Novel Psychoactive Substances (NPS) Identification using Rigaku Raman

Introduction

Precursor materials for commonly abused drugs (such as methamphetamine) have been regulated for many years, making large quantities of these materials difficult to come by for mass drug manufacturing. Cartels and other drug distributors have worked to get around these limitations by introducing novel psychoactive substances (NPS) into the drug supply. The novel nature of these materials permit them to fly under the radar as many of the precursor materials, and the NPS themselves are not regulated or scheduled by most government regulatory groups. NPS pose a special risk as well[1]; most of these chemicals have not been well studied for their toxicity, making their hazards to human users unknown or very limited. As the name suggests, these materials licit psychotropic activity in the brain similar to cannabinoids and cathinones[2] when exploited but are not chemically similar to either class of illicit drugs. Figure 1 shows the number of new NPS reported in a two-year time period by UNODC, broken down by general effect classifications[3].
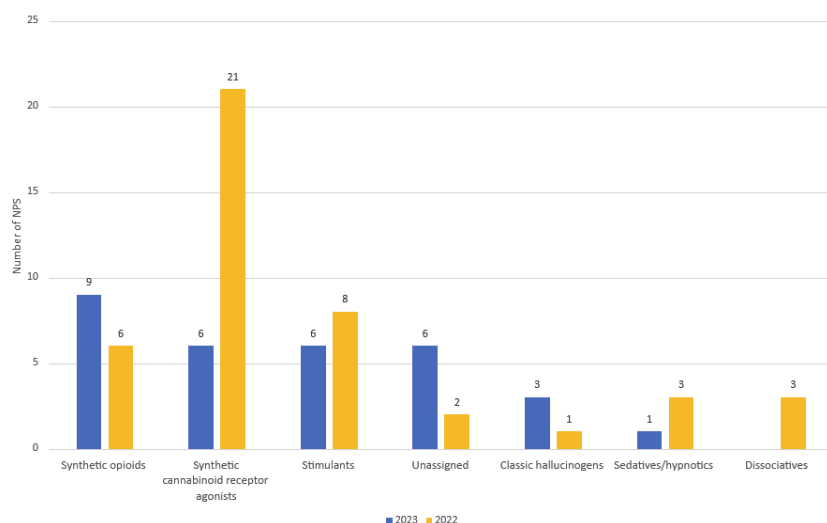
The Complexity of Novel Psychoactive Substances

Within the broad categories of NPS (with over 1,230 substances classified as such) are also non-opioid based drugs[4] intended to produce sedition effects on the user. Xylazine, commonly known by the slang term "Tranq" is a non-opioid anesthetic frequently used in veterinary medicine. The drug is not used in human medicine as Xylazine is considered too potent for safe human use. The sedative effects of Xylazine make it an ideal cutting agent for opioids such as opium-mixtures, heroin, and fentanyl. Most of the overdose deaths in which Xylazine was found in the drug of choice always had a related opioid (or more) with it, making it difficult for medical professionals to determine the exact cause of death.

Rigaku CQL Narc-ID Handheld Raman Provides NPS Analysis

Rigaku's CQL Narc-ID handheld Raman analyzer has a targeted library that contains reference data for NPS, Xylazine, and precursors of these materials. Stopping the production chain before NPS can be synthesized is one means of helping to curb the distribution of these materials. The CQL Narc-ID's hardware allows for non-destructive, non-contact analysis of possible drug precursors or drug mixtures. The GUI interface reduces the cognitive burden on users by prioritizing threat alerts first. If a drug mixture contains NPS materials along with cutting agents, CQL Narc-ID's algorithm automatically alerts users to the presence of an NPS, Xylazine or other narcotic if it is detected within a mixture of cutting agents at non-trace levels. This result is stored in a non-mutable PDF report for easy export to law enforcement.

The Rigaku CQL Narc-ID allows users to also configure their specific threat lists according to local jurisdictions for illicit NPS substances[5], making it readily used by teams across multiple localities and countries with variances in narcotic scheduling and possession laws. Figure 2 shows some screenshots of CQL Narc-ID's results – red indicating the identification of an illicit substance, while yellow indicates a synthetic precursor material or common cutting agent. While other handheld Raman systems may be overwhelmed with fluorescence, CQL Narc-ID's 1064nm excitation greatly reduces NPS materials do not have to pose a complication in drug detection screening using CQL Narc-ID's prioritization and non-contact platform.
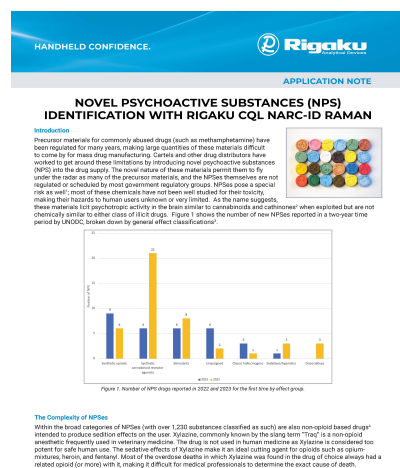
Figure 2: Examples of NPS materials detected by the Rigaku CQL Narc-ID, including 2C-derivatives, Xylazine, and drug precursor materials, such as phenylacetone (P2P).

Conclusion

The rise of Novel Psychoactive Substances (NPS) presents a significant challenge for law enforcement and public health agencies due to their unregulated nature and unknown toxicity. Tools like Rigaku's CQL Narc-ID provide a crucial line of defense by enabling accurate and efficient identification of these substances and their precursors. With its advanced algorithms, customizable threat lists, and user-friendly interface, the CQL Narc-ID enhances the ability to detect and report NPS, helping to curb their distribution and mitigate the risks they pose to communities worldwide. As NPS continue to evolve, technologies like the Rigaku CQL Narc-ID will be vital in adapting to this ever-changing threat landscape.

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References

[1]https://www.unodc.org/LSS/Page/NPS

[2]https://www.unodc.org/LSS/Page/NPS/pharmacology

[3]Figure 1 resourced from https://www.unodc.org/LSS/Announcement?type=NPS

[4]https://www.unodc.org/LSS/SubstanceGroup/Details/01f2d3e0-91d1-4406-87db-e7129d40a371

[5]https://www.unodc.org/LSS/Country/List

Related products

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A cost-effective solution for departments looking for targeted chemical threat analysis

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