Guidance sheet for:

Nitroglycerin
Monitored by analysis of nitroglycerin (GTN) and its metabolites 1,2 and 1,3 glycerol dinitrate (GDN) in urine

BMGV: 15µmol nitroglycols/mol creatinine

Hazardous Substance
Nitroglycerin
CAS number: 55-63-0
Biological Monitoring

Guidance Value (BMGV)

Guidance value: 15µmol nitroglycols/mol creatinine
Conversion: 1mmol/mol = 2.007µg/g

Sample Collection

Urine samples should be collected at the end of shift into polystyrene universal containers (30mL).

Sample Transport to Laboratory

Send samples to the laboratory by first class post (or equivalent) to arrive within 48 hours of collection. If any delay is anticipated, store at -20°C. Packaging must comply with Post Office regulations.

Description of Suggested Method

Urine samples are hydrolysed by addition of pH5-buffered glucuronidase and heating to 37°C overnight. They are then cooled and all samples are spiked with 100µL of 15N-labelled nitroglycerine (as internal standard) and 100µL of 20mM silver nitrate solution. The analytes are extracted with isopropyl ether, which is then evaporated until dry. The residue is resuspended in 20% methanol with 0.025mM ammonium chloride prior to analysis. Polypropylene or silanised glass apparatus is used throughout. LC-MS analysis is carried out using a Phenomenex Gemini 5µm C18 110A (150x2.0mm, 5µm) column; mobile phases 0.025mM ammonium chloride in methanol and 0.025mM ammonium chloride in water are used and a gradient programme is carried out. Ions are monitored at m/z 217 (1,3/1,2 GDN) and m/z 262 (GTN).

Analytical Evaluation

Detection limit: 0.3nmol/L (3 x background)
Calibration range: Typically 0-250 nmol/L
Precision:
- within day <10% RSD at 16µmol/L
- day to day <12% RSD at 16µmol/L
Sample stability:
>2 days at ambient temperature, >2 months at 20°C
Analytical Interferences: None known

http://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/biological-monitoring
**Interpretation**

Urinary nitroglycerin/GDN results reflect systematic exposure to nitroglycerin that may have entered the body by inhalation or more likely, 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 mean that exposure is not being adequately controlled. Under these circumstances employers will need to look at current work practices to see how they can be improved to reduce exposure.

**Other Information**

**Confounding factors:** Nitroglycerin is used in pharmaceuticals prescribed to treat angina. It should be noted if workers take nitroglycerin therapeutically as this will affect their urine levels.

**Unexposed level:** None detected

Creatinine correction is advised

**Quality Assurance**

**Internal QC:**
Must be established

**External QA:**
Available from Health and Safety Laboratory

http://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/biological-monitoring
Biological Monitoring Guidance Values

Nitroglycerin in urine

Links

EH40 List of Approved Workplace Exposure Limits
http://www.hse.gov.uk/pubns/books/eh40.htm

Biological Monitoring at HSL
http://www.hsl.gov.uk/online-ordering/analytical-services-and-assays/biological-monitoring

References


For further advice, please contact us:

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