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*Research Article*

# DETECTION OF METHAMPHETAMINE AND CAFFEINE IN ILLICIT TABLETS

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**ABSTRACT**
Tripura Police during investigation seized some tablets from two interstate drug peddlers bearing impression 'R' & 'WY'. The tablets are orange red in colour each weighing 120mg having sweet smell. The detection of the compounds in seized tablets was established to be methamphetamine (C10H15N) and Caffeine (C8H10N4O2) by Thin Layer Chromatography, Infrared Spectroscopy & GC-MS methods. Methamphetamine is a synthetic stimulant drug used for both medicinal and illicit purpose may induce strong feelings of euphoria. This is known as one of the world's most wide spread illicit drug coming under NDPS Act. Caffeine is CNS stimulant which is used both recreationally and medically to restore mental alertness and relatively safe for human.

**KEY WORDS**: Methamphetamine, Caffeine, TLC, FTIR, GC-MS.

## INTRODUCTION

The use of illicit drugs is a global problem and a menace to the society. The demand of many designed drugs in every sphere of life is very high as a result trafficking of illicit drug is alarmingly increasing. As per report placed in the parliament the seizure of illicit drugs in India during the year 2011 to 2014 was 105,173 tones. [1,2] The original drug amphetamine (Fig. 1-a) was used in World War-II, in Vietnam and other wars. The use of such drug by astronauts during space mission is reported in literature [3]. The group also includes crystal methamphetamine which can be inhaled by smoking. (Fig. 1-b). It is also abused as party drug and popular for stimulant/aphrodisiac affect [4]. These drugs have similar effects are available in tablets and capsules can be taken orally. They are also available as crystals, chunks and powder, which may be sniffed. It has become one of the world's most wide spread illicit drugs.

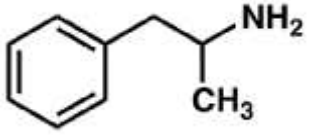



**Fig.1-a**

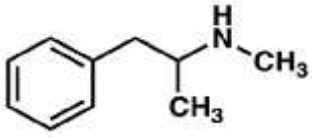



**Fig. 1-b**

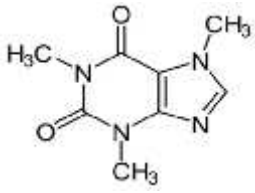



**Fig.1-c**

Caffeine (Fig.1-c) is a stimulant. It is used both recreationally and medically to restore mental alertness. It is relatively safe for human [5]. It is detected with methamphetamine one of the ingredients in the tablet Identification and Quantification of methamphetamine with and without caffeine have been achieved by use of a variety of techniques like Infrared Spectroscopy (IR), Thin Layer Chromatography (TLC), Gas chromatography-Mass spectrophotometry (GC-MS) and High Performance Liquid Chromatography(HPLC).

## Materials and Methods

Two tablets of different impressions were taken randomly out of the total tablets received for examination. Initially these tablets were made to fine powder and transferred to a suitable glass container, kept for 5-6 hours with solvent methanol and centrifuged. The supernatant liquid was passed through activated charcoal, filtered and almost colourless liquid was obtained. After concentration, few drops of methanol was added and the stock solution was used for TLC, FTIR & GC-MS studies.

Fig. 2-a, Front view

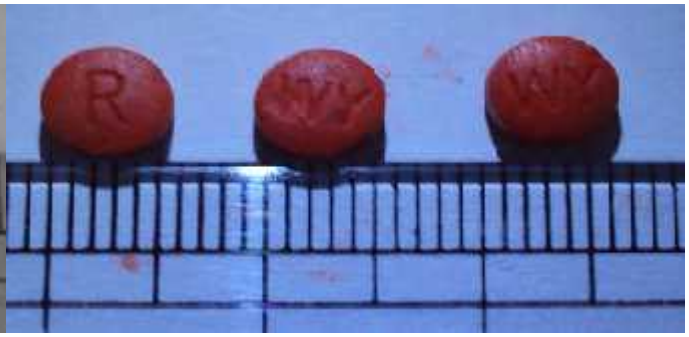


Fig-2-b Reverse view

**Thin layer Chromatography study:** TLC system : cyclohexane: toluene: diethyl amine: (7.5:1.5:1.0). Initially one plate spotted with sample was developed [6,7] and observed under variable wavelength. One prominent spot was observed followed with faint one suggesting presence of two different compounds in it. Visualisation reagent: Subsequently the second plate spotted with sample was developed and initially sprayed with ninhydrin reagent, exposed at $110^0$C for 5 minutes, appearance of light violet spot suggesting the presence of methamphetamine. Further on overspray the plate with acidified iodoplatinate solution, dirty grey- violet-brown spot on a pink background indicates presence of methamphetamines or amphetamines. The faint spot observed under variable wavelength did not respond to visualisation reagent to develop any colour.

**Instrumental analysis**

**IR spectroscopy analysis:** (Perkin Elmer, model –Spectrum BX II was used for analysis) With the help of preparative TLC the compounds showing different $R_f$ values were separated and subjected to FTIR analysis.

(a) The spectral data at 525, 598, 700, 741, 790, 1031, 1071, 1085,1117, 1126 $cm^{-1}$ recorded are in good agreement with the standard data of methamphetamine. [6,7,]

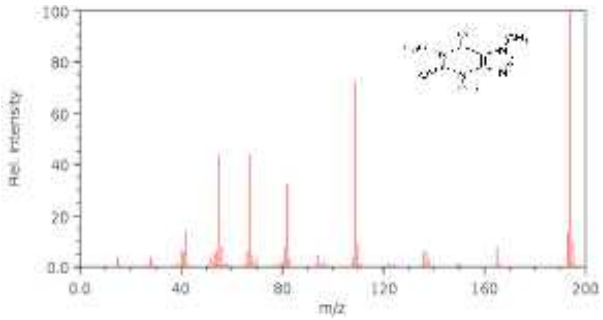
(b) The spectral data recorded at 1658, 1698, 747, 1548, 1242, 760 $cm^{-1}$ are in correspond with standard spectral data of caffeine available in literature. [6,7,8]

**Gas chromatography-Mass spectrophotometry:**

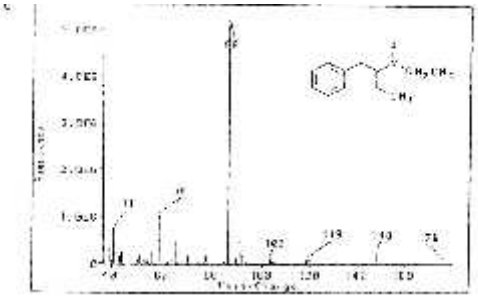
GC-MS, make Perkin Elmer, Model – Clarus 500, Column-Elite MS, detector-EI was used for analysis.

## Results

The analytical data confirmed the presence of methamphetamine and caffeine two different compounds in the illicit tablets. The mass spectra are shown below:




Mass spectrum (caffeine).



Mass spectrum (methamphetamine).

Further the results could match with that of the spectral data of software libray nemely NIST & WILEY.

## Discussion

The isolation of compound present in the illicit tablets was made as per standard procedure. The analysis of the active ingredient was done by TLC, FTIR and GC-MS method and identified to be methamphetamine and caffeine in them. The analysis of such tablets could be made from minimum quantity of tablets during short time with sophisticated equipment showing reproducible results helpful for prosecution of such cases in the court of law.

## Acknowledgement

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