



ADDICTION SCIENCE SERIES

Alpha-APV (“Gravel”/“Flakka”)

Alpha-pyrrolidinovalerophenone (alpha-/ α -PVP) is a synthetic cathinone. It is typically manufactured in China, India, or Pakistan and resold in other countries. α -PVP has been identified on the streets of the U.S. since 2012, with reports of its use increasing in 2015. In 2014, there were three news reports in the United States related to “flakka”, but between January and mid-April 2015, that number increased to 122, and by June 1, to 437.

α -PVP is closely related to MDPV (methylenedioxypropylvalerone), one of the substances once sold legally as “bath salts”. Although published research on α -PVP is sparse, MDPV has been shown in classic animal self-administration studies to have an addiction potential equal to or exceeding that of methamphetamine.¹ In the United States, α -PVP is listed in Schedule I of the Controlled Substances Act. However, it is still available on the black market under the names “flakka”² and “gravel”.



Sample of α -PVP sold as “gravel” in Tennessee, 2013



Sample of “flakka” sold in Florida, 2014

¹ Watterson, L.R. & Olive, M.F. (2014). Synthetic cathinones and their rewarding and reinforcing effects in rodents. *Advances in Neuroscience* (2014), Article ID 209875, June 4

² Possibly based on the Spanish “flaca” (thin)



Synthetic cathinones (SCs) are related to cathinone, the psychoactive chemical in the khat (qat) plant, native to tropical East Africa. Like other SCs, α -PVP causes central nervous system stimulation, resulting in accelerated pulse and breathing, higher blood



Sample of "blue aqua" sold in Illinois, 2016

pressure, alertness and loss of appetite. It also produces a sense of euphoria and enhanced mood, possibly as the result of its hypothesized action as a norepinephrine-dopamine reuptake inhibitor (NDRI)³. α -PVP has been reported to be the cause or a significant contributory cause of death in suicides and polydrug overdoses⁴⁵. It can cause a condition called "excited delirium" that involves hyperstimulation, paranoia, and hallucinations. α -PVP has also been linked to at least one death where it was combined with the synthetic cathinone pentedrone and caused heart failure⁶. Between January 1 and May 25, 2015, 2714 α -PVP related cases were reported to the American Association of Poison Control Centers⁷. In Broward County, Florida, hospitals have

³ Meltzer, P. C.; Butler, D; Deschamps, J. R.; Madras, B. K. (2006). "1-(4-Methylphenyl)-2-pyrrolidin-1-yl-pentan-1-one (Pyrovalerone) analogues: A promising class of monoamine uptake inhibitors". *Journal of Medicinal Chemistry* **49** (4): 1420–32. doi:10.1021/jm050797a. PMC 2602954. PMID 16480278.

⁴ Marinetti, L. J.; Antonides, H. M. (2013). "Analysis of synthetic cathinones commonly found in bath salts in human performance and postmortem toxicology: Method development, drug distribution and interpretation of results". *Journal of Analytical Toxicology* **37** (3): 135–46. doi:10.1093/jat/bks136. PMID 23361867

⁵ Waugh et al. (2013). "Deaths Involving the Recreational Use of α -PVP (α -pyrrolidinopentiophenone)" (PDF). *AAFS Proceedings*. Abstract K16.

⁶ Sykutera, M.; Cychowska, M.; Bloch-Boguslawska, E. (2015). "A Fatal Case of Pentedrone and -Pyrrolidinovalerophenone Poisoning". *Journal of Analytical Toxicology*. doi:10.1093/jat/bkv011

⁷ American Association of Poison Controls Centers (2015). "Synthetic Marijuana Data". Fairfax VA: AAPCC



seen an average of 20 a-PVP overdose or excited delirium cases per day since March 2015⁸ and 60 people have died in α -PVP related medical incidents⁹.

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⁸ Center on Substance Abuse Research (2015). First Annual NDEWS Report Describes Drug Use Trends in 12 Sentinel Community Sites. *National Drug Early Warning System News*, (1).

⁹ McFadden, C.; Nadi, A. & Connor, T. (2015). 'Devil Drug': Flakka is driving Florida insane. NBC News, December 18, 2015. Retrieved 12/19/15 from <http://www.nbcnews.com/news/us-news/devils-drug-flakka-driving-florida-insane-n471531>