EXPERIMENTAL NOTES

Clarus™ SQ 8 GCMS

GC-CHEM

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Evaluation of Sensitivity (S/N) of Clarus™ SQ 8 C GC-MS Using Octafluronapthalene (OFN) in Scan Mode

Abstract

Sensitivity is a one of the prime specification of Single Quadrupole GC-MS Instrument. Sensitivity can be defined as ability of the instrument to detect the lowest amount of analyte present in the sample matrix. Signal to Noise ratio (S/N) is the ratio of signal height to average noise in chromatographic system, which is used to determine the lowest limit of detection (LOD) and limit of quantification (LOQ). In current investigation the S/N value of the SQ-8 GCMS is evaluated using Octafluoronaphthalene (1.0 pg/µL) as a standard to check the performance of the instrument installed in Customer Knowledge Centre for Analytical Sciences, Thane, Maharashtra, India.

Standards & solution

The GC/MS Sensitivity Test Mix is directly purchased from PerkinElmer Inc., USA.

GCMS sensitivity test mix:

Part No.: N933-1078; Lot # PE-007
Date Manufactured: June 9, 2011
Expiration Date: June 2012

Mix 1:

Octafluoronaphthalene 1 pg/µL ± 0.01 pg/µL
Benzophenone 10 pg/µL ± 0.1 pg/µL

Mix 2

Hexachlorobenzene 100 pg/µL ± 1.0 pg/µL
Octafluoronaphthalene 100 pg/µL ± 1.0 pg/µL
Benzophenone100 pg/µL ± 1.0 pg/µL

Solvent: Iso-Octane

Procedure:

The instrument is tuned and calibrated as per the user manual (09931018A Clarus™ SQ8 GCMS Tutorial). The Instrument parameters were further established as per procedure given in SQ-8 GCMS IQ/OQ manual.

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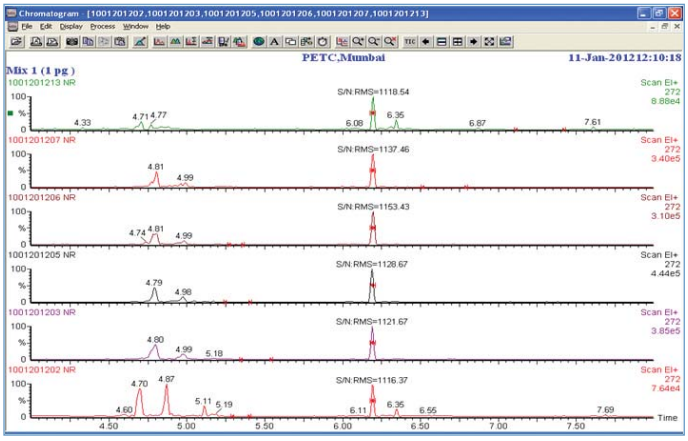
Instrumental conditions

GC Conditions	
Instrument	Clarus SQ8 GC
Column	Elite-5MS, 30 M X 0.25 mm, 0.25 µm
Injector	PSSI with standard liner with quartz wool.
Injector Temp.	250 °C
Injection Volume	1.0 µL
Carrier gas	Helium
Carrier Flow	1.00 mL/min.
Injection	Auto-sampler spilt-splitless
Oven Program	50 °C 1.50 min 20.0 °C/min. 240 °C 10.00 min Total run time: 21.0 min.
Event program	Event Value Time SPL1 0 -0.75 CAR1 4 -0.70 SPL1 50 1.50 CAR1 1 1.55
Clarus™ SQ8 MS parameters	
Ionisation source	EI+
Electron energy	70eV
Source temperature	2000 C
Transfer line temperature	2000 C
Scan range	50-300 a.m.u.
Time (min.)	4.0-8.0
Data	Centroid
Scan Time (Sec)	0.35
Inter-Scan Delay (Sec)	0.05
Multiplier (V)	1700 V

Analytical results and conclusions

The Total Ion Chromatograms (TIC) was collected by injecting replicate injections of 1pg/µL of Octafluoronaphthalene (Mix 1) in GCMS as per the instrument conditions described above. The extracted ion chromatogram (EIC) of Octafluoronaphthalene was obtained by extracting the m/z 272. The Signal to Noise ratio for all the EIC chromatogram was calculated by using TurboMass® software. EIC showing signal to noise ratio achieved on Octafluoronaphthalene are annotated in the following figures:



The S/N ratios obtained in the above chromatograms are mentioned in the below table:

Chromatogram no.	S/N ratio	Average value
1	1116.37	
2	1121.67	
3	1128.67	1129.36
4	1153.43	
5	1137.46	
6	1118.54	

Conclusions

The average Signal to Noise ratio (S/N) were found to be 1129.36 after injecting 1.0 µL of Mix 1 i.e. 1pg/µL of Octafluoronaphthalene successively for 6 times. Consequently, based on the results obtained in the current studies, it can be concluded that the PE GCMS SQ 8 instrument shows good sensitivity in term of S/N ratio in scan mode.

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