



Methyl mercury

To meet requests for accurate measurements of methyl mercury at environmentally relevant levels, ALS Scandinavia brings you accredited analyses by isotope dilution – gas chromatography – inductively coupled plasma mass spectrometry (ID-GC-ICPMS).



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Accuracy is inherent to ID since only isotope ratios are measured¹; GC connected to ICPMS provides unsurpassed specificity and detection power². Together, the ID-GC-ICPMS combination delivers high quality methyl mercury results, time after time.

Table 1 provides a few examples of application of ID-GC-ICPMS to reference materials certified for their content of methyl mercury.

Figure 1 illustrates our control chart for methyl mercury in sediment certified reference material, representing three years of traceable, accurate analyses.

The limits of reporting (LORs) achieved by applying ID-GC-ICPMS to a variety of sample types are listed in Table 2 to demonstrate the detection power of the technique. Note that the LORs are set at concentrations corresponding to 10 times the standard deviation of the blanks.

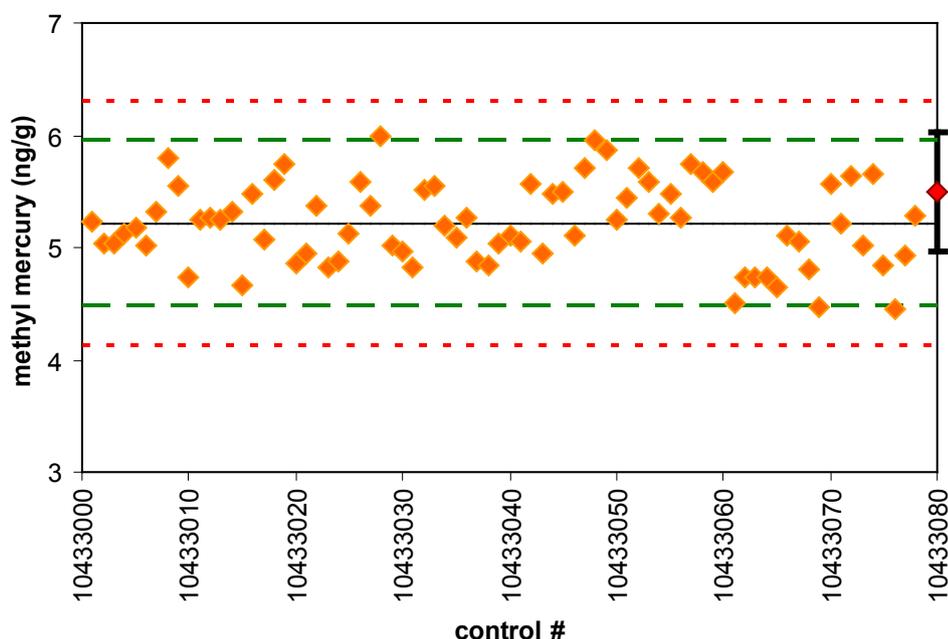


Figure 1. Control chart for methyl mercury in the certified reference material IAEA-405 sediment showing warning (green) and action (red) limits. The data date from March 2005 to October 2007. The target methyl mercury concentration is (5.22 ± 0.36) ng/g; the certified value is (5.49 ± 0.53) ng/g.

Table 1. Results for certified reference materials using ID-GC-ICPMS.

Material	Methyl mercury (ng/g)	
	Certified	Found
DORM-2 Dogfish muscle	4470 ± 320	4370 ± 290
TORT-1 Lobster hepatopancreas	128 ± 14	131 ± 6
SRM 2977 Mussel tissue	36.2 ± 1.7	38.1 ± 2.9
IAEA-405 Estuarine sediment	5.49 ± 0.53	5.22 ± 0.36



Figures 2 and 3 show chromatograms for water and serum samples containing methyl mercury at concentrations close to the LORs – further evidence of the power of ID-GC-ICPMS.

As well as accredited packages, we can develop customized solutions to new analytical problems – examples of which are also included in Table 2. This shows the flexibility of our basic packages, each adopted from tried and tested methods in the scientific literature³⁻⁶.

ALS Scandinavia strives to implement state of the art research in the analytical packages on offer – to bring you data you can rely on.

References

- 1 A. G. Adriaens, W. R. Kelly and F. C. Adams, *Analytical Chemistry*, 65 (1993) 660
- 2 J. Ruiz Encinar, P. Rodríguez-González, J. I. García Alonso and A. Sanz-Medel, *Trends in Analytical Chemistry*, 22 (2003) 108
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- 4 L. Lambertsson, E. Lundberg, M. Nilsson and W. Frech, *Journal of Analytical Atomic Spectrometry*, 16 (2001) 1296
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Table 2. Packages available for methyl mercury.

Sample type	Sample requirement	LOR	Code
Natural water	100 ml	0.03 ng/l	W-MEHG accredited
Sediment, sludge, soil	1 g dry weight	0.05 ng/g	S-MEHG accredited
Fish, shellfish	1 g dry weight	0.2 ng/g	B-MEHG accredited
Plant material	0.5 g dry weight	0.1 ng/g	B-MEHG
Blood, plasma, serum	2 ml	30 ng/l	B-MEHG validated

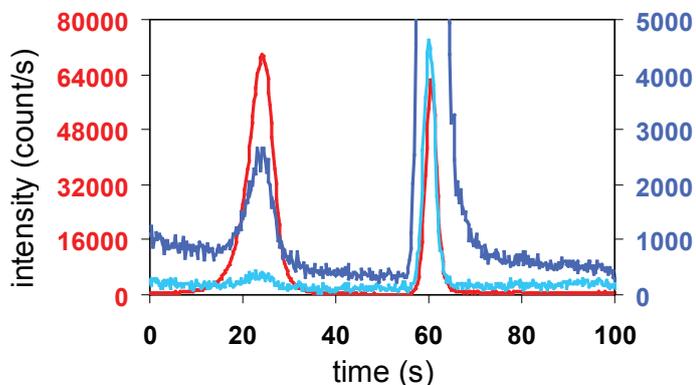


Figure 2. Chromatograms for a water sample containing (0.071 ± 0.026) ng/L methyl mercury and a blank. Signals for the stable isotope tracer ^{198}Hg , 110 pg added as methyl mercury to 100 mL water (red), as well as the reference isotope ^{202}Hg in the water sample (dark blue) and the blank (light blue) are shown.

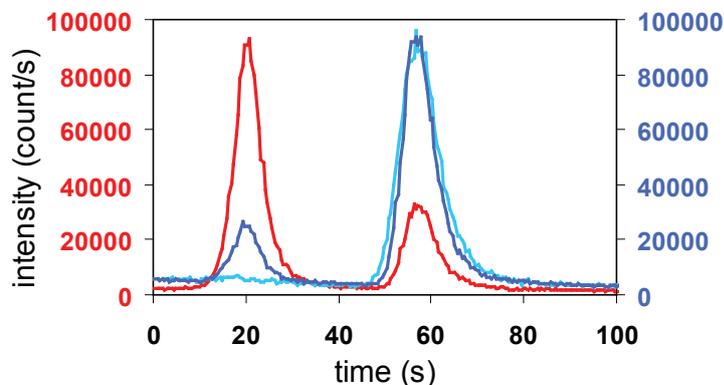


Figure 3. Chromatograms for a serum sample containing (44 ± 10) ng/L methyl mercury and a blank. Signals for the stable isotope tracer ^{198}Hg , 120 pg added as methyl mercury to 2 mL serum (red), as well as the reference isotope ^{202}Hg in the serum sample (dark blue) and the blank (light blue) are shown.