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ANALYTICAL & TESTING INSTRUMENTS

SafetyNews

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JUNE 2026

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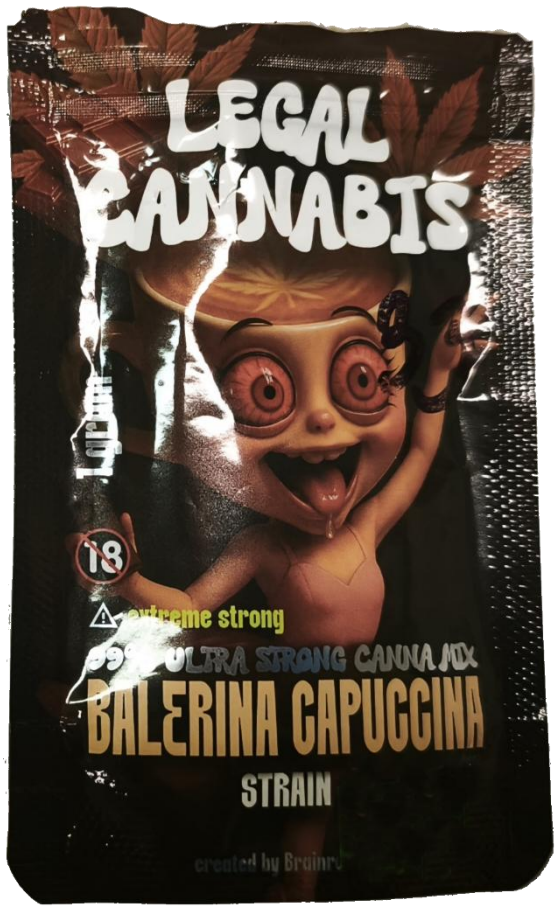
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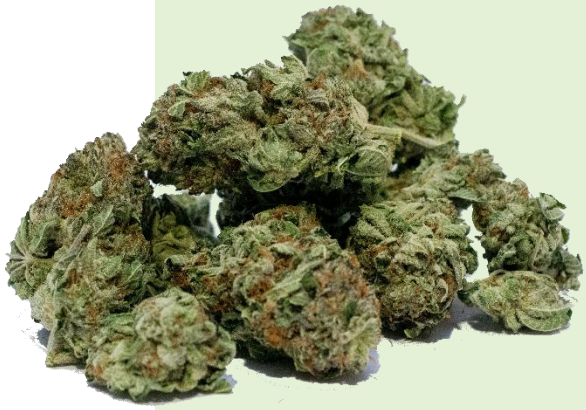
Today's post-holiday Safety News focuses primarily on the detection and identification of drugs and their precursors.

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Experience with the NIRLAB System

In the previous issue of Safety News No. 41, we addressed the issue of sprayed/modified cannabis samples. These are mostly samples sprayed with one of the variants of the synthetic cannabinoid PINACA (we currently know of 16 derivatives of this substance). However, samples containing other synthetic cannabinoids are now appearing around the world. The great danger posed by these samples lies not only in the fact that these synthetic cannabinoids are significantly more potent and their effects are still not well understood, but mainly in the high variability of the concentrations applied to different samples. Some samples thus contain high and very dangerous concentrations and are the cause of a number of cases of intoxication that we have encountered recently.





Identification of Sprayed Cannabis Samples – Experience with Using the NIRLAB System for Rapid Field Identification of Modified Cannabis Samples

Thanks to a campaign currently underway in the Czech Republic, we already have feedback on how the NIRLAB system handles these samples in the field. The system has the advantage of identifying these samples in two ways.

1) **Direct identification**. The database is gradually being expanded to include real samples of sprayed cannabis, and the output is a warning that the plant has been sprayed.

2) **Indirect identification** indicating that the sample is highly likely to be a cannabis plant (typically a cannabis flower) that has been sprayed or otherwise modified. In such cases, the identification result indicates CBD or CBG cannabis, but with a low "confidence level"—meaning that the sample merely resembles the model for "pure" CBD/CBG cannabis. **This approach has great potential in that it will issue warnings even when various types of synthetic cannabinoids are used; it is therefore, to a certain extent, immune to the introduction of more and more derivatives.** For heavily modified samples, the result may also be a warning that the sample does not fit the cannabis model at all, even though it is clearly a cannabis sample visually.
   Based on the results of analyzing several hundred samples, which were subsequently analyzed using the GC-MS method, it can be stated that the error rate is approximately 10% with the model in its current state. These are false-positive errors; the sample was not modified with a known synthetic cannabinoid, but it may represent a deviation from known varieties or otherwise partially degraded material.

