MISUSE OF MEPHEDRONE CRYSTAL’S AS A NARCOTIC DRUG IN MUMBAI, INDIA

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ABSTRACT

Mephedrone drug also known as Meow Meow or MD. Mephedrone is highly popular in the illicit market. This drug is used as stimulant like cocaine, amphetamine, methylamphetamine. etc. Mephedrone addiction increased drastically since last year. Students from school and colleges became addict as it is stimulant. About 1000 cases received by Forensic Science Laboratory, Mumbai Maharashtra in year 2014. The FSL Maharashtra and forensic medicine have given their view on this drug, hence since 5th Feb 2015 Mephedrone falls under NDPS act 1985. The Finance Dept. of India issued a notification and listed this drug in psychotropic substance. Suspected samples were referred to forensic science laboratory for testing of ketamine and methamphetamine as appearance of mephedrone is similar to ketamine and methamphetamine. But HPTLC and UV of this drug did not revealed presence of ketamine and methamphetamine. Hence GCMS analysis was carried out that showed the presence of mephedrone. Mass spectra was carefully studied and the drug was again validated by using other techniques.

KEYWORDS: HPTLC, UV, GC-MS, Mephedrone, Ketamine, Methamphetamine.

INTRODUCTION

Mephedrone is an amphetamine and Cathinone class drug. An amphetamine is a drug with a stimulant effect on the (CNS) central nervous system that can be physically and psychologically addictive when it was taken. Cathinone is a naturally occurring stimulant present in the Khat plant. Its structure and effects are similar to those of Ephedrine and amphetamine.
Mephedrone is similar to methamphetamine. It can be swallowed, snorted or injected. It can come in the form of tablets, capsules, crystals or white powder. Snorting is the most common way of taking the drug, and injection the rarest.

In 2009 Mephedrone became the 4th most popular street drug in the United Kingdom, after marijuana, cocaine and ecstasy. Mephedrone is informally known as meph, MCAT, bubbles and drone. Mephedrone is one of hundreds of designer drugs. These drugs are primarily developed to avoid being controlled by laws against illegal drugs.

Mephedrone causes euphoria, stimulation, an enhanced appreciation for music, an elevated mood, decreased hostility, improved mental function and mild sexual stimulation. These effects are similar to the effects of cocaine, amphetamines and MDMA. Mephedrone has side effects like loss of appetite, muscle clenching and tremors, headache, anxiety, elevated blood pressure, chest pain, fast / irregular heartbeat, difficulty in urinating, changes in body temperature and blue / cold fingers.

Mephedrone (MD Powder) is highly popular in Mumbai as it is cheaper than the other drugs. After considering the data of seizer of mephedrone Govt. of India decided to incorporate this drug under NDPS act. There are different methods available in literature for analysis of drugs. These methods can be used for analysis of unknown drug.

**Experimental**

Chemicals and solvent used were of analytical grade obtained from E. Merck India Ltd. Standard drugs Mephedrone, Amphetamine and Ketamine are obtained from Food and Drug Administration Mumbai. Standard solution of Mephedrone, Amphetamine and Ketamine were prepared by dissolving (10 mg of each) in 10 ml of methanol.

I) **Colour Test**

Colour tests like Marquis, Libermann, Cobalt Thiocynate, Mandellins reagent were carried out on the suspected sample.

II) **High Performance Thin layer chromatography (HPTLC)**

HPTLC was performed on glass plates of size (20 cm x 20 cm) precoated with 0.25 mm layer silica gel 60F254. The plate was activated in an oven at 110°C for about 30 minutes, then removed and cooled at room temperature. Then samples of Mephedrone, Amphetamine, Ketamine and suspected samples (5µl) were spotted with the help of capillaries, on an
activated plate. The plate was developed to a distance of 10 cm with ethyl acetate: methanol: ammonia (17: 2: 1) as a mobile phase in a camag twin trough chamber previously saturated with mobile phase. The plate was then removed, dried in air for 15 min and sprayed with Dragendorff’s reagent. Orange spots were obtained. The Rf values were noted.

III) Ultra Violet Spectrophotometry
UV System specord S 600 with Aspect plus software was used for the analysis. Suspected sample solution was prepared in 0.1 N HCl and λmax was estimated in UV range 200nm to 400nm

IV) Gas Chromatography – Mass Spectrometry
GC-MS System – Agilent technologies 5975C and mass 7890 A with NIST Library. Methanol extract of the suspected sample (1µl) was injected to GC-MS under following conditions.

Column – HP-5 Capillary Column
Carrier gas – Helium
Oven temperature – Initial – 120°C (Hold time 2 min)
Final – 250°C (Hold time 5 min)
Ramp Rate - 10°C/min.
Injector temperature - 230°C
MS Conditions – Ionization mode – EI+
Source temperature – 230°C
Quadrapole temperature – 150°C

RESULTS AND DISCUSSION
Spot tests were initially carried out on the suspected sample. Marquis test did not give any colour to the suspected sample. However, Cobalt Thiocynate gave blue colour, Libermann test gave orange to brown colour and Mandellins test gave orange colour to the suspected sample. Marquis test gave orange colour to Methamphetamine and Ketamine. It means suspected sample is not of amphetamine, methamphetamine and ketamine.

In HPTLC analysis after spraying with dragendorff’s reagent, orange spots were obtained for standard Mephedrone, Ketamine and Methamphetamine at Rf 0.75,0.82 and 0.70
respectively. Suspected sample shows orange spot at Rf 0.75. Hence HPTLC analysis indicates the presence of Mephedrone as depicted in figure no.1.

UV Spectrum of suspected sample showed $\lambda_{\text{max}}$ at 263nm indicating presence of Mephedrone as shown in figure no.2. However ketamine and methamphetamine showed crown shaped UV hence they are absent in suspected sample.

GC-MS showed TIC peak at RT- 7.314. Its mass Spectrum showed m/z at 58, 91, 119, 173 with base peak 119. It shows presence of Mephedrone.

The colour test, TLC and instrumental analysis revealed that suspected sample is of mephedrone. The suspected sample which is in the form of crystals having similar appearance of methamphetamine is showing positive test for cobalt thiocynate is not methamphetamine. To mislead the investigation agency, this new drug is introduced in illicit drug market. Due to the efforts of investigation officer, Forensic science laboratory and forensic medicine this drug now falls under NDPS act 1985 in India.

Figure 1: HPTLC of suspected sample.

Track no- 1, 2, 3- Suspected sample
4, 5- STD Mephedrone
6- STD Ketamine
7- STD Methamphetamine
Figure 2: UV spectrum of suspected sample.

Figure 3: TIC of suspected sample.
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