CLANDESTINE MANUFACTURE OF SUBSTANCES UNDER INTERNATIONAL CONTROL

MANUAL FOR USE BY NATIONAL LAW ENFORCEMENT AUTHORITIES AND PERSONNEL OF NARCOTICS LABORATORIES

UNITED NATIONS

UNITED NATIONS INTERNATIONAL DRUG CONTROL PROGRAMME
Vienna

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CONTENTS

INTRODUCTION

Background

1. The first "synthetic" narcotic material that appeared on the illicit market was undoubtedly heroin, a substance easily synthesized from a natural product, morphine, which it was meant to replace in medicine. Heroin clearly exemplifies the general trend characterizing the transfer of chemical knowledge and technology from the legal manufacture of drugs to the world of clandestine production. With a few exceptions, all narcotic and psychotropic substances were originally the result of pharmaceutical research and development work and were used as medicines or research material (e.g. (+)-lysergide (LSD), phencyclidine (PCP)). However, many of them became progressively and sometimes rapidly subject to abuse and trafficking.

The emerging illegal demand for drugs then resulted, during the last few decades, in a slowly but constantly growing volume of illicit drug production. This in turn has led to the proliferation of clandestine laboratories, extracting and synthesizing a wide variety of drugs of abuse in many countries. This development was facilitated by advances in chemical knowledge and technology, as well as by the free and easy availability of certain basic chemicals and equipment and access to legitimate and (grey) underground literature/ information.

2. While the manufacture of illicit heroin and the production of cocaine were previously confined to areas of the world where the required technology was available, today the extraction of and/or chemical conversion leading to those substances together with the necessary know-how and technology (clandestine laboratories) have shifted closer to the areas where the raw material (e.g. opium and coca leaf) is produced. At the same time, much more sophisticated clandestine procedures (extraction/synthesis) and laboratories were developed in many countries. Today, a wide variety of synthetic known (e.g. amfetamine) as well as new substances (e.g. amfetamine analogues) are illicitly produced.

3. Clandestine laboratory operations were reported to have been seized in many countries. Yearly reports show an increase in i) the number of countries where clandestine production takes place, ii) the number of clandestine laboratories and iii) the quantities and variety of substances produced. Seizure reports indicate that heroin, cocaine, amfetamine, metamfetamine, 3,4-methylenedioxymetamfetamine (MDMA), methaqualone, (+)-lysergide (LSD) and phencyclidine (PCP) were the leading products synthesized clandestinely. Intelligence reports also reveal that clandestine laboratories often avail themselves of the knowledge of well-trained chemists and have access to the latest chemical literature/published methods and equipment developed specifically for the purpose of producing drugs illicitly.

4. The developments just outlined continue to cause concern not only to individual countries directly affected by the clandestine production of drugs, but also to regional drug control authorities and institutions as well as to international organizations. The task of the authorities and institutions involved in the fight against the illicit traffic is no longer limited to the seizure of the clandestine products and/or laboratories. For example, whereas the role of analysts of national drug testing laboratories providing services to law enforcement authorities was in the past limited to the identification and analysis of seized drugs, today the responsibilities of those analysts include the determination of the possible origin (natural or synthetic) of those drugs, their legitimacy (diverted from legitimate commerce or clandestine),

the identification of precursors, reagents and solvents used for their production and the provision of advice on the possible purpose for their use. To complicate matters for analysts operators of clandestine laboratories have been able to significantly modify known methods of synthesis or production by using substitutes for and "mixtures" of precursors, essential chemicals and solvents when the availability of these becomes limited due to effective control.

5. Extraction of natural narcotic or psychotropic substances and synthesis of many of the most commonly trafficked and abused drugs require a broad range of chemicals. Those chemicals have a wide legitimate use in the chemical and pharmaceutical industry and are extensively traded in the licit international commerce. Monitoring of their exact use requires a close multisectoral international co-operation.

6. In this regard, the 1961 Single Convention on Narcotic Drugs (Art.2, para.8) and the 1971 Convention on Psychotropic Substances (Art.2, para.9) state that: *"The parties shall use their best endeavours to apply to substances which do not fall under this Convention, but which may be used in the illicit manufacture of drugs, such measures of supervision as may be practicable".*[1/2/]

7. At its 28th session, the Commission on Narcotic Drugs expressed its concern in respect of the alarming situation and invited Governments *"to make available to the Division of Narcotic Drugs relevant information on legislative and administrative measures to control the chemical precursors of drugs of abuse which have been taken and which have proved successful, as well as any information on which those measures are based, including the results of pertinent research work in this respect".*[3/]

8. Efforts have been made in some countries to collect, produce and publish relevant information on various aspects of clandestine drug manufacture, with special emphasis on substances produced synthetically.[4/5/6/] In addition, national and international meetings were held on the subject and recommended a range of possible measures to counteract this rapid and threatening development[7/8/9/10/]

9. The Commission reviewed the situation at its 31st session and adopted a resolution[11/] on measures against the diversion in international commerce of specific precursors, reference chemicals and solvents used in the illicit manufacture of narcotic drugs and psychotropic substances. In this resolution, the Commission recommended, inter alia, to Governments: *"to introduce, consistent with domestic laws, a licensing or monitoring system for the supply and import of such precursors, chemicals and solvents used in the manufacture of narcotic drugs and psychotropic substances, or to prohibit the import of those substances where there is no licit need for them;"*

10. The 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances[12/] addresses the problem of diversion of essential precursors, chemicals/reagents and solvents in Article 12, which states, inter alia, that: *"The Parties shall take the measures they deem appropriate to prevent diversion of substances in Table I and Table II used for the purpose of illicit manufacture of narcotic drugs or psychotropic substances, and shall co-operate with one another to this end".* Article 12 and Tables I and II are reproduced in the Annex. It must be pointed out that there are a large number of substances with potential use in clandestine drug manufacturing laboratories. However, because these substances are widely utilized in legitimate chemical and pharmaceutical industries and are traded in large quantities, only twenty two (22) substances are currently under control, based on several considerations (see Annex, Article 12, para.s 4 and 5).

Purpose of the Manual

11. The "Manual on Clandestine Manufacture of Substances under International Control"[13] has been prepared as a working reference tool drawing on reviews supplied by national authorities as well as on available literature. In view of the broadening of the scope of control of the 1961 and 1971 Conventions by the Commission on Narcotic Drugs and the entry into force of the 1988 Convention, this manual has now been revised to cover:

- newly scheduled narcotic drugs and psychotropic substances since the publication of the first edition of the manual;
- substances controlled under the 1988 Convention (see Annex, Article 12);
- new developments in synthetic methods;
- procedures for handling and disposal of seized drugs and substances used for their manufacturing/processing as well as procedures for clandestine laboratory investigations.

12. As the number and variety of drugs produced clandestinely is at present impressively large and growing, the scope of the manual had to be limited to those substances under international control which are most frequently produced and trafficked and to the synthetic routes most frequently used.

13. Following the introduction of this manual, individual monographs on narcotic drugs and psychotropic substances produced clandestinely show information on the "essential precursors/raw materials" known to have been used. They also indicate for some drugs major impurities (natural, semi-synthetic or synthetic by-products, diluents and adulterants). For publications on drug identification and analysis the reader is referred to the ST/NAR/... publication reference shown on the individual monographs. Synonyms and other names of the drugs covered in this manual can be found in the Multilingual Dictionary of Narcotic Drugs and Psychotropic Substances under International Control[14]. For substances controlled under Article 12 of the 1988 Convention, those synonyms and other names are given in Chapter E.

14. Chapter B of this manual comprises tables (I-IV) listing:

a) essential precursors/raw materials;
b) chemicals/reagents;
c) solvents;

known to have been used in the illicit production/manufacture of the most frequently trafficked/abused drugs.

15. Table I lists - in alphabetical order - controlled drugs together with the essential precursors/raw materials, chemicals/reagents and solvents that have reportedly been used for their production/manufacture. Tables II, III and IV list (also alphabetically) essential precursors/raw materials, chemicals/reagents and solvents together with the target controlled drugs the production/manufacture of which they are known to have been used for.

16. The most common synthetic and production pathways reportedly used in clandestine laboratories are shown schematically only, as this aspect has been and is dealt with extensively in the scientific literature and has been the subject of several reviews and manuals. In fact, given the sensitive nature of the subject, exclusion of production/synthesis details from this manual with an expected wide distribution, was considered necessary.

17. Drugs of abuse which are synthesized less frequently or only in isolated cases are listed on page 181 (Chapter D) of this manual.

18. Finally, Chapter F provides major recommendations extracted from the reports on expert group meetings which addressed legal and scientific issues related to the pre-trial destruction of seized narcotic drugs, psychotropic substances, precursors and essential chemicals[15/16] as well as to clandestine laboratory investigation[17]. With regard to the latter, this chapter also lists tasks for law enforcement officers and forensic chemists in clandestine laboratory investigations.

19. The attention of the reader is drawn to the fact that this publication is meant to serve as a source of information for national law enforcement agencies and laboratory personnel and not as an operational manual for detecting and seizing clandestine laboratories. However, national authorities may draw on its contents to develop their own operational guidelines and training programmes, taking into account the local characteristics of the illicit market, the available technical expertise and the national legal framework. Those operational guidelines and training programmes should take due account of the safety and health hazards (inflammability, corrosiveness and toxicity) associated with the handling and storage of many of the chemicals and solvents as well as of the drugs themselves. In this connection, Chapter E provides general information on the physical characteristics and safety requirements for the handling and storage of precursors, chemicals/reagents and solvents under international control.

20. As the pattern of illicit drug processing/manufacturing, trafficking and abuse is constantly changing, this manual will need to be periodically updated to reflect such changes. In this connection, the United Nations International Drug Control Programme (UNDCP) would welcome observations, suggestions and information on new aspects or developments related to manufacture of clandestine drugs under international control. These may be addressed to:

United Nations International Drug Control Programme
Technical Services Branch
Laboratory Section
United Nations Office at Vienna
P.O. Box 500
A-1400 Vienna
Austria

GENERAL REFERENCES

1/ Single Convention on Narcotic Drugs, 1961, Article 2, paragraph 8.

2/ Convention on Psychotropic Substances, 1971, Article 2, paragraph 9.

3/ Report on the Twenty-Eighth Session of the Commission of Narcotic Drugs, (E/CN.7/638), resolution 5 (XXVIII), paragraph 1.

4/ Clandestine Laboratory Guide for Agents & Chemists, Office of Science and Technology, Drug Enforcement Administration, U.S. Department of Justice, 1984, 1986, 1989, 1994.

5/ Frank, R.S.. J.For.Sci., 28 (1983) 18.

6/ Dykeman, R.W. et al.. Control of Precursors of Chemical Drugs of Abuse (Manuscript), Ottawa, 1984.

7/ Informal Working Group of Officials in Charge of the Licit Movement of Narcotic Drugs and Psychotropic Substances in the Major Manufacturing-Exporting Countries. Vienna, June 1981, 1982 and 1983.

8/ Conference of Source Nations on the Diversion of Controlled Drugs, Precursors and Essential Chemicals from International Commerce. Rome, Italy, May 7-11, 1984.

9/ Conference of Source Nations on the Diversion of Controlled Drugs, Precursors and Chemicals from International Commerce. Wiesbaden, Federal Republic of Germany, December 1-3, 1986.

10/ Report, Fifth Meeting of Operational Heads of National Law Enforcement Agencies, Far East Region, MNAR/1985/2, paragraph 78.

11/ Report on the Thirty-First Session of the Commission of Narcotic Drugs (E/CN.7/1985/22), draft resolution II, paragraph 1.

12/ United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988, Article 12.

13/ Manual on Clandestine Manufacture of Substances under International Control (ST/NAR/10), United Nations, New York, 1987.

14/ Multilingual Dictionary of Narcotic Drugs and Psychotropic Substances under International Control (ST/NAR/1/Rev.1), United Nations, New York, 1993.

15/ Report on the Meeting of the Expert Group on Pre-Trial Destruction of Seized Narcotic Drugs, Psychotropic Substances, Precursors and Essential Chemicals, Vienna, 13-17 November 1989 (E/CN.7/1990/7/Add.1).

16/ Report on the Meeting of the Expert Group on Pre-Trial Destruction of Seized Narcotic Drugs, Psychotropic Substances, Precursors and Essential Chemicals, Bangkok, 22-26 October 1990 (E/CN.7/1991/CRP.5).

17/ Report on the Meeting of the Expert Group on Clandestine Laboratory Investigation, Seoul, 2-6 December 1991 (E/CN.7/1992/CRP.8).

DEFINITIONS

Production means the separation of opium, coca leaves, cannabis and cannabis resin from the plants from which they are obtained (Single Convention on Narcotic Drugs, 1961);

Manufacture means all processes, other than production, by which drugs may be obtained and includes refining as well as the transformation of drugs into other drugs (Single Convention on Narcotic Drugs, 1961);

Process is one or more of the successive individual operations necessary for the production/manufacture of a definite compound; as, crushing, grinding, separating, leaching, dissolving, concentrating, evaporating, distilling, mixing.

Essential precursor is a chemical substance which in the clandestine manufacturing process becomes incorporated in full or part into the final molecule of a substance under international control;

Raw material (e.g. opium, coca leaves) is a material of natural origin which is a requisite for the manufacture of a substance under international control;

Chemical is a substance used as reagent or solvent in the illegal manufacture of controlled substances;

Reagent is a chemical substance that participates during the processing/ manufacturing, but does not become part of the final product;

Solvent is a substance capable of or used in dissolving or dispensing one or more substance(s) without modifying their molecular structure. It does not become part of the molecule of the final product;

Impurities are:

- naturally occurring substances in raw material;
- reagents;
- solvents;
- substances in reagents and/or solvents; or
- substances/artefacts formed during the processing/manufacturing of drugs.

They remain in the final product;

By-products are substances formed during the production/manufacturing of the target drug;

Adulterants are pharmacologically active substances:

- of natural origin which remain in the final product;
- formed during the processing/manufacturing and remain in the final product; or
- added to the final product after the processing/manufacturing is completed;

Diluents are pharmacologically inactive substances added to the final product to increase bulk.

A. DRUGS UNDER INTERNATIONAL CONTROL FREQUENTLY PRODUCED/MANUFACTURED IN CLANDESTINE LABORATORIES

MONOGRAPHS

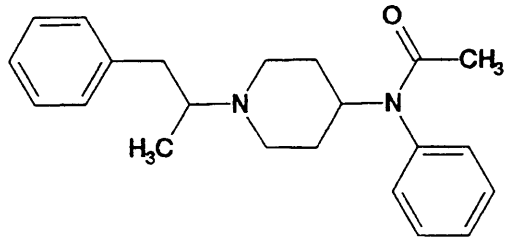
EXPLANATORY NOTES

The Chemical Names of the drugs follow the Conventions of 1961 and 1971. However, the stereochemistry was not taken into account.

For additional essential precursors/raw materials, for chemicals and reagents and for solvents used in the clandestine production/manufacture of the drugs see Chapter B (tables I-IV).

The references quoted in the monographs are listed on pages 70-72.

ACETYL-ALPHA-METHYLFENTANYL



Chemical Name: *N*-[1-(α-methylphenethyl)-4-piperidyl]acetanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

Amfetamine
1-benzyl-4-piperidinone
N-(4-piperidinyl)aniline

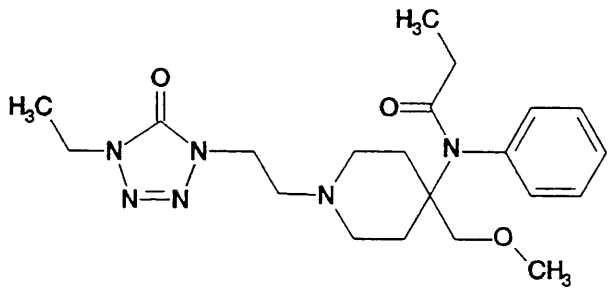
Synthesis Schemes

→ see pages 151, 156 and 158.

REFERENCES

→ see page 72, numbers 117, 118, 129.

ALFENTANIL



Chemical Name: *N*-[1-[2-(4-ethyl-4,5-dihydro-5-oxo-1*H*-tetrazol-1-yl)ethyl]-4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamide

International Control: Schedule I (1961)

Therapeutic Use: Analgesic

MANUFACTURE

Essential Precursors

1-(2-bromoethyl)-4-ethyl-1,4-dihydro-5*H*-tetrazol-5-one

N-[4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamide

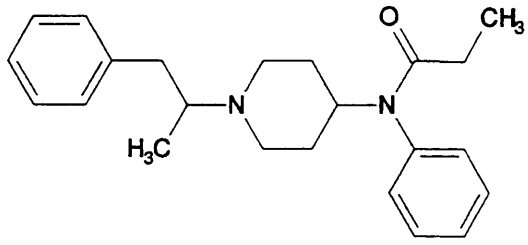
Synthesis Schemes

→ see pages 153 and 160.

REFERENCES

→ see pages 71 and 72, numbers 93, 117.

ALPHA-METHYLFENTANYL



Chemical Name: *N*-[1-(α-methylphenethyl)-4-piperidyl]propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

Amfetamine
1-benzyl-4-piperidinone
N-(4-piperidinyl)aniline

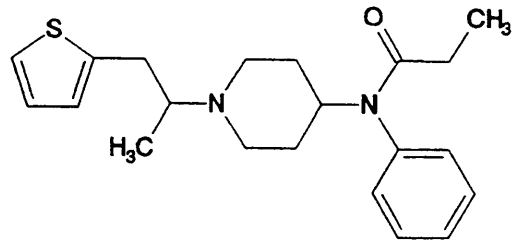
Synthesis Schemes

→ see pages 151, 156 and 157.

REFERENCES

→ see page 72, numbers 117, 118, 129.

ALPHA-METHYLTHIOFENTANYL



Chemical Name: *N*-[1-[1-methyl-2-(2-thienyl)ethyl]-4-piperidyl]propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-4-piperidinone
N-(4-piperidinyl)aniline
1-(2-thienyl)-2-propanamine

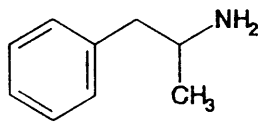
Synthesis Schemes

→ see pages 151, 156 and 157.

REFERENCES

→ see page 72, numbers 117, 118.

AMFETAMINE



Chemical Name: α-methylphenethylamine
International Control: Schedule II (1971)
Therapeutic Use: CNS stimulant; anorectic

MANUFACTURE

Essential Precursors

Allylbenzene
Benzaldehyde
Norpseudoephedrine
Phenylpropanolamine (Norephedrine)
1-phenyl-2-propanone (P2P)

Synthesis Schemes

→ see pages 129, 130, 131 and 132.

IMPURITIES

a) By-Products:

N-acetylamfetamine
Benzyl methyl ketone benzylimine
Benzyl methyl ketone phenylisopropylimine
2-benzyl-2-methyl-5-phenyl-2,3-dihydropyrid-4-one
α-benzylphenethylamine
4-benzylpyrimidine
1-chloro-1-phenyl-2-aminopropane
Dibenzyl ketone
2,4-dihydroxy-1,5-diphenyl-1-methylpent-1-ene
N,N-dimethylamfetamine
2,4-dimethyl-3,5-diphenylpyridine
2,6-dimethyl-3,5-diphenylpyridine
2,4-dimethyl-3-phenyl-6-benzylpyridine
N,N-di(β-phenylisopropyl)amine
N,N-di(β-phenylisopropyl)formamide
N,N-di(β-phenylisopropyl)methylamine
Formic acid
N-formylamfetamine
2-methyl-3-phenyl-6-benzylpyridine
4-methyl-5-phenyl-2-benzylpyridine
N-methyl-5-phenylpyrimidine
1-oxo-1-phenyl-2-(β-phenylisopropylimino)propane

Phenethylamine
1-phenyl-2-propanol

1-phenyl-2-propanone (P2P)

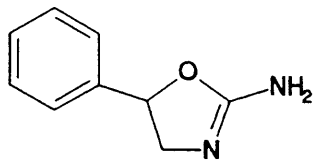
b) Adulterants and Diluents:

α-benzylphenethylamine
Caffeine
Cannabis plant
Ephedrine
Glucose
Magnesium sulfate
Mannitol
Metamfetamine
Phenazone
Procaine
Sucrose

REFERENCES

→ see pages 70-72, numbers 6, 23, 35, 36, 42, 43, 44, 52, 53, 54, 55, 72, 75, 76, 92, 100, 101, 104, 105, 106, 107, 108, 117, 120.

AMINOREX



Chemical Name: 2-amino-5-phenyl-2-oxazoline
International Control: Schedule IV (1971)
Therapeutic Use: CNS stimulant; anorectic

MANUFACTURE

Essential Precursor

Phenethanolamine

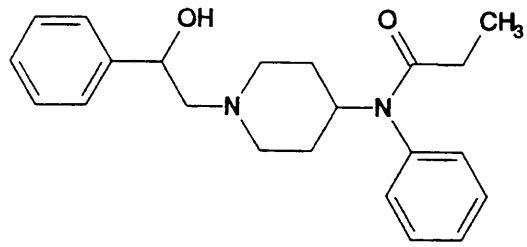
Synthesis Scheme

→ see page 145.

REFERENCES

→ see pages 71 and 72, numbers 73, 117.

BETA-HYDROXYFENTANYL



Chemical Name: *N*-[1-(β-hydroxyphenethyl)-4-piperidyl]propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-4-piperidinone
Phenethanolamine
N-(4-piperidinyl)aniline

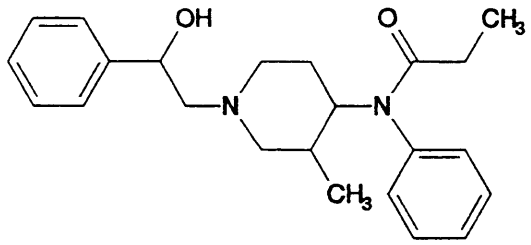
Synthesis Schemes

→ see pages 150, 155 and 157.

REFERENCES

→ see page 72, numbers 117, 118.

BETA-HYDROXY-3-METHYLFENTANYL



Chemical Name: *N*-[1-(β-hydroxyphenethyl)-3-methyl-4-piperidyl]-propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-3-methyl-4-piperidinone
N-(3-methyl-4-piperidinyl)aniline
Phenethanolamine

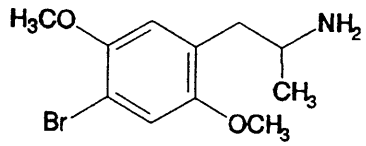
Synthesis Schemes

→ see pages 152, 155 and 159.

REFERENCES

→ see page 72, numbers 117, 118.

BROLAMFETAMINE
(DOB)



Chemical Name: 4-bromo-2,5-dimethoxy-α-methylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

o-bromophenol
2,5-dimethoxyamfetamine (DMA)
2,5-dimethoxybenzaldehyde

Synthesis Scheme

→ see page 137.

REFERENCES

→ see pages 70 and 72, numbers 30, 117, 124.

CANNABIS OIL

International Control: Schedule I (1961)
Therapeutic Use: No medical use

PRODUCTION

Essential Raw Materials

Cannabis plant
Cannabis resin

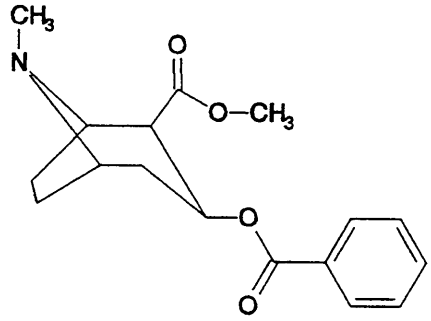
IMPURITIES

Solvent residues

REFERENCES

→ see pages 70 and 72, numbers 45, 46, 121, 132.

COCAINE



Chemical Name: Methyl ester of benzoylecgonine
International Control: Schedule I (1961)
Therapeutic Use: CNS stimulant; local anesthetic

PRODUCTION

Essential Raw Materials

Coca leaf
Coca paste

Processing Scheme

→ see page 146.

