



### **K40 Excretion of 11-Hydroxy- $\Delta^9$ -Tetrahydrocannabinol (11-OH-THC), and 11-nor- $\Delta^9$ -Tetrahydrocannabinol-9-Carboxylic Acid (THCCOOH) in Urine From Chronic Cannabis Users During Monitored Abstinence**

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After attending this presentation, scientists will understand the urinary excretion of cannabinoids in chronic cannabis users, a population that is rarely studied due to the difficulty and cost of sequestering individuals for extended periods of time.

This presentation will impact the forensic science community by demonstrating how the urinary 11-OH-THC excretion data conducted with heavy chronic daily cannabis users during monitored abstinence clearly indicate that 11-OH-THC in urine cannot be used to indicate recent cannabis use.

Seven healthy participants (aged 20-35, four males & three females), who self-reported an extended history of daily cannabis use, provided written informed consent for this IRB-approved study. Subjects self-reported chronic daily smoking of between one and five cannabis “blunts” prior to entering the closed research unit. During the study, all subjects were under continuous medical surveillance for up to 29 days at the NIDA Intramural Research Program to prevent self-administration of additional drugs. Each urine specimen ( $n = 259$ ) was collected individually *ad libitum*. Two mL urine specimens were hydrolyzed by a tandem enzyme (*E. coli*  $\beta$ -glucuronidase)/alkaline method, extracted by SPE (Clean Screen® ZSTHC020 extraction columns, United Chemical Technologies, Bristol, PA), and derivatized with BSTFA for 30 min at 85°C. Trimethylsilyl derivatives of 11-hydroxy- $\Delta^9$ -tetrahydrocannabinol (11-OH-THC), and 11-nor- $\Delta^9$ -tetrahydrocannabinol-9-carboxylic acid (THCCOOH) were resolved and quantified in a 2-dimensional/cryofocusing chromatography system (Agilent 6890 GC/5973MSD) operated in electron impact selected ion monitoring (EI/SIM) mode. Limit of quantification (LOQ) was 2.5 ng/mL for both analytes. Accuracy of the method ranged from 87.6% to 102.1%. Intra- and inter-assay precision, as percent relative standard deviation, were less than 8.6% for both analytes.

Time of last detection (> LOQ) of 11-OH-THC for all subjects in urine ranged from 180 – 716 hours (7.5 to 29.8 days). 11-OH-THC maximum concentrations ranged from 25 – 133 ng/mL (mean  $79.7 \pm 40.1$ , median 67 ng/mL). Maximum concentrations of THCCOOH ranged from 117 – 766 ng/mL (mean  $455.3 \pm 208.3$ , median 482 ng/mL). All participants also had THCCOOH positive urine specimens at the LOQ on the last day of residence between 7.5 to 29.8 days. It also is important to evaluate urinary THCCOOH concentrations at the 15 ng/mL federally mandated cut off utilized by most laboratories. Employing the 15 ng/mL cutoff, THCCOOH urine specimens also were positive throughout residence on the research unit for 7.5 to 29 days.

These data indicate that following chronic cannabis smoking, 11-OH-THC can be measured in urine for up to 29 days, negating its value as a urinary biomarker of recent cannabis use.

#### **Cannabinoids, Urine, GC/MS**