B192 Forensic Analysis of Dipyrone in Fentanyl Samples

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The goal of this presentation is to provide attendees with relevant information about a newly emerging trend of fentanyl samples encountered by the Drug Enforcement Administration (DEA). Attendees will also gain an insight of commonly encountered adulterants/cutting agents and the methodologies required for conclusive identification. These findings and methodologies may impact individuals in both the forensic science and toxicology fields.

This presentation will impact the forensic science community by highlighting some of the trends that are seen with fentanyl samples in the DEA Northeast Laboratory.

Fentanyl, N-phenyl-N-[1-(2-phenylethyl)-4-piperidinyl]-propanamide, is a synthetic opioid commonly used in anesthesia both as a pre-anesthetic and postoperatively to control pain.[1] It has an analgesic potency of approximately 100 times that of morphine and 50 times that of heroin.[2] Due to its potential for abuse, it is a Schedule II drug under the Controlled Substances Act. Illicit drug dealers often encounter difficulty when utilizing fentanyl as an adulterant due to its extremely high potency compared to other cutting agents. In 2013, the DEA Northeast Laboratory experienced a resurgence of heroin exhibits adulterated with fentanyl. This potent combination of dangerous drugs was attributed to an increase in overdose fatalities throughout the northeast region.

In an effort to maximize the effects of the drug, illicit dealers add additional adulterants which have synergistic effects in combination with fentanyl samples. Dipyrone, a methanesulfonic acid sodium salt of aminopyrine, is a relatively new adulterant that has been commonly seen in fentanyl cases in the northeast region. On its own, dipyrone exhibits analgesic effects on the body and is also commonly used to control pain; however, due to its potential fatal side effects, it has been withdrawn from medical use in the United States. Forensic analysis of dipyrone utilizing conventional methodologies such as gas chromatography/mass spectrometry and gas chromatography/flame ionization detector may yield a false positive for the presence of aminopyrine. Electrospray Ionization-Liquid Chromatography/Mass Spectrometry (ESI-LC/MS) has shown to have high discriminatory power and the required sensitivity for the conclusive identification of dipyrone and other adulterants in illicit fentanyl exhibits.

In this study, two ESI-LC/MS methods will be presented for routine confirmation of dipyrone in fentanyl-seized samples. Preliminary results showed that dipyrone and aminopyrine can be confirmed in positive mode ESI based on C18 chromatographic separation and unique fragmentation for each compound. The results also revealed that positive mode ESI will not detect the pseudomolecular ion for dipyrone but will for aminopyrine. In order to detect the pseudomolecular ion, one must employ negative mode ESI-LC/MS. Both methods employed the use of a C18 stationary phase and a quaternary pump.

References:

1. Kennedy, S.K., Longnecker, D.E., Jaffe, J.H., Martin, W.R., *The Pharmacological Basics of Therapeutics*, Pergamon Press, New York 1990, p. 508.
2. Meyer, M.R., Maurer, H.H., *Pharmacogenomics* 2011, 12, 215–233.

Dipyrone, Fentanyl, LC/MS