ABSTRACT

THE EFFECT OF HEMATOCRIT CONCENTRATION ON FORENSIC BLOOD ALCOHOL ANALYSIS

Defense attorneys have been questioning the validity of forensic blood alcohol analysis based on an individual's hematocrit concentration. The purpose of this work was to determine how much, if any, hematocrit concentration values affect forensic blood alcohol measurements using the heated headspace gas chromatography technique with an *n*-propanol internal standard. Samples were generated from bovine blood to give samples with hematocrit values ranging from 0 to 84 percent. Statistical analysis of the average blood alcohol concentration and the sample hematocrit showed no statistically significant correlation between the blood alcohol level and the sample's hematocrit value. Plasma, whole blood, and red blood cell fractions from human donors were evaluated to confirm the results from the bovine blood experiment were applicable to the evaluation of human samples. These results showed no statistically significant difference between the measured blood alcohol levels for plasma, whole blood, or concentrated red blood cell fractions. The partitioning of ethanol and *n*-propanol in bovine blood was evaluated by adding the alcohol to the blood sample prior to separation of the plasma and red blood cell fractions. Both ethanol and *n*-propanol favor the plasma fraction to a similar extent. This supports the hypothesis that the similarity in their partitioning behavior removes any effect of hematocrit on the measured blood alcohol concentration with heated headspace with an internal standard.

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