DrugNetAsia

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A Regional Newsletter for Participating Laboratories at the UNDCP Consultative Meeting of Heads of Drug Testing Laboratories in Southeast Asia

Editor's notes

This issue is a special release to facilitate the exchange of information for UNODC Project H44 "Scientific support to strengthen regulatory and law enforcement control of ATS and their precursors in East, South and South-East Asia". Mr Chan Kee Bian, Coordinator for UNODC Project H44, has given a short summary of the various happenings of the project. Many thanks to our contributors for your efforts in partnering us in this sharing of knowledge. It is our sincere hope that all readers will enjoy reading the articles!

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UNODC Project H44 Coordinator's Updates

- **Sassafras Oils:** A validated GC method for the quantitation of safrole and isosafrole in sassafras oils was developed by the Singapore Laboratory for use by all participating countries. Reference standards of safrole, isosafrole and the internal standard decane will be provided by UNODC. Laboratories were also provided with samples of sassafras oils to enable them to develop methods for colour tests and TLC.
- **Dye Identification in "Yaba" and "Ecstasy" Tablets:** A procedure for the study was documented and forwarded to the Yangon Laboratory. Reference dye standards and other materials for the study were sourced from the Indonesian and Malaysian Laboratories.
- **Collection of Drug Seizure Data:** Statistics such as number of cases/samples, nett weight of drug, % purity, clandestine laboratory seizures and "Ecstasy" tablet composition will be collected from national drug testing laboratories.
- **Internet-based Network:** This is established for interactive exchange of information between laboratories and their clients. In addition, a regional "Ecstasy" information database will also be implemented.
- **Study Tour/Training Course:** This will take place in June 2007 for selected national drug analysts.

Analysis of Poppy Seed Food Products

Introduction

Poppy seeds are widely used in flavouring and garnishing of breads, cakes, cookies and other pastry items. It can also be added to savoury dishes, dressings, spice blends and desserts. Occasionally, the laboratory receives poppy seed food products such as biscuits, bread dough and cake mix for analysis from commercial sources as well as law enforcement agencies. The reason being that in Singapore, both poppy seeds and poppy seed food products must be certified free of morphine before they are allowed to be imported into the country.

It is well known that both morphine and codeine are present albeit low levels in most varieties of poppy seeds. Hence, the consumption of poppy seeds or poppy seed food products could lead to the excretion of morphine and codeine in urine. In some instances, the concentration of morphine can reach a level which results in the urine being interpreted as positive for the presence of opiates.

Fig. 1: Commercial poppy seed food products

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Analysis of Poppy Seed Food Products (cont'd)

(continued from page 1)

Opiate Alkaloidal Contents in Poppy Seeds

A large variation in opiate alkaloidal content of poppy seeds may arise due to variations in the climate, soil composition, seed quality, the year of harvest and the variety of opium poppy, *Papaver Somniferum*, cultivated. While opium generally contains 5 main alkaloids; namely: morphine, codeine, thebaine, papaverine and narcotine, morphine and codeine are the two common opium alkaloids present in poppy seeds both as external contaminants and as constituents of the seed[1]. The opiate contents will also vary depending on the washing and processing method employed. Washing of the seed prior to use has been shown to remove as much as 45.6% free morphine and 48.4% free codeine[2].

Fig. 2: Dried poppy seeds in poppy pod (left) and kidney-shaped poppy seeds viewed at 25X magnification (right)

Fig. 3: Poppy seed food products analysed by the laboratory

The laboratory employs the following method of analysis for opiate alkaloids in poppy seed food products.

Sample Preparation

Due to the complex matrices of poppy seed food samples, poppy seed extracts are prepared as outlined in Fig. 4.

Qualitative Analysis

A concentrated poppy seed extract was analysed by Gas Chromatography/Mass Spectrometry (GC/MS) to determine the presence of any opiate alkaloids.

The GC/MS instrument settings are as follows:	
GC Conditions	
Column:	Cross-linked 5% phenyl methyl silicone gum, HP-5MS, (12.5 m x 0.2 mm i.d x 0.33 µm)
Oven Temp.:	225°C (6 min) ramped to 240°C at 10°C/min and subsequently ramped to 280°C (10 min) at 20°C/min
Injector Temp.:	280°C
Injection Type:	Split mode
Constant Pressure:	8 psi
MS Conditions	
Interface Temp.:	280°C
Ion Source Temp.:	230°C
Mass Range:	35-480 amu

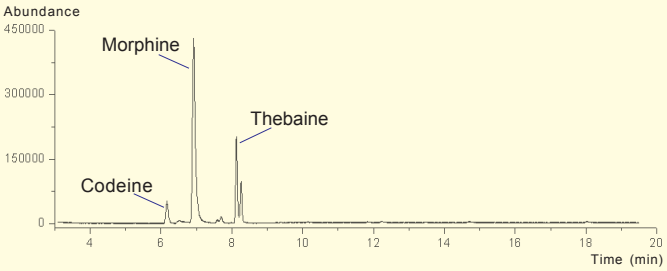


Fig. 5: Total ion chromatogram of an extract of a poppy seed food product

Quantitative Analysis

The morphine and codeine contents in the poppy seed extract were determined by Gas Chromatography/Flame Ionisation Detector (GC/FID) with octacosane as the internal standard. The extract and internal standard were derivatised with BSTFA in chloroform at 80°C for 1 hr prior to analysis.