IMPURITIES

a) Other Coca Constituents:

Ecgonine
Ecgonine benzoylester
Ecgonine methylester
trans/*cis*-cinnamoylcocaine
Tropacocaine

b) By-Products:

Benzoic acid
Benzoyltropeine
Cocaethylene
Ecgonidine (anhydroecgonine) methylester
Ecgonine ethylester
Methyl benzoate
trans/*cis*-methyl cinnamate
Pseudotropine

c) Main Adulterants and Diluents:

Benzocaine
Caffeine
Glucose
Lactose
Lidocaine
Mannitol
Procaine
Tetracaine

d) Other Compounds Found:

Acetaminophen
Acetylamfetamine
Acetylsalicylic acid
Amfepramone
Amfetamine
Amitryptiline
Amylocaine
Ascorbic acid
Barium carbonate
Boric acid
Bupivacaine
Butacaine
Calcium sulfate
Cannabis plant
Cinchocaine
Cyclomethycaine
Diphenhydramine
Doxylamine
Dyclonine
Ephedrine
Fencamfamin
Heroin
Inositol
Isonicotinamide
Manganese salts
Mecloqualone
Mepivacaine
Metamfetamine
Methadone
Methapyrilene
Methaqualone
Methocarbomal
2-methyl-2-propene-1-sulfonic acid
Nicotinamide
Norpseudoephedrine
Pentobarbital
Pethidine
Phencyclidine
Phenylpropanolamine (Norephedrine)
Piperocaine
Potassium permanganate
Prilocaine
Proxymetacaine
Quinine
Sodium carbonate
Sodium 2-methyl-2-propene-1-sulfonate
Sorbitol
Tenamfetamine
Theophylline
L-threonine

e) Solvent Residues:

Acetone
Benzene
Butyl acetate
Dichloromethane
Ethanol
Ethyl ether
Kerosene
Methyl ethyl ketone
Xylenes

REFERENCES

→ see pages 70-72, numbers 10, 12, 13, 14, 18, 19, 25, 27, 31, 33, 34, 59, 64, 68, 78, 87, 88, 98, 117, 122.

COCA PASTE

International Control: → see Cocaine
Therapeutic Use: CNS stimulant; no medical use

PRODUCTION

Essential Raw Material
Coca leaf

Processing Scheme
→ see page 146.

IMPURITIES

Sulfuric acid

Other Coca Constituents:
→ see Cocaine

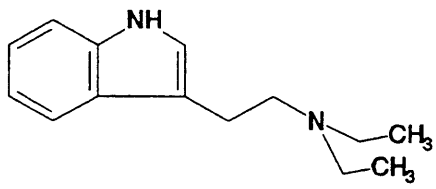
By-Products:
→ see Cocaine

Solvents Residues:
→ see Cocaine

REFERENCES

→ see pages 70 and 72, numbers 8, 68, 117, 122.

DET
(DIETHYLTRYPTAMINE)



Chemical Name: 3-[2-(diethylamino)ethyl]indole
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Diethylamine
Indole
Oxalyl chloride

Synthesis Scheme

→ see page 147.

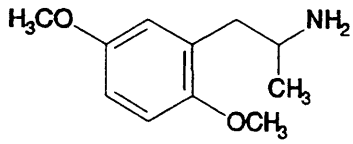
IMPURITIES

1-(*N,N*-diethylamino)-2-(3-indolyl)ethan-1-ol
2-(3-indolyl)ethan-1-ol

REFERENCES

→ see pages 70 and 72, numbers 26, 117.

2,5-DIMETHOXYAMFETAMINE
(DMA)



Chemical Name: 2,5-dimethoxy-α-methylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

2,5-dimethoxybenzaldehyde
Gentisic acid

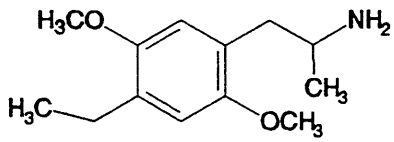
Synthesis Scheme

→ see page 137.

REFERENCES

→ see page 72, numbers 117, 124, 132.

2,5-DIMETHOXY-4-ETHYLAMFETAMINE
(DOET)



Chemical Name: 4-ethyl-2,5-dimethoxy-α-methylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

2,5-dimethoxy-4-ethylbenzene
Ethylhydroquinone
o-ethylphenol

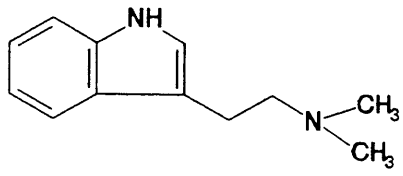
Synthesis Scheme

→ see page 138.

REFERENCES

→ see page 72, numbers 117, 124.

DMT
(DIMETHYLTRYPTAMINE)



Chemical Name: 3-[2-(dimethylamino)ethyl]indole
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Dimethylamine
Indole
Oxalyl chloride

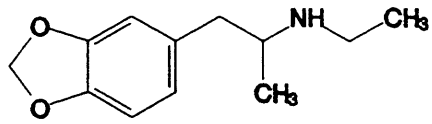
Synthesis Scheme

→ see page 147.

REFERENCES

→ see page 72, number 117.

N-ETHYLTENAMFETAMINE
(MDE)



Chemical Name: *N*-ethyl-α-methyl-3,4-(methylenedioxy)phenethylamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant; hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Isosafrole
3,4-methylenedioxyphenyl-2-propanone (MD-P2P)
Piperonal
Safrole

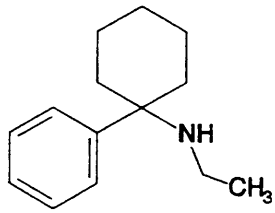
Synthesis Schemes

→ see pages 142 and 143.

REFERENCES

→ see page 72, numbers 109, 117, 118, 129.

ETICYCLIDINE
(PCE)



Chemical Name: *N*-ethyl-1-phenylcyclohexylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Bromobenzene
Cyclohexanone
Ethylamine

Synthesis Scheme

→ see page 175.

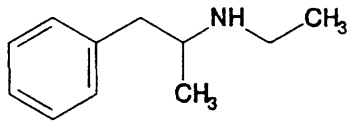
IMPURITIES

Acetylsalicylic acid

REFERENCES

→ see pages 70-72, numbers 21, 22, 84, 117, 132.

ETILAMFETAMINE



Chemical Name: *N*-ethyl-α-methylphenethylamine
International Control: Schedule IV (1971)
Therapeutic Use: CNS stimulant; anorectic

MANUFACTURE

Essential Precursor

1-phenyl-2-propanone (P2P)

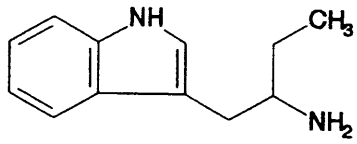
Synthesis Scheme

→ see page 136.

REFERENCES

→ see page 72, number 117.

ETRYPTAMINE



Chemical Name: 3-(2-aminobutyl)indole
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic/CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

Gramine
1-nitropropane

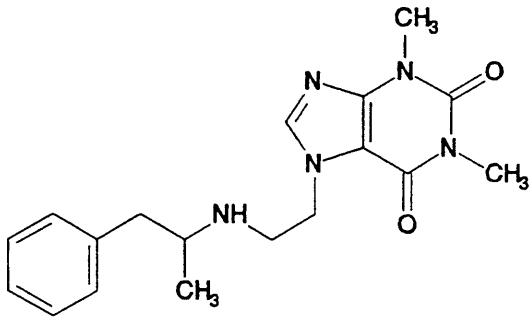
Synthesis Scheme

→ see page 148.

REFERENCES

→ see pages 71 and 72, numbers 93, 117.

FENETYLLINE



Chemical Name: 7-[2-[(α-methylphenethyl)amino]ethyl]theophylline
International Control: Schedule II (1971)
Therapeutic Use: CNS stimulant

MANUFACTURE

Essential Precursors

Amfetamine
7-(β-bromoethyl)theophylline

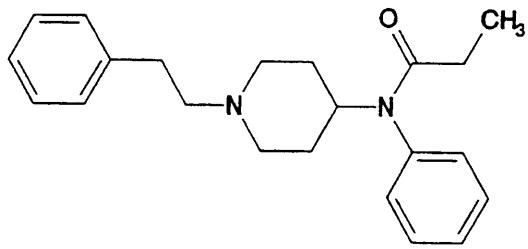
Synthesis Scheme

→ see page 149.

REFERENCES

→ see pages 71 and 72, numbers 93, 130.

FENTANYL



Chemical Name: 1-phenethyl-4-*N*-propionylanilinopiperidine
International Control: Schedule I (1961)
Therapeutic Use: Analgesic

MANUFACTURE

Essential Precursors

1-benzyl-4-piperidinone
Phenethylamine
N-(4-piperidinyl)aniline

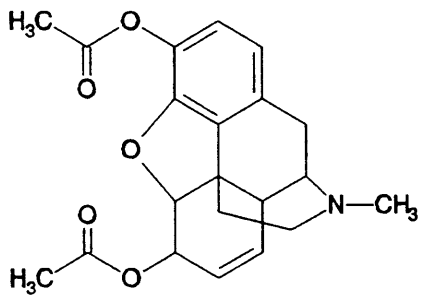
Synthesis Schemes

→ see pages 150, 154 and 157.

REFERENCES

→ see page 72, numbers 117, 118, 129.

HEROIN



Chemical Name: Diacetylmorphine
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; very limited legitimate use

PRODUCTION/MANUFACTURE

Essential Precursors/Raw Materials

Acetic anhydride
Acetyl chloride
Codeine
Concentrate of poppy straw
Morphine
Opium

Synthesis/Processing Scheme

→ see page 167.

IMPURITIES

a) Opium Constituents:

Codeine
Meconine
Morphine
Noscapine (narcotine)
Papaverine
Sterol
Thebaine

b) Acetylation By-Products:

Acetylcodeine
Acetylthebaol
O^3-monoacetylmorphine
O^6-monoacetylmorphine
Thebaol

c) Main Adulterants and Diluents:

Caffeine
Ephedrine
Glucose
Lactose
Mannitol
Quinine
Starch
Sucrose

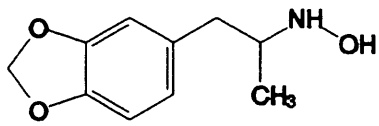
d) Other Compounds Found:

Acetaminophen
Acetylbenzocaine
Acetylprocaine
Acetylquinine
Acetylsalicylic acid
Allobarbital
Amfetamine
Aminopyrine
Amitryptiline
Amylocaine
Antipyrine
Ascorbic acid
Barbital
Barium sulfate
Benzocaine
Benzoyltropeine
Bisacodyl
Cannabis resin
trans-cinnamic acid
Citric acid
Cocaine
Diphenhydramine
Dipyrone
Dolomite
Ethylmorphine
Glutethimide
Hyoscyamine
Indomethacine
Isonicotinamide
Lidocaine
Meprobamate
Metamfetamine
Metapyrilene
Methadone
Nalidixic acid
Paracetamol
Pethidine
Phenacetin
Phencyclidine
Phendimetrazine
Phenmetrazine
Phenobarbital
Phentermine
Phenylbutazone
Piracetam
Prilocaine
Procaine
Propoxyphene
Pyrilamine
Quinidine
Salicylamide
Salicylic acid
Scopolamine
Silica
Sodium salicylate
Strychinine
Tartaric acid
Tetracaine
Theophylline
p-tolenesulfonamide
Tripelennamine
Tropacocaine

REFERENCES

→ see pages 70-72. numbers 1, 2, 3, 4, 16, 27, 41, 56, 60, 61, 65, 69, 70, 80, 111, 113, 117, 123.

N-HYDROXYTENAMFETAMINE
(N-OH-MDA)



Chemical Name: *N*-[α-methyl-3,4-(methylenedioxy)phenethyl]-hydroxylamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant/hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Isosafrole
3,4-methylenedioxyphenyl-2-propanone (MD-P2P)
Safrole

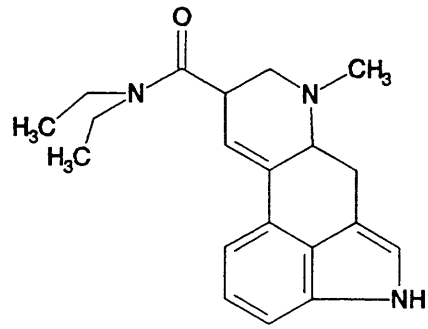
Synthesis Scheme

→ see page 143.

REFERENCES

→ see page 72, numbers 110, 117, 118.

(+)-LYSERGIDE
(LSD)



Chemical Name: 9,10-didehydro-*N,N*-diethyl-6-methylergoline-8β-carboxamide
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

PRODUCTION/MANUFACTURE

Essential Precursors/Raw Materials

Ergot (*Claviceps purpurea* or *Claviceps paspali*)
Ergometrine
Ergotamine
Hawaiian baby woodrose seeds (*Argyreia nervosa*)
Lysergamide
Lysergic acid
Morning glory seeds (*Rivea corymbosa*; *Ipomoea* spp.)

Synthesis/Processing Scheme

→ see page 161.

IMPURITIES

a) By-Products:

Ergot alkaloids
(e.g. ergometrine, ergotamine)
d-iso-LSD (Lumi-LSD)
Isolysergic acid
Lysergamide
Lysergic acid
Lysergic acid methylpropylamide (LAMPA)
Lysergic acid monoethylamide
Metamfetamine
Tartaric acid

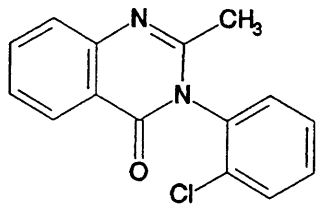
b) Adulterants and Diluents:

Cocoa	Lactose
Dyes	Plasticizers
Glues	

REFERENCES

→ see pages 70-72, numbers 15, 35, 38, 63, 91, 99, 102, 117, 125.

MECLOQUALONE



Chemical Name: 3-(*o*-chlorophenyl)-2-methyl-4(3*H*)-quinazolinone
International Control: Schedule II (1971)
Therapeutic Use: Non-barbiturate depressant; sedative; hypnotic

MANUFACTURE

Essential Precursors

Acetic anhydride
N-acetylanthranilic acid
Anthranilic acid
o-chloroaniline

Synthesis Scheme

→ see page 164.

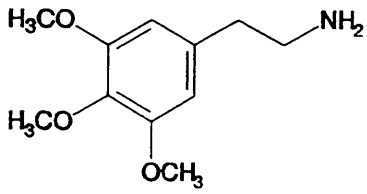
IMPURITIES

N-acetylanthranilic acid
Anthranilic acid
o-chloroaniline

REFERENCES

→ see pages 70 and 72, numbers 5, 28, 35, 117, 126.

MESCALINE



Chemical Name: 3,4,5-trimethoxyphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

PRODUCTION/MANUFACTURE

Essential Precursors/Raw Material

Gallic acid
Peyote (flowering heads of *Lophophora williamsii*)
3,4,5-trimethoxybenzaldehyde
3,4,5-trimethoxybenzoic acid

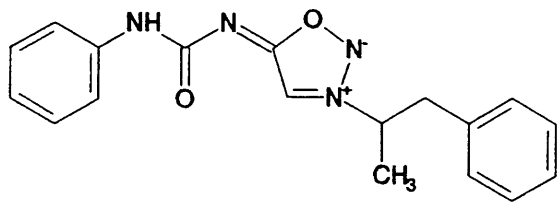
Synthesis/Processing Scheme

→ see page 162.

REFERENCES

→ see page 72, numbers 117, 128.

MESOCARB



Chemical Name: 3-(α-methylphenethyl)-*N*-(phenylcarbamoyl)sydnone imine
International Control: Schedule IV (1971)
Therapeutic Use: CNS stimulant

MANUFACTURE

Essential Precursors

Amfetamine
Phenyl isocyanate

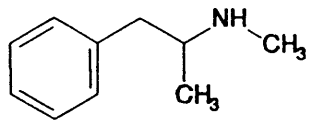
Synthesis Scheme

→ see page 163.

REFERENCES

→ see pages 70 and 72, numbers 32, 131.

METAMFETAMINE



Chemical Name: *N*,α-dimethylphenethylamine
International Control: Schedule II (1971)
Therapeutic Use: CNS stimulant; anorectic

MANUFACTURE

Essential Precursors

Benzyl chloride
Ephedrine
1-phenyl-2-propanone (P2P)
Pseudoephedrine

Synthesis Schemes

→ see pages 133, 134 and 135.

IMPURITIES

a) By-Products:

Amfetamine
Barium
α-benzyl-*N*-methylphenethylamine
1-chloroephedrine
Dibenzyl ketone
N,N-dimethylamfetamine
1,2-dimethyl-3-phenylaziridine
N,N-di(β-phenylisopropyl)amine
N,N-di(β-phenylisopropyl)methylamine
1,5-diphenyl-4-methyl-3-penten-2-one
1,5-diphenyl-4-methyl-4-penten-2-one
3,5-diphenyl-4-methyl-3-penten-2-one
Ephedrine
N-formylamfetamine
N-formylmetamfetamine
Iodine
Methcathinone
N-methyldiphenethylamine
N-methylformamide
Norpseudoephedrine
Palladium
1-phenyl-2-propanol
1-phenyl-2-propanone (P2P)
Phenylpropanolamine (Norephedrine)
Phenylpropylmethylamine

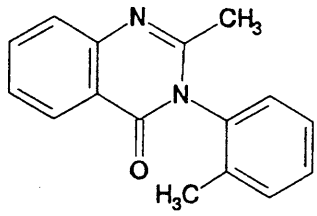
b) Adulterants and Diluents:

Acetaminophen
Caffeine
Diphenhydramine
Inositol
Nicotinamide
Phentermine
Procaine
Pyridoxine
Sucrose

REFERENCES

→ see pages 70-72, numbers 6, 7, 9, 35, 36, 47, 49, 50, 51, 52, 58, 62, 66, 67, 71, 72, 76, 77, 79, 97, 103, 117, 120, 132.

METHAQUALONE



Chemical Name: 2-methyl-3-*o*-tolyl-4(3*H*)-quinazolinone
International Control: Schedule II (1971)
Therapeutic Use: Non-barbiturate depressant; hypnotic; sedative

MANUFACTURE

Essential Precursors

Acetic anhydride
N-acetylanthranilic acid
Anthranilic acid
Isatoic anhydride
o-toluidine

Synthesis Schemes

→ see pages 164 and 165.

IMPURITIES

a) By-Products:

N-acetylanthranilic acid
Anthranilic acid
N,N'-di-(2-methylphenyl)acetamidine
2-ethyl-3-phenyl-4-quinazolone
o-methyl acetanilide
2-methyl-3-*O*-carboxyphenyl-4-quinazolinone
o-toluidine

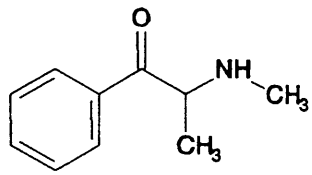
b) Adulterants and Diluents:

Chlorpheniramine
p-diaminodiphenylmethane
Diazepam
Diphenhydramine
Ephedrine
Lactose
Starch
Thioridazine

REFERENCES

→ see pages 70 and 72, numbers 5, 35, 36, 117, 126, 132.

METHCATHINONE



Chemical Name: 2-(methylamino)-1-phenylpropan-1-one
International Control: Schedule I (1971)
Therapeutic Use: CNS stiumulant; no medical use

MANUFACTURE

Essential Precursors

Ephedrine
Pseudoephedrine

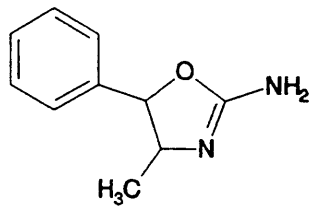
Synthesis Scheme

→ see page 166.

REFERENCES

→ see pages 70-72, numbers 29, 74, 90, 94, 115, 117.

4-METHYLAMINOREX



Chemical Name: 2-amino-4-methyl-5-phenyl-2-oxazoline
4,5-dihydro-4-methyl-5-phenyl-2-oxazolamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant; anorectic; no medical use

MANUFACTURE

Essential Precursors

Norpseudoephedrine
Phenylpropanolamine (Norephedrine)

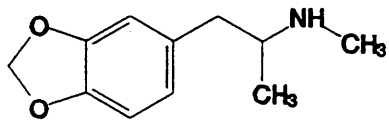
Synthesis Scheme

→ see page 145.

REFERENCES

→ see pages 70-72, numbers 40, 81, 117, 118.

3,4-METHYLENEDIOXYMETAMFETAMINE
(MDMA)



Chemical Name: *N*,α-dimethyl-3,4-(methylenedioxy)phenethylamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant; hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Isosafrole
3,4-methylenedioxyphenyl-2-propanone (MD-P2P)
Piperonal
Safrole

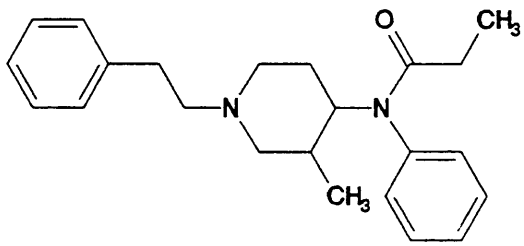
Synthesis Schemes

→ see pages 142 and 143.

REFERENCES

→ see pages 70-72, numbers 20, 39, 76, 85, 110, 117, 118, 124, 129.

3-METHYLFENTANYL



Chemical Name: *N*-(3-methyl-1-phenethyl-4-piperidyl)propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-3-methyl-4-piperidinone
N-(3-methyl-4-piperidinyl)aniline
Phenethylamine

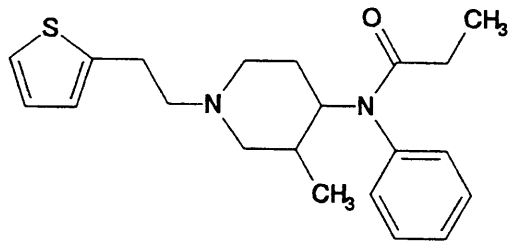
Synthesis Schemes

→ see pages 152, 154 and 159.

REFERENCES

→ see pages 71 and 72, numbers 95, 117, 118, 129.

3-METHYLTHIOFENTANYL



Chemical Name: *N*-[3-methyl-1-[2-(2-thienyl)ethyl]-4-piperidyl]propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-3-methyl-4-piperidinone
N-(3-methyl-4-piperidinyl)aniline
2-(2-thienyl)-1-ethanamine

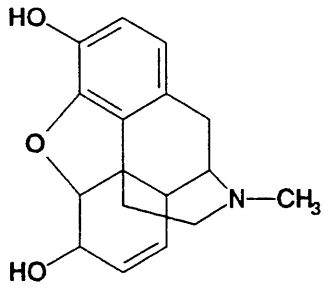
Synthesis Schemes

→ see pages 152, 155 and 159.

REFERENCES

→ see page 72, numbers 117, 118.

MORPHINE



Chemical Name: Morphine
International Control: Schedule I (1961)
Therapeutic Use: Analgesic

PRODUCTION/MANUFACTURE

Essential Precursors/Raw Materials

Codeine
Concentrate of poppy straw
Opium
Thebaine

Synthesis/Processing Scheme

→ see page 167.

IMPURITIES

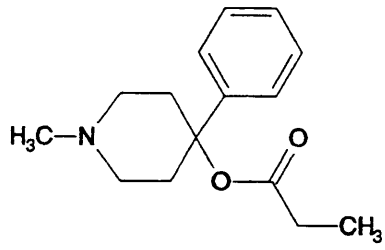
Other Opium Alkaloids:

Codeine
Noscapine (narcotine)
Papaverine
Thebaine

REFERENCES

→ see page 72, numbers 117, 127, 132.

MPPP
(1-METHYL-4-PHENYL-4-PROPIONOXYPIPERIDINE)



Chemical Name: 1-methyl-4-phenyl-4-piperidinol propionate (ester)
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

Methylamine
1-methyl-4-piperidinone
α-methylstyrene

Synthesis Scheme

→ see page 170.

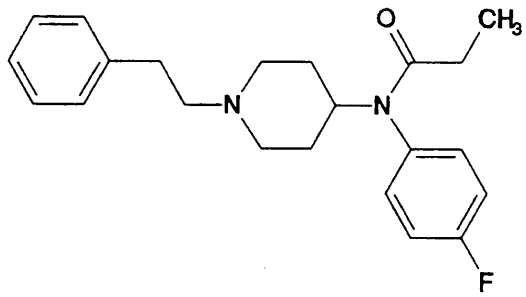
IMPURITIES

MPTP (1-methyl-4-phenyl-1,2,5,6-tetrahydropyridine)

REFERENCES

→ see page 72, numbers 116, 117, 118, 129.

