



K24 Alcohol Analysis in the 21st Century: Analysis, Reporting, and Interpretation

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After attending this presentation, attendees will gain knowledge about conducting thorough alcohol analyses in DUI cases, from analysis to accurate reporting, as well as, interpretation of the data using BAC software.

This presentation will impact the forensic science community by demonstrating a very thorough approach to the analysis of blood alcohol concentration (BAC) in DUI cases. In addition to the traditional approach of Gas Chromatography (GC)-Headspace analysis, uncertainty of the analysis will be introduced as well as the use of BAC software to extrapolate what the blood alcohol level was at the time of the incident in question, as in the case of an accident, based on the measured BAC. The application of this analysis method to several DUI cases will be discussed.

The analyses were performed on an GC-Headspace instrument that had been validated to confirm its accuracy based on results obtained from another instrument. A dual column system was used, the first of which quantitated the concentration of ethanol, while the second column served to confirm the presence of ethanol. The uncertainty of the measurements is taken into consideration by addressing a variety of areas, including the uncertainty in the purity of the standards used, the accuracy of the pipettes used, and the accuracy of the aliquoting of samples. Once the measurement was made, the BAC software was then used to extrapolate the BAC at the time of the incident. Using this software, a range of levels can be calculated by averaging BAC levels obtained by several published equations for the estimation of BAC.

One of the cases analyzed was that of a 50-year-old white female who was involved in a car accident. Her measured BAC was 0.19 g/dL at 3:30 a.m., whereas the accident she was involved in took place at 11:30 p.m. She stated that she had two martinis, the first one at 7:30 p.m. and the second at 10:00 p.m. Using the BAC software, it was determined that she would have had to have consumed 5.13 oz of 100% alcohol/volume during the time period that she stated that she had been drinking. Using the extrapolation function of the software, it was determined that the BAC at the time of the accident would have been 0.26 ± 0.03 g/dL.

In conclusion, this method provides a thorough approach to the determination of BAC levels in DUI cases, resulting in a range of measurements that analysts can feel confident about.

References:

1. BAC Tracker. <http://www.bac-tracker.com/>
2. LeBeau, Marc A. "Uncertainty of Quantitative Measurements." Society of Forensic Toxicologists meeting. Austin, Texas. 2006

DUI, GC-Headspace, Extrapolation