



K16 The Measurement of Uncertainty for Toluene Analysis in Biological Fluids by HS-GC

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After attending this presentation, attendees will understand the uncertainty estimation process and to validate the method in forensic field.

Toluene has been widely used as an industrial solvent. Sniffing of thinners or adhesives containing toluene, which is illegal in Korea, is known to occur. The determination of toluene level in biological fluids such as blood and urine is a powerful tool for monitoring toluene exposure and for evaluation of toluene inhalation. The aim of this work was to validate the method of toluene determination and obtain the uncertainty estimate around cut-off level. The chromatographic conditions of the method employ an HP INNOWax capillary column (30m x 0.25mm, film thickness 0.25um), programmed condition (60 °C(6min), 10 °C/min, 140 °C(3min)) with He at a column flow of 1.0ml/min, injector and detector temperature at 240 °C, a split ratio of 30:1. Sealed sample vials containing biological sample 1ml, buffer 2ml and isobutanol 50ul as an internal standard were heated at 60 °C for 20 minutes in headspace autosampler and injected into GC with FID. The linearity of the toluene peak area responses was demonstrated from 0.05ppm to 100ppm. Repeatability and reproducibility of the toluene peak area responses showed R.S.D. of 3.6% and 4.6 %, respectively. The limits of detection and quantitation were determined to be 0.01ug/mL and 0.02ug/mL in water and 0.02ug/mL and 0.05ug/mL in urine, respectively. The other parameters such as selectivity, sensitivity, accuracy and recovery were also examined. The measurement uncertainty for toluene analysis was estimated from experimental results. We determined 0.068ug/mL as the uncertainty for cut-off level, 0.1ug/mL.

Toluene, Uncertainty, Validation