The GC/FID instrument settings are as follows:			
Column:	Cross-linked methyl silicone gum, HP-1, (12.5 m x 0.2 mm i.d x 0.33 µm)		
Oven Temp.:	225°C	Injector Temp.:	260°C
Detector Temp.:	280°C	Injection Type:	Split mode
Constant Pressure:	33 psi		

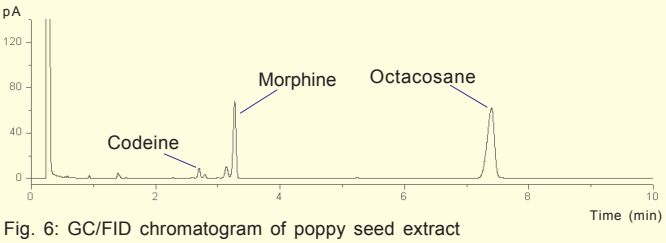
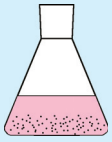
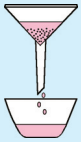


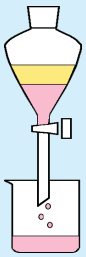
Fig. 6: GC/FID chromatogram of poppy seed extract



1. Isolate the poppy seeds and transfer into a conical flask.
2. Add a suitable amount of methanol and sonicate for 30 mins.



3. Filter the extract into an evaporating dish.
4. Repeat steps 2 and 3. Combine the filtrate and evaporate the solvent to dryness on a water bath.



5. Reconstitute with 30 ml of purified water. Acidify with 2N HCl, and extract with 3 X 30 ml diethyl ether.
6. Basify the aqueous layer with ammonia and extract with 3 X 30 ml chloroform/isopropanol (3:1).
7. Combine the extracts and evaporate to dryness.
8. Reconstitute with HPLC methanol and transfer to a 5 ml volumetric flask.

Fig. 4: Sample preparation procedure for poppy seed food products

(continued on page 3)

Methamphetamine Tablets and Ketamine in Cambodia

The methamphetamine tablets commonly encountered in the laboratory over the past few years were stamped with imprints such as diamond, club (clover), christmas tree, musical note, ying-yang symbol, Rolex logo and the marking "OK". Some of these tablets were found to contain ketamine in addition to methamphetamine. Recently, two large seizures of "wy" tablets were uncovered. These tablets were found to contain paracetamol alone.

Since 2003, the laboratory has also encountered ketamine in the form of solutions in vials. Fig. 1 illustrates the two types of ketamine HCl solution (USP grade "ASTRAPIN" and "ROTEXMED").

Fig. 1: Ketamine HCl solutions

~Contributed by the Laboratory of National Authority for Combating Drugs (NACD), Phnom Penh, CAMBODIA~

(continued from page 2)

Poppy seeds containing a large amount of morphine and codeine would provide a greater possibility for a positive urinalysis for opiates. Table 1 summarises the morphine and codeine content found in some poppy seed samples analysed by the laboratory. The highest opiates content found was 201 µg/g for morphine and 26 µg/g for codeine. These values were comparable to those reported in the literature of which the highest reported value for morphine was 294 µg/g[3] and for codeine was 57.1 µg/g[4].

No.	Source	Origin	Morphine Content (µg/g)	Codeine Content (µg/g)
1	Law Enforcement Agency	Unknown	121	26
2	Law Enforcement Agency	Unknown	21	Negligible
3	Commercial	Turkey	8	Negligible
4	Commercial	Australia	121	8
5	Law Enforcement Agency	France	170	23
6	Law Enforcement Agency	France	171	23
7	Law Enforcement Agency	France	188	24
8	Commercial	Netherlands	201	6
9	Commercial	Unknown	116	5

Table 1: Morphine and codeine contents of poppy seeds analysed by the laboratory

References:

1. M. D. Grove, *et al.,* "Morphine and Codeine in Poppy Seed", *J. Agric. Food Chem.*, 24/4 (1976) 896-897.
2. D. S. T. Lo, *et al.,* "Poppy seed: implications of consumption", *Med. Sci. Law*, 32 (1992) 296-302.
3. L. W. Hayes, *et al.,* "Concentrations of morphine and codeine in serum and urine after ingestion of poppy seeds", *Clin. Chem.*, 33/6 (1987) 806-808.
4. M. G. Pelders, *et al.,* "Poppy seeds: differences in morphine and codeine content and variation in inter- and intra-individual excretion", *J. Forensic Sci.*, 41 (1996) 209-212.

