

Contact Points

Dr Loretta Ford

Consultant Clinical Scientist

Tel: 0121 507 6026

Email: Loretta.ford@nhs.net

Dr Jonathan Berg

Head of Department

Tel: 0121 507 5353

Email: jonathanberg@nhs.net

Main Laboratory

Tel: 0121 507 4138

Out of Hours

Tel: 0121 554 3801

Ask for Consultant Biochemist on-call.

Mailing Address

Department of Clinical Biochemistry

Toxicology Laboratory

City Hospital

Dudley Road

Birmingham

B18 7QH

www.cityassays.org.uk

Plasma Ethylene Glycol and Diethylene Glycol Analysis by Gas Chromatography with Flame Ionisation Detection

Clinical Biochemistry

Version No. 1.00



 CPA Accredited Laboratory



Where
EVERYONE
Matters



A Teaching Trust of The University of Birmingham
Incorporating City, Sandwell and Rowley Regis Hospitals

© Sandwell and West Birmingham Hospitals NHS Trust

ML3752

Issue Date: August 2012
Review Date: August 2016



Where
EVERYONE
Matters



Sending Specimens for Analysis

This service is available 24 hours. During working hours (09:00 - 17:30) please contact the laboratory on 0121 507 4138. Out of hours (17:30 - 09:00) please contact switchboard on 0121 554 3801 and ask them to bleep the On-Call Duty Biochemist.

Sample requirement: minimum of 1 ml of plasma.

DO NOT SEND GEL TUBES OR SERUM FROM GEL TUBES AS THEY INTERFERE WITH ANALYSIS

- Please contact lab for advice
- Samples should be stored at 4°C prior to dispatch.
- Send samples at ambient temperature

Fluids suspected of containing toxic diols can also be analysed. Please send a minimum of 1 mL.

Limit of Quantification

Ethylene Glycol	25 mg/L
Diethylene Glycol	25 mg/L

Our assay is capable of the simultaneous detection of Ethylene Glycol (ETHG) and Diethylene Glycol (DEG) in plasma. It uses a capillary column and an Agilent 6890N Gas Chromatograph with Flame Ionisation Detection.

Performance

The assay has a low limit of detection for both ETHG and DEG of 25 mg/L, and excellent precision (intra-variation <5% and inter-variation <7%).

Clinical Use

Ethylene Glycol (ETHG) is a common constituent of antifreeze and screenwash. Another diol, Diethylene Glycol (DEG) may also be present in these products. Both ETHG and DEG are metabolised by alcohol and aldehyde dehydrogenases to produce toxic metabolites resulting in renal failure, increased osmolar gap and metabolic acidosis, although this may be delayed in patients ingesting DEG only¹⁻⁴. Management of ETHG and DEG poisoning includes administration of ethanol, fomepizole and haemodialysis^{4,5}. Early diagnosis is essential to prevent morbidity and mortality. Since the clinical indications of poisoning are non-specific, rapid confirmation by detection of ETHG and/or DEG in blood is crucial⁷⁻⁸.

References

1. J.F. Winchester. Methanol, isopropyl alcohol, higher alcohols, ethylene glycol, cellosolves, acetone and oxalate. In L.M. Haddad, J.F. Winchester eds. Clinical management of poisoning and drug overdose. Philadelphia: WB Saunders. 393-410 (1983).
2. K.L. O'Brien, J.D. Selanikio, C. Hecedivert, M.F. Placide, M. Louis, D.B. Barr, J.R. Barr, C.J. Hopedales, M.J. Lewis, B. Schwartz, R.M. Philen, S.S. Victor, J. Espindola, L.L. Needham, and K. Denerville. Epidemic of paediatric deaths from acute renal failure caused by diethylene glycol. *J. Am. Med. Assoc.* 279: 1175-1180 (1998).
3. A.D. Fraser. Clinical toxicologic implications of ethylene glycol and glycolic acid poisoning. *Ther. Drug. Monit.* 24: 232-238 (2002)
4. A. Vale. Ethylene glycol and diethylene glycol. *Medicine.* 35: 617-618 (2007)
5. D. Jacobsen, S. vreb, J. stborg, and O.M. Sejersted. Glycolate causes the acidosis in ethylene glycol poisoning and is effectively removed by haemodialysis. *Acta. Med. Scand.* 216: 409-416 (1984).