PARA-FLUOROFENTANYL



Chemical Name: 4'-fluoro-*N*-(1-phenethyl-4-piperidyl)propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-4-piperidinone
p-fluoro-*N*-(4-piperidinyl)aniline
Phenethylamine

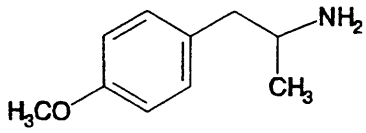
Synthesis Schemes

→ see pages 153, 154 and 158.

REFERENCES

→ see pages 70 and 72, numbers 24, 117, 118, 129.

PARA-METHOXYAMFETAMINE
(PMA)



Chemical Name: *p*-methoxy-α-methylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

p-anisaldehyde
p-anisic acid
p-methoxyphenylpropene

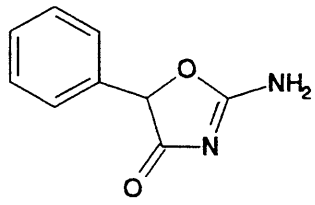
Synthesis Scheme

→ see page 139.

REFERENCES

→ see page 72, numbers 117, 124.

PEMOLINE



Chemical Name: 2-amino-5-phenyl-2-oxazolin-4-one
2-imino-5-phenyl-4-oxazolidinone
International Control: Schedule IV (1971)
Therapeutic Use: CNS stimulant

MANUFACTURE

Essential Precursors

Guanidine
Mandelic acid ethyl ester

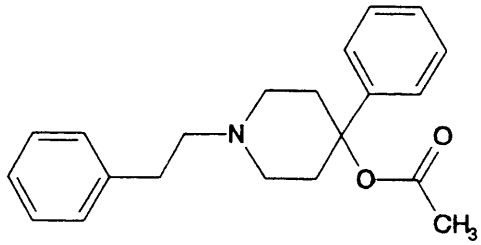
Synthesis Scheme

→ see page 168.

REFERENCES

→ see pages 71 and 72, numbers 93, 112, 119.

PEPAP
(1-PHENETHYL-4-PHENYL-4-ACETYLOXYPIPERIDINE)



Chemical Name: 1-phenethyl-4-phenyl-4-piperdinol acetate (ester)
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

α-methylstyrene
2-phenethylamine
1-phenethyl-4-piperidone

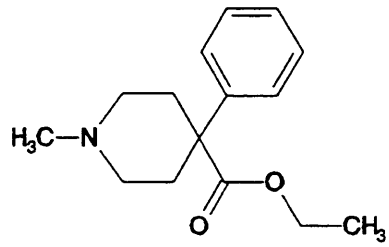
Synthesis Scheme

→ see page 171.

REFERENCES

→ see page 72, numbers 116, 118, 129.

PETHIDINE



Chemical Name: 1-methyl-4-phenylpiperidine-4-carboxylic acid ethyl ester
International Control: Schedule I (1961)
Therapeutic Use: Analgesic

MANUFACTURE

Essential Precursors

Di(ethanol)methylamine
Pethidine intermediate A

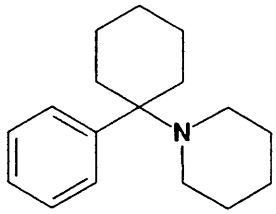
Synthesis Scheme

→ see page 169.

REFERENCES

→ see pages 71 and 72, numbers 93, 118, 129.

PHENCYCLIDINE
(PCP)



Chemical Name: 1-(1-phenylcyclohexyl)piperidine
International Control: Schedule II (1971)
Therapeutic Use: Anestethic; analgesic; hallucinogenic

MANUFACTURE

Essential Precursors

Bromobenzene
Cyclohexanone
Piperidine

Synthesis Scheme

→ see page 172.

IMPURITIES

a) By-Products:

Biphenyl
Bromobenzene
Cyclohexanone
1-cyclohexylpiperdine
Phenol
1-phenylcyclohexane
1-phenylcyclohexanol
1-phenylethanol
Piperidine
1-piperidinocyclohexanecarbonitrile (1-PCC)

b) Other Related Compounds:

1-phenylcyclohexylmorpholine
1-phenylcyclohexylpyrrolidine (PHP)
N-propyl-1-phenylcyclohexylamine

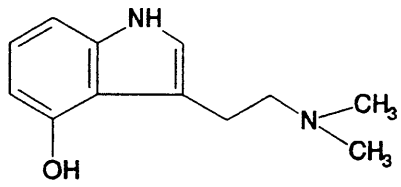
c) Adulterants and Diluents:

Acetylsalicylic acid	Metamfetamine
Boric acid	Methaqualone
Caffeine	Palmitic acid
Cannabis plant	Parsley
Cocaine	Stearic acid
Lactose	Sucrose

REFERENCES

→ see pages 70-72, numbers 21, 22, 35, 36, 48, 57, 82, 83, 84, 117, 132.

PSILOCINE (PSILOTSIN)



Chemical Name: 3-[2-(dimethylamino)ethyl]indol-4-ol
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

PRODUCTION/MANUFACTURE

Essential Precursors/Raw Materials

p-benzyloxyindole
Inocybe, *Panaeolus*, *Conocybe* species
p-methoxyindole
Oxalyl chloride
Psilocybe mexicana and other *Psilocybe* species
Psilocybine

Synthesis/Processing Scheme

→ see page 176.

IMPURITIES

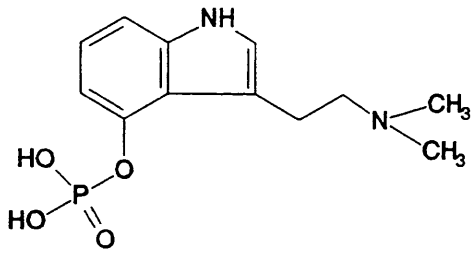
Other Psilocybe Alkaloids:

Baeocystine
Norbaeocystine
Psilocybine

REFERENCES

→ see pages 70-72, numbers 11, 15, 17, 37, 89, 96, 114, 117, 128, 132.

PSILOCYBINE



Chemical Name: 3-[2-(dimethylamino)ethyl]indol-4-yl dihydrogen phosphate
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

PRODUCTION

Essential Raw Materials

Conocybe species
Inocybe species
Panaeolus species
Pluteus species
Psilocybe mexicana or other *Psilocybe* species

Processing Scheme

→ see page 176.

IMPURITIES

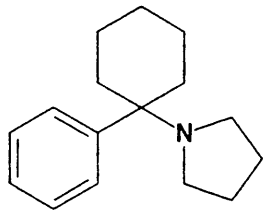
Other Psilocybe Alkaloids:

Baeocystine
Norbaeocystine

REFERENCES

→ see page 72, numbers 117, 128.

ROLICYCLIDINE
(PHP, PCPy)



Chemical Name: 1-(1-phenylcyclohexyl)pyrrolidine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Bromobenzene
Cyclohexanone
Pyrrolidine

Synthesis Scheme

→ see page 174.

IMPURITIES

a) By-Products:

1-phenylcyclohexylmorpholine
1-pyrrolidinocyclohexanecarbonitrile

b) Other Related Compounds:

Phencyclidine

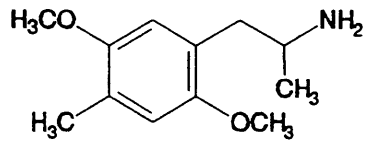
c) Adulterants:

Cannabis plant

REFERENCES

→ see pages 70-72, numbers 21, 22, 57, 87, 117, 132.

STP, DOM
(2,5-DIMETHOXY-4-METHYLAMFETAMINE)



Chemical Name: 2,5-dimethoxy-α,4-dimethylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; CNS stimulant; no medical use

MANUFACTURE

Essential Precursors

o-cresol
2,5-dimethoxytoluene
Methylhydroquinone

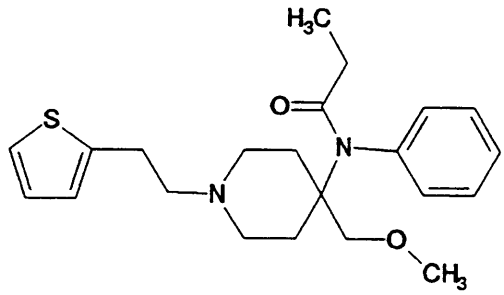
Synthesis Scheme

→ see page 140.

REFERENCES

→ see page 72, numbers 117, 124, 132.

SUFENTANIL



Chemical Name: *N*-[4-(methoxymethyl)-1-[2-(2-thienyl)ethyl]-4-piperidyl]-propionanilide
International Control: Schedule I (1961)
Therapeutic Use: Analgesic

MANUFACTURE

Essential Precursors

N-[4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamide
2-(2-thienyl)ethyl methanesulfonate

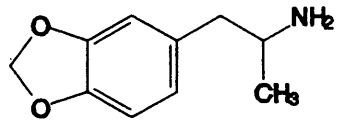
Synthesis Schemes

→ see pages 153 and 160.

REFERENCES

→ see pages 71 and 72, numbers 93, 117.

TENAMFETAMINE
(MDA)



Chemical Name: α-methyl-3,4-(methylenedioxy)phenethylamine
International Control: Schedule I (1971)
Therapeutic Use: CNS stimulant; hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Isosafrole
3,4-methylenedioxyphenyl-2-propanone (MD-P2P)
Piperonal
Safrole

Synthesis Schemes

→ see pages 142, 143 and 144.

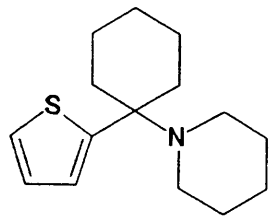
IMPURITIES

Norpseudoephedrine
Phenylpropanolamine (Norephedrine)

REFERENCES

→ see pages 70-72, numbers 20, 35, 36, 76, 86, 110, 117, 124.

TENOCYCLIDINE
(TCP)



Chemical Name: 1-[1-(2-thienyl)cyclohexyl]piperidine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

2-bromothiophene
Cyclohexanone
Piperidine

Synthesis Scheme

→ see page 173.

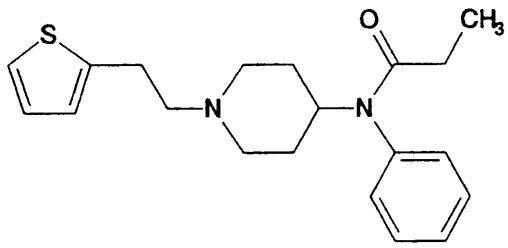
IMPURITIES

1-piperidinocyclohexanecarbonitrile (PCC)

REFERENCES

→ see pages 70-72, numbers 21, 22, 57, 84, 117, 132.

THIOFENTANYL



Chemical Name: *N*-[1-[2-(2-thienyl)ethyl]-4-piperidyl]propionanilide
International Control: Schedules I & IV (1961)
Therapeutic Use: Analgesic; no medical use

MANUFACTURE

Essential Precursors

1-benzyl-4-piperidinone
N-(4-piperidinyl)aniline
2-(2-thienyl)-1-ethanamine

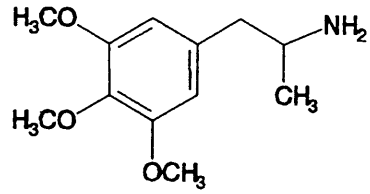
Synthesis Schemes

→ see pages 150, 155 and 157.

REFERENCES

→ see page 72, numbers 117, 118.

3,4,5-TRIMETHOXYAMFETAMINE
(TMA)



Chemical Name: 3,4,5-trimethoxy-α-methylphenethylamine
International Control: Schedule I (1971)
Therapeutic Use: Hallucinogenic; no medical use

MANUFACTURE

Essential Precursors

Gallic acid
3,4,5-trimethoxybenzaldehyde
3,4,5-trimethoxyphenylpropene

Synthesis Scheme

→ see page 141.

REFERENCES

→ see page 72, numbers 117, 124.

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B. ESSENTIAL PRECURSORS/RAW MATERIALS, CHEMICALS/REAGENTS AND SOLVENTS MOST FREQUENTLY USED IN THE CLANDESTINE MANUFACTURE OF DRUGS UNDER INTERNATIONAL CONTROL

TABLES I - IV

EXPLANATORY NOTE

The essential precursors/raw materials, chemicals/reagents and solvents that are under international control are printed in **bold** letters.

TABLE I

Substances most frequently used in the illicit production/manufacture of drugs under international control

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Acetyl-*alpha*-methylfentanyl	**Acetic anhydride** Acetyl chloride ***Alpha*-methylfentanyl** **Amfetamine** Aniline 1-benzyl-4-piperidinone 2-bromo-1-phenylpropane 2-chloro-1-phenylpropane Methyl acrylate 1-(2-phenylisopropyl)-4-piperidinone *N*-(4-piperidinyl)aniline	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Alfentanil	1-bromo-2-chloroethane 1-(2-bromoethyl)-4-ethyl-1,4-dihydro-5*H*-tetrazol-5-one 1-(2-chloroethyl)-4-ethyl-1,4-dihydro-5*H*-tetrazol-5-one 1-ethyl-1,4-dihydro-5*H*-tetrazol-5-one *N*-[4-(methoxymethyl)-4-piperidinyl]-aniline *N*-[4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamide Propionic anhydride	Hydrogen chloride (gas) Potassium iodide Sodium carbonate Sodium sulfate (anhydrous)	**Acetone** Acetonitrile Chloroform Dichloromethane **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Alpha-methylfentanyl	**Amfetamine** Aniline 1-benzyl-4-piperidinone 2-bromo-1-phenylpropane 2-chloro-1-phenylpropane Methyl acrylate 1-(2-phenylisopropyl)-4-piperidinone *N*-(4-piperidinyl)aniline Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Alpha-methylthiofentanyl	Aniline 1-benzyl-4-piperidinone 2-bromo-1-(2-thienyl)propane 2-chloro-1-(2-thienyl)propane Methyl acrylate *N*-(4-piperidinyl)aniline Propionic anhydride Propionyl chloride 1-[2-(2-thienyl)isopropyl]-4-piperidinone 1-(2-thienyl)-2-propanamine	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Amfetamine	**Acetic anhydride** Acetonitrile Allylbenzene Allyl chloride (*R*)-(+)-2-amino-3-phenylpropanol Ammonia (gas) Ammonium acetate Ammonium formate Benzaldehyde Benzene Formamide Hydroxylamine hydrochloride Nitroethane Norpseudoephedrine **Phenylacetic acid** *D*-phenylalanine Phenylpropanolamine (Norephedrine) **1-phenyl-2-propanone (P2P)**	Acetic acid Aluminium (foil) Aluminium chloride Ammonia Ammonia (gas) Ammonium chloride Benzyl chloroformate Butylamine Copper Ferric chloride Formic acid Hydriodic acid **Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Iodine Lithium Lithium aluminium hydride Magnesium sulfate (anhydrous) Mercuric chloride	**Acetone** Benzene Chloroform Ethanol Ethyl acetate **Ethyl ether** *n*-hexane Methanol Pyridine Tetrahydrofuran

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
(Amfetamine, cont.'d)		Mercury Palladium (on carbon) Palladium black Potassium hydroxide Raney nickel Red phosphorous Sodium acetate Sodium amalgam Sodium bicarbonate Sodium cyanoborohydride Sodium hydroxide Sodium sulfate **Sulfuric acid** Tartaric acid *p*-toluenesulfonyl chloride	
Aminorex	Cyanogen bromide Phenethanolamine	Potassium carbonate Sodium acetate Sodium carbonate	Benzene Methanol
Beta-hydroxyfentanyl	Aniline 1-benzyl-4-piperidinone 2-bromo-1-phenylethanol 2-chloro-1-phenylethanol 1-(2-hydroxy-2-phenylethyl)-4-piperidinone Methyl acrylate Phenethanolamine *N*-(4-piperidinyl)aniline Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Beta-hydroxy-3-methylfentanyl	Aniline 1-benzyl-3-methyl-4-piperidinone 2-bromo-1-phenylethanol 2-chloro-1-phenylethanol 1-(2-hydroxy-2-phenylethyl)-3-methyl-4-piperidinone Methyl acrylate Methyl methacrylate *N*-(3-methyl-4-piperidinyl)aniline Phenethanolamine Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Brolamfetamine (DOB)	Bromine 1-bromo-2,5-dimethoxybenzene Bromohydroquinone *o*-bromophenol Dichloromethyl methyl ether **2,5-dimethoxyamfetamine (DMA)** 2,5-dimethoxybenzaldehyde Dimethyl sulfate Gentisic acid Nitroethane	Acetic acid Ammonium acetate **Hydrochloric acid** Hydrogen chloride (gas) Lithium aluminium hydride Magnesium sulfate (anhydrous) Potassium persulfate Sodium hydroxide Stannic chloride	Dichloromethane Ethanol **Ethyl ether** Tetrahydrofuran
Cannabis oil	**Cannabis plant** **Cannabis resin**	Florisil	Chloroform Ethanol *n*-hexane Methanol Petroleum ether

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Cocaine and coca paste	Acetonedicarboxylic acid* Acetonedicarboxylic anhydride* Benzoic anhydride* Benzoyl chloride* **Coca leaf** **Coca paste** (for cocaine) 2,5-diethoxytetrahydrofuran* 2,5-dimethoxytetrahydrofuran* Dimethyl carbonate* Dimethyl acetonedicarboxylate* Furan* Methylamine* Methylamine hydrochloride* Pyrrole* Succindialdehyde*	Acetic acid* **Acetic anhydride*** Ammonia Ammonia (gas)* Ammonium chloride* Barium carbonate* Bromine* Calcium carbonate Calcium hydroxide Calcium oxide Ethanol* **Hydrochloric acid** Hydrogen* Hydrogen chloride (gas)* Hydroxylamine hydrochloride* Mercury* Methanol* Nitrogen (gas)* Oxalic acid* Potassium bicarbonate* Potassium carbonate Potassium hydroxide **Potassium permanganate** Raney nickel* Sodium* Sodium amalgam* Sodium bicarbonate Sodium carbonate Sodium hydroxide Sodium methoxide* Sodium nitrite* Sodium phosphate, dibasic* Sodium sulfate (anhydrous) **Sulfuric acid**	**Acetone** Benzene *n*-butanol Butyl acetate Chloroform Diacetone alcohol Dichloromethane Ethanol Ethyl acetate **Ethyl ether** *n*-hexane Isobutyl methyl ketone Isopropanol Kerosene Methanol **Methyl ethyl ketone** Petroleum ether **Toluene** Xylenes

* Because of the importance of cocaine, it was deemed useful to also list the precursors/chemicals/reagents/ solvents required for the synthesis of cocaine.

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
DET (Diethyltryptamine)	Diethylamine Indole Oxalyl chloride	**Hydrochloric acid** Lithium aluminium hydride Sodium hydroxide Sodium sulfate (anhydrous)	Benzene Chloroform **Ethyl ether** Methanol Petroleum ether Tetrahydrofuran
2,5-dimethoxyamfetamine (DMA)	2,5-dimethoxybenzaldehyde 2,5-dimethoxybenzoic acid 2,5-dimethoxybenzoyl chloride 2,5-dimethoxyphenylpropene Dimethyl sulfate Gentisic acid Nitroethane Tetranitromethane	Acetic acid Ammonium acetate Barium sulfate **Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Lithium aluminium hydride Palladium chloride Phosphorous pentachloride Sodium bisulfite Sodium hydroxide Thionyl chloride	**Acetone** Benzene Chloroform Ethanol **Ethyl ether** Methanol Pyridine Tetrahydrofuran Xylenes
2,5-dimethoxy-4-ethylamfetamine (DOET)	Dichloromethyl methyl ether 2,5-dimethoxy-4-ethylbenzaldehyde 2,5-dimethoxy-4-ethylbenzene Dimethyl sulfate Ethylhydroquinone *o*-ethylphenol Nitroethane	Ammonium acetate **Hydrochloric acid** Lithium aluminium hydride Potassium persulfate Sodium hydroxide Stannic chloride	Dichloromethane Ethanol **Ethyl ether** Tetrahydrofuran
DMT (Dimethyltryptamine)	Dimethylamine Indole Oxalyl chloride	**Hydrochloric acid** Lithium aluminium hydride Sodium hydroxide Sodium sulfate (anhydrous)	Benzene Chloroform **Ethyl ether** Methanol Petroleum ether Tetrahydrofuran

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
N-ethyltenamfetamine (MDE)	Bromosafrole Chlorosafrole Dibromomethane Dichloromethane Ethylamine Ethylamine hydrochloride **Isosafrole** **3,4-methylenedioxyphenyl-2-propanone (MD-P2P)** **Piperonal** **Safrole** Vanillin	Aluminium (foil) Aluminium chloride Formic acid Hydrobromic acid **Hydrochloric acid** Hydrogen chloride (gas) Hydrogen peroxide Mercuric bromide Mercuric chloride Potassium hydroxide Sodium bicarbonate Sodium carbonate Sodium cyanoborohydride Sodium dichromate Sodium hydroxide **Sulfuric acid**	**Acetone** Benzene Dimethylformamide Dimethylsulfoxide Ethanol **Ethyl ether** Isopropanol Methanol **Toluene**
Eticyclidine (PCE)	Bromobenzene Cyclohexanone Ethylamine Phenyllithium	**Hydrochloric acid** Hydrogen chloride (gas) Lithium Potassium hydroxide Sodium sulfate (anhydrous)	**Ethyl ether** Isopropanol
Etilamfetamine	**Acetic anhydride** Ethylamine **Phenylacetic acid** **1-phenyl-2-propanone (P2P)**	Aluminium (foil) **Hydrochloric acid** Hydrogen chloride (gas) Magnesium sulfate (anhydrous) Mercuric chloride Sodium acetate Sodium cyanoborohydride Sodium hydroxide	**Acetone** Ethanol **Ethyl ether** Isopropanol Methanol

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Etryptamine	Gramine 1-nitropropane 3-(2-nitro-1-propenyl)indole	Acetic acid Ammonia (gas) Charcoal **Hydrochloric acid** Hydrogen Nitrogen (gas) Palladium (on carbon) Palladium dioxide Potassium hydroxide Raney nickel Sodium hydroxide	Benzene Ethanol Ethyl acetate **Ethyl ether** Methanol
Fenetylline	**Amfetamine** 7-(β-bromoethyl)theophylline 2-chloroethanol 7-(β-chloroethyl)theophylline Etofylline **1-phenyl-2-propanone (P2P)** Theophylline	Ammonia Benzylamine Hydrobromic acid **Hydrochloric acid** Hydrogen Palladium (on carbon) Potassium carbonate Thionyl chloride	Ethanol Isopropanol Methanol **Toluene**
Fentanyl	Aniline 1-benzyl-4-piperidinone 1-bromo-2-phenylethane 1-chloro-2-phenylethane Methyl acrylate Phenethylamine 1-phenethyl-4-piperidinone *N*-(4-piperidinyl)aniline Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Heroin	Acetic acid **Acetic anhydride** Acetyl chloride **Codeine** **Concentrate of poppy straw** Ethylidene diacetate **Morphine** **Opium** Poppy straw	Ammonia Ammonium chloride Boron tribromide Calcium carbonate Calcium hydroxide Calcium oxide Charcoal **Hydrochloric acid** Nitrogen (gas) Phosphorous pentachloride Phosphorous trichloride Potassium carbonate Pyridine Sodium bicarbonate Sodium carbonate Tartaric acid Thionyl chloride	**Acetone** Chloroform Ethanol Ethyl acetate **Ethyl ether** Methanol **Methyl ethyl ketone**
N-hydroxytenamfetamine (N-OH-MDA)	Hydroxylamine hydrochloride **Isosafrole** **3,4-methylenedioxyphenyl-2-propanone (MD-P2P)** **Safrole**	Formic acid **Hydrochloric acid** Hydrogen peroxide Potassium hydroxide Sodium cyanoborohydride Sodium hydroxide **Sulfuric acid**	**Acetone** Benzene Dichloromethane Ethanol **Ethyl ether** Methanol

