

More from Our Recent Case Files

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ABSTRACT: This paper further reports some of the recent interesting cases encountered in our drug laboratories. Six cases relating to the analysis of unknown substances are presented in the first part. In two of these, we report our first encounter with the plant material khat and “ma huang” (ephedra). In the second part we report a case involving concealed packets recovered from the gastrointestinal tract of an Iranian body packer where we found a raw opium drug packet among the other 99 packets of crystalline methamphetamine hydrochloride. These cases reflect the significant challenges faced by our forensic drug chemists while at the same time they provide a welcome relief to the tedium and monotony of the mundane daily work.

Key words: narcotics, controlled substance, methamphetamine, khat, cathinone

Introduction

The Narcotics Section of Department of Chemistry Malaysia at Petaling Jaya and branch laboratories examine all the drug cases submitted by law enforcement agencies for prosecutorial and investigative purposes. We received samples of all kinds and some unusual encounters related to our routine work was reported earlier. In this paper, we further report some unknowns submitted to us for characterization and a recent unusual case of opium smuggling through the airport.

a) The Unknowns

Case 1 (2005)

Owing to the nature of the work and the samples handled, our forensic drugs laboratories very rarely handle work from the private sector. We report a strange case here: - A middle-aged man presented some white crystalline substance to our laboratory for analysis. The wife, who had been in good health, had suddenly died of a heart attack a few days earlier. A few weeks before the incident, the couple had newly employed a maid to help with the household chores. While they had no problem with the maid and were quite happy with her work, the husband could not help thinking that there might be a connection between the maid and his wife’s sudden death. He became more suspicious when found a small plastic packet of white crystalline substance in the maid’s drawer.

We screened the substance using Marquis, sodium nitroprusside and Janovsky tests. The results of these tests were negative and we ruled out the presence of opiates, methamphetamine and other amphetamine type stimulants (ATS), or ketamine. The substance

dissolved readily in water giving an acidic solution – indicating possibly an inorganic substance. Further analysis and material characterization by X-Ray Diffraction Analysis (XRD), Fourier Transform Infrared Spectroscopy (FTIR) looking at its organic materials and Scanning Electron Microscopy (SEM) identified the substance to be alum, a relatively harmless chemical and thus ruling it out as a smoking gun.

Case 2 (2005)

The police seized a plastic packet of white crystalline substance from a lady going through airport immigration. She was detained for possession of the substance suspected to be a controlled substance and a sample was submitted to our laboratory for analysis. We conducted various colour tests routinely used for common controlled substances followed by FTIR and SEM analysis. The substance was determined to be sodium borate (borax).

Case 3 (2007)

An off-white powder was found strewn on the grassy open ground in the vicinity of a methamphetamine clandestine laboratory. The substance was submitted to the laboratory for further determination. Initial visual examination indicated the substance could have been there and exposed to the elements for some time. The substance was probably insoluble in water as it had not been washed away during tropical rain. Our intuition told us that it is unlikely to be methamphetamine hydrochloride salt produced by the clandestine laboratory or a methamphetamine-related precursor such as pseudoephedrine or ephedrine powder since they would be too valuable to be discarded. Initial guess of the identity of this unknown was either diatomaceous earth or fuller’s earth and it

had been utilized as a filtration or cleaning aid. The SEM trace of this substance (**Fig. 1**) resembled that of feldspar's which was provided by UNODC (Vienna). Note that *Feldspar* is the mineral name given to a

group of minerals distinguished by the presence of aluminum (Al) and the silica ion (SiO₄) in their chemistry.

