

IDENTIFICATION AND DETECTION OF METABOLITES OF DIACTYL MORPHINE FROM VISCERAL SAMPLES

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Abstract—In a case of poisoning, a sufficient quantity of opium product in a form of small varying size capsules and visceral samples such as stomach, pieces of intestine, liver, spleen, kidneys and blood were received in FSL, Delhi for the analysis and detection of suspected poison. Since the amount of suspected capsule like material was in a large amount, a number of chemical tests were carried out on that sample. As the visceral samples were in a limited quantity, only targeted analysis was carried out cautiously. The samples contained drugs in beyond the limits of conclusive evidence by routine methods. After getting a faint indication of poison to be an opium preparation by Chemical test, TLC & GC-MS analysis were subsequently carried out for the conclusive evidence. After Instrumental analysis it was confirmed that the suspected poison present in the samples was of opium origin.

Key words— Heroin metabolites

I. INTRODUCTION

A Case was received in forensic science laboratory regarding the death of a person. As per case history briefs the dead body was received from a hotel. After police inquiry it was found that two persons came in a hotel to stay there for few days. One morning, the hotel employee found one person dead and another one missing. The dead body of the person was sent to the hospital for postmortem examination to ascertain the cause of death of the person. His postmortem was conducted in the mortuary by the doctors and the exhibits i.e. viscera & capsules of varying sizes received from his stomach, were handed over to the police for deposition at FSL to determine cause of death. Police officials deposited the viscera at Forensic Science Laboratory Delhi for chemical analysis. The preserved samples were capsules of varying sizes in a plastic container and visceral samples which included stomach, small intestine, liver, spleen, kidney and blood. Chemical, TLC, and instrumental analysis were

performed on all exhibits for the presence of any suspected poison.

Opium (Afeem) is somniferous or sleep inducing drug. White poppy papaver somniferum is dried and unripe capsule incised to drive opium. The composition of opium is highly complex containing more than 25 alkaloids. Morphine is the major constituent of opium henceforth opium owes its action to morphine. It occurs as a white powder with a bitter taste and alkaline reaction, the outstanding action of morphine being the analgesic effects which finds its use in clinical practice. Heroin is a semisynthetic narcotic drug prepared from opium derived base morphine by its acetylation. It is many times more potent than the parent compound. The other names by which heroin is known are DAM (Diacetyl morphine), Dimorphine, brown sugar and smack.

II. MATERIALS AND METHODS

For the identification of the suspected poison, suspected visceral samples were digested with ammonium sulphate method and the blood sample was deproteinized for the preparation of samples. Samples were extracted with 20ml x 3 aliquots of ether. The materials were air dried and redissolved in 100 microliters of ether for acidic drugs. The remaining organic material was made alkaline and extracted with chloroform: ether in 1:3 ratio for basic drugs. 5 microliter each of extract was applied on 2 separate precoated TLC plates. On the first plate, standards of benzodiazepines, opium and DAM, dissolved in ether were spotted. Similarly on the second plate standards of phenothiazines were spotted. TLC plates were developed in the solvent system and air dried. The TLC plates were sprayed with specific reagents for the detection of benzodiazepines, morphine, DAM and phenothiazines. The plate sprayed with Dragendorff

gave positive indication with the extract of visceral samples and capsules like material. A faint orange colored spot could be seen as for the presence of morphine and diacetyl morphine. While no spot was seen for the presence of benzodiazepines with its standards. The second plate sprayed with specific reagent FPN gave negative indication with the extract of visceral samples and capsules like material. No spot could be seen as for the presence of any phenothizenes.

III. OBSERVATIONS

A. Colour Test

Table 1. Colour Test Results

S.No.	Reagents	Stomach & Contents	Liver, Spleen, Kidney	Blood	Capsules of varying sizes
1.	Marquis Test	+ve	+ve	+ve	+ve
2.	Mecke Test	+ve	+ve	+ve	+ve
3.	Froehde Test	+ve	+ve	+ve	+ve
4	FeCl ₃ Test	+ve	+ve	+ve	+ve

B. TLC

Table 2. TLC Results

S.No.	Reagents	Stomach & Contents	Liver, Spleen, Kidney	Blood	Capsules of varying sizes
1.	Dragondorff	+ve	+ve	+ve	+ve
2.	FPN	-ve	-ve	-ve	-ve
3.	Iodoplatinate	+ve	+ve	+ve	+ve

