

INTERPRETATION

Health Guidance Values (HGVs) are set at a level at which there is no indication from the scientific evidence available that the substance being monitored is likely to be injurious to health. Values not greatly in excess of a HGV are unlikely to produce serious short or long term effects on health. However, regularly exceeding the HGV does indicate 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.

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BIOLOGICAL MONITORING METHODS

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Method for 2-Butoxyacetic acid in Urine (Metabolite of Butoxyethanol)

Hazardous Substance:

2-Butoxy ethanol

Alternative name:

Ethylene glycol monobutyl ether (EGBE)
Occupational Exposure Standard = 25ppm
(skin notation)
CAS No. 111-76-2

Biological Monitoring Guidance Value:

Health Guidance Value = 240 mmol 2-butoxyacetic acid/mol creatinine
Conversion: 1mmol/mol = 1.167 mg/g

☐ Sample Collection:

Urine sample at end of shift

Equipment: Polystyrene universal container (30ml)

☐ Description of Suggested Method

The metabolite 2-butoxyacetic acid is analysed as an indicator of exposure to 2-butoxyethanol. The urine is spiked with propoxy acetic acid as internal standard, acid hydrolysed, derivatised with dry acetone and pentafluorobenzyl bromide and analysed by capillary GCMS. The GCMS is operated in the negative ion CI mode with selected ion recording using m/z 117 for propoxy acetic acid and m/z 131 for 2-butoxyacetic acid.

☐ Reference

Jones K, Cocker J (2003). *Biomarkers* 8(5) 360-70

☐ Alternative Method

Bergrow et al. (1988) Determination of butoxyacetic acid by capillary GC. *Fresenius Z. Anal Chem*, **331**, 818-820.

Johanson G. (1989) Analysis of ethylene glycol ether metabolites. *Arch Toxicol.* **63** 101-111.

☐ Sample Transport to Laboratory

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

☐ Analytical Evaluation

Precision

- within day <5% RSD at 600 µmol/l
- day to day 12% RSD at 600 µmol/l

Detection Limit

- 3x background - 10 µmol/l

Calibration Range

- typically 0-1000 µmol/l

Sample Stability

- 2 days at ambient, >3 months at -20°C

Analytical Interferences

- None known

☐ Other Information

Elimination half-time

Approximately 6-7 hours (butoxyethanol in urine)

Confounding Factors

Ethanol will delay excretion

Unexposed Levels

<10 µmol/l

Creatinine Correction

Advised

☐ Quality Assurance

Internal QC - must be established

External QA - G-EQUAS (www.g-equas.de)