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
(+)-Lysergide (LSD)	5-bromoisatin Diethylamine Ergot (*Claviceps purpurea* or *Claviceps paspali*) **Ergometrine** **Ergotamine** Hawaiian baby woodrose seeds (*Argyreia nervosa*) Lysergamide **Lysergic acid** Methyl 6-methylnicotinate Morning glory seeds (*Rivea corymbosa*; *Ipomoea spp.*)	Acetic acid Alumina Ammonia (gas) *N,N*-carbonyldiimidazole Celite (545) Charcoal Hydrazine **Hydrochloric acid** Hydroxylamine Lithium hydroxide Methylamine Nitrogen (gas) Phosphoric acid Potassium hydroxide Sodium bicarbonate Sodium chloride Sodium nitrite Sodium sulfate (anhydrous) **Sulfuric acid** Sulfur trioxide Tartaric acid Trifluoroacetic anhydride	**Acetone** Acetonitrile Benzene Chloroform 1,2-dichloroethane Dichloromethane Dimethylformamide Ethanol Ethyl acetate **Ethyl ether** Methanol
Mecloqualone	**Acetic anhydride** Acetylacetone ***N*-acetylanthranilic acid** **Anthranilic acid** *o*-chloroaniline 4-chloro-2-methylquinazoline Isatoic anhydride 2-methyl-4(3*H*)-quinazolinone *o*-nitrobenzoic acid *o*-nitrotoluene	Ammonia Benzenesulfonyl chloride **Hydrochloric acid** Hydrogen chloride (gas) Phosphoric acid Phosphorous oxychloride Phosphorous pentoxide Phosphorous trichloride Sodium bicarbonate Sodium carbonate Sodium hydride Triethylamine	Chloroform Diglyme Ethanol **Ethyl ether** *n*-heptane Methanol Pyridine **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Mescaline	Dimethyl sulfate Gallic acid Methyl 3,4,5-trimethoxybenzoate Nitromethane Peyote (flowering heads of *Lophophora williamsii*) 3,4,5-trimethoxybenzaldehyde 3,4,5-trimethoxybenzoic acid 3,4,5-trimethoxybenzoyl chloride 3,4,5-trimethoxybenzyl alcohol 3,4,5-trimethoxybenzyl chloride	Ammonia Barium sulfate Dimethyl sulfate **Hydrochloric acid** Hydrogen Lithium aluminium hydride Palladium chloride Phosphorous pentachloride Potassium cyanide Potassium hydroxide Sodium bisulfite Sodium carbonate Sodium hydroxide Sodium sulfate (anhydrous) **Sulfuric acid** Thionyl chloride	Benzene Chloroform Ethanol **Ethyl ether** Methanol Xylenes
Mesocarb	Acetone cyanohydrin **Amfetamine** Formaldehyde Phenyl isocyanate Sodium nitrite	Acetic acid Ammonium nitrate Formic acid **Hydrochloric acid** Potassium bromide Sodium chloride Triethylamine Urea	Chloroform Ethanol

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Metamfetamine	Acetaldehyde **Acetic anhydride** (*R*)-(+)-2-amino-3-phenylpropanol Benzyl chloride 1,3-dimethyl urea **Ephedrine** Methylamine *N*-methylformamide **Phenylacetic acid** *D*-phenylalanine **1-phenyl-2-propanone (P2P)** **Pseudoephedrine**	Acetic acid Aluminium (foil) Ammonia (gas) Ammonium chloride Benzyl chloroformate Benzylmagnesium chloride Calcium hydroxide Copper sulfate Formic acid Hydriodic acid **Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Iodine Lithium Lithium aluminium hydride Magnesium (turnings) Magnesium sulfate (anhydrous) Mercuric chloride Palladium (on barium sulfate) Palladium black Perchloric acid Phosphorous pentachloride Platinum Platinum chloride Platinum oxide Red phosphorous Sodium Sodium acetate Sodium bicarbonate Sodium chloride Sodium cyanoborohydride Sodium hydroxide **Sulfuric acid** Thionyl chloride *p*-toluenesulfonyl chloride	**Acetone** Benzene Chloroform Ethanol Ethyl acetate **Ethyl ether** *n*-hexane Isopropanol Petroleum ether Pyridine Tetrahydrofuran

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Methaqualone	**Acetic anhydride** Acetylacetone ***N*-acetylanthranilic acid** **Anthranilic acid** 4-chloro-2-methylquinazoline Isatoic anhydride 2-methyl-4(3*H*)-quinazolinone *o*-nitrobenzoic acid *o*-nitrotoluene *o*-toluidine	Ammonia Benzenesulfonyl chloride **Hydrochloric acid** Phosphoric acid Phosphorous oxychloride Phosphorous pentoxide Phosphorous trichloride Sodium bicarbonate Sodium carbonate Sodium hydride Triethylamine	Chloroform Diglyme Ethanol **Ethyl ether** *n*-heptane Methanol Pyridine **Toluene**
Methcathinone	**Ephedrine** **Pseudoephedrine**	Acetic acid **Hydrochloric acid** Hydrogen chloride (gas) Magnesium sulfate (anhydrous) **Potassium permanganate** Sodium bicarbonate Sodium bisulfite Sodium dichromate Sodium hydroxide **Sulfuric acid**	**Acetone** Dichloromethane *n*-hexane **Toluene**
4-methylaminorex	Cyanogen bromide Norpseudoephedrine Phenylpropanolamine (Norephedrine)	Potassium carbonate Sodium acetate Sodium carbonate	Benzene Methanol

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
3,4-methylenedioxymetamfetamine (MDMA)	Bromosafrole Chlorosafrole Dibromomethane Dichloromethane **Isosafrole** Methylamine hydrochloride **3,4-methylenedioxyphenyl-2-propanone (MD-P2P)** **Piperonal** **Safrole** Vanillin	Aluminium (foil) Aluminium chloride Formic acid Hydrobromic acid **Hydrochloric acid** Hydrogen peroxide Mercuric bromide Mercuric chloride Potassium hydroxide Sodium bicarbonate Sodium carbonate Sodium cyanoborohydride Sodium dichromate Sodium hydroxide **Sulfuric acid**	**Acetone** Benzene Dimethylformamide Dimethylsulfoxide Ethanol **Ethyl ether** Isopropanol Methanol **Toluene**
3-methylfentanyl	Aniline 1-benzyl-3-methyl-4-piperidinone 1-bromo-2-phenylethane 1-chloro-2-phenylethane Methyl acrylate Methyl methacrylate 3-methyl-1-phenethyl-4-piperidinone *N*-(3-methyl-4-piperidinyl)aniline Phenethylamine Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
3-methylthiofentanyl	Aniline 1-benzyl-3-methyl-4-piperidinone 1-bromo-2-(2-thienyl)ethane 1-chloro-2-(2-thienyl)ethane Methyl acrylate Methyl methacrylate *N*-(3-methyl-4-piperidinyl)aniline 3-methyl-1-[2-(2-thienyl)ethyl]-4-piperidinone Propionic anhydride Propionyl chloride 2-(2-thienyl)-1-ethanamine	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Morphine	**Codeine** **Concentrate of poppy straw** **Opium** Poppy straw **Thebaine**	Ammonia Ammonium chloride Boron tribromide Calcium carbonate Calcium hydroxide Calcium oxide Charcoal **Hydrochloric acid** Nitrogen (gas) Pyridine **Sulfuric acid** Tartaric acid	**Acetone** Chloroform Ethanol **Ethyl ether**
MPPP (1-methyl-4-phenyl-4-propionoxypiperidine)	Formaldehyde Methyl acrylate Methylamine 1-methyl-4-piperdinone α-methylstyrene Phenyllithium Phenylmagnesium bromide Propionic anhydride Propionyl chloride	**Hydrochloric acid** Potassium carbonate Sodium carbonate Sodium hydroxide Sodium methoxide **Sulfuric acid**	Benzene **Ethyl ether** Methanol Pyridine **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Para-fluorofentanyl	1-benzyl-4-piperidinone 1-bromo-2-phenylethane 1-chloro-2-phenylethane *p*-fluoroaniline *p*-fluoro-*N*-(4-piperidinyl)aniline Methyl acrylate Phenethylamine 1-phenethyl-4-piperidinone Propionic anhydride Propionyl chloride	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
Para-methoxyamfetamine (PMA)	*p*-anisaldehyde *p*-anisic acid *p*-anisoyl chloride Dimethyl sulfate *p*-hydroxybenzoic acid *p*-methoxyphenylpropene Nitroethane Tetranitroethane	Acetic acid Ammonium acetate Barium sulfate **Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Lithium aluminium hydride Palladium chloride Phosphorous pentachloride Sodium bisulfite Sodium hydroxide Thionyl chloride	**Acetone** Benzene Chloroform Ethanol **Ethyl ether** Methanol Pyridine Tetrahydrofuran Xylenes
Pemoline	Ammonium thiocyanate Benzaldehyde Dichloroacetophenone Dicyanodiamide Ethanol Guanidine Mandelic acid Mandelic acid ethyl ester Mandelonitrile Urea	Ammonia Ammonia (gas) Ammonium nitrate **Hydrochloric acid** Sodium bisulfite Sodium cyanide **Sulfuric acid**	Ethanol

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
PEPAP (1-phenethyl-4-phenyl-4-acetyloxypiperidine)	**Acetic anhydride** Acetyl chloride Formaldehyde Methyl acrylate α-methylstyrene Phenethylamine 1-phenethyl-4-piperidinone Phenyllithium Phenylmagensium bromide	**Hydrochloric acid** Potassium carbonate Sodium carbonate Sodium hydroxide Sodium methoxide **Sulfuric acid**	Benzene **Ethyl ether** Methanol Pyridine **Toluene**
Pethidine	Benzyl chloride Benzyl cyanide Di(2-chloroethyl)methylamine Di(ethanol)methylamine Ethanol **Pethidine intermediate A** **Pethidine intermediate B** **Pethidine intermediate C**	**Hydrochloric acid** Potassium carbonate Potassium hydroxide Sodamide Sodium hydroxide **Sulfuric acid** Thionyl chloride	**Ethyl ether** Isopropanol Methanol **Toluene**
Phencyclidine (PCP)	Bromobenzene Cyclohexanone Phenylmagnesium bromide **Piperidine** Pyridine	Ammonia Ammonium chloride Hydrobromic acid **Hydrochloric acid** Hydrogen chloride (gas) Iodine Magnesium (turnings) Potassium carbonate Potassium cyanide Sodium bisulfite Sodium cyanide *p*-toluenesulfonic acid	Benzene **Ethyl ether** Isooctane Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Psilocine (psilotsin)	Aminoacetaldehyde *p*-benzyloxyindole 1,3-cyclohexanedione Dimethylacetal Dimethylamine 2,6-dinitrotoluene Ethyl bromopyruvate 3-(methoxycarbonyl)propionyl chloride *p*-methoxyindole Oxalyl chloride **Psilocybine** Pyrrole	Alumina Ammonia Celite (545) Hydriodic acid **Hydrochloric acid** Hydrogen Lithium aluminium hydride Palladium Sodium hydroxide Sodium sulfate (anhydrous)	Benzene Chloroform Dioxane **Ethyl ether** Methanol Petroleum ether **Toluene**
Psilocybine	*Conocybe spp.* *Inocybe spp.* *Panaeolus spp.* *Pluteus spp.* *Psilocybe spp.*	Celite (545) Charcoal	Methanol
Rolicyclidine (PHP, PCPy)	Bromobenzene Cyclohexanone Phenylmagnesium bromide Pyrrolidine	Ammonia Ammonium chloride Hydrobromic acid **Hydrochloric acid** Hydrogen chloride (gas) Iodine Magnesium (turnings) Potassium carbonate Potassium cyanide Sodium bisulfite Sodium cyanide *p*-toluenesulfonic acid	Benzene **Ethyl ether** Isooctane Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
STP, DOM (2,5-dimethoxy-4-methylamfetamine)	*o*-cresol Dichloromethyl methyl ether 2,5-dimethoxy-4-methylbenzaldehyde 2,5-dimethoxytoluene Dimethyl sulfate *N*-methylformanilide Methylhydroquinone Nitroethane	Acetic acid Ammonium acetate **Hydrochloric acid** Hydrogen chloride (gas) Lithium aluminium hydride Phosphorous oxychloride Potassium persulfate Sodium hydroxide Stannic chloride **Sulfuric acid**	Dichloromethane Ethanol Ethyl acetate **Ethyl ether** Methanol Tetrahydrofuran
Sufentanil	1-bromo-2-(2-thienyl)ethane *N*-[4-(methoxymethyl)-4-piperidinyl]-aniline *N*-[4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamide Propionic anhydride 2-(2-thienyl)ethyl methanesulfonate	Hydrogen chloride (gas) Potassium iodide Sodium carbonate Sodium sulfate (anhydrous)	Acetonitrile Chloroform **Ethyl ether** Isobutyl methyl ketone Isopropyl ether Methanol Petroleum ether **Toluene**
Tenamfetamine (MDA)	Ammonia (gas) Ammonium formate Bromosafrole Chlorosafrole Dibromomethane Dichloromethane Formamide **Isosafrole** **3,4-methylenedioxyphenyl-2-propanone (MD-P2P)** Nitroethane **Piperonal** **Safrole** Vanillin	Acetic acid Aluminium chloride Ammonium acetate Copper oxide Formic acid Hydrobromic acid **Hydrochloric acid** Hydrogen peroxide Lithium aluminium hydride Mercuric chloride Potassium hydroxide Sodium bicarbonate Sodium carbonate Sodium dichromate Sodium hydroxide **Sulfuric acid**	**Acetone** Benzene Dimethylformamide Dimethylsulfoxide Ethanol **Ethyl ether** Methanol **Toluene**

DRUGS UNDER INTERNATIONAL CONTROL	ESSENTIAL PRECURSORS/ RAW MATERIALS	CHEMICALS/REAGENTS	SOLVENTS
Tenocyclidine (TCP)	2-bromothiophene Cyclohexanone **Piperidine** Pyridine 2-thienylmagensium bromide	Ammonia Ammonium chloride Hydrobromic acid **Hydrochloric acid** Hydrogen chloride (gas) Iodine Magnesium (turnings) Potassium carbonate Potassium cyanide Sodium bisulfite Sodium cyanide *p*-toluenesulfonic acid	Benzene **Ethyl ether** Isooctane Methanol **Toluene**
Thiofentanyl	Aniline 1-benzyl-4-piperidinone 1-bromo-2-(2-thienyl)ethane 1-chloro-2-(2-thienyl)ethane Methyl acrylate *N*-(4-piperidinyl)aniline Propionic anhydride Propionyl chloride 2-(2-thienyl)-1-ethanamine 1-[2-(2-thienyl)ethyl]-4-piperidinone	**Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Palladium (on carbon) Potassium iodide Sodium borohydride Sodium carbonate Sodium hydroxide Sodium methoxide *p*-toluenesulfonic acid	Acetonitrile **Ethyl ether** Isobutyl methyl ketone Methanol **Toluene**
3,4,5-trimethoxyamfetamine (TMA)	Dimethyl sulfate Gallic acid Nitroethane Tetranitroethane 3,4,5-trimethoxybenzaldehyde 3,4,5-trimethoxybenzoic acid 3,4,5-trimethoxybenzoyl chloride 3,4,5-trimethoxyphenylpropene	Acetic acid Ammonium acetate Barium sulfate **Hydrochloric acid** Hydrogen Hydrogen chloride (gas) Lithium aluminium hydride Palladium chloride Phosphorous pentachloride Sodium bisulfite Sodium hydroxide Thionyl chloride	**Acetone** Benzene Chloroform Ethanol **Ethyl ether** Methanol Pyridine Tetrahydrofuran Xylenes

TABLE II

Essential precursors/raw materials frequently used in the illicit production/manufacture of drugs under international control

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Acetaldehyde	Metamfetamine
Acetic acid	Heroin
Acetic anhydride	Acetyl-*alpha*-methylfentanyl Amfetamine Etilamfetamine Heroin Mecloqualone Metamfetamine Methaqualone PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
Acetone cyanohydrin	Mesocarb
Acetonedicarboxylic acid	Cocaine (synthetic)
Acetonedicarboxylic anhydride	Cocaine (synthetic)
Acetonitrile	Amfetamine
Acetylacetone	Mecloqualone Methaqualone
***N*-acetylanthranilic acid**	Mecloqualone Methaqualone
Acetyl chloride	Acetyl-*alpha*-methylfentanyl Heroin PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
Allylbenzene	Amfetamine
Allyl chloride	Amfetamine
***Alpha*-methylfentanyl**	Acetyl-*alpha*-methylfentanyl
Amfetamine	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl Fenetylline Mesocarb
Aminoacetaldehyde	Psilocine (psilotsin)
(*R*)-(+)-2-amino-3-phenylpropanol	Amfetamine Metamfetamine
Ammonia (gas)	Amfetamine Tenamfetamine (MDA)
Ammonium acetate	Amfetamine
Ammonium formate	Amfetamine Tenamfetamine (MDA)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Ammonium thiocyanate	Pemoline
Aniline	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl Thiofentanyl
p-anisaldehyde	*Para*-methoxyamfetamine (PMA)
p-anisic acid	*Para*-methoxyamfetamine (PMA)
p-anisoyl chloride	*Para*-methoxyamfetamine (PMA)
Anthranilic acid	Mecloqualone Methaqualone
Argyreia nervosa	→ see "Hawaiian baby woodrose seeds"
Benzaldehyde	Amfetamine Pemoline
Benzene	Amfetamine
Benzoic anhydride	Cocaine (synthetic)
Benzoyl chloride	Cocaine (synthetic)
Benzyl chloride	Metamfetamine Pethidine
Benzyl cyanide	Pethidine
1-benzyl-3-methyl-4-piperidinone	*Beta*-hydroxy-3-methylfentanyl 3-methylfentanyl 3-methylthiofentanyl
p-benzyloxyindole	Psilocine (psilotsin)
1-benzyl-4-piperidinone	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl Fentanyl *Para*-fluorofentanyl Thiofentanyl
Bromine	Brolamfetamine (DOB)
Bromobenzene	Eticyclidine (PCE) Phencyclidine (PCP) Rolicyclidine (PHP, PCPy)
1-bromo-2-chloroethane	Alfentanil
1-bromo-2,5-dimethoxybenzene	Brolamfetamine (DOB)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
1-(2-bromoethyl)-4-ethyl-1,4-dihydro-5*H*-tetrazol-5-one	Alfentanil
7-(β-bromoethyl)theophylline	Fenetylline
Bromohydroquinone	Brolamfetamine (DOB)
5-bromoisatin	(+)-Lysergide (LSD)
o-bromophenol	Brolamfetamine (DOB)
1-bromo-2-phenylethane	Fentanyl 3-methylfentanyl *Para*-fluorofentanyl
2-bromo-1-phenylethanol	*Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl
2-bromo-1-phenylpropane	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl
Bromosafrole	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
1-bromo-2-(2-thienyl)ethane	3-methylthiofentanyl Sufentanil Thiofentanyl
2-bromo-1-(2-thienyl)propane	*Alpha*-methylthiofentanyl
2-bromothiophene	Tenocyclidine (TCP)
Cannabis plant	Cannabis oil
Cannabis resin	Cannabis oil
o-chloroaniline	Mecloqualone
2-chloroethanol	Fenetylline
1-(2-chloroethyl)-4-ethyl-1,4-dihydro-5*H*-tetrazol-5-one	Alfentanil
7-(β-chloroethyl)theophylline	Fenetylline
4-chloro-2-methylquinazoline	Mecloqualone Methaqualone
1-chloro-2-phenylethane	Fentanyl 3-methylfentanyl *Para*-fluorofentanyl
2-chloro-1-phenylethanol	*Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl
2-chloro-1-phenylpropane	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl
Chlorosafrole	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
1-chloro-2-(2-thienyl)ethane	3-methylthiofentanyl Thiofentanyl
2-chloro-1-(2-thienyl)propane	*Alpha*-methylthiofentanyl
Claviceps paspali	→ see "Ergot"
Claviceps purpurea	→ see "Ergot"
Coca leaf	Coca paste Cocaine
Coca paste	Cocaine
Codeine	Heroin Morphine
Concentrate of poppy straw	Heroin Morphine
Conocybe spp.	Psilocybine
o-cresol	STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Cyanogen bromide	Aminorex 4-methylaminorex
1,3-cyclohexanedione	Psilocine (psilotsin)
Cyclohexanone	Eticyclidine (PCE) Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Dibromomethane	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Dichloroacetophenone	Pemoline
Di(2-chloroethyl)methylamine	Pethidine
Dichloromethane	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Dichloromethyl methyl ether	Brolamfetamine (DOB) 2,5-dimethoxy-4-ethylamfetamine (DOET) STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Dicyanodiamide	Pemoline
Di(ethanol)methylamine	Pethidine
2,5-diethoxytetrahydrofuran	Cocaine (synthetic)
Diethylamine	DET (Diethyltryptamine) (+)-Lysergide (LSD)
2,5-dimethoxyamfetamine (DMA)	Brolamfetamine (DOB)
2,5-dimethoxybenzaldehyde	Brolamfetamine (DOB) 2,5-dimethoxyamfetamine (DMA)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
2,5-dimethoxybenzoic acid	2,5-dimethoxyamfetamine (DMA)
2,5-dimethoxybenzoyl chloride	2,5-dimethoxyamfetamine (DMA)
2,5-dimethoxy-4-ethylbenzaldehyde	2,5-dimethoxy-4-ethylamfetamine (DOET)
2,5-dimethoxy-4-ethylbenzene	2,5-dimethoxy-4-ethylamfetamine (DOET)
2,5-dimethoxy-4-methylbenzaldehyde	STP, DOM (2,5-dimethoxy-4-methylamfetamine)
2,5-dimethoxyphenylpropene	2,5-dimethoxyamfetamine (DMA)
2,5-dimethoxytetrahydrofuran	Cocaine (synthetic)
2,5-dimethoxytoluene	STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Dimethylacetal	Psilocine (psilotsin)
Dimethylamine	DMT (Dimethyltryptamine) Psilocine (psilotsin)
Dimethyl carbonate	Cocaine (synthetic)
Dimethyl acetonedicarboxylate	Cocaine (synthetic)
Dimethyl sulfate	Brolamfetamine (DOB) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) Mescaline *Para*-methoxyamfetamine (PMA) STP, DOM (2,5-dimethoxy-4-methylamfetamine) 3,4,5-trimethoxyamfetamine (TMA)
1,3-dimethyl urea	Metamfetamine
2,6-dinitrotoluene	Psilocine (psilotsin)
Ephedrine	Metamfetamine Methcathinone
Ergometrine	(+)-Lysergide (LSD)
Ergot (*Claviceps purpurea* or *Claviceps paspali*)	(+)-Lysergide (LSD)
Ergotamine	(+)-Lysergide (LSD)
Ethanol	Pemoline Pethidine
Ethylamine	*N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etilamfetamine
Ethylamine hydrochloride	*N*-ethyltenamfetamine (MDE)
Ethyl bromopyruvate	Psilocine (psilotsin)
1-ethyl-1,4-dihydro-5*H*-tetrazol-5-one	Alfentanil
Ethylhydroquinone	2,5-dimethoxy-4-ethylamfetamine (DOET)
Ethylidene diacetate	Heroin
o-ethylphenol	2,5-dimethoxy-4-ethylamfetamine (DOET)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Etofylline	Fenetylline
p-fluoroaniline	*Para*-fluorofentanyl
p-fluoro-*N*-(4-piperidinyl)aniline	*Para*-fluorofentanyl
Formaldehyde	Mesocarb MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
Formamide	Amfetamine Tenamfetamine (MDA)
Furan	Cocaine (synthetic)
Gallic acid	Mescaline 3,4,5-trimethoxyamfetamine (TMA)
Gentisic acid	Brolamfetamine (DOB) 2,5-dimethoxyamfetamine (DMA)
Gramine	Etryptamine
Guanidine	Pemoline
Hawaiian baby woodrose seeds (*Argyreia nervosa*)	(+)-Lysergide (LSD)
p-hydroxybenzoic acid	*Para*-methoxyamfetamine (PMA)
Hydroxylamine hydrochloride	Amfetamine *N*-hydroxytenamfetamine (N-OH-MDA)
1-(2-hydroxy-2-phenylethyl)-3-methyl-4-piperidinone	*Beta*-hydroxy-3-methylfentanyl
1-(2-hydroxy-2-phenylethyl)-4-piperidinone	*Beta*-hydroxyfentanyl
Indole	DET (Diethyltryptamine) DMT (Dimethyltryptamine)
Inocybe spp.	Psilocybine
Ipomoea spp.	→ see "Morning glory seeds"
Isatoic anhydride	Mecloqualone Methaqualone
Isosafrole	*N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Lophophora williamsii	→ see "Peyote"
Lysergamide	(+)-Lysergide (LSD)
Lysergic acid	(+)-Lysergide (LSD)
Mandelic acid	Pemoline