IV. GC-MS ANALYSIS

The extracted visceral samples and capsules like materials of varying sizes were taken for GC-MS analysis for the confirmation of detected drugs. The visceral samples were further cleaned suitably before injecting in to the injector of GC-MS. The extracted materials in a evaporating dish, were vortex using about one ml of methanol. The solvent was evaporated and the residue was then dissolved in about 50 micro liter of each of this extract. Similarly the capsules like material was also taken for GC-MS analysis by taking approx

0.010 gm of sample in 10 ml of volumetric flask. This was diluted with methanol. Now these prepared samples were injected into preconditioned GC-MS operated at conditions described below. An electronic impact ionization spectrum was recorded for each sample.

Instrumental Conditions

GC-MS — Agilent Technologies 6890 N. Network GC System

Column — SLB – SMS (L 30m & i.d.-0.25mm)

Column oven Temperature — 150°C – 300°C

Carrier Gas Flow — 1 ml/min.

Injector Temperature — 300°C

MS Transfer Line Temperature — 280°C

Ion Source Temperature — 190°C

Detector Temperature — 300°C

Detector — MSD

Injector — FRONT

V. RESULTS AND DISCUSSION

The exhibits received at FSL for chemical examination, visceral samples and varying size capsule shape material, when subjected to preliminary chemical tests (Marquis) indicated the presence of morphine based drugs. Which was further confirmed to be DAM/Heroin by TLC method using Methanol ammonia (9:1) as separate solvent system and dragondorff and iodoplatinate as spray reagents for visualization and comparison of color and RF with that of standards of DAM. Finally instrumental confirmation using GC-MS technique, was done to conclude that all the exhibits were found to contain DAM i.e. heroin (a narcotic analgesic) as “abusive drug of opium origin”.

Further the postmortem viscera i.e stomach contents pieces of liver, spleen, kidney and blood of the same case were found to contain metabolites of DAM/Heroin i.e. morphine & codeine which were confirmed by GC-MS technique.

VI. GRAPHS REPRESENTING GC-MS SPECTRA

Fig. 1. GC-MS Spectra of Stomach & Contents

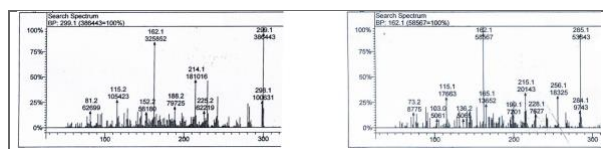


Fig. 2. GC-MS Spectra of Liver, Spleen & Kidneys

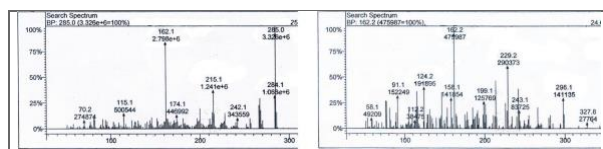


Fig. 3. GC-MS Spectra of Blood

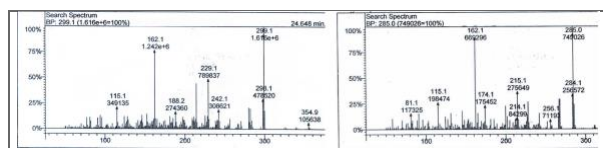
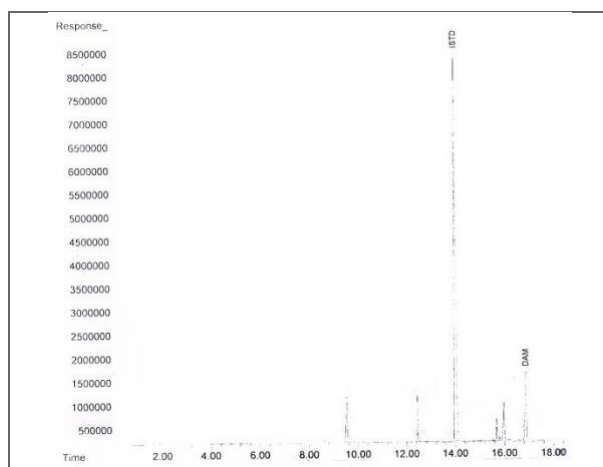


Fig. 4. GC-MS Spectra of Capsule



Note: (i) Similar GC-MS spectral graphs were obtained for presence of DAM in rest of the capsules of varying sizes.

VII. REFERENCES

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