Application of Simple, Quantitative Headspace Analysis by Cryoadsorption on a Short Alumina PLOT Column to the Characterization of Cannabinoids

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We will provide fundamental thermophysical and chemical property data of important cannabis compounds (natural, synthetic, and endogenous cannabinoids) and their important metabolites. An ultra-sensitive, quantitative, trace headspace analysis technique called porous layered open tubular-cryoadsorption (PLOT-cryo) will be used to make thermodynamic measurements of the enthalpy of vaporization. This technique is based on traditional purge and trap methods that were designed for sampling volatile organic compounds prior to chromatographic analysis. We have modified the experimental approach dramatically to allow for facile and sensitive detection of low volatility and/or trace compounds. We have shown with previous work that this application is especially useful for precise quantitative analyses and analyses as a function of sample temperature. We will present this data in the form of a van't Hoff equation plot, which will plot the concentrations as a function of headspace collection temperature. A linear relationship of the recovered mass as a function of inverse collection temperature will reveal the predictive capability of the methodology employed here. Additionally, we will determine the vapor pressure of several of the cannabinoids. Characterization of the thermophysical properties of these compounds will aid in vapor detection of cannabinoids and metabolites, aiding in the development of in-the-field vapor detection devices for law enforcement personnel to be able to detect recent drug abuse.