If the model is retrained using a dataset of current samples from the Czech Republic, there is a high probability that the NIRLAB system's performance in identifying these samples will improve even further.

A detailed explanation of how the NIRLAB system works with these samples is provided below:

As we mentioned in the previous issue of **Safety News No. 41** (available here), identifying these samples in the field is not easy. This is a complex system in which natural cannabis samples themselves contain a spectrum of natural cannabinoids (legal samples should contain less than 1% THC), and a synthetic cannabinoid is sprayed onto the surface of this material. Attempts to selectively "wash away" the applied substance have failed; the entire spectrum of other substances is always co-eluted, making it difficult to use SERS in conjunction with Raman spectroscopy. Furthermore, the use of SERS requires additional steps to be performed directly in the field. The use of NIR technology in conjunction with a cloud-based software solution that utilizes machine learning (AI)—namely, the NIRLAB system—has proven to be very promising. With this system, samples can be analyzed directly without any preparation, and results are available in approximately 10 seconds.

NIRLAB's technology has been under development for many years, primarily for the quantitative analysis of selected drugs or the identification of substances/samples that pose challenges when using Raman spectroscopy (plant materials, highly fluorescent synthetic drugs, etc.). A comprehensive model for quantifying THC, CBD, and CBG in cannabis samples was also developed separately and has since been gradually expanded to cover the entire spectrum of cannabinoids found in natural cannabis.

In addition to quantitative analysis, the system can also reliably distinguish between cannabis strains. It can thus differentiate between strains grown for high THC content and those grown for high CBD and CBG content. The model currently contains a large number of verified samples from most parts of the world (several thousand samples) and is simultaneously learning by scanning common cannabis samples. This is very important; as a result, the model is now very familiar with standard cannabis samples across a wide range of varieties and types. It is thus able to recognize that, while a given sample is CBD/CBG cannabis, it does not fit the model and is therefore, with high probability, modified cannabis.

This demonstrates that the NIRLAB system is capable of effectively **identifying "suspicious" samples,** making it possible to efficiently sort samples in the field for subsequent laboratory analysis.

In the case of a "sprayed" plant, the algorithm reacts to this and detects a low match with the model; in some cases, it is even able to directly identify the spraying. **However, it is essential to learn how to correctly interpret the results.** If you are interested, please contact us, and we will provide you with the Standard Operating Procedure (SOP) we have developed, which describes how to interpret the results.

VipIR won the TOP PRODUCT LABOREXPO 2026 award



At this year's LABOREXPO 2026 trade fair, held June 2–4 at the PVA EXPO Prague Letňany complex, the **VipIR** instrument **from 908 Devices** won the prestigious **TOP PRODUCT 2026** award in the laboratory instruments and equipment category. The award is given to exhibits that impress the expert jury with their innovative potential, technical specifications, and benefits for users. A total of 26 entries from the field of laboratory and process analytics competed in this year's competition.

VipIR represents a new generation of portable laboratories for the identification and compositional analysis of unknown samples. It combines **FTIR and Raman spectroscopy** technologies in a single device and utilizes the patented **Smart Spectral Processing (SSP)** algorithm. This algorithm can simultaneously process spectral data from both analytical methods, providing users with significantly greater reliability in identifying unknown substances, particularly in mixed samples. The instrument is designed for the rapid identification of unknown solid and liquid substances in the field. Thanks to a library containing more than 39,000 chemical spectra, it can identify drugs, explosives, industrial toxic substances, precursors, and chemical warfare agents.

For more detailed information about the device, see our Safety News 39 and visit our website here:
VipIR

Expansion of the TruNarc Delta's SERS library with dozens of new synthetic drugs

Thermo Fisher Scientific has released a new **SERS library** expansion for the **TruNarc Delta** Raman spectrometer (see SafetyNews 38), which significantly expands the capabilities for identifying modern synthetic drugs directly in the field, even at low concentrations, thanks to SERS (surface-enhanced Raman scattering) technology. This update addresses current trends in the illicit drug market and adds more than **60 new substances** from the categories of synthetic cannabinoids, fentanyl analogs, designer benzodiazepines, hallucinogens, and other new psychoactive substances.