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Mandelic acid ethyl ester	Pemoline
Mandelonitrile	Pemoline
3-(methoxycarbonyl)propionyl chloride	Psilocine (psilotsin)
p-methoxyindole	Psilocine (psilotsin)
N-[4-(methoxymethyl)-4-piperidinyl]aniline	Alfentanil Sufentanil
N-[4-(methoxymethyl)-4-piperidinyl]-*N*-phenylpropanamine	Alfentanil Sufentanil
p-methoxyphenylpropene	*Para*-methoxyamfetamine (PMA)
Methyl acrylate	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Thiofentanyl
Methylamine	Cocaine (synthetic) Metamfetamine MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine)
Methylamine hydrochloride	Cocaine (synthetic) 3,4-methylenedioxymetamfetamine (MDMA)
3,4-methylenedioxyphenyl-2-propanone (MD-P2P)	*N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
N-methylformamide	Metamfetamine
N-methylformanilide	STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Methylhydroquinone	STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Methyl methacrylate	*Beta*-hydroxy-3-methylfentanyl 3-methylfentanyl 3-methylthiofentanyl
Methyl 6-methylnicotinate	(+)-Lysergide (LSD)
3-methyl-1-phenethyl-4-piperidinone	3-methylfentanyl
1-methyl-4-piperidinone	MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
N-(3-methyl-4-piperidinyl)aniline	*Beta*-hydroxy-3-methylfentanyl 3-methylfentanyl 3-methylthiofentanyl
2-methyl-4(3*H*)-quinazolinone	Mecloqualone Methaqualone
α-methylstyrene	MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
3-methyl-1-[2-(2-thienyl)ethyl]-4-piperidinone	3-methylthiofentanyl
Methyl 3,4,5-trimethoxybenzoate	Mescaline
Morning glory seeds (*Rivea corymbosa*; *Ipomoea spp.*)	(+)-Lysergide (LSD)
Morphine	Heroin
o-nitrobenzoic acid	Mecloqualone Methaqualone
Nitroethane	Amfetamine Brolamfetamine (DOB) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) *Para*-methoxyamfetamine (PMA) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Nitromethane	Mescaline
1-nitropropane	Etryptamine
3-(2-nitro-1-propenyl)indole	Etryptamine
o-nitrotoluene	Mecloqualone Methaqualone
Norephedrine	→ see "Phenylpropanolamine"
Norpseudoephedrine	Amfetamine 4-methylaminorex
Opium	Heroin Morphine
Oxalyl chloride	DET (Diethyltryptamine) DMT (Dimethyltryptamine) Psilocine (psilotsin)
Panaeolus spp.	Psilocybine
Pethidine intermediate A	Pethidine
Pethidine intermediate B	Pethidine
Pethidine intermediate C	Pethidine

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Peyote (flowering heads of *Lophophora williamsii*)	Mescaline
Phenethanolamine	Amfetamine Aminorex *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl
Phenethylamine	Fentanyl 3-methylfentanyl *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
1-phenethyl-4-piperidinone	Fentanyl *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
Phenylacetic acid	Amfetamine Etilamfetamine Metamfetamine
D-phenylalanine	Amfetamine Metamfetamine
Phenyl isocyanate	Mesocarb
1-(2-phenylisopropyl)-4-piperidinone	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl
Phenyllithium	Eticyclidine (PCE) MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)
Phenylmagnesium bromide	MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Phencyclidine (PCP) Rolicyclidine (PHP, PCPy)
Phenylpropanolamine (Norephedrine)	Amfetamine 4-methylaminorex
1-phenyl-2-propanone (P2P)	Amfetamine Etilamfetamine Fenetylline Metamfetamine
Piperidine	Phencyclidine (PCP) Tenocyclidine (TCP)

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
N-(4-piperidinyl)aniline	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl Fentanyl Thiofentanyl
Piperonal	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Pluteus ssp.	Psilocybine
Poppy straw	Heroin Morphine
Propionic anhydride	Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl Sufentanil Thiofentanyl
Propionyl chloride	*Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl Thiofentanyl
Pseudoephedrine	Metamfetamine Methcathinone
Psilocybe spp.	Psilocybine
Psilocybine	Psilocine (psilotsin)
Pyridine	Phencyclidine (PCP) Tenocyclidine (TCP)
Pyrrole	Cocaine (synthetic) Psilocine (psilotsin)
Pyrrolidine	Rolicyclidine (PHP, PCPy)
Rivea corymbosa	→ see "Morning glory seeds"

ESSENTIAL PRECURSORS/ RAW MATERIALS	DRUGS UNDER INTERNATIONAL CONTROL
Safrole	*N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Sodium nitrite	Mesocarb
Succindialdehyde	Cocaine (synthetic)
Tetranitroethane	2,5-dimethoxyamfetamine (DMA) *Para*-methoxyamfetamine (PMA) 3,4,5-trimethoxyamfetamine (TMA)
Thebaine	Morphine
Theophylline	Fenetylline
2-(2-thienyl)-1-ethanamine	3-methylthiofentanyl Thiofentanyl
2-(2-thienyl)ethyl methanesulfonate	Sufentanil
1-[2-(2-thienyl)ethyl]-4-piperidinone	Thiofentanyl
1-[2-(2-thienyl)isopropyl]-4-piperidinone	*Alpha*-methylthiofentanyl
2-thienylmagnesium bromide	Tenocyclidine (TCP)
1-(2-thienyl)-2-propanamine	*Alpha*-methylthiofentanyl
o-toluidine	Methaqualone
3,4,5-trimethoxybenzaldehyde	Mescaline 3,4,5-trimethoxyamfetamine (TMA)
3,4,5-trimethoxybenzoic acid	Mescaline 3,4,5-trimethoxyamfetamine (TMA)
3,4,5-trimethoxybenzoyl chloride	Mescaline 3,4,5-trimethoxyamfetamine (TMA)
3,4,5-trimethoxybenzyl alcohol	Mescaline
3,4,5-trimethoxybenzyl chloride	Mescaline
3,4,5-trimethoxyphenylpropene	3,4,5-trimethoxyamfetamine (TMA)
Urea	Pemoline
Vanillin	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)

Table III

Chemicals/reagents frequently used in the illicit production/manufacture of drugs under international control

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Acetic acid	Amfetamine Brolamfetamine (DOB) Cocaine (synthetic) 2,5-dimethoxyamfetamine (DMA) Etryptamine (+)-Lysergide (LSD) Mesocarb Metamfetamine Methcathinone *Para*-methoxyamfetamine (PMA) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Acetic anhydride	Cocaine (synthetic)
Alumina	(+)-Lysergide (LSD) Psilocine (psilotsin)
Aluminium (foil)	Amfetamine *N*-ethyltenamfetamine (MDE) Etilamfetamine Metamfetamine 3,4-methylenedioxymetamfetamine (MDMA)
Aluminium chloride	Amfetamine *N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Ammonia	Amfetamine Cocaine Fenetylline Heroin Mecloqualone Mescaline Methaqualone Morphine Pemoline Phencyclidine (PCP) Psilocine (psilotsin) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Ammonia (gas)	Amfetamine Cocaine (synthetic) Etryptamine (+)-Lysergide (LSD) Metamfetamine Pemoline

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Ammonium acetate	Brolamfetamine (DOB) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) *Para*-methoxyamfetamine (PMA) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Ammonium chloride	Amfetamine Cocaine (synthetic) Heroin Metamfetamine Morphine Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Ammonium nitrate	Mesocarb Pemoline
Barium carbonate	Cocaine (synthetic)
Barium sulfate	2,5-dimethoxyamfetamine (DMA) Mescaline *Para*-methoxyamfetamine (PMA) 3,4,5-trimethoxyamfetamine (TMA)
Benzenesulfonyl chloride	Mecloqualone Methaqualone
Benzylamine	Fenetylline
Benzyl chloroformate	Amfetamine Metamfetamine
Benzylmagnesium chloride	Metamfetamine
Boron tribromide	Heroin Morphine
Bromine	Cocaine (synthetic)
Butylamine	Amfetamine
Calcium carbonate	Cocaine Heroin Morphine
Calcium hydroxide	Cocaine Heroin Metamfetamine Morphine
Calcium oxide	Cocaine Heroin Morphine
N,N-carbonyldiimidazole	(+)-Lysergide (LSD)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Celite (545)	(+)-Lysergide (LSD) Psilocine (psilotsin) Psilocybine
Charcoal	Etryptamine Heroin (+)-Lysergide (LSD) Morphine Psilocybine
Copper	Amfetamine
Copper oxide	Tenamfetamine (MDA)
Copper sulfate	Metamfetamine
Dimethyl sulfate	Mescaline
Ethanol	Cocaine (synthetic)
Ferric chloride	Amfetamine
Florisil	Cannabis oil
Formic acid	Amfetamine *N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) Mesocarb Metamfetamine 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Hydrazine	(+)-Lysergide
Hydriodic acid	Amfetamine Metamfetamine Psilocine (psilotsin)
Hydrobromic acid	*N*-ethyltenamfetamine (MDE) Fenetylline 3,4-methylenedioxymetamfetamine (MDMA) Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenamfetamine (MDA) Tenocyclidine (TCP)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Hydrochloric acid	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Brolamfetamine (DOB) Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) DMT (Dimethyltryptamine) *N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etilamfetamine Etryptamine Fenetylline Fentanyl Heroin *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mecloqualone Mescaline Mesocarb Metamfetamine Methaqualone Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl Morphine MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) Pemoline PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine)) Pethidine Phencyclidine (PCP) Psilocine (psilotsin) Rolicyclidine (PHP, PCPy) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) Tenocyclidine (TCP) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Hydrogen	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cocaine (synthetic) 2,5-dimethoxyamfetamine (DMA) Etryptamine Fenetylline Fentanyl Mescaline Metamfetamine 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) Psilocine (psilotsin) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)
Hydrogen chloride (gas)	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Brolamfetamine (DOB) Cocaine (synthetic) 2,5-dimethoxyamfetamine (DMA) *N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etilamfetamine Fentanyl Mecloqualone Metamfetamine Methcathinone 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Sufentanil Tenocyclidine (TCP) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)
Hydrogen peroxide	*N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Hydroxylamine	(+)-Lysergide (LSD)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Hydroxylamine hydrochloride	Cocaine (synthetic)
Iodine	Amfetamine Metamfetamine Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Lithium	Amfetamine Eticyclidine (PCE) Metamfetamine
Lithium aluminium hydride	Amfetamine Brolamfetamine (DOB) DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) DMT (Dimethyltryptamine) Mescaline Metamfetamine *Para*-methoxyamfetamine (PMA) Psilocine (psilotsin) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Lithium hydroxide	(+)-Lysergide (LSD)
Magnesium (turnings)	Metamfetamine Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Magnesium sulfate (anhydrous)	Amfetamine Brolamfetamine (DOB) Etilamfetamine Metamfetamine Methcathinone
Mercuric bromide	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA)
Mercuric chloride	Amfetamine *N*-ethyltenamfetamine (MDE) Etilamfetamine Metamfetamine 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Mercury	Amfetamine Cocaine (synthetic)
Methanol	Cocaine (synthetic)
Methylamine	(+)-Lysergide

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Nitrogen (gas)	Cocaine (synthetic) Etryptamine Heroin (+)-Lysergide (LSD) Morphine
Oxalic acid	Cocaine (synthetic)
Palladium	Psilocine (psilotsin)
Palladium (on barium sulfate)	Metamfetamine
Palladium (on carbon)	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Etryptamine Fenetylline Fentanyl 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Thiofentanyl
Palladium black	Amfetamine Metamfetamine
Palladium chloride	2,5-dimethoxyamfetamine (DMA) Mescaline *Para*-methoxyamfetamine (PMA) 3,4,5-trimethoxyamfetamine (TMA)
Palladium dioxide	Etryptamine
Perchloric acid	Metamfetamine
Phosphoric acid	(+)-Lysergide (LSD) Mecloqualone Methaqualone
Phosphorous oxychloride	Mecloqualone Methaqualone STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Phosphorous pentachloride	2,5-dimethoxyamfetamine (DMA) Heroin Mescaline Metamfetamine *Para*-methoxyamfetamine (PMA) 3,4,5-trimethoxyamfetamine (TMA)
Phosphorous pentoxide	Mecloqualone Methaqualone
Phosphorous trichloride	Heroin Mecloqualone Methaqualone

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Platinum	Metamfetamine
Platinum chloride	Metamfetamine
Platinum oxide	Metamfetamine
Potassium bicarbonate	Cocaine (synthetic)
Potassium bromide	Mesocarb
Potassium carbonate	Aminorex Cocaine Fenetylline Heroin 4-methylaminorex MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Pethidine Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Potassium cyanide	Mescaline Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Potassium hydroxide	Amfetamine Cocaine *N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etryptamine *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mescaline 3,4-methylenedioxymetamfetamine (MDMA) Pethidine Tenamfetamine (MDA)
Potassium iodide	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Sufentanil Thiofentanyl
Potassium permanganate	Cocaine Methcathinone

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Potassium persulfate	Brolamfetamine (DOB) 2,5-dimethoxy-4-ethylamfetamine (DOET) STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Pyridine	Heroin Morphine
Raney nickel	Amfetamine Cocaine (synthetic) Etryptamine
Red phosphorous	Amfetamine Metamfetamine
Sodamide	Pethidine
Sodium	Cocaine (synthetic) Metamfetamine
Sodium acetate	Amfetamine Aminorex Etilamfetamine Metamfetamine 4-methylaminorex
Sodium amalgam	Amfetamine Cocaine (synthetic)
Sodium bicarbonate	Amfetamine Cocaine *N*-ethyltenamfetamine (MDE) Heroin (+)-Lysergide (LSD) Mecloqualone Metamfetamine Methaqualone Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Sodium bisulfite	2,5-dimethoxyamfetamine (DMA) Mescaline Methcathinone *Para*-methoxyamfetamine (PMA) Pemoline Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP) 3,4,5-trimethoxyamfetamine (TMA)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Sodium borohydride	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Thiofentanyl
Sodium carbonate	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Aminorex *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cocaine *N*-ethyltenamfetamine (MDE) Fentanyl Heroin Mecloqualone Mescaline Methaqualone 4-methylaminorex 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxu-piperidine) *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Sufentanil Tenamfetamine (MDA) Thiofentanyl
Sodium chloride	(+)-Lysergide (LSD) Mesocarb Metamfetamine
Sodium cyanide	Pemoline Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Sodium cyanoborohydride	Amfetamine *N*-ethyltenamfetamine (MDE) Etilamfetamine *N*-hydroxytenamfetamine (N-OH-MDA) Metamfetamine 3,4-methylenedioxymetamfetamine (MDMA)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Sodium dichromate	*N*-ethyltenamfetamine (MDE) Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Sodium hydride	Mecloqualone Methaqualone
Sodium hydroxide	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Brolamfetamine (DOB) Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) DMT (Dimethyltryptamine) *N*-ethyltenamfetamine (MDE) Etilamfetamine Etryptamine Fentanyl *N*-hydroxytenamfetamine (N-OH-MDA) Mescaline Metamfetamine Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Pethidine Psilocine (psilotsin) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Sodium methoxide	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cocaine (synthetic) Fentanyl 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Thiofentanyl
Sodium nitrite	Cocaine (synthetic) (+)-Lysergide (LSD)
Sodium phosphate, dibasic	Cocaine (synthetic)
Sodium sulfate (anhydrous)	Alfentanil Amfetamine Cocaine DET (Diethyltryptamine) DMT (Dimethyltryptamine) Eticyclidine (PCE) (+)-Lysergide (LSD) Mescaline Psilocine (psilotsin) Sufentanil
Stannic chloride	Brolamfetamine (DOB) 2,5-dimethoxy-4-ethylamfetamine (DOET) STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Sulfuric acid	Amfetamine Cocaine *N*-ethyltenamfetamine (MDE) *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mescaline Metamfetamine Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) Morphine MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) Pemoline PEPAP (1-methyl-4-phenyl-4-acetyloxy-piperidine) Pethidine STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA)
Sulfur trioxide	(+)-Lysergide (LSD)

CHEMICALS/REAGENTS	DRUGS UNDER INTERNATIONAL CONTROL
Tartaric acid	Amfetamine Heroin (+)-Lysergide (LSD) Morphine
Thionyl chloride	2,5-dimethoxyamfetamine (DMA) Fenetylline Heroin Mescaline Metamfetamine *Para*-methoxyamfetamine (PMA) Pethidine 3,4,5-trimethoxyamfetamine (TMA)
p-toluenesulfonic acid	Acetyl-*alpha*-methylfentanyl *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP) Thiofentanyl
p-toluenesulfonyl chloride	Amfetamine Metamfetamine
Triethylamine	Mecloqualone Mesocarb Methaqualone
Trifluoroacetic anhydride	(+)-Lysergide (LSD)
Urea	Mesocarb

TABLE IV

Solvents frequently used in the illicit production/manufacture of drugs under international control

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Acetone	Alfentanil Amfetamine Cocaine 2,5-dimethoxyamfetamine (DMA) *N*-ethyltenamfetamine (MDE) Etilamfetamine Heroin *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Metamfetamine Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) Morphine *Para*-methoxyamfetamine (PMA) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Acetonitrile	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Fentanyl (+)-Lysergide (LSD) 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Sufentanil Thiofentanyl

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Benzene	Amfetamine Aminorex Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) DMT (Dimethyltryptamine) *N*-ethyltenamfetamine (MDE) Etryptamine *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mescaline Metamfetamine 4-methylaminorex 3,4-methylenedioxymetamfetamine (MDMA) MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-methoxyamfetamine (PMA) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Phencyclidine (PCP) Psilocine (psilotsin) Rolicyclidine (PHP, PCPy) Tenamfetamine (MDA) Tenocyclidine (TCP) 3,4,5-trimethoxyamfetamine (TMA)
n-butanol	Cocaine
Butyl acetate	Cocaine
Chloroform	Alfentanil Amfetamine Cannabis oil Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) DMT (Dimethyltryptamine) Heroin (+)-Lysergide (LSD) Mecloqualone Mescaline Mesocarb Metamfetamine Methaqualone Morphine *Para*-methoxyamfetamine (PMA) Psilocine (psilotsin) Sufentanil 3,4,5-trimethoxyamfetamine (TMA)
Diacetone alcohol	Cocaine
1,2-dichloroethane	(+)-Lysergide (LSD)

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Dichloromethane	Alfentanil Brolamfetamine (DOB) Cocaine 2,5-dimethoxy-4-ethylamfetamine (DOET) *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Methcathinone STP, DOM (2,5-dimethoxy-4-methylamfetamine)
Diglyme	Mecloqualone Methaqualone
Dimethylformamide	*N*-ethyltenamfetamine (MDE) (+)-Lysergide (LSD) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Dimethylsulfoxide	*N*-ethyltenamfetamine (MDE) 3,4-methylenedioxymetamfetamine (MDMA) Tenamfetamine (MDA)
Dioxane	Psilocine (psilotsin)
Ethanol	Amfetamine Brolamfetamine (DOB) Cannabis oil Cocaine 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) *N*-ethyltenamfetamine (MDE) Etilamfetamine Etryptamine Fenetylline Heroin *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mecloqualone Mescaline Mesocarb Metamfetamine Methaqualone 3,4-methylenedioxymetamfetamine (MDMA) Morphine *Para*-methoxyamfetamine (PMA) Pemoline STP, DOM (2,5-dimethoxy-4-methylamfetamine) Tenamfetamine (MDA) 3,4,5-trimethoxyamfetamine (TMA)
Ethyl acetate	Amfetamine Cocaine Etryptamine Heroin (+)-Lysergide (LSD) Metamfetamine STP, DOM (2,5-dimethoxy-4-methylamfetamine)

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Ethyl ether	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Brolamfetamine (DOB) Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) DMT (Dimethyltryptamine) *N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etilamfetamine Etryptamine Fentanyl Heroin *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mecloqualone Mescaline Metamfetamine Methaqualone 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl Morphine MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Pethidine Phencyclidine (PCP) Psilocine (psilotsin) Rolicyclidine (PHP, PCPy) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Sufentanil Tenamfetamine (MDA) Tenocyclidine (TCP) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)
n-heptane	Mecloqualone Methaqualone
n-hexane	Amfetamine Cannabis oil Cocaine Metamfetamine Methcathinone

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Isobutyl methyl ketone	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cocaine Fentanyl 3-methylfentanyl 3-methylthiofentanyl *Para*-fluorofentanyl Sufentanil Thiofentanyl
Isooctane	Phencyclidine (PCP) Rolicyclidine (PHP, PCPy) Tenocyclidine (TCP)
Isopropanol	Cocaine *N*-ethyltenamfetamine (MDE) Eticyclidine (PCE) Etilamfetamine Fenetylline Metamfetamine 3,4-methylenedioxymetamfetamine (MDMA) Pethidine
Isopropyl ether	Sufentanil
Kerosene	Cocaine

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Methanol	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl Amfetamine Aminorex *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cannabis oil Cocaine DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) DMT (Dimethyltryptamine) *N*-ethyltenamfetamine (MDE) Etilamfetamine Etryptamine Fenetylline Fentanyl Heroin *N*-hydroxytenamfetamine (N-OH-MDA) (+)-Lysergide (LSD) Mecloqualone Mescaline Methaqualone 4-methylaminorex 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl *Para*-methoxyamfetamine (PMA) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Pethidine Phencyclidine (PCP) Psilocine (psilotsin) Psilocybine Rolicyclidine (PHP, PCPy) STP, DOM (2,5-dimethoxy-4-methylamfetamine) Sufentanil Tenamfetamine (MDA) Tenocyclidine (TCP) Thiofentanyl 3,4,5-trimethoxyamfetamine (TMA)
Methyl ethyl ketone	Cocaine Heroin
Petroleum ether	Cannabis oil Cocaine DET (Diethyltryptamine) DMT (Dimethyltryptamine) Metamfetamine Psilocine (psilotsin) Sufentanil

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Pyridine	Amfetamine 2,5-dimethoxyamfetamine (DMA) Mecloqualone Metamfetamine Methaqualone MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-methoxyamfetamine (PMA) PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) 3,4,5-trimethoxyamfetamine (TMA)
Tetrahydrofuran	Amfetamine Brolamfetamine (DOB) DET (Diethyltryptamine) 2,5-dimethoxyamfetamine (DMA) 2,5-dimethoxy-4-ethylamfetamine (DOET) DMT (Dimethyltryptamine) Metamfetamine *Para*-methoxyamfetamine (PMA) STP, DOM (2,5-dimethoxy-4-methylamfetamine) 3,4,5-trimethoxyamfetamine (TMA)
Toluene	Acetyl-*alpha*-methylfentanyl Alfentanil *Alpha*-methylfentanyl *Alpha*-methylthiofentanyl *Beta*-hydroxyfentanyl *Beta*-hydroxy-3-methylfentanyl Cocaine *N*-ethyltenamfetamine (MDE) Fenetylline Fentanyl Mecloqualone Methaqualone Methcathinone 3,4-methylenedioxymetamfetamine (MDMA) 3-methylfentanyl 3-methylthiofentanyl MPPP (1-methyl-4-phenyl-4-propionoxy-piperidine) *Para*-fluorofentanyl PEPAP (1-phenethyl-4-phenyl-4-acetyloxy-piperidine) Pethidine Phencyclidine (PCP) Psilocine (psilotsin) Rolicyclidine (PHP, PCPy) Sufentanil Tenamfetamine (MDA) Tenocyclidine (TCP) Thiofentanyl

SOLVENTS	DRUGS UNDER INTERNATIONAL CONTROL
Xylenes	Cocaine 2,5-dimethoxyamfetamine (DMA) Mescaline *Para*-methoxyamfetamine (PMA) 3,4,5-trimethoxyamfetamine (TMA)