~Contributed by the Centre for Forensic Science, HSA, SINGAPORE~

Tetrahydrocannabinol(THC) Content of Cannabis Blocks

In Malaysia, cannabis is often trafficked in highly compressed blocks. A study was carried out to estimate the potency of cannabis from the compressed blocks submitted to the laboratory at Petaling Jaya from June to October 2005. A total of 60 samples from 42 separate cases were examined in this study. These samples were mostly seized in the state of Selangor, which is located in the central region of the country. A capillary Gas Chromatographic (GC) method utilizing 4-androstene-3,17-dione as the internal standard was used for the quantitation of Δ^9-THC. The Δ^9-THC concentration was found to be in the range of 1.26%-8.35% with an average concentration of 5.65% based on dry weight.

Fig. 1: Compressed cannabis block

Fig. 2: Stalks from the block

Procedures

Instrument Settings

The GC/FID instrument settings are as follows:	
GC/FID:	Hewlett Packard 5890 Series II Gas Chromatograph equipped with a flame ionization detector
Column:	HP-5MS; 30 m x 0.25 mm; film thickness 0.25 µm
Mobile phase:	Helium at a flow rate of 1 ml/min
Column Temp.:	200°C to 260°C at a ramp of 4°C/min; hold for 10 min at 260°C
Detector Temp.:	280°C
Injection Temp.:	280°C

Solutions

Solvent and solutions were prepared as follows:	
Extracting Solvent:	methanol/chloroform (9:1, v/v)
Internal Standard Solution:	2.0 mg/ml 4-androstene-3,17-dione (*Sigma*) in methanol/chloroform (9:1; v/v)
Standard THC Solution:	1 ml of 1.0 mg/ml Δ^9-THC standard (*Cerilliant*) was added to 1 ml of the internal standard solution to give a final concentration of 0.50 mg/ml for Δ^9-THC and 1.0 mg/ml for the internal standard.

Sample Preparation

- The compressed blocks were loosened and several integral parts were randomly selected. They were then stored in a dark place at ambient temperature until they were ready for extraction.
- 1-2 g of leafy material (excluding seed and large stems) was transferred to a 50 ml conical flask containing 20 ml of extracting solvent.
- The flask was sonicated for 20 min and 2 ml of the solution was transferred to a 10 ml volumetric flask. The flask was then made up to the mark with the extracting solvent.
- 0.75 ml of the resulting solution together with 0.75 ml of the internal standard solution were transferred to a 2 ml amber GC vial.
- The content in the GC vial was mixed well and injected into the GC.

~Contributed by the Department of Chemistry, MALAYSIA~

Analysis of Papaverine in Opium by High

Opium (*afim* in Hindi) is the air-dried concentrated milky latex obtained from the capsule of *Papaver Somniferum Linn* (Papaveraceace family).

Fig. 1: *Papaver Somniferum* plant (left) and opium capsule (right)

The opium plant is cultivated in October. The seeds germinate in the fall and the seedling may be an inch high. In spring when the plants have attained a height of 15 cm, the fields are cultivated and the plants thinned to stand about 60 cm apart. The poppy blossoms in April/May and the capsule matures in June/July. Each plant bears 5-8 capsules.

When ripened, the poppy capsules are about 4 cm in diameter and change from bluish-green to a yellowish colour. This is a critical time for collecting the latex. The capsules are incised with a tri-bladed knife, taking care not to cut through the endocarp which will result in the latex flowing into the interior of the capsule and being lost. The latex, which is at first white, rapidly coagulates and turns brown. This is removed easily the following morning by scrapping off with a knife[1,2].

For Indian opium, the constituents comprise 8-20% of morphine, 5-7% of narcotine, 1-4% of codeine, 0.4-1% of papaverine and 0.5-1% of narceine[3].

Materials

Opium samples (Table 1) and papaverine reference standards were obtained from Central Revenues Control Laboratory, New Delhi.

Sample Code	Source
O-1	Gazipur, India
O-2	Uttar Pradesh, India
O-3	Neemuch, India

Table 1: Sources where opium samples were obtained

Chemicals, solvents and ready-made High Performance Thin Layer Chromatography (HPTLC) plates from Merck were used.

Preparation of Sample Solutions

Approximately 2 to 3 g of opium sample was accurately weighed and successively extracted with ethanol till completely exhausted. The extracts were made up to 100 ml and allowed to stand overnight. 1.0 ml of each of these solutions was diluted to 10.0 ml with ethanol.

