



K45 Common Heroin Adulterants in Puerto Rico: The Emergence of Xylazine

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After attending this presentation, attendees will learn about common adulterants of heroin and the emergence of xylazine as the main adulterant of heroin in Puerto Rico. The goal of this study is to increase the awareness about the appearance of these drug combinations and their potential toxic effects.

This presentation will impact the forensic community by presenting statistical information about the use of xylazine, a drug that was identified as the most frequent adulterant of the street heroin in Puerto Rico.

Xylazine is marketed as a veterinary drug and used as a sedative, analgesic, and muscle relaxant for large animals, such as deer, ruminants, and horses. Xylazine is not approved for human use because it has been proven harmful to humans. Only 27 cases of toxicity caused by xylazine consumption have been documented in humans. According to these reported cases, consumption was accidental, suicidal or for homicidal purposes, occasionally resulting in death. Xylazine was detected and reported as the cause of death in nine postmortem cases from the Puerto Rico Institute of Forensic Sciences (PRIFS).

Illicit drugs such as heroin are often adulterated (cut) with other substances to either enhance or diminish the drug effects and to increase the weight and volume of the drug, thus increasing the dealer's profits. Many different substances are used to cut heroin. Some of the more common non-opiate cutting agents with pharmaceutical effect encountered by the Controlled Substances Section of PRIFS were: caffeine, procaine, cocaine, quinine, lidocaine, and the most frequently detected substance, xylazine. In 2007, a total of 663 suspected street heroin items (or exhibits) were analyzed qualitatively by gas chromatography/mass spectrometry (GC/MS). Heroin was present in 92% (613) of the total items. Of the remaining 8% (50) of the items, 40 (80%) items had xylazine as the main drug. These 40 items represent 6% of the total 663 analyzed items (Table 1).

From the 613 positive heroin items, heroin was identified in 43% (265) as the only drug. In 57% (348) of the items heroin was found in combination with other drugs. The most common heroin combinations were heroin/xylazine (36%), heroin/caffeine (22%), heroin/xylazine/caffeine (13%), heroin/quinine (9%), heroin/cocaine (4%), heroin/xylazine/cocaine (3%), heroin/xylazine/quinine (3%) and other drugs combinations (Table 2). Of the 348 heroin items, 199 (57%) had xylazine as an adulterant. Figure 1 shows a typical chromatogram result obtained from a street sample folded in a sheet of aluminum foil (Figure 2).

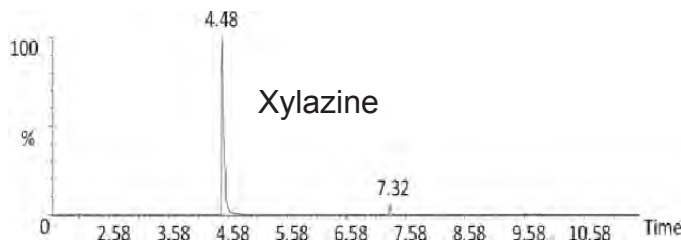


Figure 1. Chromatogram showing a typical street heroin item received by the Controlled Substances Section of PRIFS.



Table 1. Number and percentage of items without heroin, 2007 PRIFS

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	Total	Percentage
Xylazine	32	64
Xylazine/Caffeine	1	2
Xylazine/Caffeine/Cocaine	1	2
Xylazine/Caffeine/Cocaine/Lidocaine	1	2
Xylazine/Cocaine	1	2
Xylazine/Quinine	4	8
Caffeine	3	6
Caffeine/Lidocaine	1	2
Caffeine/Quinine	1	2
Quinine	5	10
Total	50	100

Table 2. Most Frequently Identified Heroin Combinations Number and percentage of identified heroin combinations, 2007 PRIFS

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	Total	Percentage
Heroin/Xylazine	125	36
Heroin/Xylazine/Caffeine	45	13
Heroin/Xylazine/Cocaine	9	3
Heroin/Xylazine/Quinine	9	3
Heroin/Xylazine/Lidocaine/Procaine	3	1
Heroin/Xylazine/Caffeine/Lidocaine	2	1
Heroin/Xylazine/Caffeine/Procaine	2	1
Heroin/Xylazine/Other combinations	4	1
Heroin/Caffeine	75	22
Heroin/Caffeine/Quinine	5	1
Heroin/Caffeine/Lidocaine	3	1
Heroin/Quinine	33	9
Heroin/Cocaine	13	4
Heroin/Cocaine/Other combinations	4	1
Heroin/Lidocaine	4	1
Heroin/Procaine	4	1

The results of this statistical information show that xylazine is the main adulterant of the street heroin in Puerto Rico. Xylazine not only was found as an adulterant of heroin but also was found as the only component or in combination with other drugs. Xylazine may be fatal when used in combination with heroin or with other drugs. The combination of heroin and xylazine can elicit synergistic effects. Literature shows some similar pharmacologic effects between xylazine and heroin. Further studies are suggested to increase the knowledge and understanding of this emerging drug as an adulterant of heroin.

Xylazine, Heroin, Adulterants