C. DRUGS UNDER INTERNATIONAL CONTROL FREQUENTLY PRODUCED/MANUFACTURED IN CLANDESTINE LABORATORIES

SYNTHESIS/PROCESSING SCHEMES

EXPLANATORY NOTES

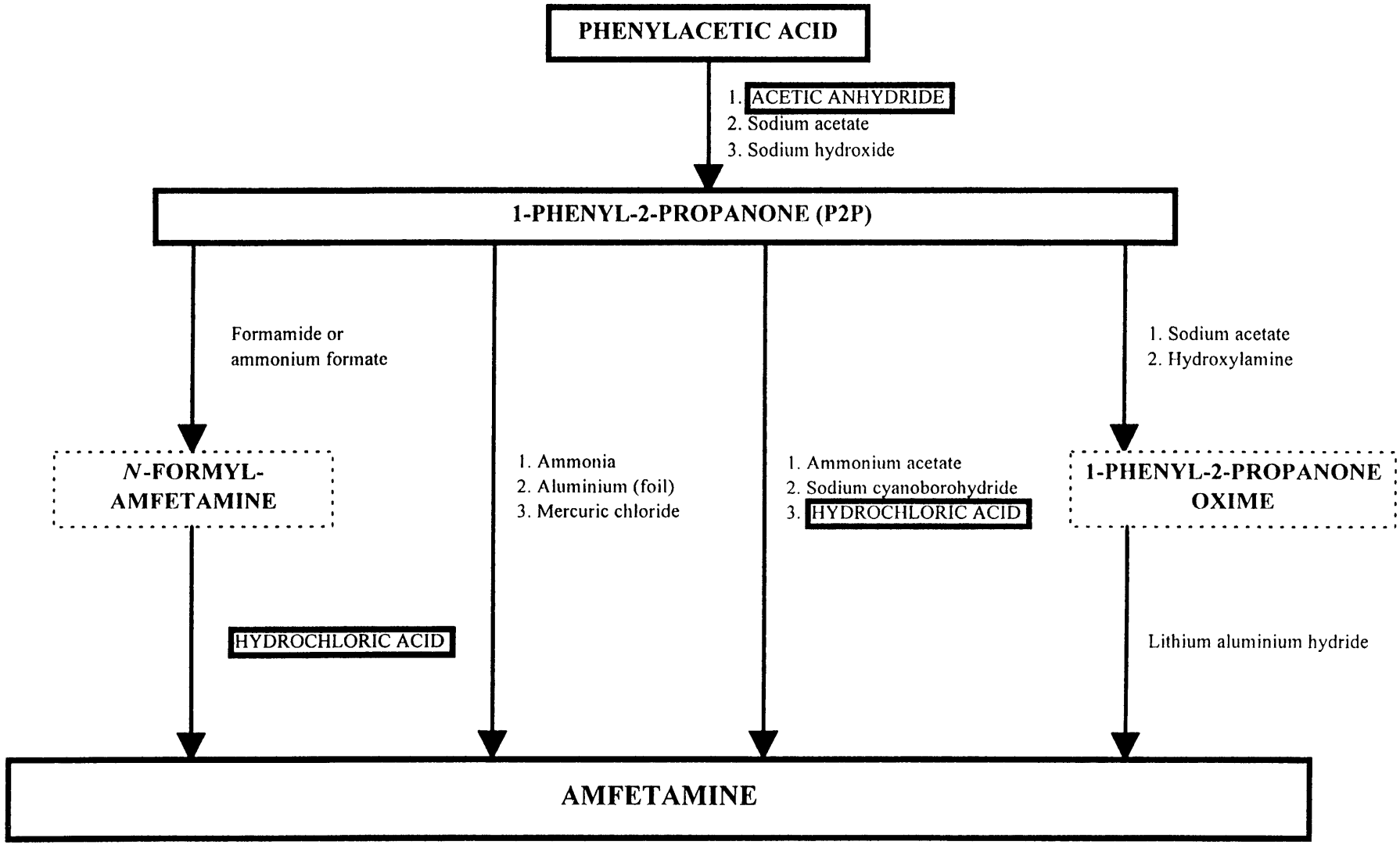
With the exception of the production of those drugs derived from natural raw materials, i.e. cocaine, heroin, (+)-lysergide (LSD), mescaline, morphine and psilocybine, solvents and purification steps within the syntheses of the rest of the drugs covered by this manual are not shown in the schemes although they may be/may require controlled substances.

With the exception of the production of selected drugs derived from natural raw materials, i.e. cocaine, heroin and mescaline, for which the schemes show also the manufacture of the drugs' most common salts, the schemes for the rest of the drugs show syntheses of the free bases.

Substances controlled under the Conventions of 1961, 1971 and 1988 are shown in bold boxes.

