Rapid and automated detection of ethylene glycol: suitable for hospital laboratories?

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Abstract

Introduction: Ethylene Glycol (ETG) is a toxic substance found in automotive antifreeze and brake fluid. Intentional ingestion and accidental poisoning leads to production of toxic metabolites that contribute to CNS depression, metabolic acidosis, acute renal failure, and death. Timely detection of the parent chemical is useful to direct patient care. Rapid initiation of supportive care and antidote therapy can reduce the morbidity and mortality in the poisoned patient. Analysis by gas chromatography (GC-FID) is the most common analytical method for detecting ETG, but requires significant analysis time. Presented here is an improvement in patient care with an automated modification of the veterinary enzymatic assay manufactured by Catachem (Oxford, CT).

Methods: The original Catachem ETG assay required modification to limit interferences from other glycols and icterus. Patient correlations were performed using 100 positives and 150 negative samples with GC-FID.

Results: GC-FID techniques are manual and require sample set up, time and expertise to run the instrument, interpret chromatograms, and perform appropriate instrument maintenance. These processes add a substantial labor component to this assay. By utilizing the enzymatic assay, labor savings of up to 80% were achieved. Testing could be completed within 15-20 minutes compared to 1.25 hours for the GC-FID assay. The potential for interpretive and mathematical error with the chromatographic process was eliminated.

Conclusion: Results from patient correlations with GC-FID determined that the enzymatic assay was acceptable for use as a primary ETG assay. The enzymatic assay reduced direct and indirect labor costs, overall assay turn around time (TAT), and improved quality of results. The Catachem enzymatic assay can improve patient care by facilitating rapid access to ETG testing in hospital laboratories.

Introduction

ETG is one of the major toxic alcohols that pose a risk to human health for which laboratory levels are requested. ETG testing is commonly performed by gas chromatography (GC). It is a technically challenging methodology and is limited in availability in hospital laboratories. We present an assay improvement to support patient care with a method change from gas chromatography with flame ionization detection (FID) to an automated veterinarian enzymatic assay manufactured by Catachem.

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Conclusions

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