K10 Driving Under the Influence of 1,1-Difluoroethane (DFE) and Marijuana

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Learning Overview: After attending this presentation, attendees will better realize the intoxicating effects of DFE and marijuana on driving performance.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by increasing awareness of DFE abuse and the importance of immediately collecting blood samples from drivers in traffic accidents. The knowledge gained will help improve investigations into vehicle accidents involving DFE and/or marijuana consumption.

DFE is a colorless, flammable hydrofluorocarbon with a slight ethereal odor. It is widely used in refrigeration, electronic cleaning products, and various aerosol propellant products that are sold in many markets.[1] When DFE is inhaled or huffed, it causes short but intense euphoria.[2] Due to its euphoric effects, it is abused by people who can easily access them, even in local supermarkets. The high from DFE inhalation can cause dizziness, euphoria, hallucinations, disorientation, loss of motor control, confusion, memory loss, pulmonary irritation, loss of consciousness, and sudden death by causing heart failure, even on the first use. Investigations of driving incidents involving DFE have shown that drivers who lost consciousness frequently have no memory of events immediately prior to the accident.

This case involved a 20-year-old man who went for a ride with his friends early in the morning. While is driving around the city, he stopped the car at a local supermarket, where one of the passengers stole a can of air duster that contained compressed air used to clean computer keyboards. After leaving the market, he huffed some of the mixture from the can and passed it to the driver. A few minutes after huffing, the driver lost control of the vehicle, crashed into and snapped off a wood telephone pole, then proceeded to crash into a store. There were no fatalities; however, the driver as well as all passengers were severely injured due to the accident.

A blood sample of the driver was taken about an hour after arrival at the hospital. Blood test results were found as 0.92ng/mL of delta-9-THC (which is active ingredient of marijuana), 16ng/mL of delta-9-carboxy-THC by Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), and 2µg/ml DFE by Gas Chromatography/Mass Spectrometry (GC/MS). No alcohol was detected. Per research, this appears to be the first case report of a traffic accident that involved both DFE and marijuana consumption of a living subject.

It can be concluded that the DFE level was consistent with other Driving While Intoxicated (DWI) incidents and the presence of both DFE and THC in the blood were contributing factors to the accident.

Reference(s):

1. ECETOC, 2004. 1,1-Difluoroethane (HFC-152a). *JACC Report* vol. 45, Brussels.
2. Broussard, L.A., Brustowicz, T., Pittman, T., Atkins, K.D., Presley, L. 1997. Two traffic fatalities related to the use of difluoroethane. *J. Forensic Sci.* 42, 1186–1187.

1,1-Difluoroethane, Marijuana, DUI

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