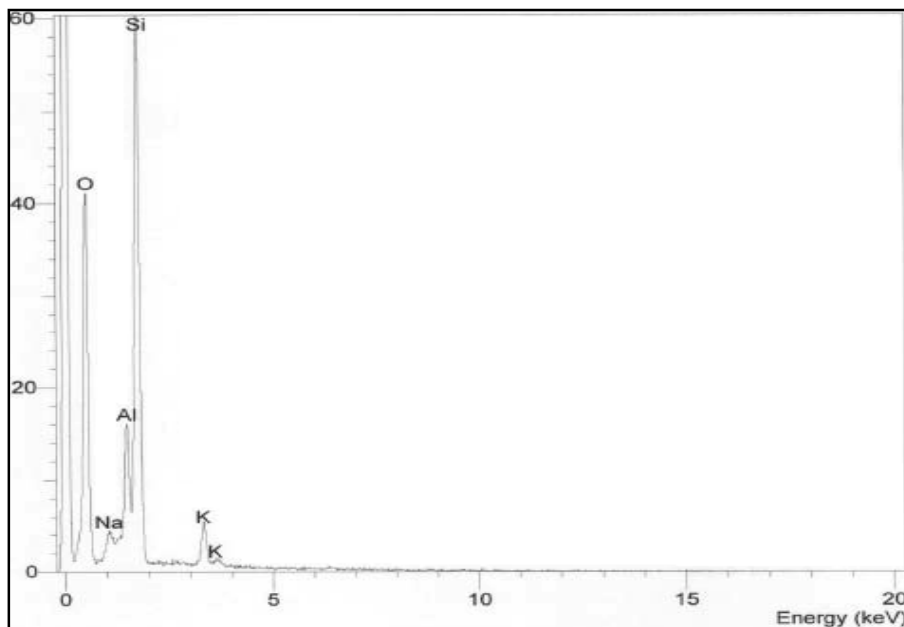


Fig.1: SEM trace of the off-white unknown

Case 4 (2010)

A consignment of fresh plant material seized by the customs was submitted to our laboratory. The plant material was extracted with a dilute hydrochloric acid solution and filtered. The filtrate was then basified and the analyte extracted into chloroform for identification by gas chromatography-mass spectrometry (GC-MS)

[1, 2]. GC-MS chromatogram showed a major peak at R.T =5.77 min (**Fig 2**) and our mass spectra library search result matched cathinone (**Fig. 3**). The plant was identified as khat (*Catha Edulis*) which contained the controlled substance cathinone [1-3], a compound that is not found in other members of the genus [4]. This is the laboratory's first encounter of khat.

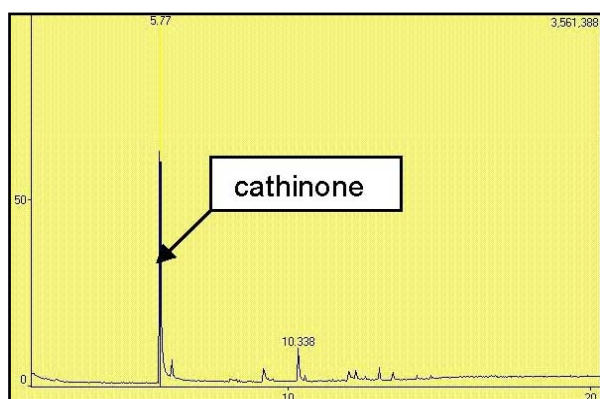


Fig. 2: GC-MS chromatogram of plant material extracts

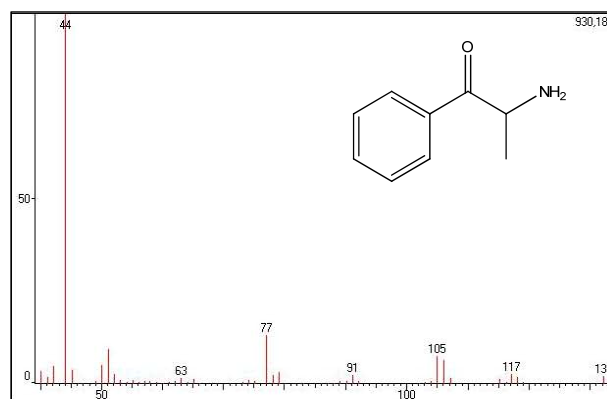


Fig. 3: Mass Spectrum of cathinone showing m/z 44 as the base peak

Case 5 (2006)

Several drums of a light brownish substance labeled "sodium D-pantophenate" in a very large methamphetamine clandestine laboratory was

identified by GC-MS and FTIR as α -acetylphenylacetonitrile (Fig. 4 and Fig. 5). The IR spectrum of the unknown (Fig. 6) matched the α -acetylphenylacetonitrile reference IR spectrum from the HR Toronto Forensic Library.