Preparation of Papaverine Standard Solution

Papaverine standard solution was prepared by dissolving 0.025 g of papaverine in 50 ml of ethanol. 1.0 ml of this solution was further diluted to 50 ml with ethanol, giving a concentration of 0.01 mg/ml.

High Performance Thin Layer Chromatography (HPTLC)

HPTLC Conditions	
Stationary phase:	HPTLC plates, silica gel 60 F_{254} (on aluminium back), 10x15 cm
Volume spotted:	Volume for standards (s1 to s5) and samples (O-1 to O-3) are indicated in Table 2
Mobile phase:	Toluene:Ethyl Acetate:Diethylamine (7:2:1)
Relative humidity:	55 ± 5
Temperature:	22°C ± 2
Migration distance:	8.5 cm
Detection:	under UV light (254 nm and 366 nm)

Sample	Track	Volume spotted (µl)	Amount (ng)
s1	1	2	20
s2	2	4	40
s3	3	6	60
s4	4	8	80
s5	5	10	100
Afim (O-1) = U 1	6	2	-
Afim (O-1) = U 1	7	4	-
Afim (O-2) = U 2	8	2	-
Afim (O-2) = U 2	9	4	-
Afim (O-3) = U 3	10	2	-
Afim (O-3) = U 3	11	4	-
Afim (O-1) = U 1	12	1	-
Afim (O-2) = U 2	13	1	-
Afim (O-3) = U 3	14	1	-

Table 2: Volume of standards and samples spotted onto the HPTLC plates

Quantitative densitometric scanning of the resolved papaverine bands in samples and standard solutions were made using a Camag TLC scanner III at 239 nm (deuterium lamp), with a slit size of 6.0 x 0.45 mm at a scanning speed of 20 mm/sec and data resolution of 100 µm/step on absorption mode, keeping detection on automatic mode.

A linearity curve for papaverine was drawn using CATS III software of TLC Scanner. It was observed that the curve is linear within the concentration of standard solutions used in the experiment (20 -100 ng). It has a correlation coefficient of $r^2 = 0.99946$.

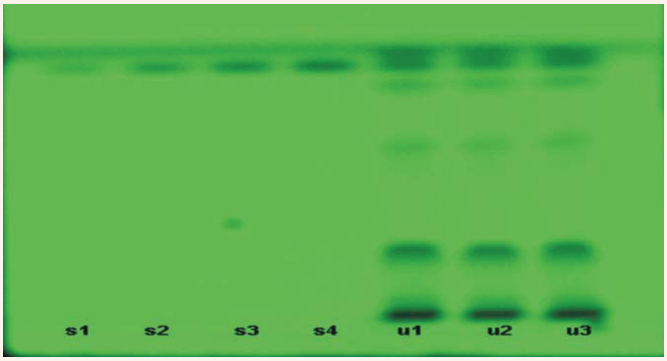


Fig. 2: HPTLC chromatogram under UV light at 254 nm

After densitometric scanning of the papaverine bands, the HPTLC plates were sprayed with Dragendorff's reagent followed by 10% $NaNO_2$ solution. The plates were kept in an oven for five minutes at 110°C and then photographed (Fig. 3).

The papaverine bands of standard solutions s1 to s5 with band amounts of 20 to 100 ng are scanned to obtain peak parameters such as R_f values, peak height and peak area (Fig. 4).

Performance Thin Layer Chromatography

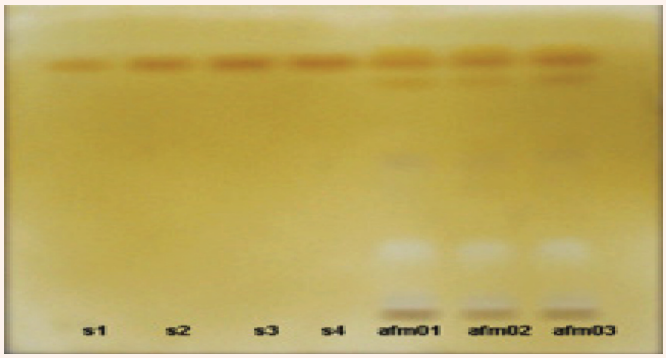


Fig. 3: HPTLC chromatogram sprayed with Dragendorff's reagent and $NaNO_2$

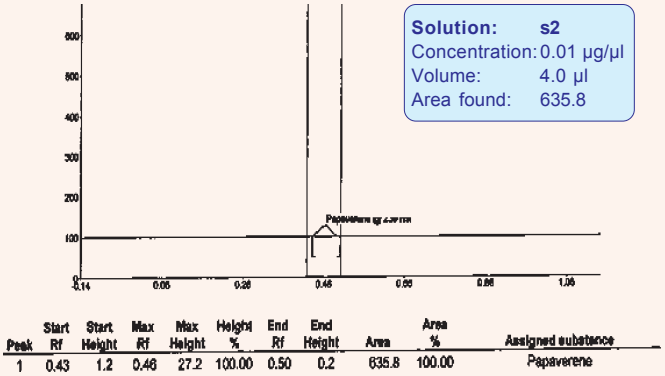


Fig. 4: Results obtained for s2

The quantity of papaverine in all the sample solutions, O-1 to O-3, were determined by comparing the total peak area found for papaverine bands in standard solutions with total peak area of papaverine bands in the sample solutions:

