ISSN 2350-1030

International Journal of Recent Research in Physics and Chemical Sciences (IJRRPCS)
Vol. 12, Issue 2, pp: (7-11), Month: October 2025 – March 2026, Available at: www.paperpublications.org

Clandestine Methamphetamine Drug Manufacturing and Substance Use Disorders in Sri Lanka: A Case study on detection of Clandestine Methamphetamine Laboratory

Mayoni Abeynayake [1], Indika Wanninayake [2], Maheshi Perera [1]

[1] National Dangerous Drugs Control Board

[2]Director District General Hospital Avissawella

DOI: https://doi.org/10.5281/zenodo.19338741

Published Date: 30-March-2026

Abstract: **The illicit manufacture of synthetic drugs, trafficking and non-medical use of these synthetic drugs are a global challenge. Development of pharmaceutical and chemical industries have contributed to the continued discovery and proliferation of synthetic drugs. However, only a few synthetic drugs mainly amphetamine type stimulant (ATS), in particularly methamphetamine and methylenedioxy methamphetamine (MDMA) have established robust global markets. Methamphetamine is probably the most widely used and supplied synthetic drug worldwide, and its manufacture and use continue to expand in South-East Asia, North America, South-West Asia, Africa and Europe. Methamphetamine continues to dominate the ATS market and trafficking is growing in non-traditional market.**

Methamphetamine named as a synthetic stimulant drug and belongs to the amphetamine group (ATS). Methamphetamine come as a crystal, powder as well as tablet form. Now in many countries, Methamphetamine manufactured in illegal illicit (clandestine) laboratories. The proliferation of clandestine laboratories manufacturing synthetic drugs such as methamphetamine, ketamine and etc., poses a significant threat to public health and law enforcement agencies in worldwide.

In May 2024, the Jaffna divisional crime investigation unit officers arrested a house in Jaffna, Sri Lanka suspecting it to be a clandestine laboratory for the production of illicit methamphetamine. As of the order of the Honorable Magistrate, the National Narcotics Laboratory (NNL) of National Dangerous Drugs Control Board was tasked to investigate the suspected clandestine laboratory. Accordingly, two official from the NNL visited and scrutinized the location. Further, equipment and chemicals were examined and samples were collected for further analysis. Presumptive colour tests were conducted at the scene. Gas Chromatography – Mass Spectroscopy (GC-MS) analysis was performed for the collected samples at the NNL. The analysis of the collected samples revealed the presence of methamphetamine which is a controlled substance in Sri Lanka.

Keywords: **Amphetamine Type Stimulant (ATS), Methamphetamine, Illicit Manufacture, Gas Chromatography – Mass Spectroscopy (GC-MS).**

I. INTRODUCTION

Methamphetamine is a synthetic stimulant and it mainly used as a recreational or performance enhancing drug (*Amphetamine, methamphetamine and their ring-substituted* ...). It uses for the treatment of Attention Deficit Hyperactive Disorder (ADHD). According to the world Drug report 2024, 30 million of people around world use Amphetamine Type

ISSN 2350-1030

International Journal of Recent Research in Physics and Chemical Sciences (IJRRPCS)
Vol. 12, Issue 2, pp: (7-11), Month: October 2025 – March 2026, Available at: www.paperpublications.org

Stimulant (ATS). Further, according to the World Drug Report 2024, "Methamphetamine is probably the most widely used and supplied synthetic drug worldwide, and its manufacture and use continue to expand in South-East Asia, North America, South-West Asia, Africa and Europe"(1) .

According to the data obtained from the National Dangerous Drugs Control Board (NDDCB), showed the significant escalation of methamphetamine use, distribution and methamphetamine related arrests (*NDDCB*). (2)