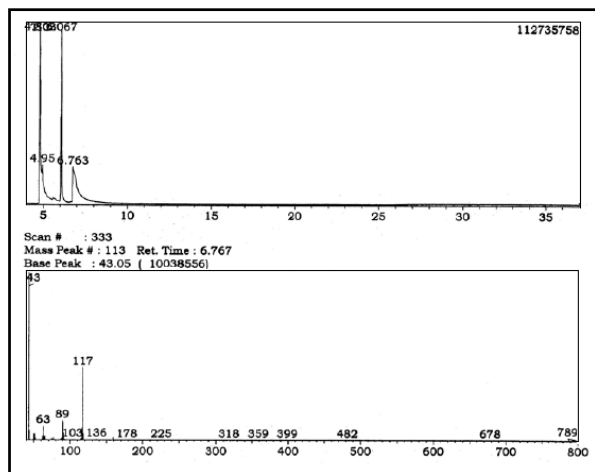


Fig. 4: TIC of unknown (Top) and MS of the peak at 6.67 min (Bottom).

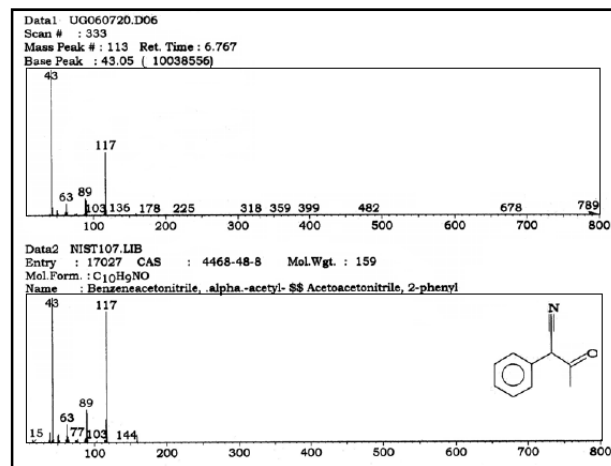


Fig. 5: MS of peak at 6.76 min (Top) and MS of α -acetylphenylacetonitrile from NIST library (Bottom)