$$P(spl) = \frac{Conc(std) \times Vol(std) \times Area(spl)}{Area(std)}$$

$$Papaverine\ (\%) = \frac{P(spl) \times 100}{Conc(spl) \times Vol(spl)}$$

P(spl): Total amount of papaverine in band of sample (µg)
Conc(std): Concentration of papaverine standard solution (µg/µl)
Vol(std): Volume of papaverine standard solution spotted (µl)
Area(spl): Total peak area of papaverine band in sample solution
Area(std): Total peak area of papaverine band in standard solution
Conc(spl): Concentration of sample solution (µg/µl)
Vol(spl): Volume of sample solution spotted (µl)

The results for sample solutions, O-1 to O-3, are shown in Table 3. The amount of papaverine found in these bands ranged from 41.1 ng to 54.8 ng, giving a percentage papaverine of 0.4 to 0.6 % in the opium samples.

Track	Sample solution	Weight(spl) (g)	Conc(spl) (µg/µl)	Vol(spl) (µl)	Area(spl)	P(spl) (µg)	Papaverine (%)
7	O-1	2.3781	2.3781	4.0	871.1	0.0548	0.576
9	O-2	2.1095	2.1095	4.0	852.7	0.0536	0.636
11	O-3	2.4081	2.4081	4.0	653.9	0.0411	0.427

Table 3: Results for sample solutions O-1 to O-3

To check the resolution of papaverine with other compounds in the band, peak purity tests were performed by comparing spectra of bands of standard solution with that of sample solutions. Similar spectral patterns were observed for the sample bands, indicating that the papaverine band in these sample solutions had no contamination (Fig. 5).

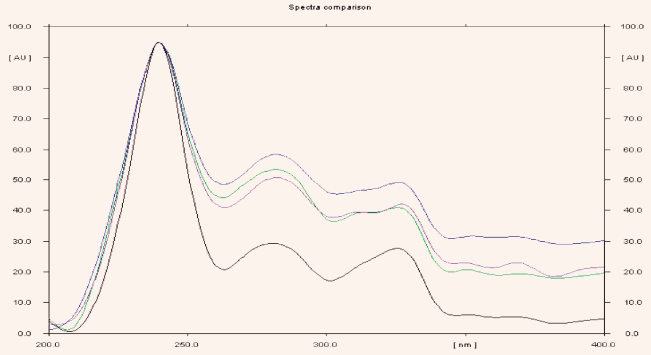


Fig. 5: Spectra of papaverine bands in sample and standard solutions

The identity of the papaverine peak in sample(s) was further confirmed by the addition of papaverine standard in sample solution (Co-TLC). The recovery of papaverine was in the range of 97.85-99.70% (Table 4), which was calculated using additions of known quantity of papaverine to the sample extracts.

Amount of Papaverine added to Sample (ng)	Amount Recovered (ng)	Recovery (%)	CV (%)
20	19.94 ± 0.15	99.70	0.75
40	39.14 ± 0.32	97.85	0.81
60	59.50 ± 0.68	99.16	1.14
80	79.10 ± 0.70	98.88	0.88

Table 4: Recovery of papaverine in sample extracts

Results and Discussion

The composition of the mobile phase for HPTLC was determined by testing different solvent mixtures of varying polarity. The best result was obtained by using toluene:ethyl acetate:diethylamine (7:2:1). The scanning wavelength of 239 nm has very good absorption at this wavelength.

The selected mobile phase has produced highly symmetrical peaks with good resolution (Figs. 2 to 4). R_f value of 0.46 for papaverine was found to be ideal. Peaks were identified by Co-TLC and superimposing UV spectra of resolved peaks of sample and standards (Fig. 5).

The recovery of papaverine in this experiment was found to be 97.85 to 99.70%. The linearity curve of papaverine has a correlation coefficient of 0.99946. This shows that the method is reliable and allows good quantification of papaverine from opium samples. The proposed HPTLC method was found to be rapid and simple, giving an accurate assessment of papaverine in opium. In addition, no pretreatment of the sample is necessary and a large number of samples can be analyzed simultaneously.

References:

1. L. S. Goodman, *et al.*, "The pharmacological basis of therapeutics", 2nd edition Macmillan, New York, (1955).
2. Anonymus, "The useful plant of India", publication Directorate of CSIR, New Delhi (1992).
3. M. Ebadi, "Pharmacodynamic basis of herbal medicine", publication CRC press, 2002, 1(1975), 71-76.