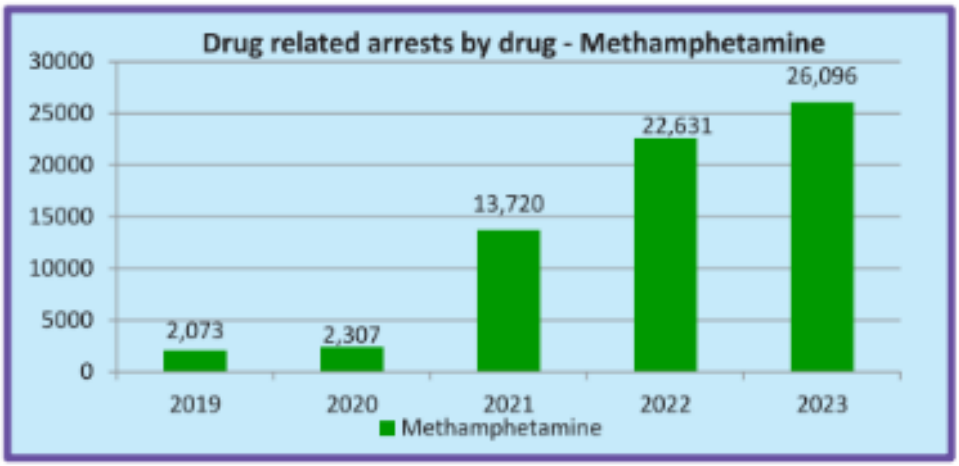

Figure 1: Drug Related Arrest by drug – Methamphetamine from 2019 to 2023 (*NDDCB*)

There are two types of clandestine methamphetamine laboratories. One is "super lab" and other one is small scale labs, normally call as "mom and pop" labs. Large laboratories manufacture 10 or more pounds of methamphetamine per production cycle and mom and pop labs can manufacture 1 to 4 ounce of methamphetamine per production cycle(3) .

Clandestine methamphetamine laboratories cause different types of harms such as physical injury from explosions, fires, chemical burns, toxic fumes, environmental hazards and child engagement (3)

Objectives of the Case Study

1. To document the circumstances surrounding the discovery of the laboratory.
2. To explore public health and law enforcement implications.
3. To recommend preventive and control measures to prevent future incidents.

In May 2024, a house located in Jaffna, Sri Lanka was apprehended by officers of Jaffna divisional crime investigation unit, suspecting it's involvement in the clandestine manufacture of illegal drugs. The individual in custody has rented out one room of his house for the manufacturing of the drugs. As per the order of the Honorable Magistrate of the area instructed the NNL to conduct an investigation of the apprehended location. Accordingly, two scientific officials from the NNL visited the site

Description of the Laboratory

It is observed a round table in the middle of the room. On this aforesaid table, apparatus made using three different sizes of syringes, liquid and powdered materials containing in this apparatus, plastic containers, weighing scales, sachet packets which contained powder materials, liquid samples containing plastic containers and different coloured filled and empty liters were observed. The analysts inspected the apparatus and chemicals, carried out presumptive on-site colour tests and sample collection conducted for further analysis in the NNL.

The presumptive on-site colour tests revealed the presence of methamphetamine in the sample and further analysis was performed by utilizing the Gas Chromatography – Mass Spectroscopy (GC-MS) technique.

ISSN 2350-1030

International Journal of Recent Research in Physics and Chemical Sciences (IJRRPCS)
Vol. 12, Issue 2, pp: (7-11), Month: October 2025 – March 2026, Available at: www.paperpublications.org

Figure 2: Round table located in the middle of the room and apparatus, materials and chemicals found at the site of illicit drug manufacturing

II. METHODOLOGY

Chemicals and Reagents

Methanol (AR) was purchased from Research Lab - India and methamphetamine reference standards was obtained from Laboratory and Scientific Services division, United Nations Office on Drugs and Crime (UNODC).

GC-MS Analysis

Samples collected from clandestine laboratory was confirmed using Agilent 8890 Gas chromatograph equipped with a 5977B GC/MSD.

GC Conditions

HP – 5 (30m x 0.32 mm, 0.25µm) Column was used and helium uses as a carrier gas with the flow of 0.8 mL/min. Initial temperature was 60^0C and held for 0.5 minutes. Then temperature was increased 12^0C/min up to 280 ^{0}C and held for 15 Minutes. Total run time of the sample was 20 minutes and splitless mode used. Data analysis was completed using the Agilent MSD Chemstation software.

MS Conditions

Solvent delay 3 minutes and mass range was 50 to 600.

Sample Preparation for GC-MS analysis

1 milligram of the powdered sample was dissolved in 1 mL of methanol to get a solution of 1mg/mL concentration. This sample was directly injected to GC-MS. Same procedure was followed to liquid samples. The powdered samples and liquid samples collected from the site was completely dissolved in the methanol.

III. RESULTS AND DISCUSSION

Gas Chromatography Mass Spectroscopy (GC-MS) results revealed the presence of methamphetamine in the powdered samples and liquids obtained from the apparatus found in the clandestine laboratory premises (Figure 2).

