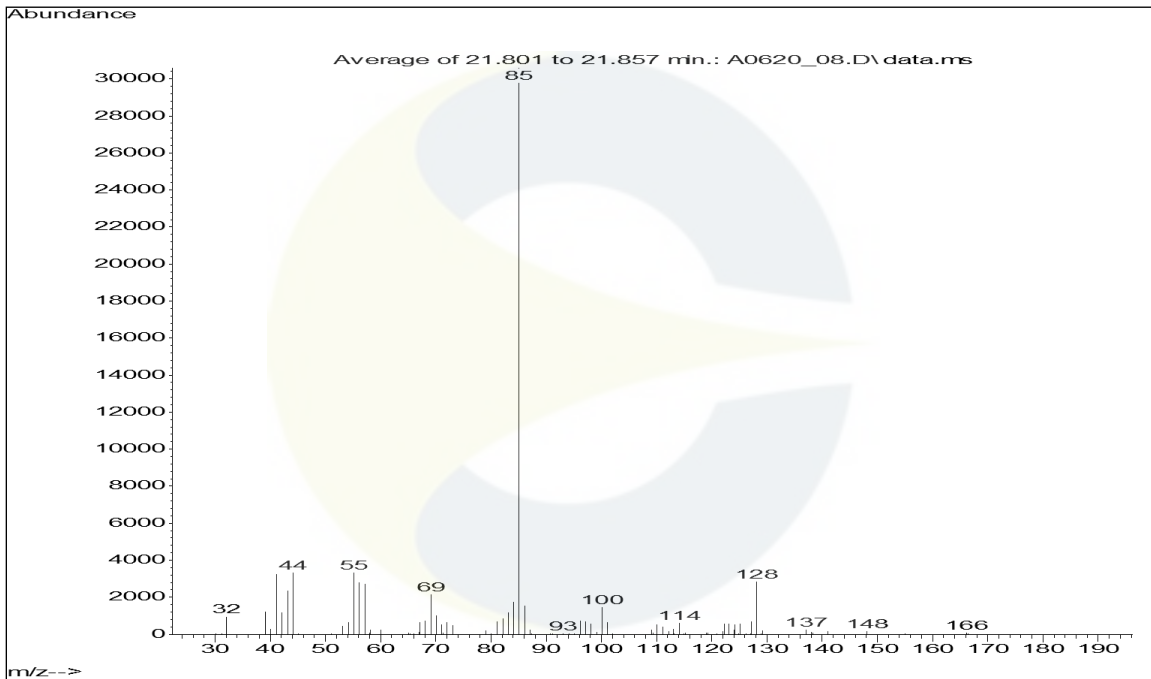
GC CHROMATOGRAM OF GAMMA-UNDECALACTONE (CDXA-13-5601)


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GC CHROMATOGRAM OF DILUENT BLANK



MASS SPECTRUM OF GAMMA-UNDECALACTONE (CDXA-13-5601)



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REVISION HISTORY

<u>Revision History</u>	<u>Date of Revision</u>	<u>Document/Changes</u>
00	09/17/2013	New report
01	01/23/2020	Updated purity, updated expiration, chromatograms, spectrum, analytical method, and removed melting point.

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