~Contributed by the Central Revenues Control Laboratory (National Drug Testing Laboratory), New Delhi, INDIA~

Evaluation of Alternative Precursor Use in South East Asia

In South East Asia and South China, illicit methamphetamine has historically been manufactured from ephedrine or pseudoephedrine, via the Emde (chloroephedrine) or Nagai (HI/red phosphorus) synthetic routes. Synthesis from optically pure (+)-pseudoephedrine or (-)-ephedrine yields the more potent form of the drug, (+)-methamphetamine. As control of these precursors is strengthened, it is likely clandestine laboratories will seek and use alternative precursors. There is some evidence that clandestine laboratories are resorting to phenyl-2-propanone (P2P), which produces the less potent racemic or (+/-) methamphetamine, as an alternative precursor.

If P2P itself is unavailable, it can be relatively easily manufactured from a number of non-controlled chemicals, referred to as pre-precursors (Fig. 1).[1] A recent case of this was observed in a large clandestine methamphetamine laboratory in Malaysia (July 2006)[2], which utilized the commercially available chemical α-acetylbenzylcyanide to synthesize P2P (Fig. 1, route 1). The laboratory also had large quantities of other P2P pre-precursors, benzaldehyde (Fig. 1, route 2 or 2a/2b) and benzyl cyanide (Fig. 1, route 3).

A switch in precursor from ephedrine/pseudoephedrine to P2P will make the task of law enforcement and regulatory authorities more challenging. This is due to the fact that most of the synthetic routes for manufacture of P2P use non-controlled chemicals, and details for carrying out these syntheses are freely available on the Internet. Consequently, it is important to evaluate current evidence from the region to gauge the level of use of P2P as a precursor. One of the simplest ways to do this is to determine the enantiomeric composition of methamphetamine, assuming synthesis from ephedrine/pseudoephedrine will only lead to the optically pure product. The presence of racemic methamphetamine will be an indication that P2P has been used as the precursor.

Recent enantiomeric analysis of clandestine samples from the region indicates that synthesis of methamphetamine from P2P does occur, even though it is with a relatively low frequency compared to Europe[3] (Table 1). There is a low occurrence of racemic (+/-) methamphetamine in crystalline form from Malaysia (4%) and a higher occurrence in Singapore (27%). Seized "WY" tablets have so far been shown to contain only (+)-methamphetamine (Table 1).

Source	No. of Cases	Year	Method	(+)	(-)	(+/-)
Malaysia[4]	74 "ice"	2005	HPLC	71	0	3
Malaysia[5]	2 "WY"	2005	HPLC	2	0	0
Singapore[6]	64 "ice"	1993-2003	GC/FID	36	11	17
Singapore[7]	26 "WY"	1998-2002	GC/FID	26	0	0
Thailand[3]	1 "WY"[a]	-	CE	1	0	0

[a] *1 seizure of 27,000 "WY" tablets from 4 batches*

Table 1: Enantiomeric data on seized methamphetamine "WY" tablets and pure "ice" methamphetamine from the region, determined using chiral high performance liquid chromatography (HPLC), gas chromatography/flame ionization detection (GC/FID) and capillary electrophoresis (CE).

Another way to judge the use of P2P as a precursor is by detection of route specific impurities. Impurity profiling in the Philippines has suggested an even higher use of P2P as a precursor with all of 30 case samples synthesized from P2P, with benzaldehyde as the likely pre-precursor.[8] This was based on the detection of P2P in all samples, benzaldehyde in 87% of samples, and a lack of impurities specific to synthesis from ephedrine/pseudoephedrine.

In conclusion, there is some evidence on the use of alternative precursors. Accordingly, there needs to be greater awareness, and education of law enforcement and regulatory authorities, regarding the potential for diversion of non-controlled chemicals to illicit methamphetamine synthesis.

