B169 Field Identification of Kratom by Portable Gas Chromatography/ Mass Spectrometry (GC/MS) Instrumentation

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Learning Overview: After attending this presentation, attendees will understand how mitragynine, the active component of Kratom, can be positively identified in the field by portable gas chromatography/mass spectrometry (GC/MS) instrumentation.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by presenting the first method for the on-scene identification of Kratom, which is valuable because other field deployable methods such as color tests and vibrational spectrometers are unable to identify this opioid.

Kratom is a relatively new "legal high" in the United States that is easily purchased over the internet, and its federal legality is under considerable debate. It has been linked with at least 44 deaths which have triggered significant attention by the FDA and DEA. Kratom comes from the *Mitragyna speciosa* leaves which is part of the *Rubiaceae* family native to South East Asia. Originally the plant was ingested for its stimulant properties, and it is advertised today as a concentration booster, a workout enhancer, a replacement for opioid painkillers and as a way to treat opioid addiction. The main active compound in kratom is mitragynine which in low doses binds to the delta-opioid receptors where it acts as a stimulant, but as the dose increases it binds to the mu-opioid receptors and becomes a sedative. It is in the same category as morphine but is 13 times more potent of an agonist for the receptors, thus it is similarly addictive. Consequently, in February 2018, the FDA determined that kratom was more than just a plant and classified it as an opioid. Although it has not yet been scheduled by the DEA, its ban appears to be imminent with this new FDA classification.

Law enforcement officers commonly rely on the field identification of illicit drugs for arrests. The most commonly employed field test is a presumptive colorimetric test called the Narcotics Identification Kit (NIK) which relies on a reaction with the provided reagents to produce characteristic color changes. To date, no colorimetric test has been found to identify Kratom or its active compounds. Infrared and Raman spectrometry are also not suited for the identification this opioid due to the complexity of the plant matrix. In the lab, chromatographic tests (GC/MS and HPLC/MS) are used for the confirmatory identification of mitragynine in Kratom. A gap has thus been identified because there is a need for the on-scene identification of Kratom by the law enforcement community. Field deployable GC/MS instruments are of considerable interest for law enforcement and hazmat teams, with applications for explosive and general unknown identifications, illicit drug testing, and clandestine lab investigations. This research reports on the positive identification of mitragynine in Kratom by portable GC/MS instrumentation. The Torion T-9 portable GC/MS using SPME sampling with direct injection via thermal desorption successfully detected and identified mitragynine in 14 samples of kratom: 10 powders, 3 pills, and an oil extract.

Portable GC/MS, Kratom, Mitragynine