



ANALYSIS OF THE DRUG CRYSTALS DISCOVERED BY POLICE 23 SEP 2008 TO 20 MAR 2009 IN ARAK

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ABSTRACT

Drug abuse is an important social, medical and legal issue which needs special attention by practioner and policy makers. Recently, an illicit drug called "SHISHEH" has been distributed among drug abusers in Marakazi province with some dreamlike after-use effects. In the present study, it is tried to shed some light on active ingredient of this illicit drug. Our study is an observational descriptive cross sectional study. All cases of illicit drug detection by police under the street name of "SHISHE" referred laboratory of Arak legal medicine center. In sum, 54 samples were sent to the laboratory since 23 Sep 2008 to 20 Mar 2009. Samples were analyzed by TLC (Thin Layer Chromatography) and HPLC (High Performance Gas Chromatography). These methods resulted in detection of relatively high percentage of amphetamine and methamphetamine in all 54 analyzed samples (> 97%). The amount of methamphetamine was also more than Amphetamine in samples but the difference was not statistically important. So, more training and awareness about its effects and dangers for teens and community population are critical.

Keywords: drug crystals, analysis, methamphetamine, HPLC, SHISHEH.

1. INTRODUCTION

Methamphetamine also known as methyl amphetamine, N-methyl amphetamine or desoxyephedrine is a powerful psycho stimulant and sympathomimetic drug. It is one of the members of phenylethylamines family. The levorotary (R-isomer) levomethamphetamine is an over-the-counter drug and is used in inhalers for nasal decongestion whit out CNS activity of dextro or racemic methamphetamine. The dextrorotatory (S-isomer) dextromethamphetamine is prescribed in treating attention-deficit hyperactivity disorder, though unmethylated amphetamine is more commonly prescribed in this respect. Narcolepsy and obesity can also be treated by the aforementioned isomer under the brand name Desoxyn. It is considered a second line of treatment when amphetamine and methylphenidate have too many side effects for patients. It is only recommended for short-term use (~6 weeks) in treatment-resistant obesity patients because it is thought that the anorectic effects of the drug are short-lived and produce tolerance quickly, whereas the effects on CNS stimulation are much less susceptible to tolerance. Its primary illegal use is for recreational purposes, weight loss as well as maintaining alertness, focus, motivation and mental clarity for extended periods of time. The half life of methamphetamine is 9-15 hours. It is excreted by the kidneys and its half life depends on urinary pH. One of the metabolites of methamphetamine is amphetamine. The chemical structure of methamphetamine is shown in Figure-1.

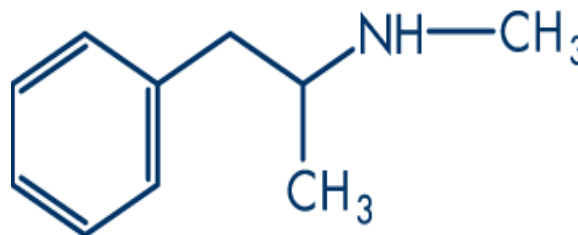


Figure-1. Chemical structure of methamphetamine (Systematic (IUPAC) name: (2S)-N-methyl-1-phenylpropan-2-amine Formula: C₁₀H₁₅N Mol. mass 149.233 g/mol)

In 1983, laws were passed in the United States prohibiting possession of precursors and equipment for methamphetamine production; this was followed a month later by a bill passed in Canada enacting similar laws. In 1986, the U.S. government passed the Federal Controlled Substance Analogue Enforcement Act in an attempt to curb the growing use of designer drugs. Despite of this, the use of methamphetamine expanded throughout rural United States, especially through the Midwest and South. Since 1989 five U.S. federal laws and dozens of state laws have been imposed in an attempt to curb the production of methamphetamine. Methamphetamine can be produced in home laboratories using pseudo ephedrine or ephedrine, the active ingredients in over-the-counter drugs such as Sudafed and Contac. Preventative legal strategies of the past 17 years have steadily increased restrictions to the distribution of pseudo ephedrine/ephedrine-containing products.