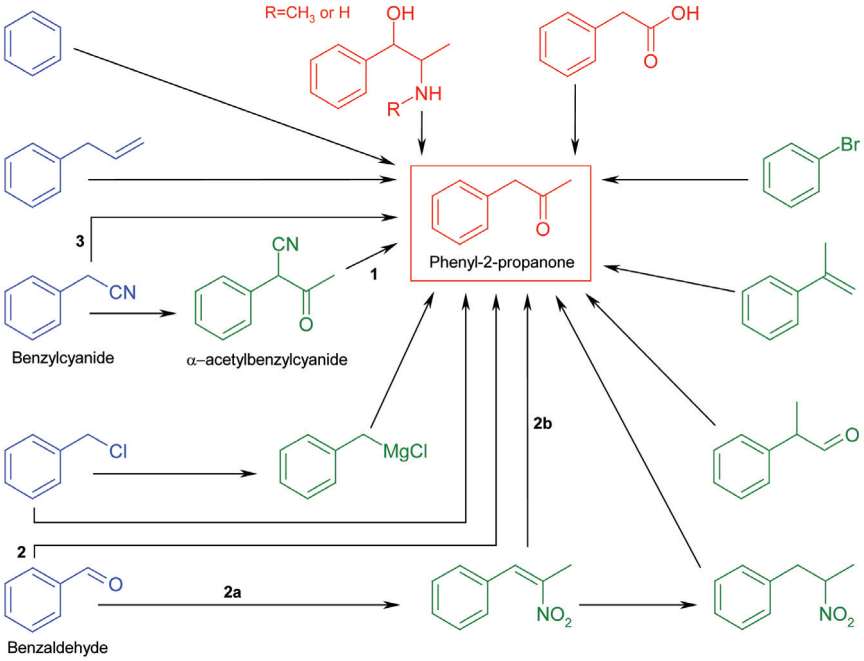


Fig. 1: Synthetic routes for the production of P2P (adapted from Ref. 1). Compounds highlighted in green are uncontrolled, in orange – monitored on a special surveillance list, in red – controlled by the UN 1988 Convention. Only compounds of interest in the Malaysian case are named, for other compound names see Ref. 1.

References:

1. E. Lock, "Development of a harmonized method of profiling amphetamine" (PhD thesis), University of Lausanne, 2005.
2. Personal communication, 2006.
3. W. Bernhard, *et al.*, "Methamphetamine from Thailand with the logo WY" (posted online, www.tiaft.org/tiaft99/ab_7.htm), 1999.
4. "A survey of enantiomeric form of syabu seized in Malaysia" (report), 2005.
5. R. A. Rahim *et al.*, "Comparison of two samples of 'WY' tablets to establish a common origin", *Buletin Kualiti dan Teknikal*, 9 (2006) 14-21.
6. Y. Y. Tan, *et al.*, "Profiling of Methamphetamine Abused in Singapore" (presented at the 17th International Symposium on the Forensic Sciences).
7. Centre for Forensic Science, HSA, Singapore, "Characterisation and profiling of illicit methamphetamine tablets abused in Singapore", *DrugNetAsia*, 3 (2003) 4-5.
8. F. M. Dayrit, *et al.*, "Impurity profiling of methamphetamine hydrochloride drugs seized in the Philippines", *Forensic Sci. Int.*, 144 (2004) 29-36.

~Contributed by UNODC Regional Centre, Bangkok~

Emerging Drug Trend in the Philippines

Ketamine

Although there is no report of ketamine abuse from the country's rehabilitation centers, intelligence reports indicated that transnational drug groups had made use of the country as a venue for the production of ketamine powder for exporting to other countries. In 2003 to 2005, a total of five ketamine processing facilities were discovered and dismantled in the Philippines. This resulted in the seizure of 39,300 vials of 10 ml ketamine hydrochloride solution, 54.83 kg of ketamine powder and an assortment of equipment used in ketamine processing.

The problem of ketamine production arose from a legal loophole in the Philippine's drug laws, as ketamine was initially not classified as a dangerous drug. Hence this created an opportunity for the drug syndicates to import ketamine hydrochloride solution from source countries, convert it to ketamine powder in the Philippines, and finally export the powder to the neighboring countries. To rectify this loophole in the legal system, the Dangerous Drugs Board of the Philippines had classified ketamine as a dangerous drug with effect from 1st October, 2005.

Fig. 1: Ketamine HCl vial (left) and ketamine powder (right)

Fig. 2: A ketamine processing facility

Datura Metel (Talampunay)

Datura metel and *Datura arborea* are among the innumerable plants of great therapeutic value in the Philippine folk medicine. The use of Datura in the symptomatic relief of asthma is well-known by the population. Cigarettes made from Datura leaves are also sold in the market. It has been used not only in relieving dyspnea (secondary to asthma) but also for other ailments. However, in recent years, more cases of hypertension and convulsion induced by talampunay have been seen among PGH (Philippine General Hospital) patients, due to ignorance in the proper use of the plants as well as its inherent toxic properties.

The Dangerous Drugs Board had received requests for the examination of these plants. The sample was extracted using chloroform and the extract was analysed by Gas Chromatography/Mass Spectrometry (GC/MS). Scopolamine and atropine are the active ingredients found in the extract of the Talampunay plants.

~Contributed by the Dangerous Drugs Board, PHILIPPINES~

A Survey of the Enantiomeric Form of "Syabu" seized in Malaysia (2005)

Crystalline methamphetamine ("Syabu") is a major drug of abuse in Malaysia. Recently, a survey was carried out to determine the enantiomeric form of the methamphetamine seizures. The enantiomeric form of the residual ephedrine/ pseudoephedrine present in the samples was also determined. The samples were taken from seizures of more than 2 g from various states of the country in 2005. The results of the analysis are summarized in Table 1.

