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Application Note

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Analyze Narcotics, Legal highs and Cutting Agents using ATR

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Drugs and cutting agents are easy to identify with the Specac Quest™.

Drugs, blood and semen are often found at crime scenes and several forensic analyses exist to test them. Border protection and security services who stop and search criminals also rely on these tests to determine what certain substances are.

This note shows how the Specac Quest™ ATR accessory can be used at crime labs as a powerful tool in confirmatory testing of narcotics.



Specac's ATR Accessory, The Quest™

Acknowledgement

Specac would like to thank Mia Abbott, Jodie Dunnett and Alison Davidson from Staffordshire University and Staffordshire Police for their assistance with the collection of the spectra reported in this application note.

Method

Twelve drug samples taken from a UK music festival were analyzed by Staffordshire University in collaboration with Staffordshire Police to determine which narcotics they contained. Approximately 1 mg of each sample was placed onto the Quest™ ATR, without any sample preparation. The Quest™ ATR was mounted in a commercially available spectrometer and spectra of the drugs were recorded.

ATR Reference Spectra

Figure 1 shows the ATR spectra of 3 common drug samples: ketamine, mephedrone and cocaine. Each drug has its own unique signal peaks and shapes, especially in the lower wavenumber region, from 1500 – 500 cm^{-1} . The computer can quickly distinguish two samples and even identify if the sample is pure or cut with other substances.

Of course, not all seized drugs are pure and are often mixed with cutting agents. These agents alter the street value and chemistry of drugs. The Quest™ ATR can also be used to detect the presence of these substances.

Benzocaine is a local anaesthetic that mimics the numbing effect of cocaine. For this reason, it is a common bulking agent. Figure 2 shows how the spectrum of pure cocaine changes when it is cut with benzocaine.

Likewise, lidocaine is a common cutting agent for ketamine. The effect of mixing lidocaine and ketamine on the ATR spectra is shown in Figure 3.

Pharmaceutical drugs like benzocaine and lidocaine are cheap over-the-counter pharmaceuticals, costing tens of dollars a kilo. However, when cut with cocaine, they can be sold for as much as \$70,000! Buyers can be conned into buying cocaine that is actually 100% benzocaine, maximizing profits for the drug dealers.

Results and Conclusion

The Quest™ ATR was used to test twelve unknown drug samples, in conjunction with GC-MS. Five of the samples contained cocaine and six were primarily ketamine.

This note shows that FTIR analysis allows for accurate confirmatory identification of the various drugs samples and can be used to detect cutting agents. The ability to identify the samples is extremely beneficial to developing accurate and fast drug detection.

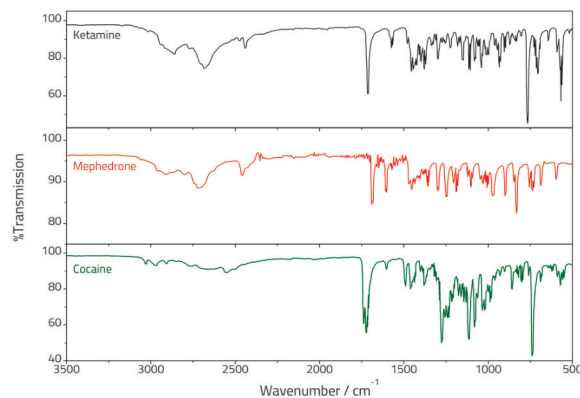


Figure 1. ATR spectra of ketamine, cocaine and mephedrone

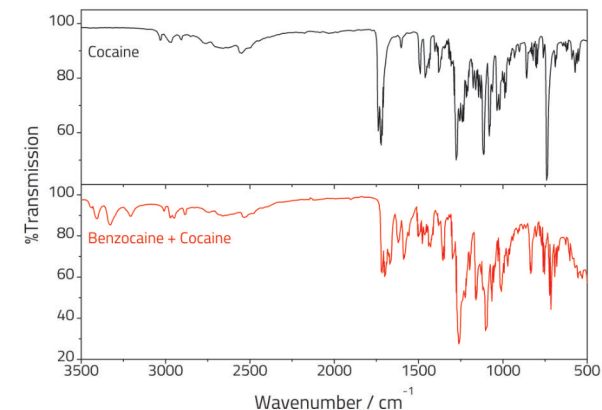


Figure 2. ATR spectra of cocaine: pure and cut with benzocaine

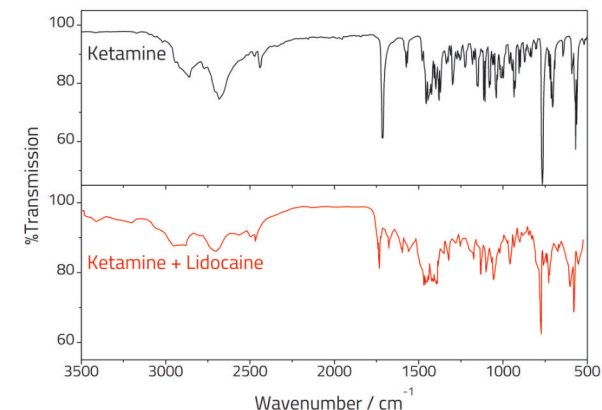


Figure 3. ATR spectra of ketamine: pure and cut with lidocaine