The retention time for methamphetamine in the Total Ion Chromatography (TIC) was 5.754 minutes. Characteristic mass peaks m/z of 51, 91, and 134 were identified in both the mass spectrum of the samples and library search results, confirming the presence of methamphetamine (Figure 3)

ISSN 2350-1030

International Journal of Recent Research in Physics and Chemical Sciences (IJRRPCS)
Vol. 12, Issue 2, pp: (7-11), Month: October 2025 – March 2026, Available at: www.paperpublications.org

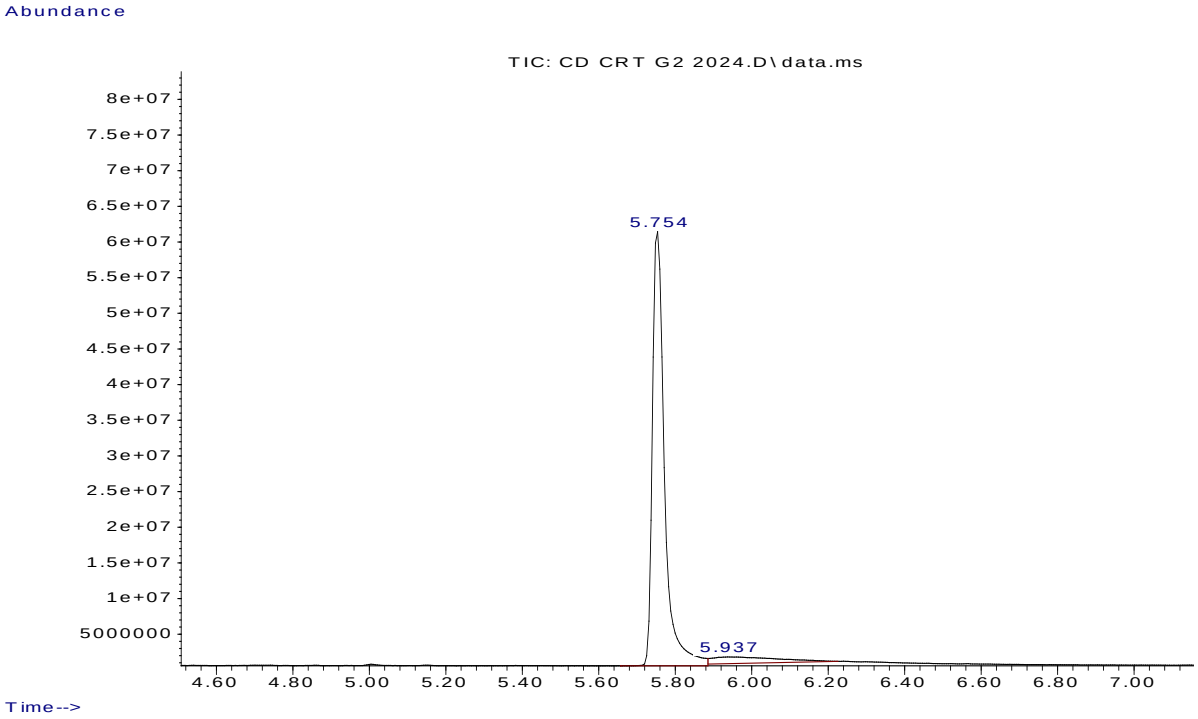

Figure 3: Gas Chromatography Mass Spectroscopy (GC-MS) spectrum for methamphetamine