Common nicknames for methamphetamine include "crank", "meth", "ice", "snappy", "crystal", "tina", "glass", "P", "shabu" or "syabu" (Philippines), "tik" (South Africa), and "yaa baa" (Thailand). Methamphetamine is sometimes referred to as "speed" but this term is generally



reserved for regular amphetamine and dextroamphetamine [1-14].

Amphetamine and methamphetamine abuse is recently popular in Markazi province with some dream like announcement about its effect and dependency (addiction). So, more training and awareness about its effects and dangers for teens and community population are critical. In the present study, it is tried to shed some light on active ingredient of this illicit drug. Our study is an observational descriptive cross sectional study. All cases of illicit drug detection by police under the street name of "shishe" referred laboratory of Arak legal medicine center. In sum, 54 samples were sent to the laboratory since 23 Sep 2008 to 20 Mar 2009. Samples were analyzed by TLC (Thin Layer Chromatography) and HPLC (High Performance Gas Chromatography) and the obtained results were compared with its standard.

2. EXPERIMENTAL SECTION

The present work is an observational descriptive cross sectional study. In this step, at first, the amphetamine and its derivatives was extracted by suitable solvent in Chromatograph vessels and then analyzed by HPLC method.

2.1. Solvents and reagents

The used reagents were of highest purity (>99.95%). Methanol and acetonitrile of HPLC grade were from Merck (Germany) and orthophosphoric acid was from Alkaloid.

2.2. Samples preparation

Stock solutions (1.00 mg/ mL) were prepared in HPLC-grade methanol. The solutions were stored at 4°C for further analyzes. All analyzed samples (powders) were seized by police during last half of 2008-2009 in Arak city. Grounded tablets (10 mg) were weighed and dissolved in 7 mL methanol. The solution was sonicated for 5 min, filtered and diluted to 10 mL with methanol; and then after confirmed by TLC method, 20 µL was injected for chromatographic analysis.

2.3. HPLC (high performance gas chromatography)

HPLC was performed with a Varian system equipped with a ternary pump model 9012 and a diode-array UV detector model 9065. The system was controlled by the software package, Varian Star 4.50. Separations were performed on a 250 mm × 4.6 mm, 5-µm particle diameter, LiChrospher 60 RP-select B column protected by a 4 mm × 4.6 mm guard column containing the same packing (both from Merck). Isocratic elution with 90:10 (v/v) aqueous orthophosphoric acid (pH 2.1)-acetonitrile as optimum mobile phase was performed at 40°C. The flow rate was 1.5 mL/min with 10 min running time. Samples were injected through a Rheodyne injector valve model 7125 with 20-µL sample loop. The column was thermostatted with a CH-30 column heater and Eppendorf TC-45 temperature controller. A typically HPLC result was shown in Figure-2. It confirmed amphetamine materials.

