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A CASE STUDY ON KNOCK-OUT DRUG: HALOTHANE

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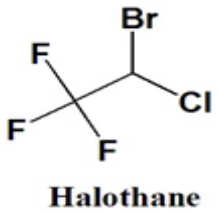
ABSTRACT

The criminals are using latest techniques to commit crimes. Recently a case has been reported in the forensic science laboratory wherein a vial containing blank liquid was sent for forensic analysis. The culprits tried to use this unknown liquid to sedate the victims in order to commit the offence of dacoity. However, the failed attempt lead to their arrest and the vial was recovered from them. In the present case study the unknown sample was analyzed using tandem GCMS and found to be halothane. Therefore, this case study becomes significant in crime scene investigation and also helps the forensic professional in their routine case work.

Keywords: Halothane, Tandem GC-MS, Dacoity etc.

INTRODUCTION

Halothane (2-bromo-1,1,1-trifluoro-2-chloroethane) is a medicament used as a general inhalation anaesthetic having a pleasant odour which is miscible in solvents such as chloroform, ether, alcohol and other fat solvents[1]. It is also known as rhodialothan, phthorothanum, fluothane. The halothane is considered as volatile poison and has boiling point between 49-51oC. The chemical structure is shown in figure 1.



Halothane

Figure 1. Structure of halothane (2-bromo-1,1,1-trifluoro-2-chloroethane)

[source:http//google/images.com]

The lethal dose is 200 mg/L, however, blood concentration between 7-310 mg/L has also been reported with many fatalities [2,3]. The mechanism of action of halothane involves the multi-ion-channels such as binding to potassium channels in cholinergic neuron that suppresses nerve impulse, respiratory rate and cardiac contraction. Therefore, halothane could be an important drug of forensic toxicological importance.

In present study, a case has brought to State forensic science laboratory (SFSL) Raipur wherein halothane was tried as a sedative hypnotic to accomplish the crime of dacoity. It was first of its kind where halothane was attempted to commit dacoity hence make it an important case study which would be informative for investigators and forensic scientist.

MATERIAL AND METHODS

Chemicals: All the chemicals used in the analytical

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work were of analytical grade or above.

Crime scene exhibit: The small glass vial (~30 mL) of Bedex forte (injection of vitamine B-complex) containing approx. 5 mL liquid was sent for forensic analysis to SFSL as evident from figure 2.

Sample preparation: The 10 µL of liquid from the vial was combined with 1.0 mL of methanol (HPLC grade) and filtered using microfilter (PTFE syringe filter 0.45 micron pore size, dia-25mm). The filterate was collected in the GC 1.0 mL vial and then kept in the autosampler for analysis using the following GCMSMS analytical conditions.

Instrumentation

The following instrument with their analytical conditions (qualitative mode only) has been used for the analysis of exhibit.

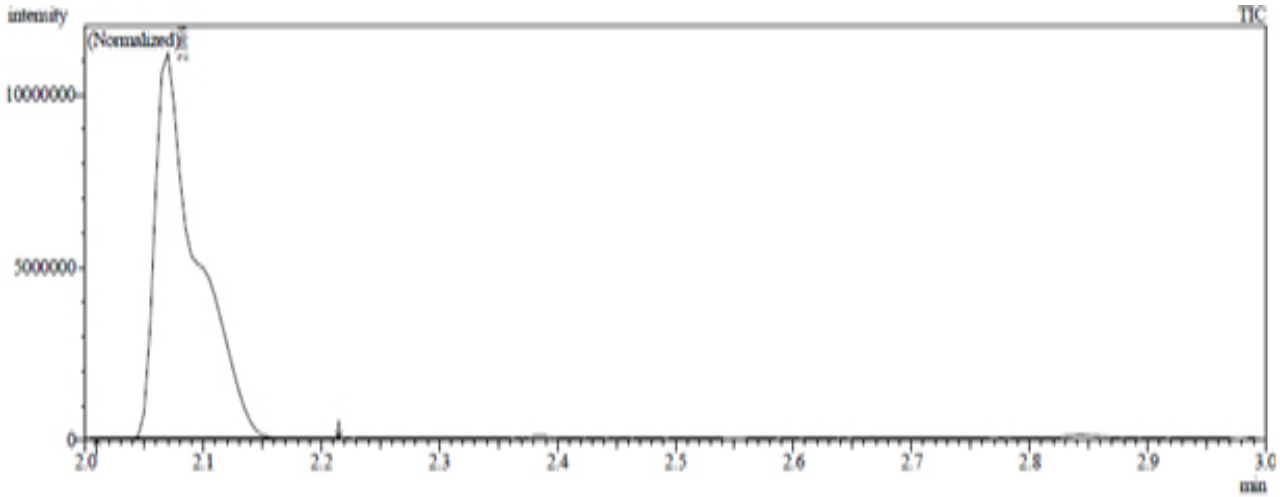
GC-MS-MS: SHIMADZU NEXIS GC-2030, GCMS-TQ8040NX, with column SH-Rxi-5Sil MS (30m, 0.25mm I.D.), autosampler (AOC-20d(S)), Injection volume – 1 µL, injector temperature 250oC, splitless mode, Carrier gas – Helium, Column flow – 1 mL/min, Purge flow – 3.0 mL/min, column , Initial temperature– 40 ºC, Rate – 20 ºC, final temperature – 300 ºC, Ion source temp – 250 ºC, Interface temp – 300 ºC, Solvent cut time – 1.0 min, Total run time – 20 min, range of molecular weight (m/z) 40-600, Acquisition mode – Q3 scan.