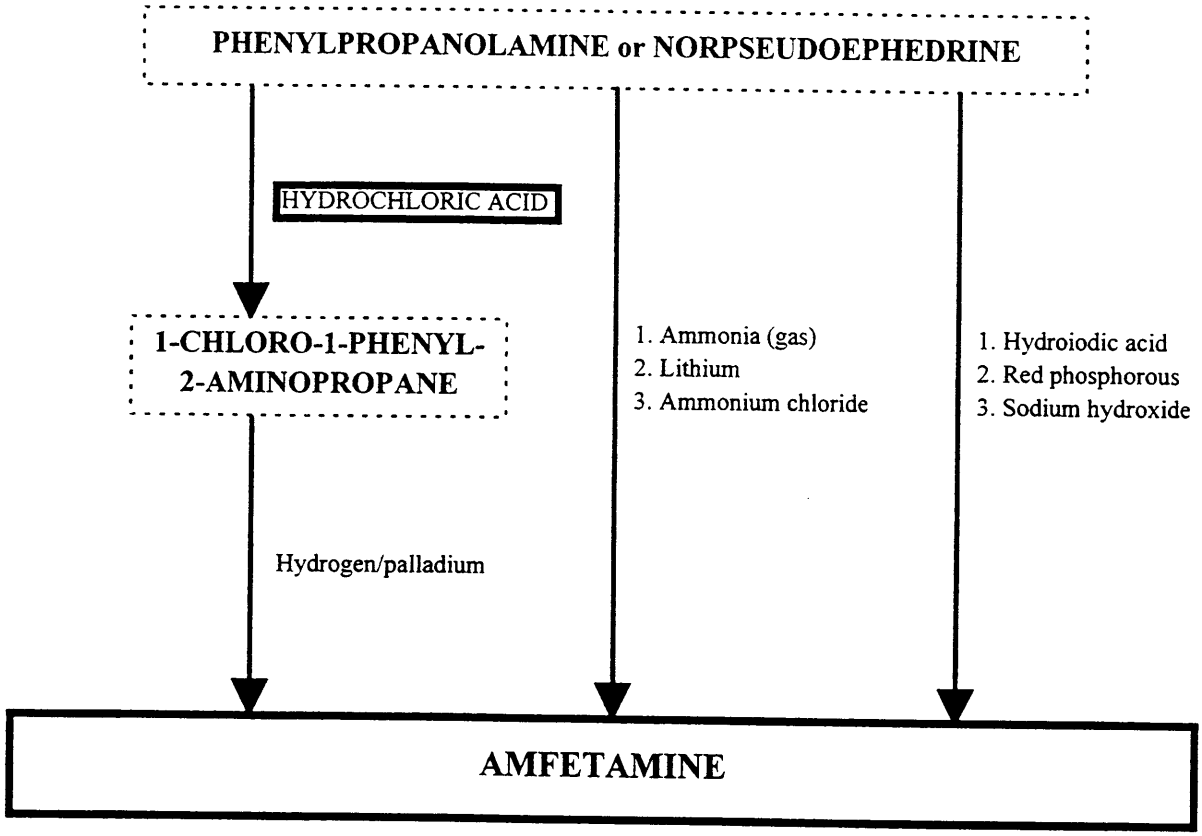
ILLICIT MANUFACTURE OF AMFETAMINE

SCHEME I



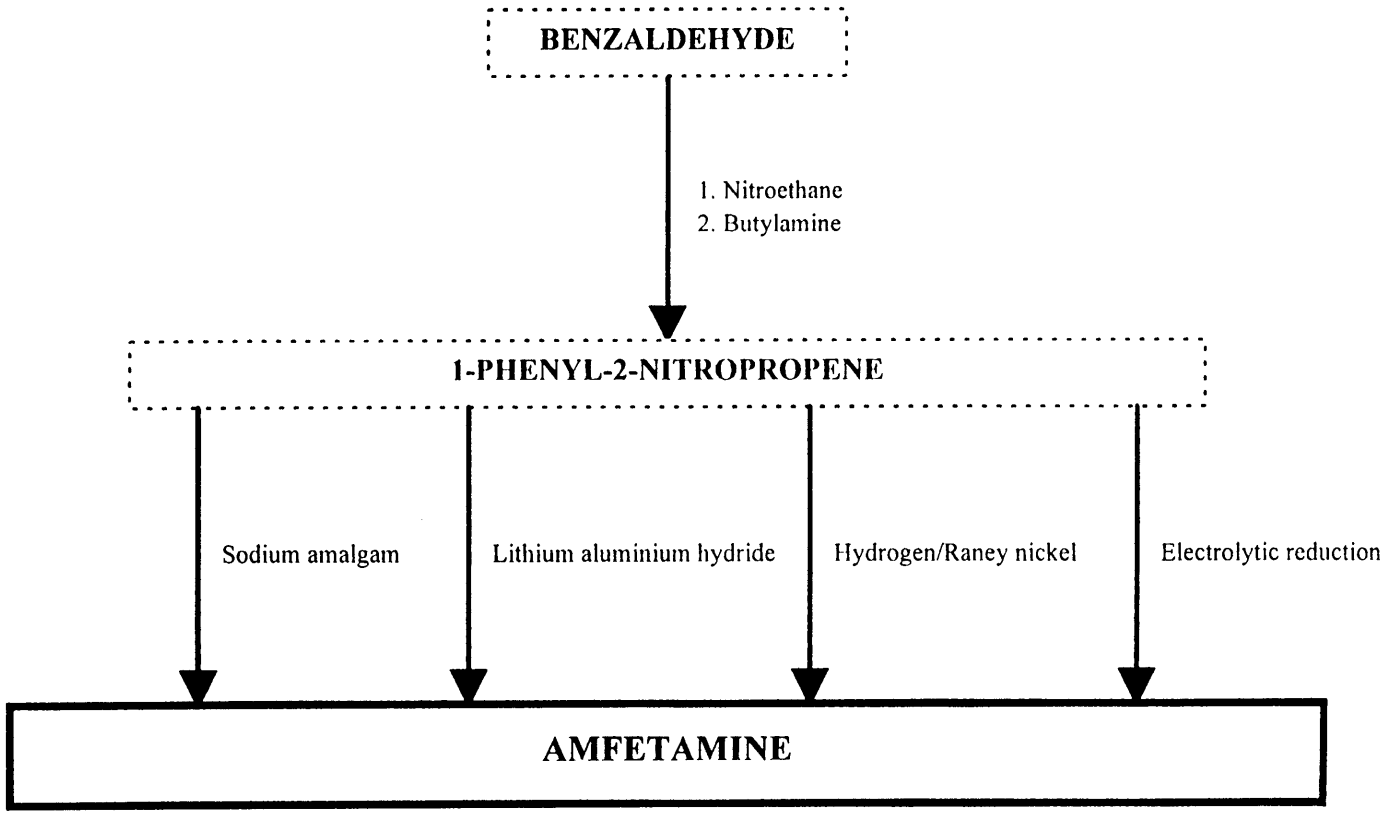
ILLICIT MANUFACTURE OF AMFETAMINE

SCHEME II



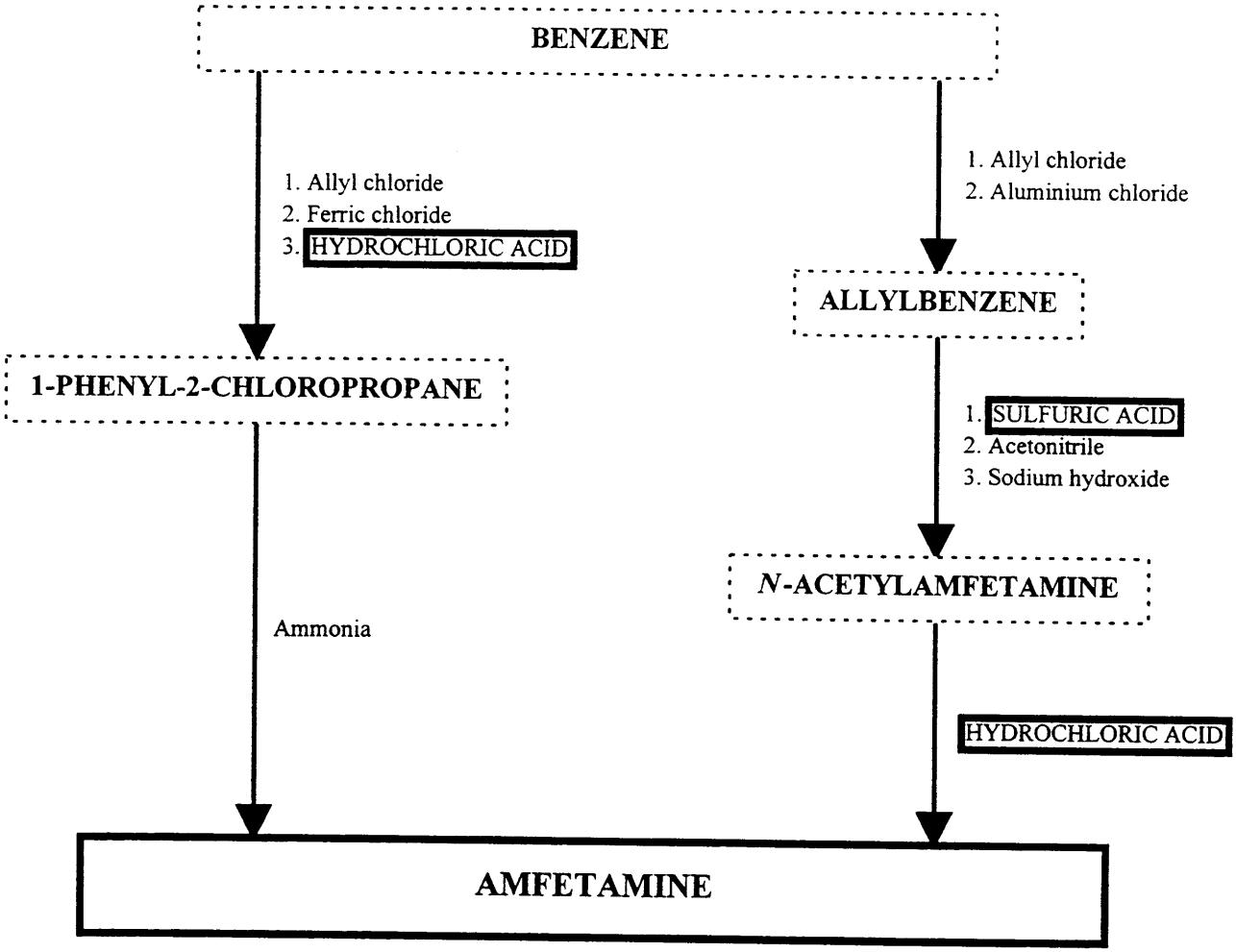
ILLICIT MANUFACTURE OF AMFETAMINE

SCHEME III



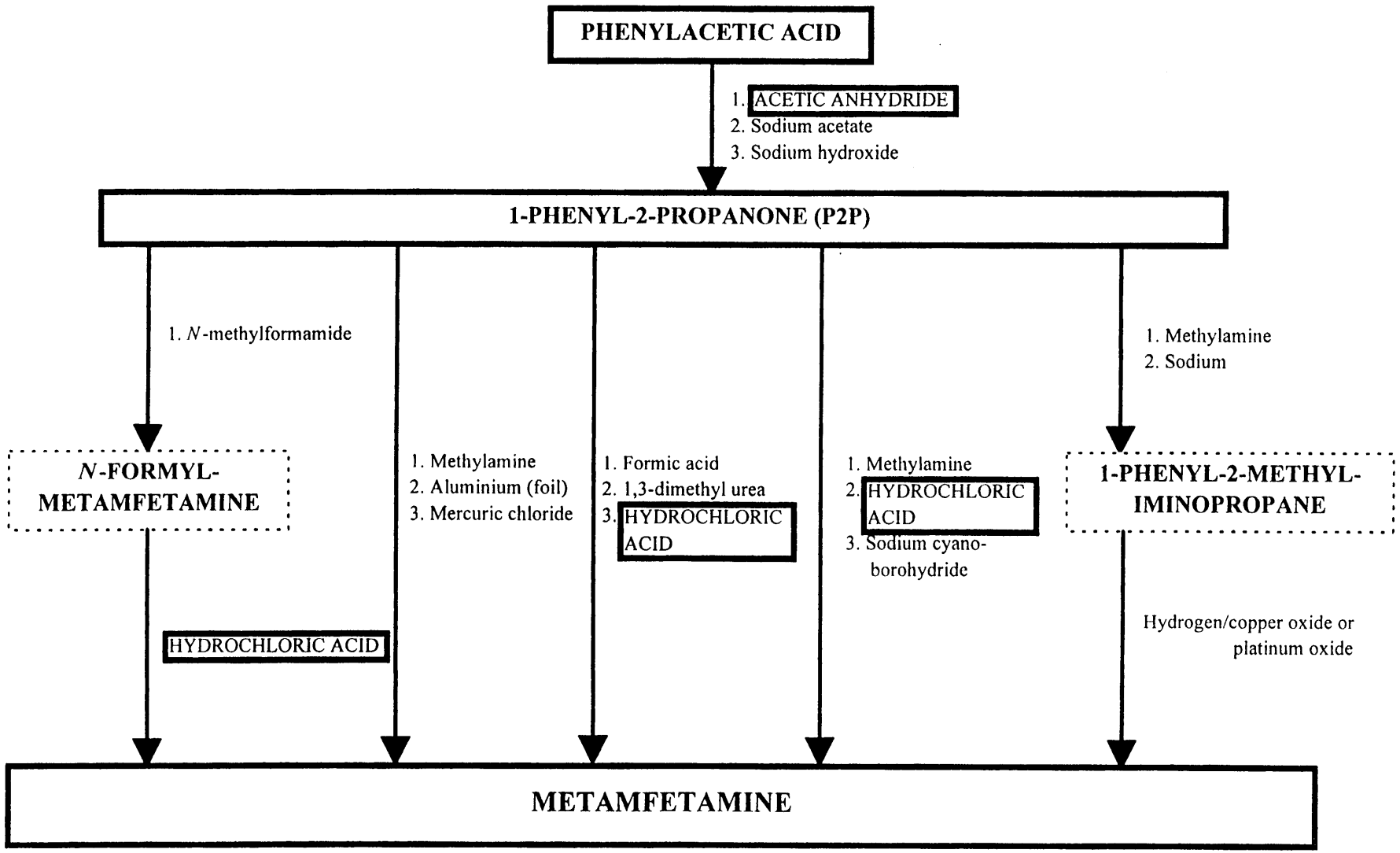
ILLICIT MANUFACTURE OF AMFETAMINE

SCHEME IV



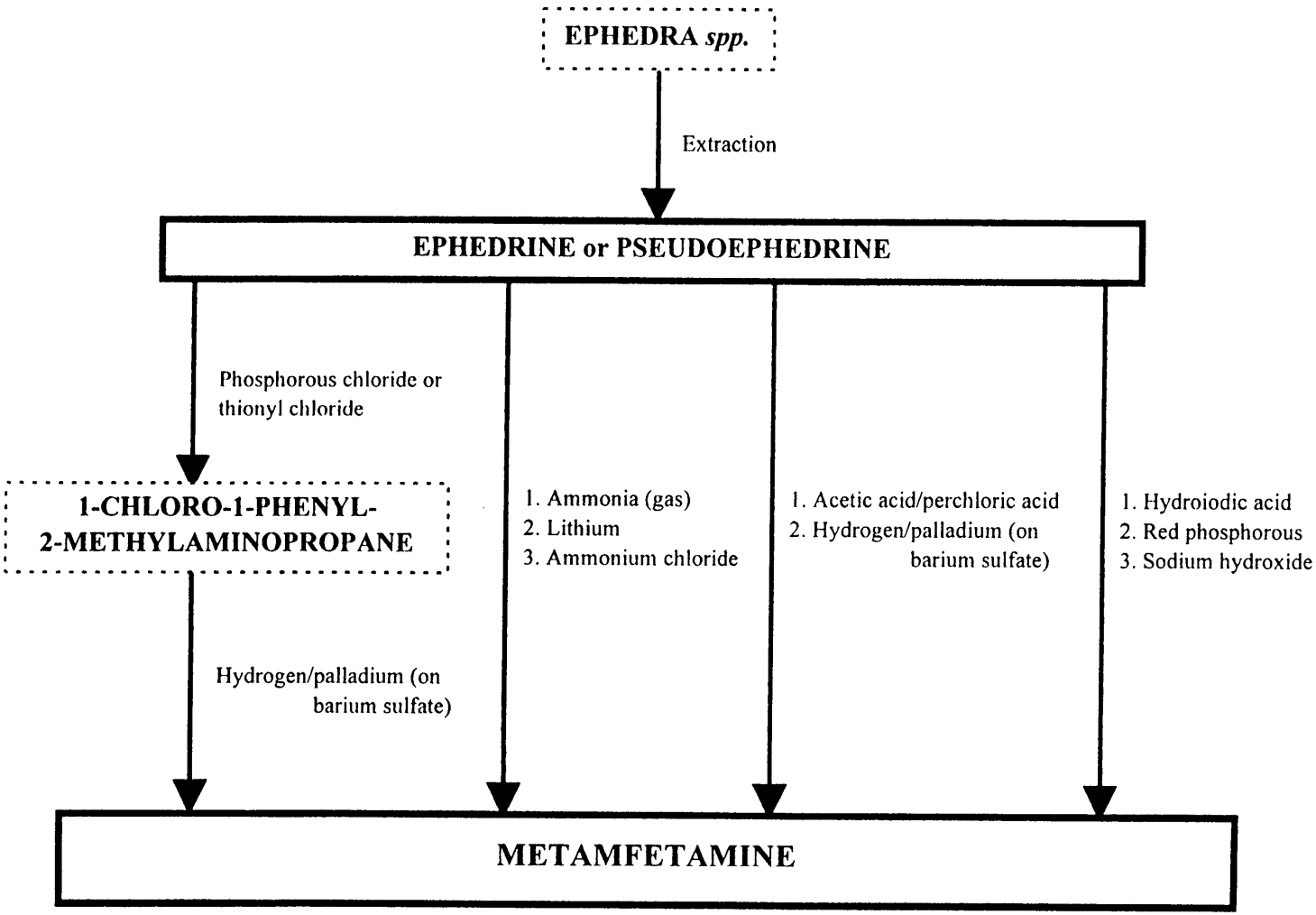
ILLICIT MANUFACTURE OF METAMFETAMINE

SCHEME I



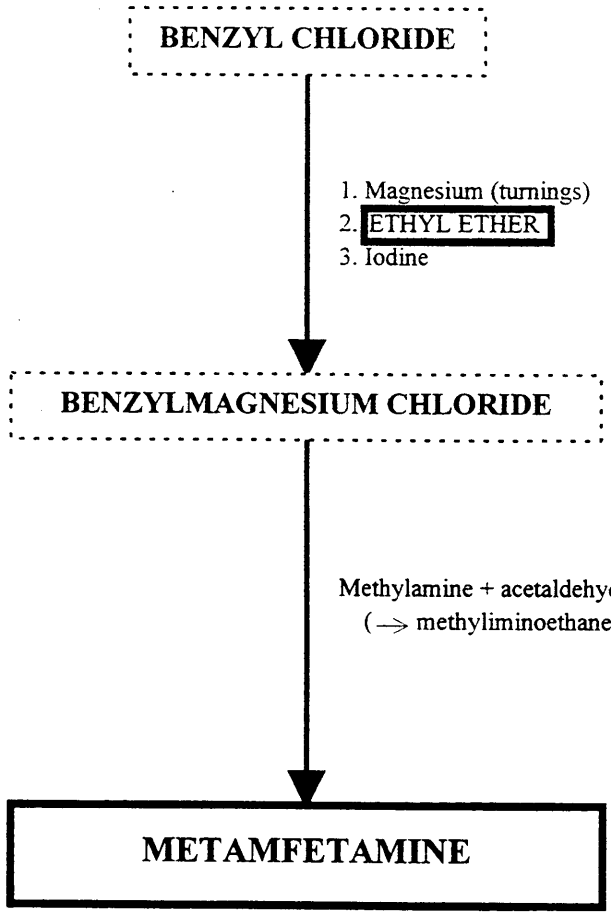
ILLICIT MANUFACTURE OF METAMFETAMINE

SCHEME II

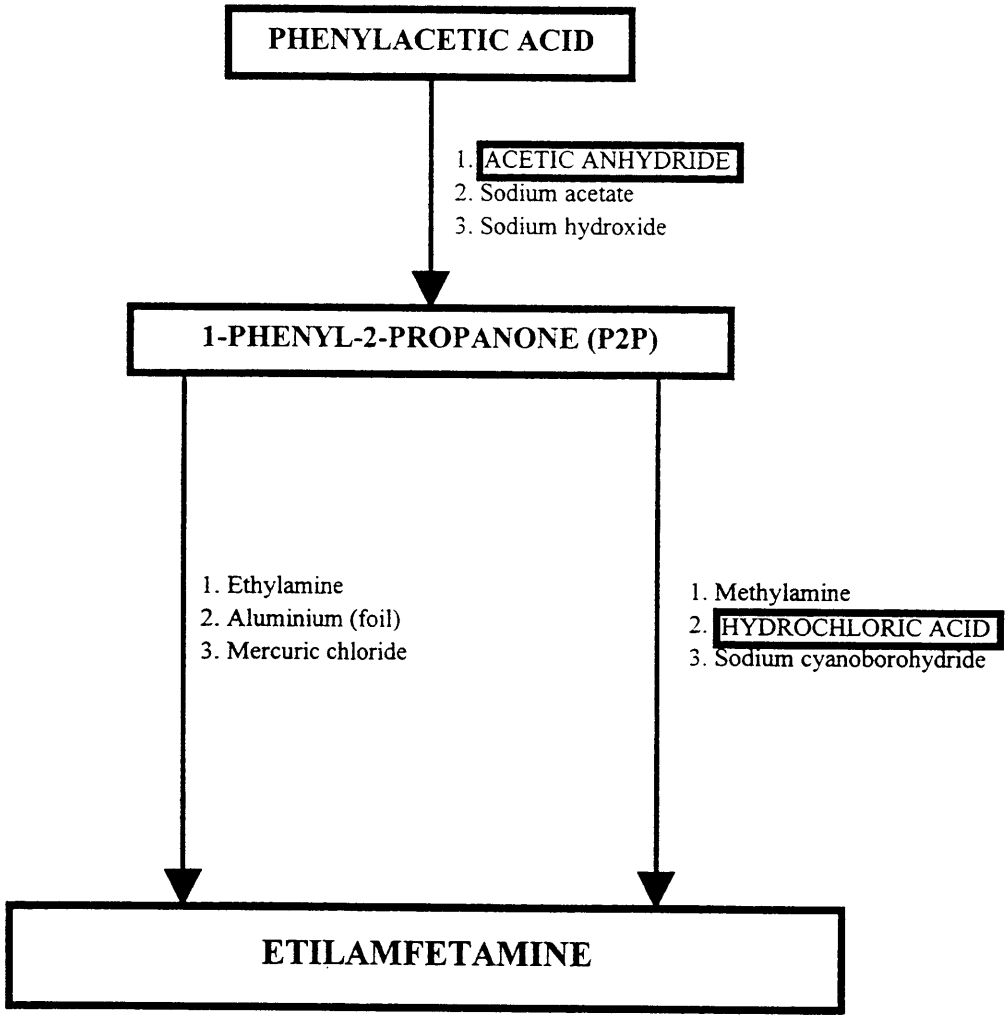


ILLICIT MANUFACTURE OF METAMFETAMINE

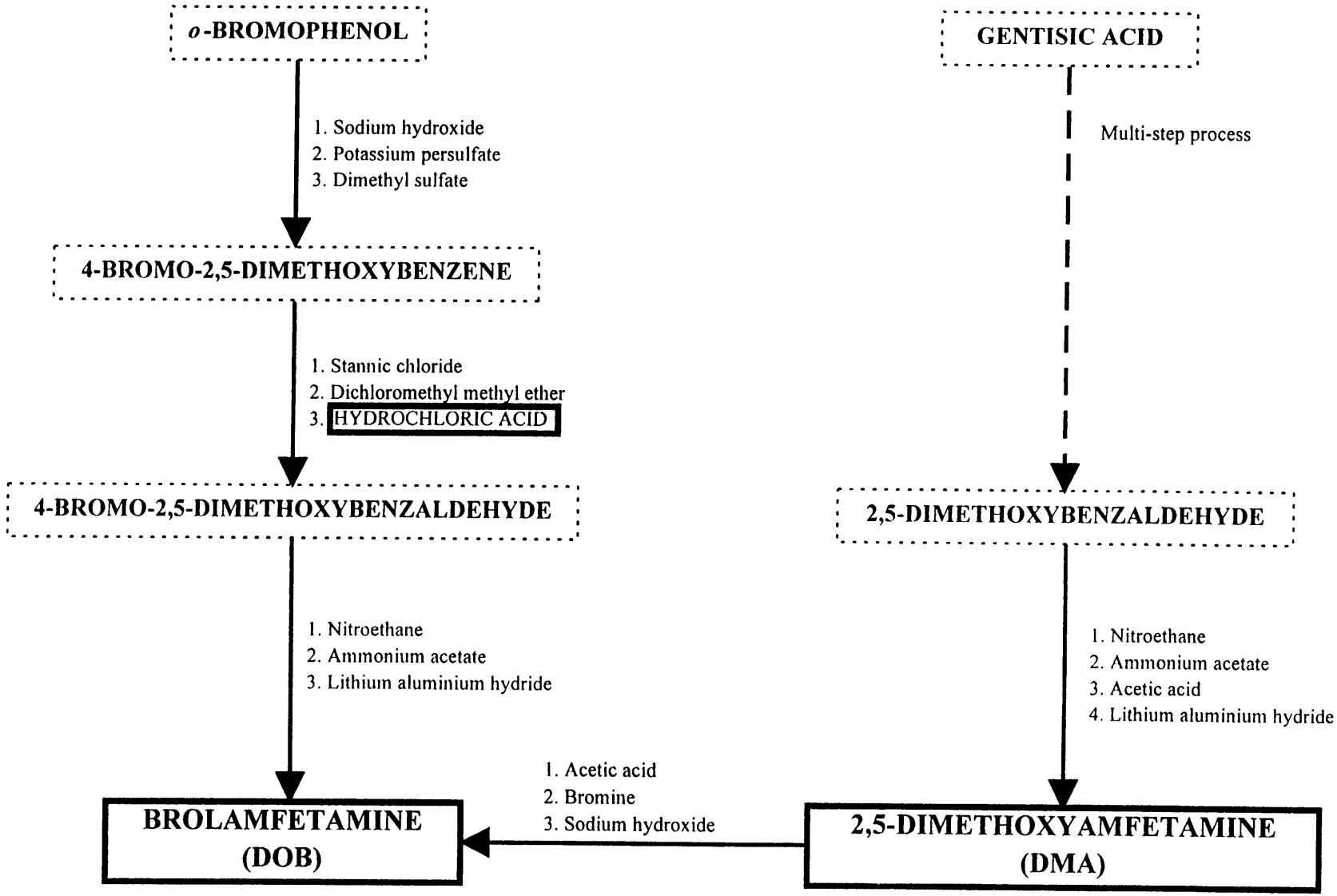
SCHEME III



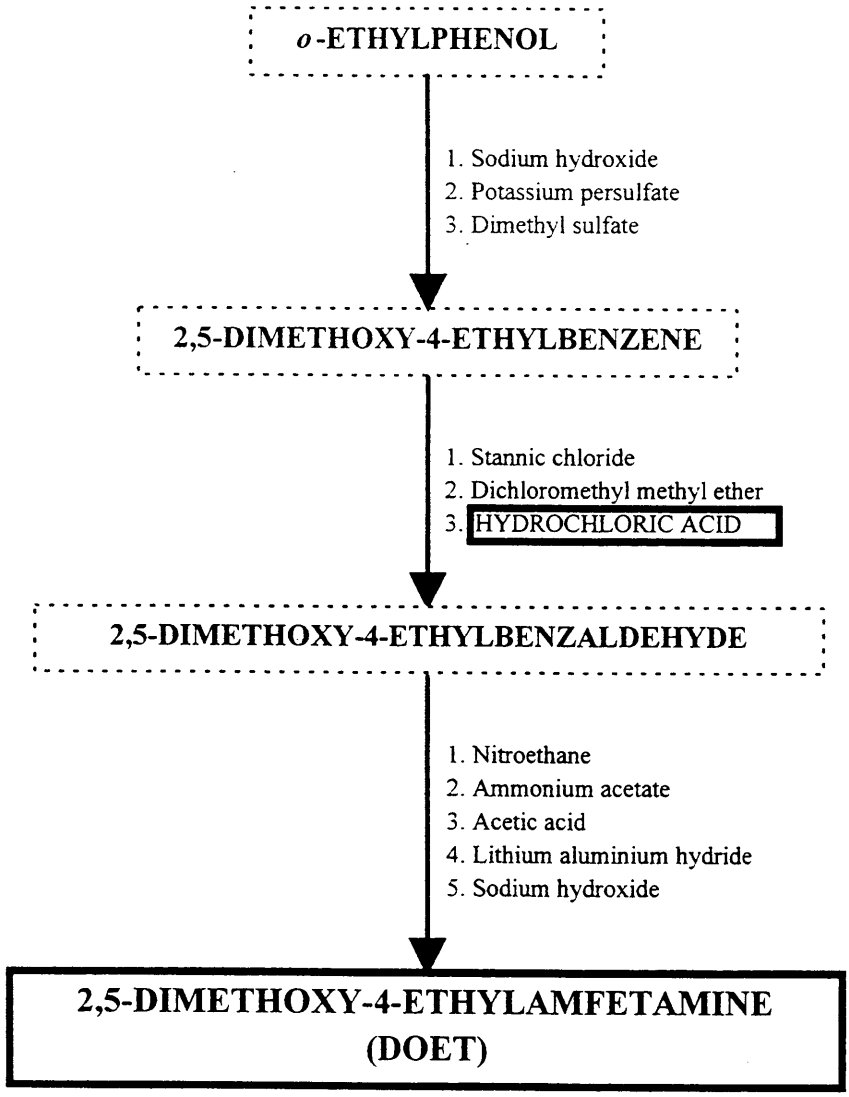
ILLICIT MANUFACTURE OF ETILAMFETAMINE



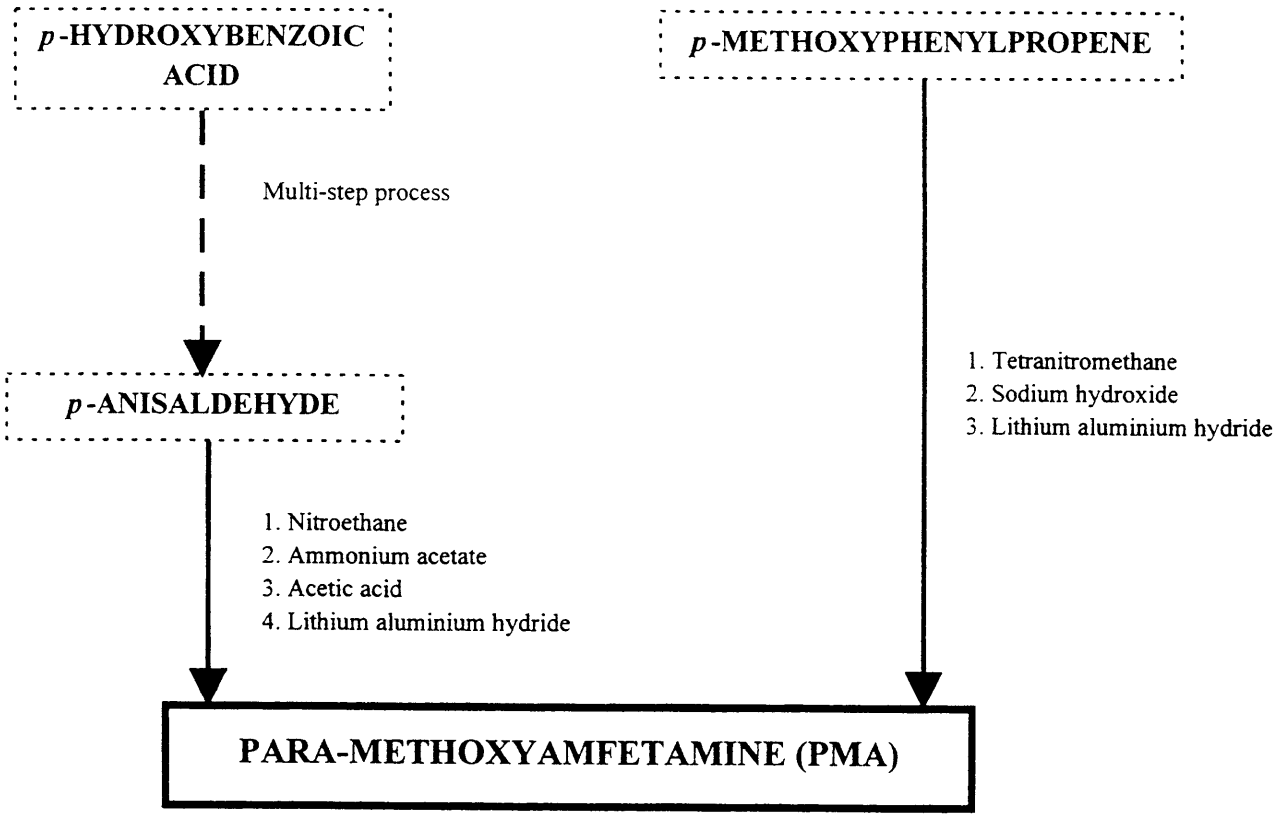
ILLICIT MANUFACTURE OF BROLAMFETAMINE (DOB) AND 2,5-DIMETHOXYAMFETAMINE (DMA)



ILLICIT MANUFACTURE OF 2,5-DIMETHOXY-4-ETHYLAMFETAMINE (DOET)

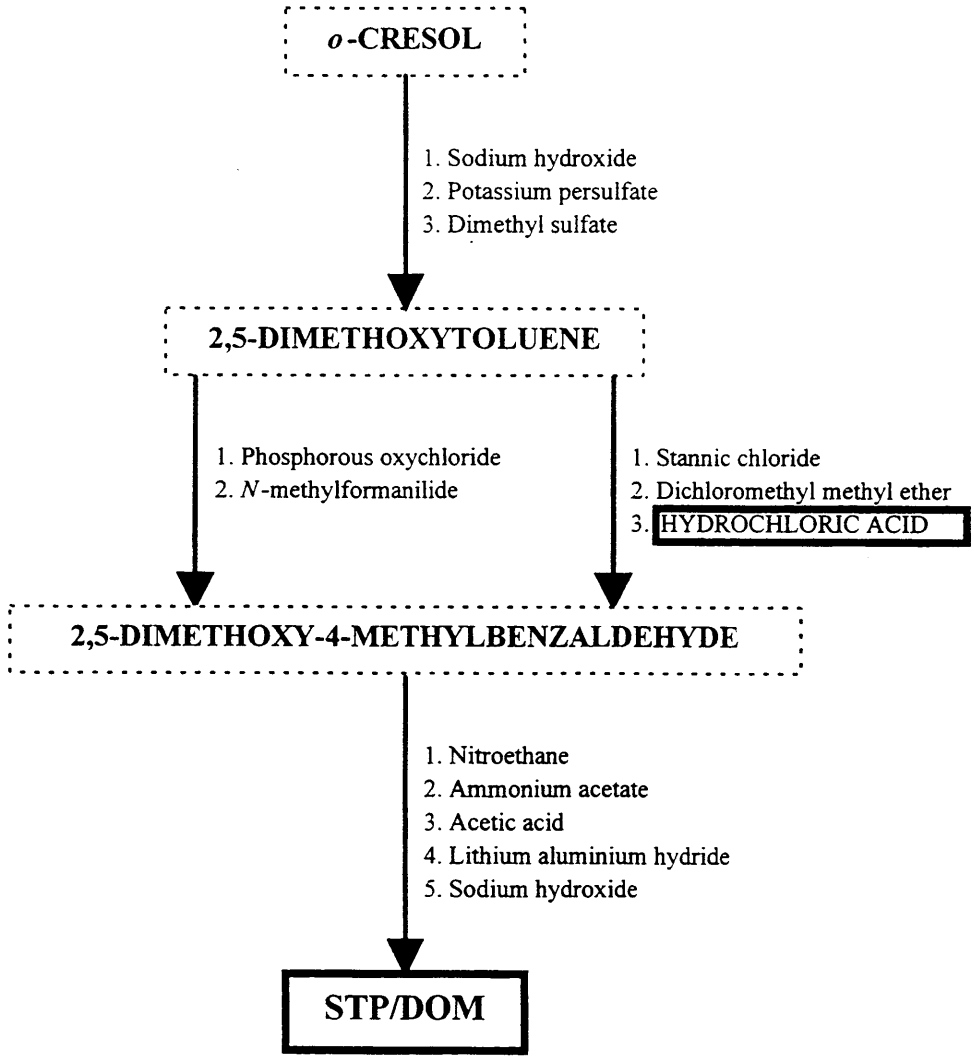


ILLICIT MANUFACTURE OF PARA-METHOXYAMFETAMINE (PMA)

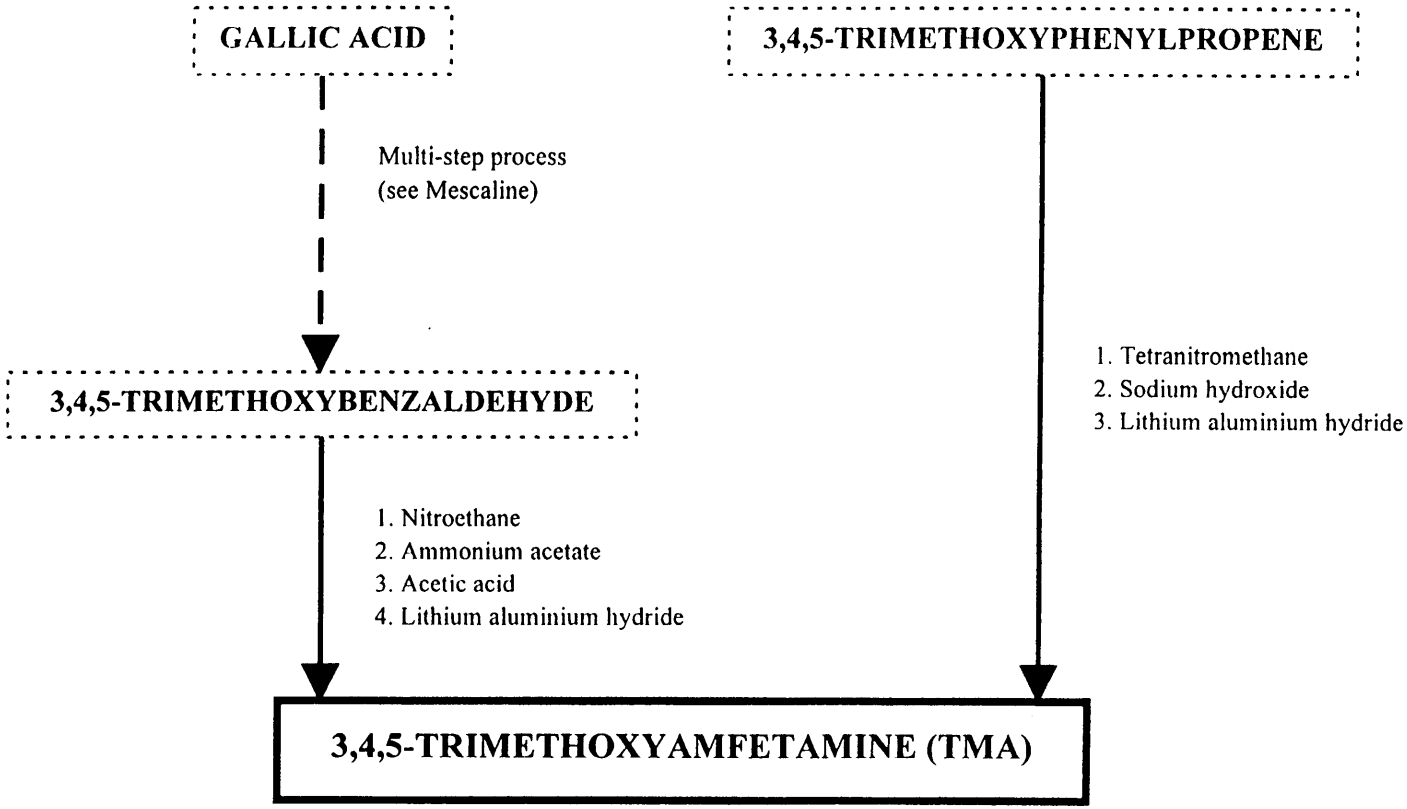


ILLICIT MANUFACTURE OF STP/DOM

(2,5-DIMETHOXY-4-METHYLAMFETAMINE)

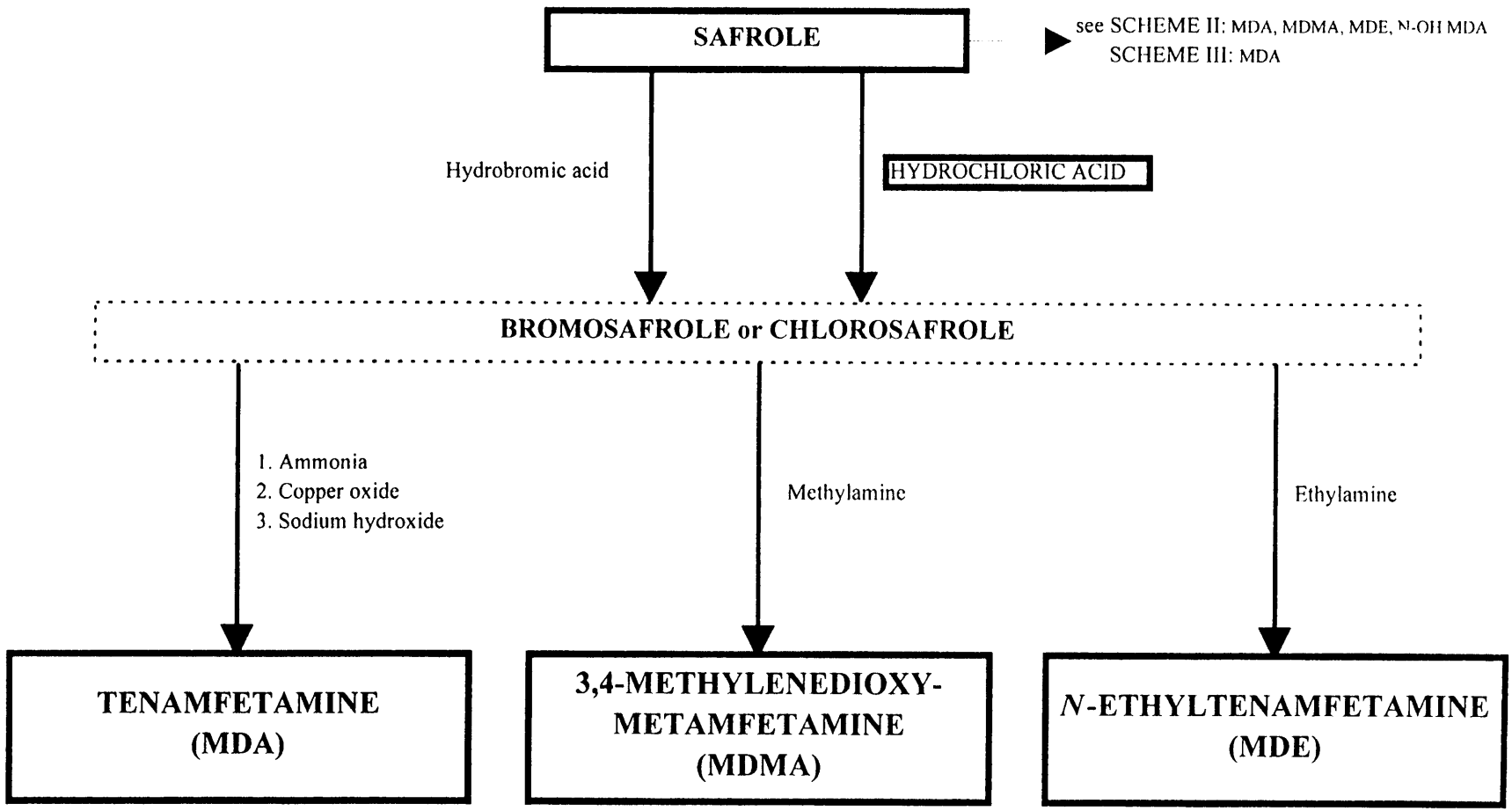


ILLICIT MANUFACTURE OF 3,4,5-TRIMETHOXYAMFETAMINE (TMA)



