



DETECTION AND IDENTIFICATION OF AJINOMOTO AS AN ADULTERANT IN A NARCOTIC DRUG MEPHEDRONE BY THIN LAYER CHROMATOGRAPHY

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ABSTRACT

Mephedrone is now included in Narcotic Drug and Psychotropic Substance Act, 1985 and also categorized as banned drugs. It has been found that Ajinomoto is used as an adulterant in Mephedrone. This is because physical appearance of both i.e. Mephedrone and Ajinomoto is similar. Hence Ajinomoto can not be easily distinguished from Mephedrone sample. Ajinomoto salt is also known as monosodium glutamate, commonly referred to as MSG, and it is a type of sodium salt that has been linked to various adverse reaction. Mephedrone is costly in illicit market as compared to easily available Ajinomoto salt. To compensate for the narcotic effect and to get more profit Ajinomoto is used as an adulterant. In this work a new specific spray reagent and

mobile phase is developed for detection and identification of Mephedrone and Ajinomoto in one stroke.

KEYWORDS: Mephedrone, Ajinomoto, HPTLC.

INTRODUCTION

Mephedrone(MD Powder) is highly popular in Mumbai. The city is literally raging over the explosion of Mephedrone in the illicit market. The drug that was introduced to India about three year back, has recently seen a record number of seizures. In Mumbai 80% of the total drug addicts are addicted to MD powder. The prime targets of the drug are children in 14-20 year age.

Mephedrone is an amphetamine and Cathinone class drug.^[1,2] An amphetamine is a drug with a stimulant effect on the (CNS) central nervous system that can be physically and psychologically addictive when used too much. Cathinone is a naturally occurring stimulant present in the Khat plant. Its structure and effects are similar to those of ephedrine and amphetamine.^[3]

Mephedrone is now included in Narcotic Drug and Psychotropic Substance Act 1985, and also categorized as banned drugs. It has been found that Ajinomoto is used as an adulterant in Mephedrone sample. This is because physical appearance of both i.e. Mephedrone and Ajinomoto is similar. Hence ajinomoto can not be easily distinguished from Mephedrone sample.

Ajinomoto is commonly used in chinese food dishes and numerous other applications, like barbecue sauces and various frozen and canned food. Hence it is easily available in the market. The Mephedrone is sold to economically poor drug addicts by adulterating it with Ajinomoto which is cheaper and easily available adulterant to make more profit.

Forensic science laboratory, Mumbai received many cases which contain mixture of Ajinomoto and Mephedrone.^[5] Consequently many police agencies were seized consignment of Ajinomoto as a Mephedrone. Then it was necessary to develop a new spray reagent and mobile phase to detect, confirm and differentiate the same for routine analysis.

EXPERIMENTAL

Chemicals and solvent used were of analytical grade obtained from E.Merck India Ltd. Standard Mephedrone, and Ajinomoto obtained from Food and Drug Administration Mumbai. Solution of Mephedrone, Ajinomoto and suspected sample prepared by dissolving (10 mg of each) in 10 ml of distilled water. Sample preparation was also done in methanol where suspected sample is found to be partly soluble in methanol.

Preparation of Reagent

A) Dragendorff's Reagent

Solution (a): 2g Bismuth subnitrate + 25 ml Glacial Acetic acid+ 100 ml Distilled water.

Solution (b): 40 g Potassium Iodide + 100 ml Distilled water.

Mix -10 ml of Solution (a) + 10 ml of Solution (b) + 20 ml of Glacial Acetic acid+ 100 ml of distilled water.

B) Ninhydrin Reagent: Dissolve 0.5 g of ninhydrin in 50 ml of Acetone.

I) High Performance Thin layer chromatography (HPTLC): Methanol Extract

HPTLC was performed on glass plates of size (20 cm x 20 cm) precoated with 0.25 mm layer silica gel $60F^{254}$. The plate were activated in an oven at $110^{\circ}C$ for about 30 minutes, then removed and cooled at room temperature. Then methanol extract of standard Mephedrone, Ajinomoto and suspected sample (5 μ l) 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 Dragendroff's reagent. Orange spots were obtained. The Rf values were noted.