Figure 2: Collected sample from SOC

RESULT

The analyzed unknown sample revealed the presence of halothane as shown by the inbuilt library provided by the Shimadzu. The retention time was 2.069, base peak at 117 m/z and similarity 91% as per the library software was . fig 3 & fig 4.



Peak Report TIC

Peak#	R.Time	Area	Area%	Name
1	2.069	29516444	100.00	Halothane
		29516444	100.00	

Spectrum

Figure 3: Retention time of Halothane in the given sample by tandem GCMS

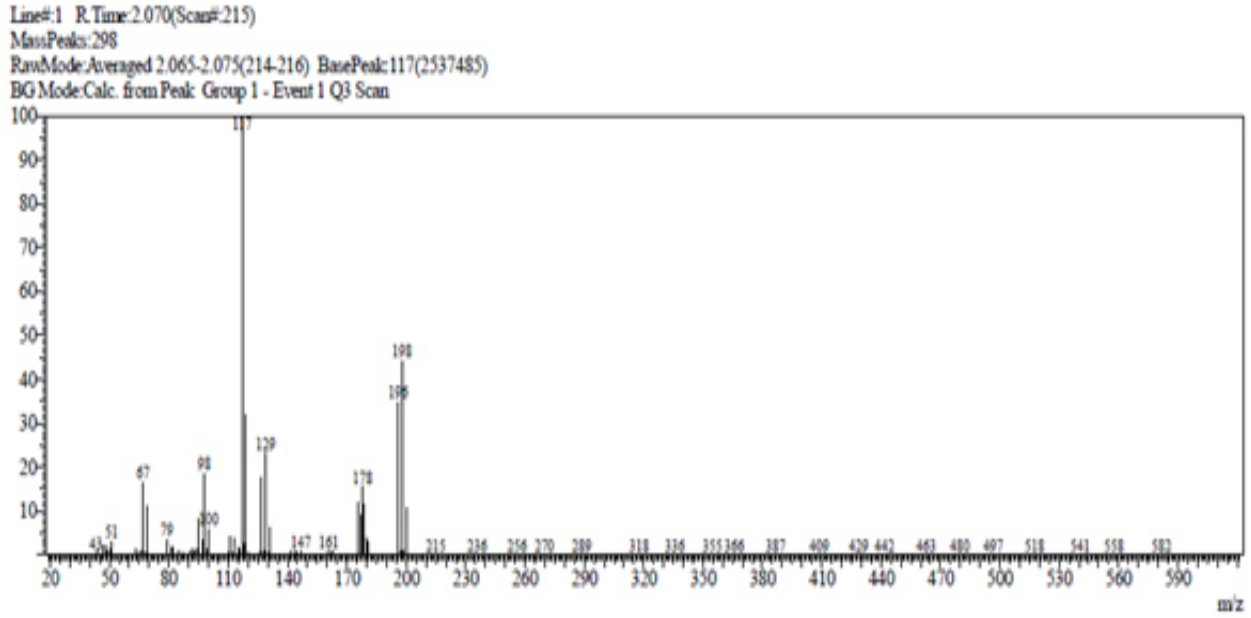


Figure 4: Mass spectra of Halothane by tandem GCMS

DISCUSSION

This case was first of its kind where criminals were exploring new chemicals for such kind of crimes. No report has been found on the cloud sources where the use of halothane has been mentioned to commit dacoity kind of crimes. However, many reports reported the extraction and analysis of halothane form bio-specimens such as blood [8], urine [8] and tissues [8] with the history of drug overdose, and patient management [9].

Different methods have shown different recovered concentration of the halothane from the various biospecimens. For example:- blood 7.2 mg/kg, kidney 8.9mg/kg, liver 0.6mg/kg, not detected in urine sample

CONCLUSION

Halothane was reported in a case of dacoity which has been analyzed using tandem GCMS. The promising results were obtained which can be referenced by other forensic scientists in similar kind of cases. The inbuilt library of the instrument found to be helpful and time saving. The present work will further be extended for evaluation studies for bio-specimens.

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