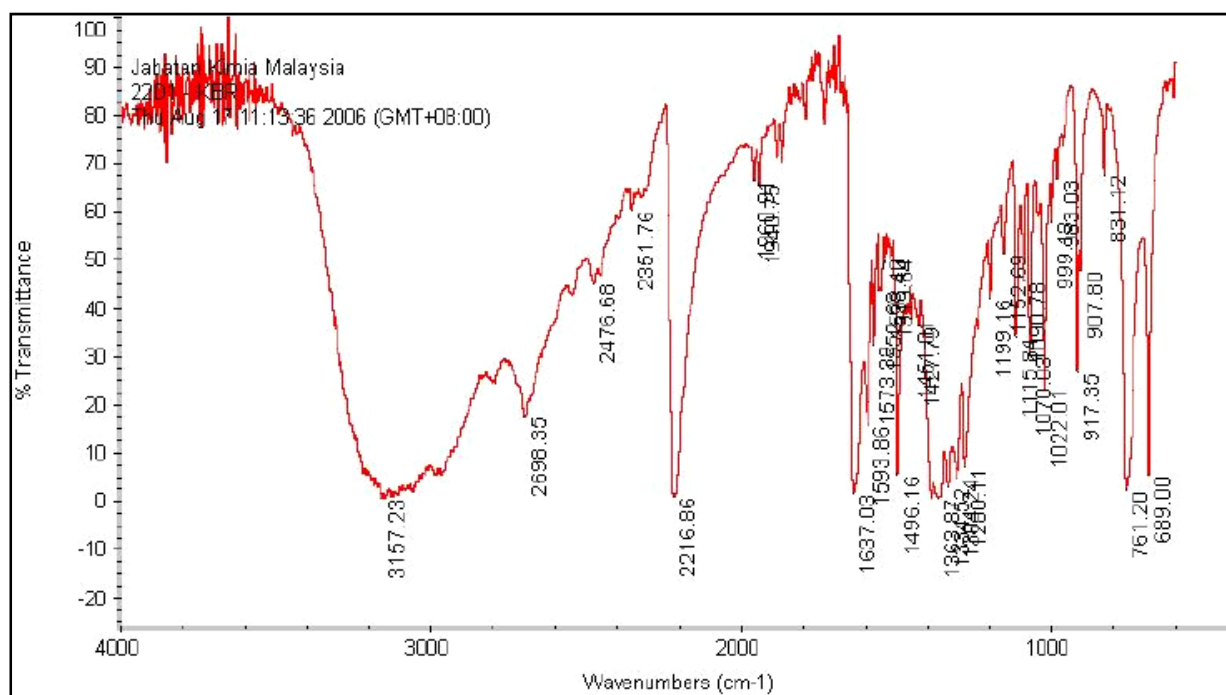


Fig. 6: IR spectrum of the unknown (α -acetylphenylacetonitrile)

Pure α -acetylphenylacetonitrile has a melting point of 86-89 °C [5]. This chemical, also known as α -acetylbenzylcyanide, can be easily converted to phenyl-2-propanone, a common precursor for the synthesis of methamphetamine [6]. As expected from

the utilization of this precursor the methamphetamine hydrochloride produced at this clandestine laboratory was determined by our in-house chiral HPLC procedure to be a racemic mixture of the dextro and levo enantiomers (Fig. 7).

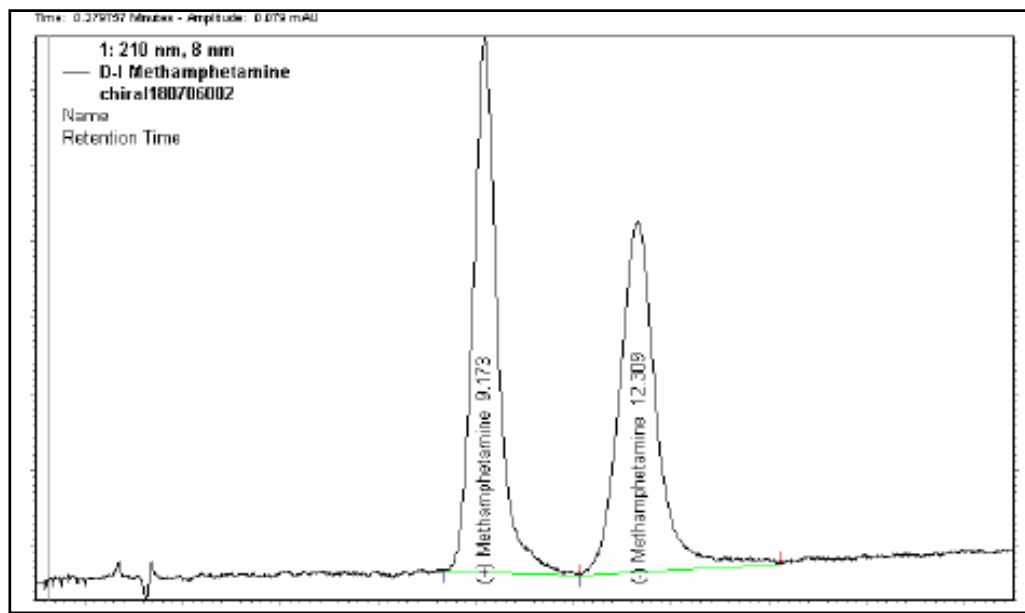


Fig. 7: HPLC trace showing the racemic methamphetamine HCl found at the clandestine laboratory.

Case 6 (2010)

Some dried stringy plant material (Fig. 8) suspected by the law enforcement to contain a controlled substance was submitted to the laboratory for analysis.

On examination the plant material was found to be “ma huang” or ephedra. A GC-MS screen confirmed the presence of ephedrine/pseudoephedrine and methylephedrine [8].