II) High Performance Thin layer chromatography (HPTLC): Water Extract

As the sample was partly soluble in methanol and soluble in water another HPTLC was done by using water extract of the sample. HPTLC was performed on glass plates of size (20 cm x 20 cm) precoated with 0.25 mm layer silica gel $60F^{254}$. The plate were activated in an oven at $110^{\circ}C$ for about 30 minutes, then removed and cooled at room temperature. Then water extract of standard Mephedrone, Ajinomoto and suspected sample (5 μ l) were spotted with the help of capillaries, on an activated plate. The plate was developed to a distance of 10 cm with n-Butanol: Glacial Acetic acid : Water (5 : 3 : 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 1% Ninhydrin reagent. Violet and Pink spots were obtained. The Rf values were noted.

RESULTS AND DISCUSSION

In HPTLC analysis of methanol extract (Fig 1) after spraying with dragendorff's reagent, orange spots were obtained for std. Mephedrone and suspected sample at Rf 0.75. No spot located for std Ajinomoto. Hence methanol extract of suspected sample indicates the presence of Mephedrone only and absence of Ajinomoto.

By referring the fact that suspected sample is partly soluble in methanol, hence the identification of the methanol insoluble part of the sample was required. In HPTLC analysis of water extract (Fig 2). after spraying with 1% ninhydrin reagent, violet colour spot were obtained for std. Ajinomoto at Rf 0.50 and pink colour spot was obtained for std. Mephedrone at Rf 0.72. Where as suspected sample showed same violet and pink spots at Rf

0.50 and 0.72. Hence the second HPTLC analysis indicates the presence of Ajinomoto and Mephedrone.(Fig. 2).

In conclusion the present work illustrate detection and confirmation of Ajinomoto as an adulterant in Mephedrone by HPTLC using n-Butanol : Glacial Acetic acid : Water(5 : 3 : 1) mobile phase and Ninhydrin as a spray reagent. The method strongly support the presence of Ajinomoto in Mephedrone sample and give firm evidence for the material used for the purpose of crime. The present work will be very much useful to forensic expert in future.



Figure 1: HPTLC --- Methanol Extract.

Track no- 1, 2, - Suspected sample

3, 4 - Std Ajinomoto

5, 6 - Std Mephedrone

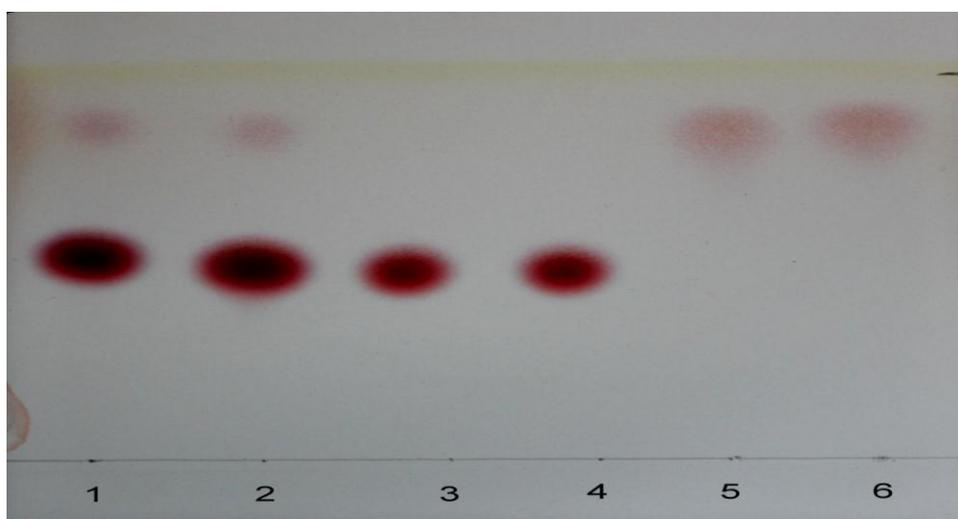


Figure 2: HPTLC ---Water Extract.

Track no- 1, 2, - Suspected sample

3, 4 - Std Ajinomoto

5, 6 - Std Mephedrone

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