No.	State	No. of Cases	MA			Eph			d-PsEph	*d*-PsEph and *l*-Eph
			d	*l*	*d,l*	*d*	*l*	*d,l*		
1	KL (Federal Territories)	12	12	-	-	-	-	-	-	-
2	Selangor	21	18	-	3	-	4	-	-	-
3	Penang	14	14	-	-	-	1	-	1	-
4	Sabah	5	5	-	-	-	-	-	-	2
5	Sarawak	8	8	-	-	-	-	1	-	1
6	Johor	13	13	-	-	-	-	-	-	-
7	Perak	1	1	-	-	-	-	-	-	1
	TOTAL	**74**	**71**	**-**	**3**	**0**	**5**	**1**	**1**	**4**

MA: Methamphetamine, Eph: Ephedrine, PsEph: Pseudoephedrine, KL: Kuala Lumpur

Table 1: Summary of results

The enantiomeric forms were determined by chiral HPLC using the following conditions:

The HPLC instrument settings are as follows:	
HPLC:	Shimadzu HPLC CLASS-VP Ver. 6.1 equipped with a UV/PDA detector (SPD-M10AVP).
Detector:	UV detector (monitoring wavelength 210 nm)
Mobile phase:	Phosphate buffer 20 mmol (KH_2PO_4):ACN (80:20). Phosphate buffer was prepared by dissolving 2.72 g KH_2PO_4 in 1 L of distilled water.
Column:	Phenyl-ß-cyclodextrin (Chiral Drug) Shiseido; 5 µm particle size; length 150 mm and i.d. 4.6 mm.
Column Temp.:	25°C (ambient temperature)
Flow rate:	1.0 ml/min
Injection Type:	Rheodyne loop injector/autoinjector
Injection Volume:	1 µl
Run time:	20 min

Ephedrine and pseudoephedrine were differentiated by HPLC with ODS column (other non-stated conditions are the same as above):

The HPLC instrument settings are as follows:	
Mobile phase:	Phosphate buffer:ACN (60:40). Phosphate buffer was prepared by dissolving 5 mmol of sodium dodecyl sulphate in 20 mmol KH_2PO_4 solution
Column:	ODS, 5 µm particle size, length 250 mm, i.d. 4.6 mm.
Flow rate:	0.3 ml/min
Run time:	45 min

~Contributed by the Department of Chemistry, MALAYSIA~

Cultivation of Cannabis in Hong Kong

Cannabis used to be one of the commonly encountered drugs of abuse in Hong Kong. Most of the seizures involve cannabis resin and herbal cannabis, which are frequently encountered as dried plant materials consisting mainly of buds and leaves. Smoking is, by far, the most popular method of cannabis use. Cannabis resin or herbal cannabis, either pure or mixed with tobacco, are smoked in joints, pipes or hookahs.

Intelligence from law enforcement departments indicates that the majority of cannabis is smuggled into Hong Kong from overseas. The largest seizure of cannabis was made in 1996 where over 7,000 kg of compressed cannabis blocks, each weighing 1 kg, were seized. Recently, the smugglers packed the cannabis buds (about 10-20 g) in mails which were then delivered to addresses in Hong Kong. The buds have high potency (average THC content of 15%) probably because of the selection and production of better strains by cross-breeding and growing under controlled environment.

Cannabis is a fast growing annual plant and can be cultivated both outdoors and indoors. Cultivation of cannabis was rarely encountered in Hong Kong, though potted cannabis plants were seized occasionally. The first scene dated back to 1984 where about 200 cannabis plants were found growing outdoors.

In recent years, the cultivation of cannabis with well-equipped and sophisticated set-up has been encountered. The first case of indoor hydroponics cultivation was discovered on the roof of a house in 2004 (Figs. 1 to 4). The plants were cultivated in a greenhouse with controlled temperature, humidity, carbon dioxide concentration, simulated lighting conditions with time controlled lights of different wavelengths as well as gauged nutrient supply to speed up plant growth. The growth cycle was shortened from one year to three months.

In 2006, the laboratory staff attended two similar large scale cultivation scenes. During these investigations, over two thousand cannabis plants and 8 kg of harvested products were seized (Figs. 5 & 6). Both cases were located inside industrial buildings. The selection of these sites may be due to their lower rental cost, larger floor areas and lower occupancy rate, leading to a lower chance of being located by the law enforcement agencies.

~Contributed by the Government Laboratory, HONG KONG SAR~

Fig. 1: An automatic hydroponics system for cultivation of cannabis

Fig. 2: pH value and nutrient level electronic sensors and regulators

Fig. 3: The greenhouse was equipped with high intensity lamps

Fig. 4: Magazines and reference books on cannabis cultivation seized in the scene

Fig. 5: Indoor cannabis cultivation inside industrial building

Fig. 6: Packaging of herbal cannabis product