A complete list of substances in the TruNarc Delta SERS library expansion is available upon request from us at RMI; please feel free to contact us.



The majority of the newly classified substances are **synthetic cannabinoids**, including members of the now widely prevalent **PINACA, FUBINACA, CHMINACA, BUTINACA, and JWH** groups. Users can now identify, for example, AB-PINACA, AB-FUBINACA, ADB-FUBINACA, APP-CHMINACA, MAB-CHMINACA, MMB-FUBINACA, CUMYL-THPINACA, PB-22, BB-22, MN-18, MN-25, UR-144, XLR-11, and a number of their fluorinated or otherwise modified analogs. It is precisely these substances that frequently appear in herbal mixtures, e-cigarette refills, or on impregnated paper intended for smuggling into prisons. There has also been a significant increase in the prevalence of **synthetic opioids**. Highly dangerous substances such as **carfentanil**, **acrylfentanyl**, ortho- and meta-fluorofentanyl, para-chlorofentanyl, para-chloroisobutyryl fentanyl, and beta-hydroxythiofentanyl have been added to the library. These substances pose a high risk not only to drug users but also to first responders when handling unknown samples. The new library also includes several significant **designer benzodiazepines and other psychoactive substances**, such as flubromazolam, lorazepam, xylazine, and the stimulant NRG-3. The group of hallucinogens has also been expanded to include **25B-NBOMe, 25C-NBOMe, 25I-NBOMe, 2C-B, 2C-E, and 2C-I**, which are highly potent psychedelic phenethylamines.

This update confirms the growing importance of continuously expanding spectral libraries. Today, illicit drug manufacturers are rapidly introducing new chemical modifications of known substances to the market, which are often difficult to identify without up-to-date databases. Thanks to the new SERS library, TruNarc Delta users can now identify these new threats even at low concentrations or, for example, in impregnated papers, etc.

A complete list of substances in the TruNarc Delta SERS expansion library is available upon request from us at RMI; please feel free to contact us atsale@rmi.cz .

MX908: When Drugs Are Invisible—Practical Examples of Application

Organized crime is constantly seeking new ways to circumvent security checks. While in the past it was enough to detect a suspicious package or shipment, today's smugglers are using increasingly sophisticated methods to conceal drugs. For police, customs, correctional services, and other law enforcement agencies, technologies capable of detecting even invisible traces of hazardous substances are therefore becoming increasingly important. This is precisely where the **MX908** handheld mass spectrometer from 908 Devices proves its worth in practice. The device is designed to quickly identify trace amounts of drugs, explosives, chemical warfare agents, and other hazardous chemicals in a matter of seconds (more here: **MX908**)

The Largest Drug Seizure in Chile's History



A recent case in Chile showed just how far smugglers are willing to go. Authorities there uncovered more than **108 metric tons of cocaine and ketamine** that were not hidden in a shipment of lumber but had been chemically impregnated into the wood itself. In total, there were 1,080 metric tons of contaminated lumber distributed across 45 containers bound for Europe and North America. This method was chosen specifically to evade standard X-ray inspections and the capabilities of drug-sniffing dogs. It is in situations like these that the MX908 demonstrates its power. Thanks to its ability to detect trace amounts of narcotics, it can identify the presence of substances such as cocaine or ketamine directly on the surface of materials and packaging. It does not rely on visual identification of a suspicious substance. The chemical nature of a substance simply cannot be disguised as easily as its appearance.