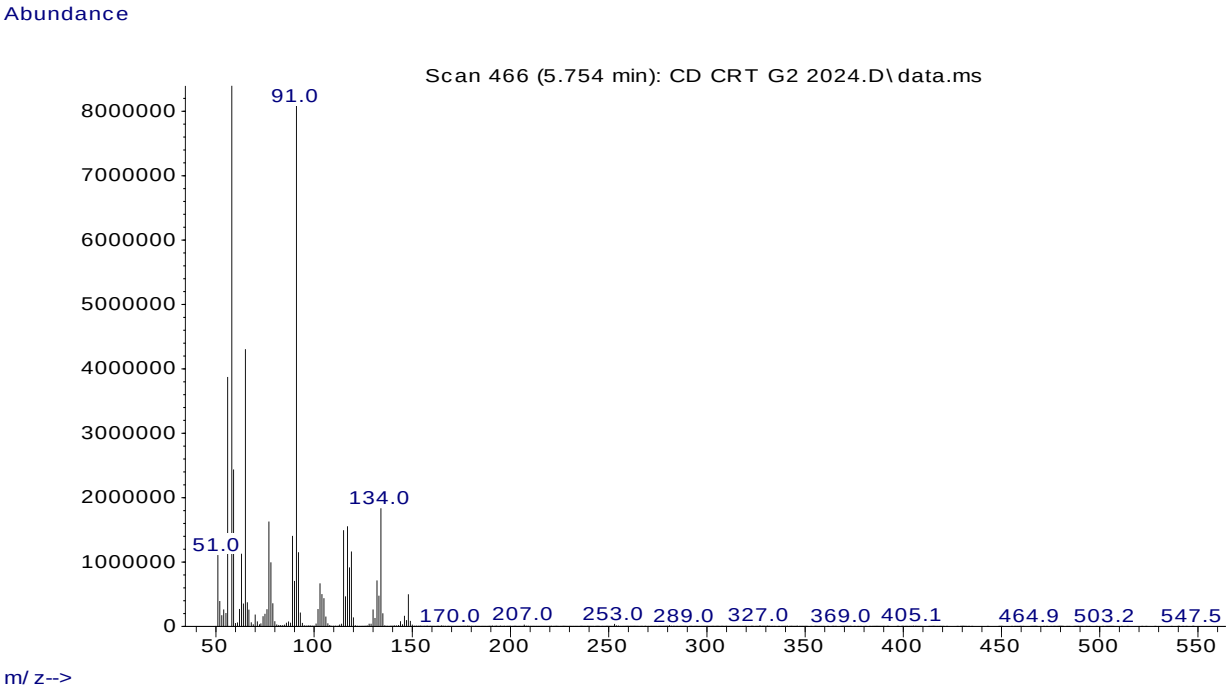

Figure 4: Mass spectrum for the result for methamphetamine

However, any precursor chemicals which used to manufacture of this methamphetamine substances were not identified at this premises. Therefore, we were not able to predict the chemical pathway used to manufacture of methamphetamine in this clandestine laboratory and it is not clear where the storage location of those precursor chemicals. Moreover, there is a doubt for availability of any other manufacturing sites and the pathway of obtaining precursor chemicals to this methamphetamine production.

Environmental and public Health Risk

Clandestine laboratory will cause serious hazardous to operators, community near the lab, environment and law-enforcement officers, there are risks including

- Exposure to toxic chemicals and fumes
- Risk of fire explosion due to volatile substance
- Improper disposal of chemical waste
- Environmental contamination

Lesson Learned

- Increasing technical capacity is required to detect synthetic drug manufacturing.
- Monitoring of precursor chemicals must be strengthened.
- Community awareness is important for early detection of suspicious activities.
- Effective coordination between law enforcement and public health agencies is essential.

IV. RECOMMENDATIONS

Based on the findings of this case study, the following actions are recommended:

1. Strengthen surveillance and monitoring of chemical precursors used in synthetic drug production.
2. Provide specialized training for law enforcement personnel to identify clandestine laboratories.
3. Improve intelligence sharing among relevant agencies.
4. Enhance community awareness programs on reporting suspicious activities related to drug manufacturing.

V. CONCLUSION

The detection of a clandestine methamphetamine laboratory in Jaffna District represents an emerging threat within Sri Lanka's drug landscape. Preventing the proliferation of such facilities requires coordinated efforts between law enforcement agencies, public health authorities, and the community. Continued vigilance and strengthened regulatory mechanisms will be essential to address the public health and environmental risks posed by synthetic drug production in the country

According to the National Dangerous Drugs Control Board, emerging thereat of seizing clandestine laboratories in Sri Lanka, made an emerging risk to the control of drug demand, control of drug supply, risk to the community and ultimately to the National security. Strenthening the precursor control mechanism is also a paramount need of the hour.

REFERENCES

[1] *World Drug Report 2024United Nations : Office on Drugs and Crime*. Available at: https://www.unodc.org/unodc/en/data-and-analysis/world-drug-report-2024.html (Accessed: 27 December 2024).

[2] *NDDCB*. Available at: https://www.nddcb.gov.lk/Docs/research/Final_Handbook_2023.pdf (Accessed: 27 December 2024).

[3] Scott, M.S. Dedel, K (2006) *Clandestine methamphetamine labs*). https://popcenter.asu.edu/sites/default/files/clandestine_meth_labs_2nd_edition.pdf.pdf (Accessed: 27 December 2024).