Fig. 8: Dried “ma huang” (Ephedra)

b) The Black Pearl (2010)

The practice of body packing is defined as the trafficking of illicit drugs within the gastrointestinal tract or vagina. In view of the difficulty of its detection and the potentially large financial gain it is a popular way of smuggling drugs. Body packers are also called “swallowers”, “internal carriers” and “mules”. The

body packer usually carries about 1 kg of the drug, divided into 50-100 packets of 8-10 g each, although persons carrying more than 200 packets have been reported [9]. Packets swallowed are usually around 2 cm in size and spherical in shape while rectally inserted packets are bigger [10]. We have encountered quite a number of drug cases involving “swallowers” in Malaysia since the late 1980s. These cases usually

involved heroin, cocaine, and more recently crystalline methamphetamine hydrochloride. In a recent case, the police submitted 100 such concealed packets which were suspected to contain crystalline methamphetamine (Fig. 9). These were recovered from the gastrointestinal tract of an Iranian swallower detained at the airport and were probably not machine made as their size and shape were not quite uniform [11].

Colour tests, GC-MS, FTIR-ATR and gas chromatography-flame ionization detector (GC-FID) confirmed the packets (of mean weight ca.12 g) to contain methamphetamine hydrochloride of about 98% purity. However, one of the packets was found to contain a black gummy substance consistent with the appearance and odour of raw opium. The Marquis and Froehde reagents tested positive for opiates while the ferric chloride test indicated the presence of meconic acid which is present in both prepared and raw opium. The 2N hydrochloric acid and Thin Layer Chromatography (TLC) tests (positive for porphyroxine) showed the substance to be raw opium. A GC-MS analysis confirmed the presence of the five principal opium alkaloids, namely the codeine, morphine, thebaine, papaverine and noscapine in the material (Fig. 10).

In addition, the relatively high papaverine content of this raw opium sample indicated that it was not of the South East Asian type (Fig. 11) and had probably originated from another region. From our experience, raw opium from Iran (which shares a border with Afghanistan) has a relatively high papaverine level. This finding thus corroborated the law enforcement's information that the concealed drugs originated from Iran. This is the first case to have found raw opium in a body packer since it is rarely reported elsewhere due its considerably lower financial value compared to drugs like methamphetamine, cocaine and heroin.



Fig 9: Some of the packets recovered from gastrointestinal tract (markings made by investigating officer)

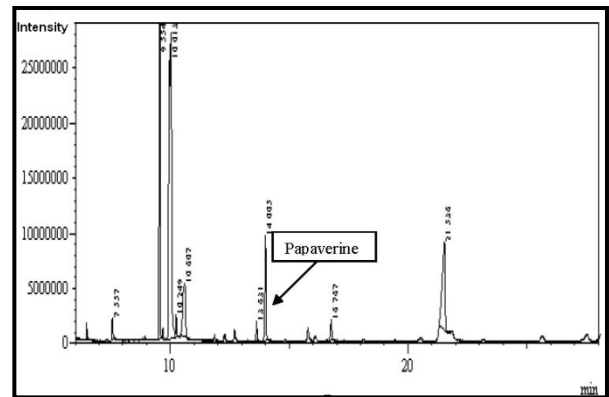


Fig. 10: GC-MS chromatogram of the concealed raw opium showing a pronounced papaverine peak at R.T = 14.003 min

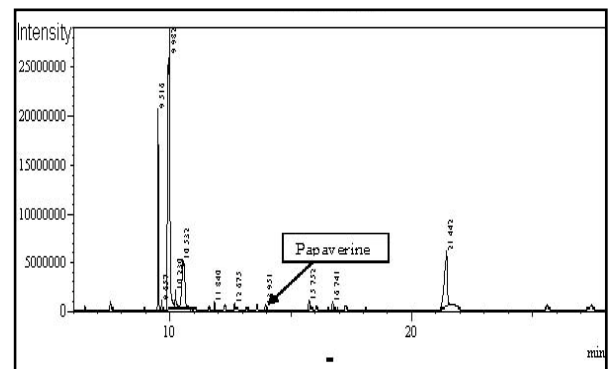


Fig. 11: GC-MS chromatogram of raw opium of South East Asian origin showing a papaverine peak with low intensity.

Conclusion

We report some most recent cases involving the analysis of unknown materials submitted to our laboratories. This reflects the nature of the work in our laboratory. It also delineates the importance of experience and common sense in the drugs laboratory and how the information obtained from various analyses can help in law enforcement investigations. They help illustrate that drug analysis can be an exciting and challenging field.

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