



**UNODC**

United Nations Office on Drugs and Crime

## **COUNTER NARCOTICS POLICE OF AFGHANISTAN**

### **FORENSIC LABORATORY**

#### **Laboratory Information Bulletin LIB 1/2011**

Welcome to the latest edition of the CNPA Kabul Forensic Laboratory Information Bulletin (LIB).

This edition gives information on the latest improvements and advances in scientific procedures carried out at the laboratory along with information on some of the latest seizures and submissions of drugs and precursor chemicals to the laboratory.

There are also articles on methamphetamine and on the production of heroin from opium.



Inside the CNPA Forensic Laboratory in Kabul

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## SAMPLES ANALYSED IN THE FIRST SIX MONTHS OF 2011

The purpose of the CNPA forensic laboratory is to provide detailed forensic analysis of controlled substances. The laboratory is able to undertake a wide range of forensic analysis of seizures narcotic drugs and chemical precursors on behalf of the CNPA.

During the first six months of 2011 (Jan - June) the laboratory processed a total of 2577 samples from a total of 925 separate cases.

Just over 58% of the samples tested were opium, morphine or heroin. Many of the heroin samples received and analysed were relatively poor quality, low purity heroin base and heroin hydrochloride. At the present time the laboratory is not able to carry out accurate purity determinations but estimates of the purities of seized drug samples can be obtained using FT-IR spectrophotometry.

Just under 10% of the submissions (240 samples) were found to contain either cutting agents/adulterants or other non-controlled substances such as dextromethorphan (171 samples).

Cutting agents identified included caffeine (32 samples), chloroquine (19 samples), paracetamol and caffeine mixtures (12 samples), paracetamol (3 samples), chloramphenicol (2 samples) and lactose (1 sample).

As noted in previous editions of the CNPA Laboratory Information Bulletin (see LIB II/2009), chloroquine (4-aminoquinoline) is an anti-malarial drug and can prove fatal if injected. Chloroquine is very dangerous in overdose and it is known that the therapeutic index for chloroquine is small. The therapeutic index or therapeutic ratio is the comparison of the amount of a therapeutic agent that causes the therapeutic effect to the amount that causes death or toxicity.

Dextromethorphan is an opioid analgesic and is an active ingredient in many over the counter cough medicines. In its pure form dextromethorphan is a white powder. Many of the 171 samples of dextromethorphan encountered were found to be mixed with caffeine. It may be that these samples are being produced for sale on the local market rather than for export to other countries.

### Table of samples analysed at the CNPA Forensic Laboratory January – June 2011

700 samples of opium (27%)
652 samples of heroin (25%)
321 samples of hashish (cannabis and cannabis resin) (12.5%)
171 samples of dextromethorphan (6.6%)
170 samples of morphine (6.6%)
157 samples of opiate derivatives (6%)
103 samples of Alcoholic beverages (4%)
77 samples of cannabis seeds (3%)
73 samples of precursor chemicals (including 53 samples of acetic anhydride) (3%)
69 samples of cutting agents (2.7%)
57 samples of miscellaneous chemicals (2.2%)
13 samples of acetyl morphine (0.5%)
6 samples of methamphetamine (0.23%)
6 samples of poppy seeds (6 samples) (0.23%)
2 miscellaneous samples

**Total: 2577 samples**

## Methamphetamine

There have been a total of 6 samples of methamphetamine seen in the six month reporting period. This represents a slight increase in methamphetamine seizures compared to 2010. It is believed that these samples were probably all smuggled into the country.



Pure methamphetamine is often seen in the form of clear crystals, hence the name “Ice”

Methylamphetamine is one of the amphetamine-type stimulant (ATS) drugs that act on the brain and nervous system. Like cocaine and amphetamines, methylamphetamine has stimulant properties but it is much longer acting. Pure methamphetamine is often seen in the form of clear crystals, hence the name “Ice”. It is also known as “meth” or “crystal meth” and in Afghanistan and Iran it is known as “shesha” which mean “glass”. Methamphetamine is a very highly addictive and extremely dangerous drug whose psychological effects include euphoria, anxiety, increased self-esteem, aggressiveness, hallucinations and repetitive and obsessive behaviour.

Methamphetamine – like ‘crack cocaine’ can be easily smoked which can rapidly lead to high levels in the bloodstream. It is also long-acting compared to crack so it is an extremely powerful stimulant. High doses may cause convulsions, heart attacks and death. Long term methamphetamine use has a high association with depression and suicide as well as serious heart disease, anxiety and violent behaviours. Methamphetamine addiction is one of the most difficult forms of addictions to treat.

The introduction of methamphetamine into Afghanistan is a worrying development.

## FT – IR Spectrophotometer now in operation at CNPA laboratory

The CNPA laboratory has recently taken delivery of a Thermo-Nicolet 670 Fourier Transform Infra-Red (FT-IR) spectrophotometer equipped with a “SMART” Golden Gate Diamond ATR (Attenuated Total Reflectance) accessory which is now in routine use. This instrument will enable the laboratory to identify a wider range of drug samples including mixtures and the laboratory staff now has access to a far larger database of IR spectra. FT-IR is a spectroscopic technique used for the identification of most organic and many inorganic compounds. Almost any solid or liquid sample may be run (with the exception of strong acids), and, because of the small sampling area, microsamples, such as fibres and plastics, can also be analysed.