Zero Fatal Overdoses in Prisons

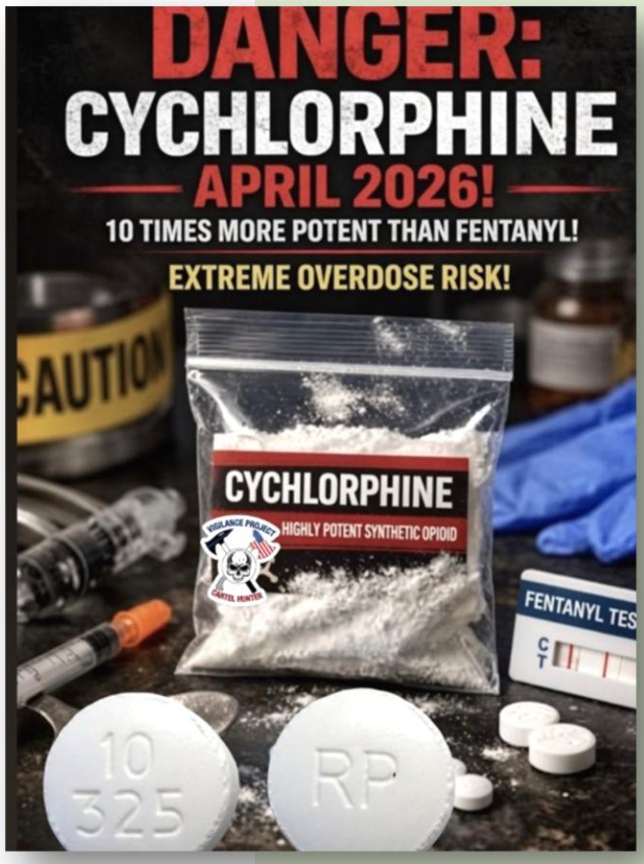


However, the significance of the MX908 extends beyond borders and ports. The **Operation FREE** program, implemented in prisons in the state of Virginia in the U.S., yielded very interesting results. Thanks to the deployment of MX908 devices and systematic screening of packages, mail, and other potential sources of contraband, anti-drug measures were significantly strengthened. As a result, the number of fatal overdoses in prisons dropped from 24 cases in 2024 to **zero in 2025**. The ability to analyze trace amounts of fentanyl, synthetic cannabinoids, xylazine, and other drugs makes it possible to detect contaminated letters, packages, or items before they even enter the facility. This significantly increases the safety of both staff and inmates. You can find the webinar and more information about the Operation FREE program HERE.

The New Wave of Synthetic Opioids: An Ever-Changing Threat

The fentanyl crisis is no longer just a problem for North America. Law enforcement agencies around the world are now facing an ever-widening range of synthetic opioids, which are often many times more potent than heroin and, in some cases, even more potent than fentanyl itself. The latest warning from the U.S. DEA concerns **cychlorphine**, an emerging synthetic opioid from the orphin class that has already been linked to fatal overdoses and is beginning to be detected in multiple U.S. states as well as in the EU. Experts note that the substance is not only being detected in postmortem toxicological analyses but also in living users undergoing treatment for addiction. This confirms that this is not an isolated occurrence but an emerging trend that requires increased attention from analytical laboratories and law enforcement agencies.

In the case of orphins as well, we are seeing the emergence of new derivatives; the DEA has recently detected the first samples containing the substance N-propionitrile 5-chloro desmethylbrorphine (source: DEA https://lnkd.in/eGwi-zPg).





At the same time, massive pressure continues regarding the distribution of fentanyl and its analogs into prisons and other secure facilities. A recent federal investigation in New Mexico uncovered an extensive drug smuggling network linked to the Cibola County Correctional Center. During the raid, fentanyl tablets, heroin, methamphetamine, firearms, and other evidence of organized crime were seized. Investigators note that drug networks are increasingly using family members, visitors, and outside associates to smuggle drugs behind prison walls. For the police, customs authorities, correctional services, and HAZMAT teams, this leads to a clear conclusion: traditional lists of known drugs are no longer sufficient. New synthetic opioids are emerging faster than ever before and are often distributed under the guise of other substances or in the form of counterfeit medications. The ability to rapidly identify unknown compounds directly in the field is therefore becoming a key element in protecting first responders.

Modern mass spectrometry devices, such as the MX908, enable the detection of fentanyl, its analogs, and emerging synthetic opioids within seconds, without the need to transport samples to a laboratory. At a time when the drug market is changing practically every month, rapid chemical identification represents one of the most effective weapons against the growing threat of synthetic drugs.

Thank you for your support

Stay up to date on the latest news from the world of analytical technologies.

For more information, please feel free to contact us at sale@rmi.cz .

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Your RMI, s.r.o. team