



K41 Determining Concentrations of Fentanyl in Decomposing and (Formalin-Stored) Postmortem Liver Tissue Over Time by Gas Chromatography-Mass Spectrometry (GC-MS)

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After attending this presentation, attendees will have an overview of the opioid analgesic drug fentanyl, its stability over time in aqueous and liver matrices, and the effects of simulated embalming in formalin on its concentration.

This presentation will impact the forensic community by aiding the forensic medical examiner and forensic scientist in the determination of fentanyl concentrations in decomposing tissue cases as well as cases where tissue has been stored in formalin.

A systematic study of matrix effects on the postmortem concentration of the opioid analgesic drug fentanyl in liver tissue was conducted over a six-year period. Porcine liver homogenates were spiked with 200 nanograms of fentanyl per gram of liver to simulate a fatal overdose and treated with the chemical preservative formalin to simulate embalming of the deceased victim. The samples were prepared in triplicate (samples 1A-1C) and stored at room temperature. Periodically, aliquots were removed from the sample containers and extracted using a solid-phase extraction (SPE) method, and the concentration of fentanyl was monitored over time by gas chromatography-mass spectrometry (GC-MS). To isolate the effects of formalin and of the liver tissue itself on fentanyl's concentration, triplicate samples were also prepared in which these two components were systematically omitted from the sample sets (samples 2A-4C). Also, negative controls were prepared in which no fentanyl was spiked into the samples (samples 5A-6C). Statistical analysis of the concentration data over time was conducted to determine effects of time and other sample matrix components on fentanyl concentrations. Details of the study, data analysis, and results as well as implications for forensic toxicology practice will be presented.

Fentanyl, GC-MS, Solid-Phase Extraction, Formalin