When a material is placed in the Infra-red beam, some of this energy will be absorbed by the material and not transmitted through the material. In the resulting FTIR spectra, deflections (“IR absorbance bands”) from the baseline indicate the frequency region of absorbed radiation and can be assigned to specific groupings of atoms; e.g., C-H, C=O.

In many cases, identification of a material can be made based on the presence of a number of these bands. The availability of reference spectra of known compounds increases the probability of making a positive identification.

FT-IR is an extremely useful analytical technique because it is quick, non-destructive and requires only a few milligrams of sample. Samples can be analysed within 2 -3 minutes without any chemical preparation. FT-IR can identify most organic compounds, including illicit drugs, pharmaceutical products, adulterants, precursor chemicals and most common solvents. It can also handle mixtures of chemical compounds without the need to undertake any chemical separation and in certain instances the analyst is able to give an estimate of the purity of a sample by examining the IR spectra. This makes it ideal for the analysis of illicit drug samples which usually contain cutting agents or manufacturing impurities.

Other laboratory techniques such as Thin Layer chromatography (TLC) and colour tests are still used to identify trace components and to provide a second confirmatory analytical method.

The instrument was donated to the CNPA forensic laboratory by the United States’ Drug Enforcement Administration (DEA) with the support of the Counter-Narcoterrorism Technology Program Office (CNTPO).

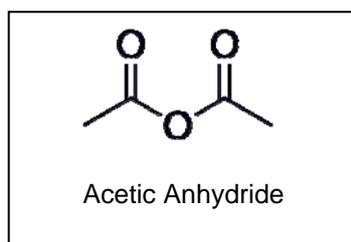


The Nicolet 670 FT-IR Spectrophotometer is now in routine use at the CNPA Forensic laboratory

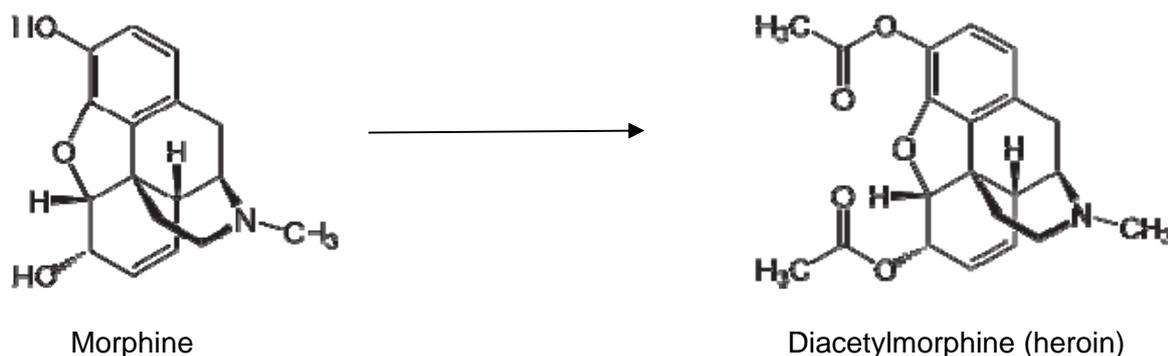
## Precursor and essential chemicals

Precursor and essential chemicals are generally defined as compounds that are required in the synthetic or extraction processes for the manufacture controlled substances/illicit drugs.

The most important "precursor chemical" in the production of heroin from morphine is **acetic anhydride** (C<sub>4</sub>H<sub>6</sub>O<sub>3</sub>). Acetic anhydride is a colourless liquid with a boiling point of 140°C that smells strongly of acetic acid (vinegar), which is formed by the reaction of acetic anhydride with the moisture in the air.



Two molecules of acetic anhydride react with one molecule of morphine to give one molecule of diacetylmorphine (heroin).



In theory 1kg of pure morphine and about 750g (or 750 ml) of acetic anhydride should give a yield of up to 1.3 kg of pure heroin but most chemical reactions, even under ideal conditions, do not give a 100% yield of final product and so a 77% reaction yield would produce about 1kg of heroin from each kilogram of morphine starting material. It should also be noted that an excess of acetic anhydride needs to be used in the production of heroin and so far more than 750ml would be needed for each kilogram of heroin produced. As a rough guide 1 kilogram of morphine and 2 litres of acetic anhydride would be required to produce 1 kilogram of pure heroin.

Acetic Anhydride is not produced in Afghanistan and therefore must be diverted from licit trade and smuggled into the country. In 2009, according to the UNODC World Drug Report 2010, Afghanistan produced about 6900 tonnes of raw opium. Each kilogram of Afghan heroin requires about 7 kilograms of opium and so the report calculates (p 44) that "In order to produce the required volumes of heroin (380 mt), as much as 1000 tonnes of acetic anhydride needed to be smuggled into Afghanistan (or other countries where processing potentially takes place) in 2008". 1000 tonnes is the equivalent of about 1 million litres of Acetic Anhydride.

## Interesting and exceptional seizures

The Counter Narcotics Police of Afghanistan (CNPA) Mobile Detection Teams were recently called upon to conduct a detailed search of two trucks. The search of the first truck revealed 12x20 litre containers. Staff from the CNPA Forensic Laboratory was able to identify the liquid in the containers as acetic anhydride (240 litres) which is used in the production of heroin. This amount of acetic anhydride would be able to produce approximately 120 kilograms of heroin.



Containers being removed from the truck



Containers of acetic anhydride seized from truck

The search of the second truck revealed a hidden compartment in the floor of the cargo area which contained 100 AK47 rifles. (Pictured below).



Hidden compartment under the floor



AK47 rifles recovered from the compartment