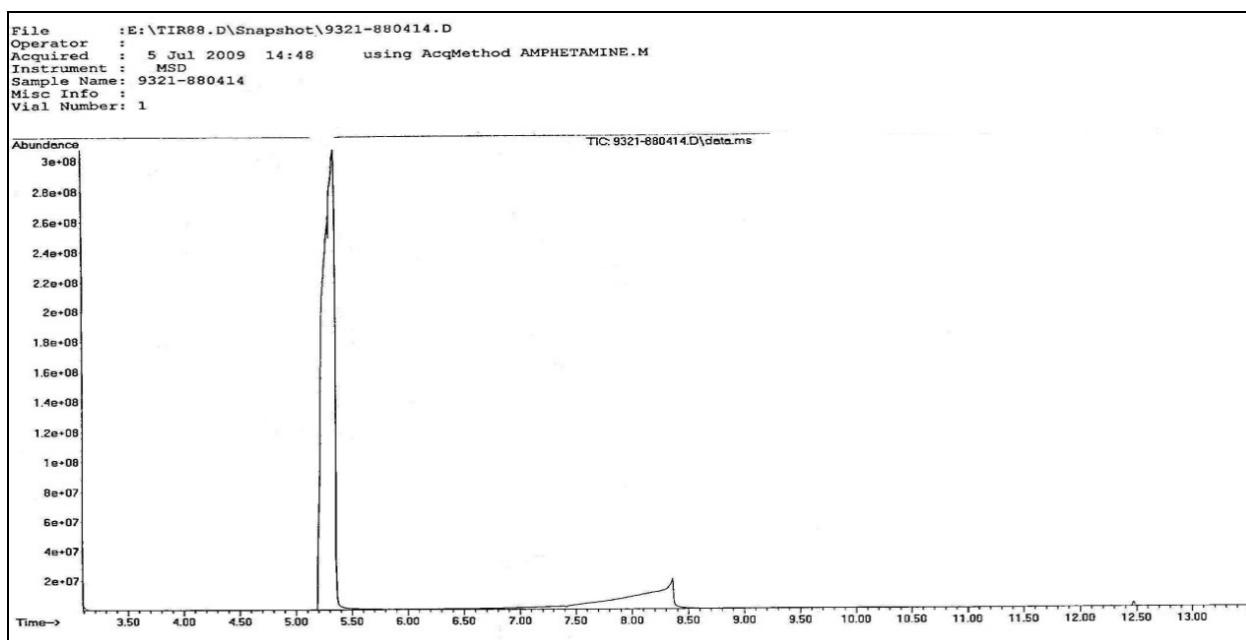


Figure-2. A typically sample's HPLC result.

3. RESULTS AND DISCUSSIONS

In sum, 54 samples from materials discovered and seized by police with street name of "shisheh" were analyzed. Amphetamine compounds spots with same RF were found in all samples using TLC method. In order to

confirm the results, the HPLC method was undertaken and again amphetamine compounds especially methamphetamine were detected. There was a small portion of impurity (less than 3%) in the samples containing phenylethylamine, mescaline, diethylamine,



dextroamphetamine, phenylpropanolamine phenmetrazine, and phentherminize. This means the drugs were produced from relative pure precursors. Because of crystalline nature of Amphetamine and methamphetamine, the production process plays a minimal role in creating impurities in the final product. In Arak city, purity of Amphetamine and methamphetamine in samples was high (97%). The amount of methamphetamine was more than Amphetamine in samples but the difference was not statistically important.

In another study in Macedonia at 2005-2006 [15], researcher found Amphetamine and methamphetamine in drug powders and tablets discovered by the police. The standard used in these analyses was 50 µg/ml Amphetamine and methamphetamine. In the mentioned study, the amount of amphetamine was more than methamphetamine in samples in contrast to our study. Impurity of Valentina Pavlva study, was mainly caffeine whereas we found no caffeine in our samples. Impurities such as caffeine are added during production phases while in our study there was no such added impurity.

Also in another study [16] with standard sample of 100µg/ml Amphetamine and methamphetamine, obtained the same results.

Also, according to U.S Drug Enforcement Administration [17] reports in 2007 and another research such as KANYA reports [18], the methamphetamine purity was observed low. This indicates that in the last years this material is produced in suitable experimental conditions with high purity.

Briefly, the public education plans are needed to increase public awareness about "shishe" as an illegal street drug with adverse and catastrophic effects on young people and other populations.

4. CONCLUSIONS

Drugs distributed with street name of "SHISHEH" in Arak city mainly contain Amphetamine and/or methamphetamine. Also in Arak city, purity of Amphetamine and methamphetamine in samples was high (97%). The amount of methamphetamine was more than Amphetamine in samples. Results indicated that in the last years this material is produced in suitable experimental conditions with high purity.

Briefly, the public education plans are needed to increase public awareness about "SHISHEH" as an illegal street drug with adverse and catastrophic effects on young people and other populations.

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