Biological Monitoring
Guidance Values

Guidance sheet for:
Method for Mercury in Urine
BMGV 20 μmol/mol creatinine

Hazardous Substance
Mercury & inorganic compounds

Workplace Exposure Limit
0.025 mg m⁻³
CAS No. 7439-97-6
Biological Monitoring Guidance Value:

BMGV = 20 μmol Hg /mol creatinine

Conversion: 1 μmol/mol = 1.167 mg/g

Sample Collection

Time: Random, untimed urine
Equipment: Polystyrene universal container (30ml).

Sample Transport to Laboratory

At ambient temperature, samples should arrive within 48h of collection. If delay anticipated store at -20OC. Samples sent through postal system must comply with Post Office regulations.

Description of Suggested Method

Analysis of urine using direct nebulisation Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Samples should be diluted in nitric acid, and it is advisable to add gold to the samples and standards to stabilise the analytical performance. An internal standard must be added to the samples to compensate for matrix effects.

Quality Assurance

Internal QC - must be established
External QC - TEQAS, University of Surrey
(Tel: 01483 509217)

Analytical Evaluation

Precision
- within day <4% RSD at 180 nmol/l
- day to day <6% RSD at 180 nmol/l
- recommended precision <7.3% RSD

Detection Limit
- 5 nmol/l

Calibration Range
- typically 0-500 nmol/l

Sample Stability
- 2 days at RT, >6 months at -20OC

Analytical Interferences
- None known

Alternative Method

Mercury in urine may also be determined using a cold-vapour mercury detector or by cold vapour atomic absorption spectrometry. The method consists of firstly digesting the urine sample by reduction of Hg2+ to Hg0 using stannous chloride and subsequent measurement of elemental mercury with the detector of choice.

Alternative Method

At moderate exposures results reflect cumulative exposure over recent weeks/months
Half life-time
- 40-60 days

Confounding Factors
None known
Unexposed Levels <2 μmol/mol creatinine
Creatinine Correction Advised, specific gravity correction less suitable
Interpretation

Urinary Mercury results reflect systemic exposure to Mercury that may have entered the body by inhalation or through the skin. If biological monitoring results are greater than the guidance value it does not necessarily mean that ill-health will occur, but it does indicate that control of exposure may not be adequate. Under these circumstances employers will need to look at current work practices to see how they can be improved to reduce exposure.

References


Links

EH40 List of Approved Workplace Exposure Limits  http://www.hse.gov.uk/coshh/table1.pdf

Biological Monitoring at HSL  http://www.hsl.gov.uk/online-ordering/analytical-services.aspx