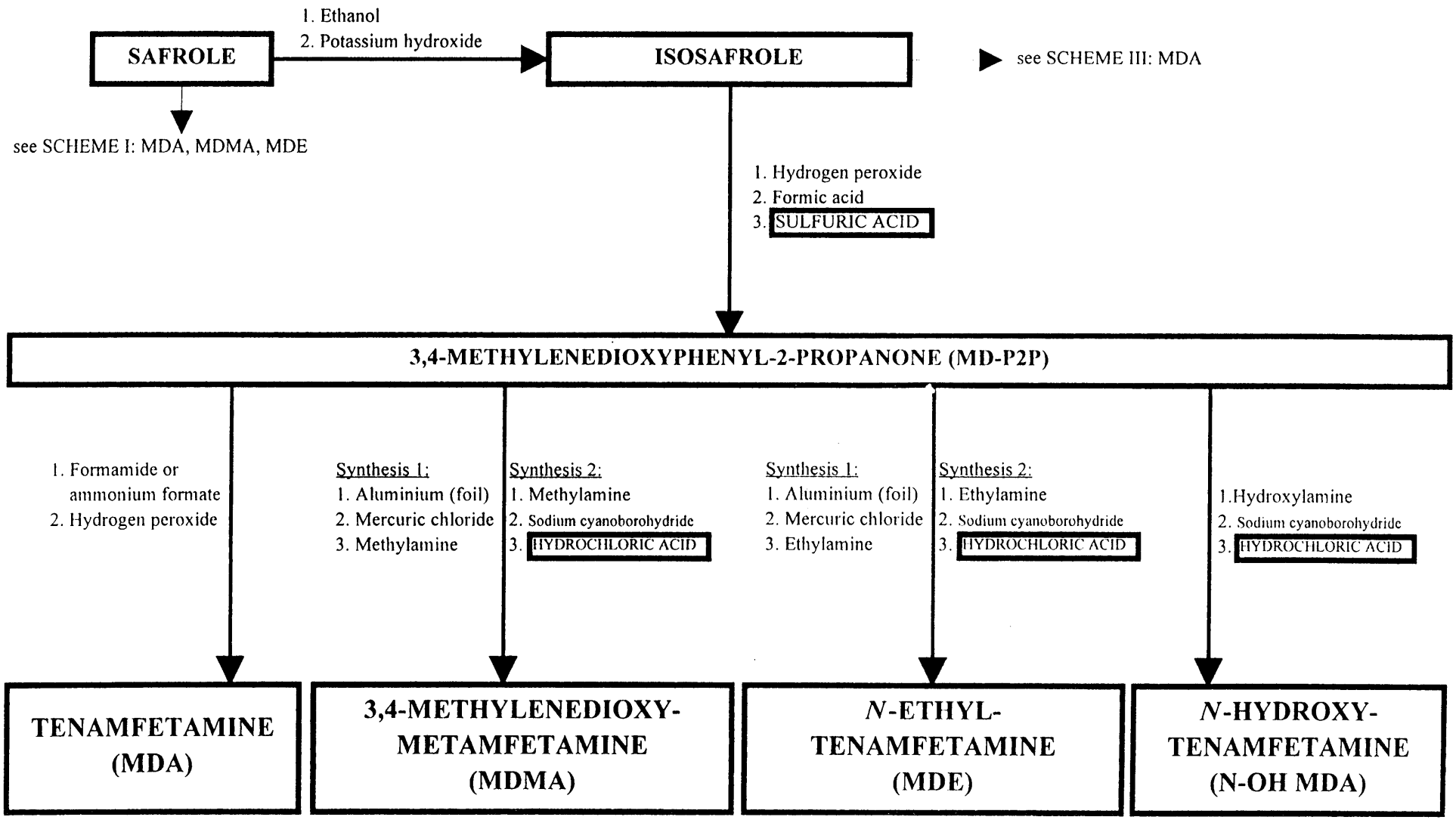
ILLICIT MANUFACTURE OF TENAMFETAMINE (MDA) AND ITS ANALOGUES

SCHEME I: MDA, MDMA, MDE



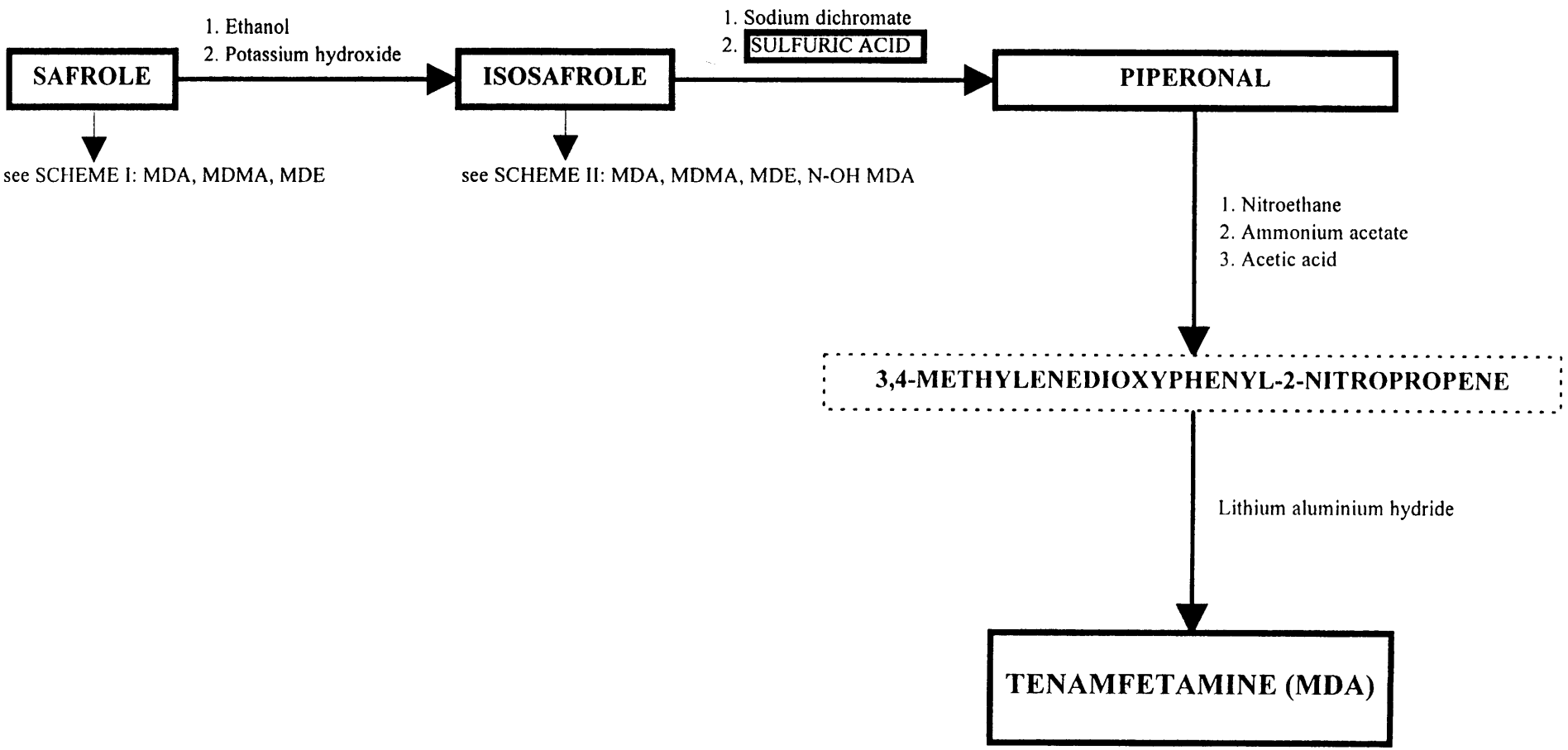
ILLICIT MANUFACTURE OF TENAMFETAMINE (MDA) AND ITS ANALOGUES

SCHEME II: MDA, MDMA, MDE, N-OH MDA

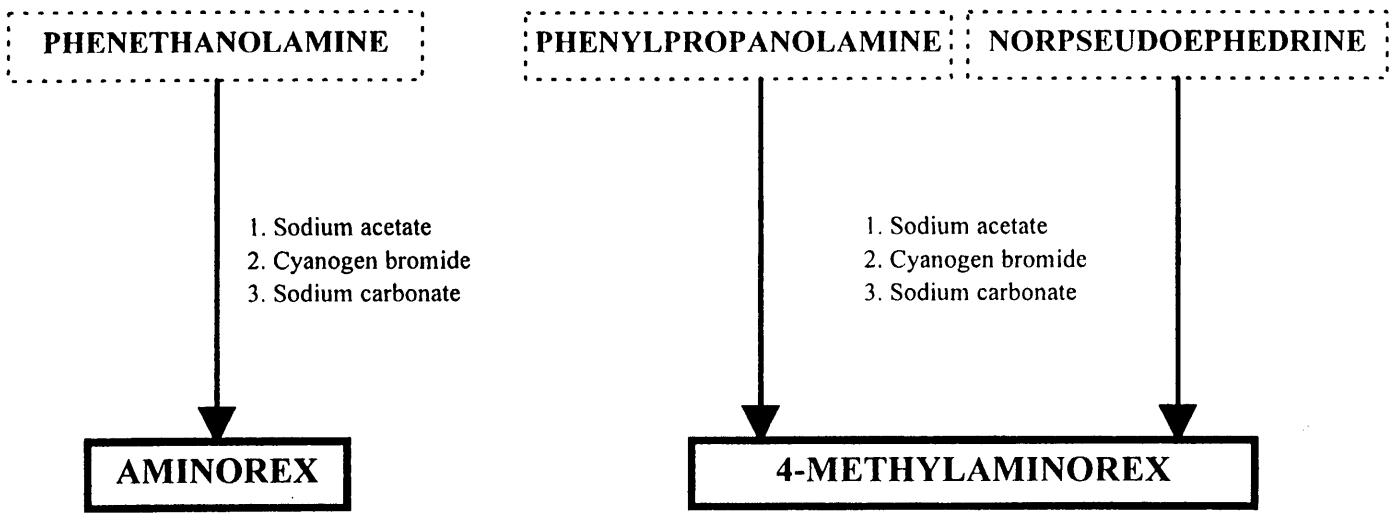


ILLICIT MANUFACTURE OF TENAMFETAMINE (MDA) AND ITS ANALOGUES

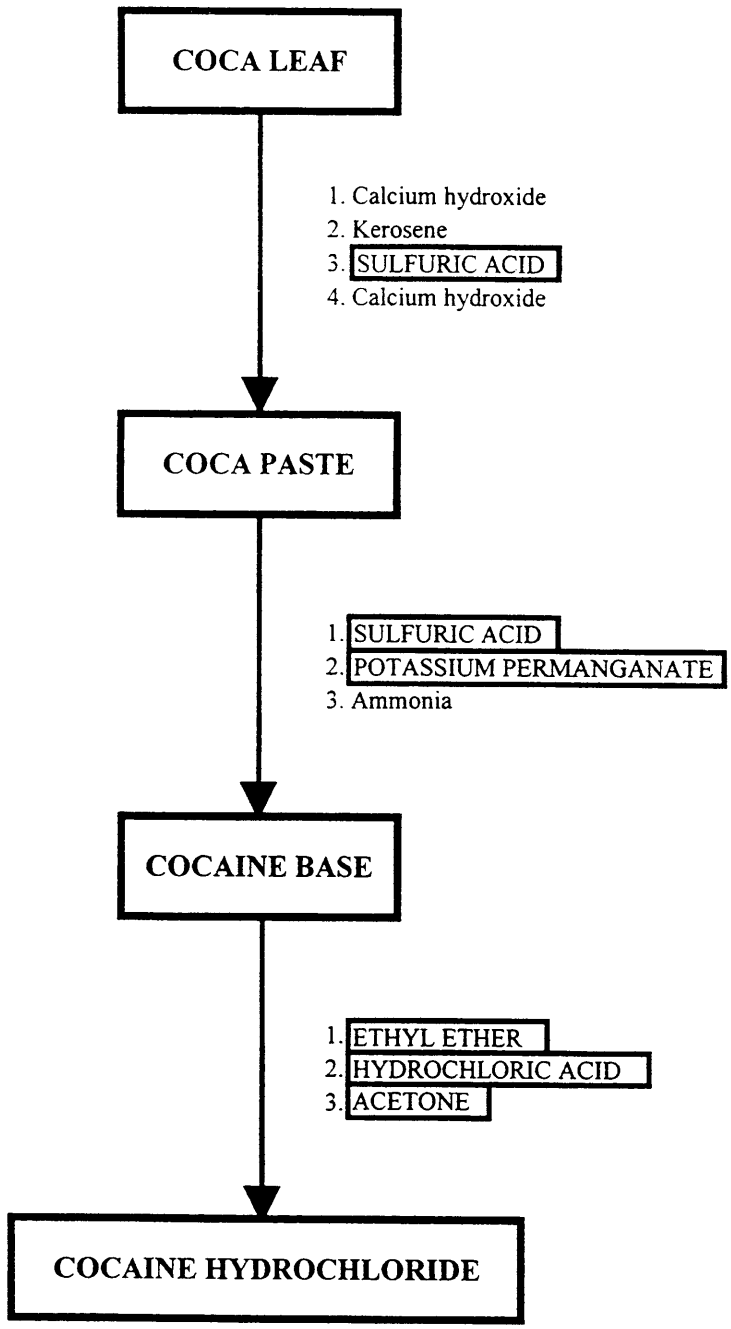
SCHEME III: MDA



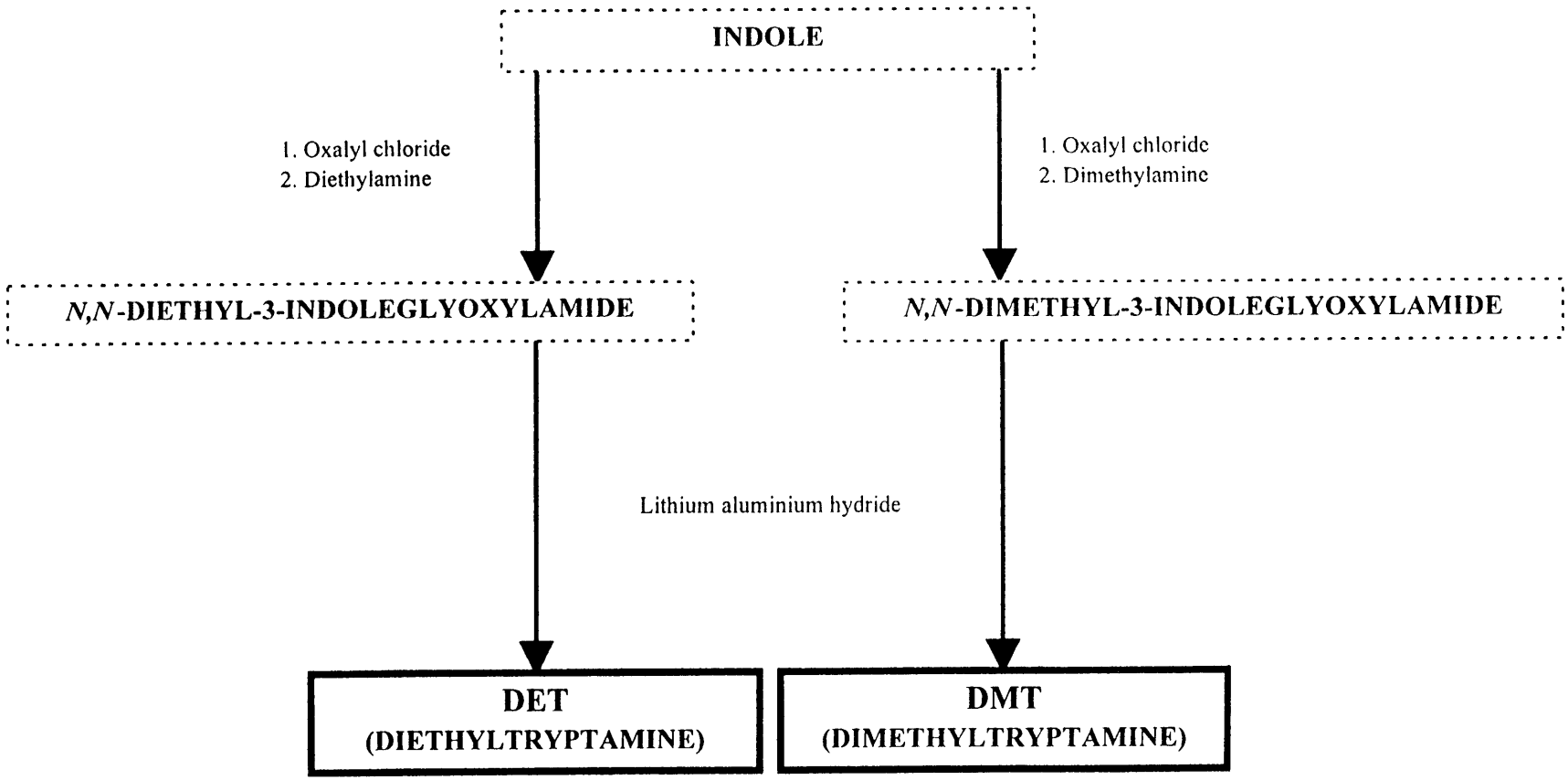
ILLICIT MANUFACTURE OF AMINOREX AND 4-METHYLAMINOREX



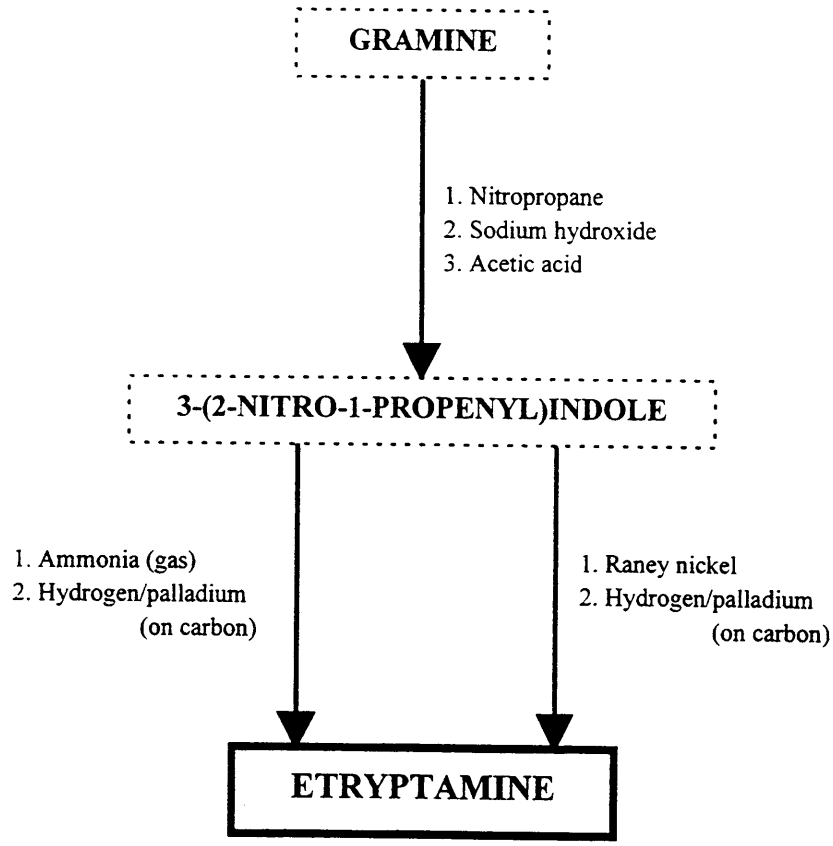
ILLICIT PRODUCTION OF COCA PASTE/COCAINE



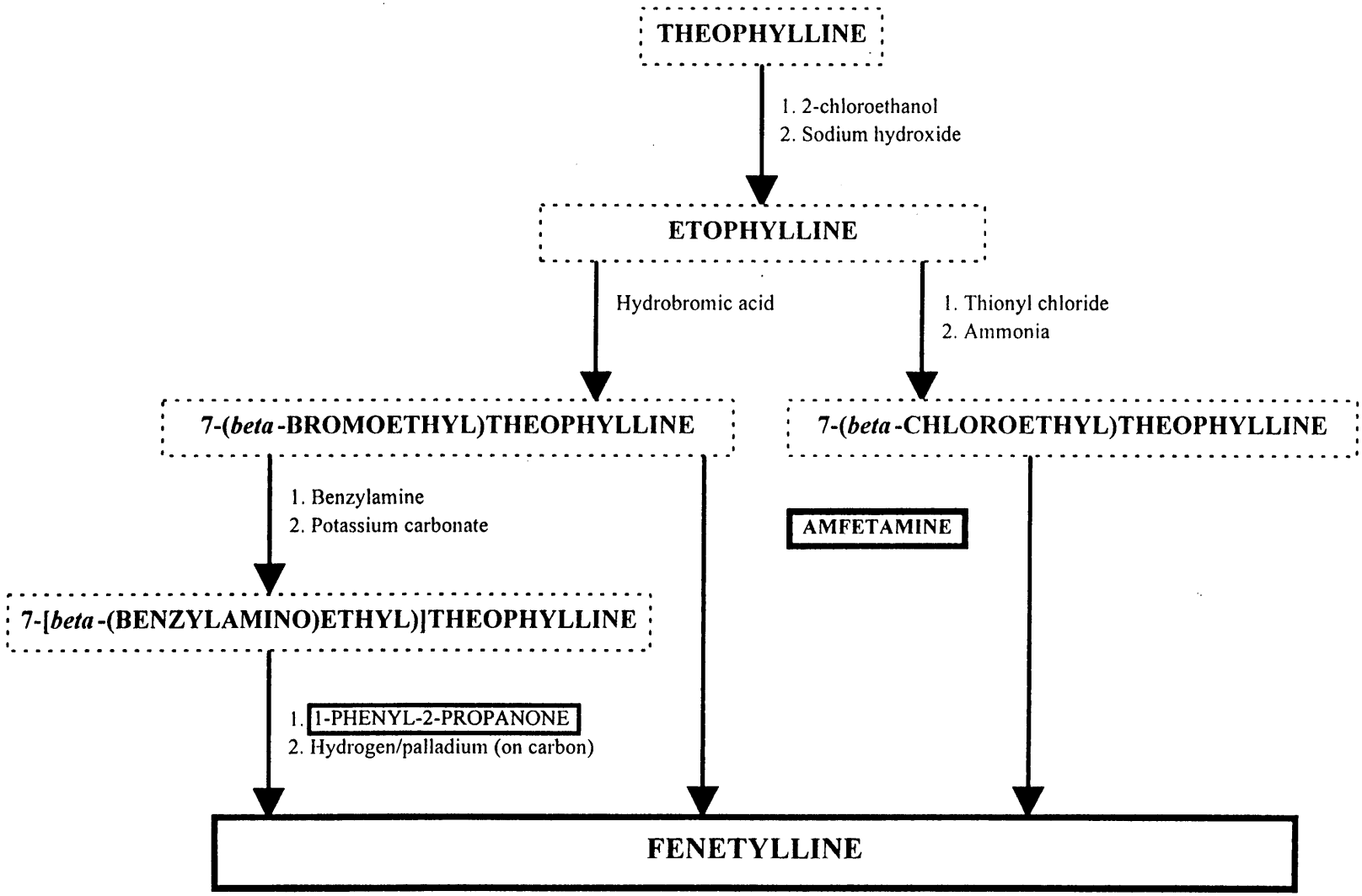
ILLICIT MANUFACTURE OF DET AND DMT



ILLICIT MANUFACTURE OF ETRYPTAMINE

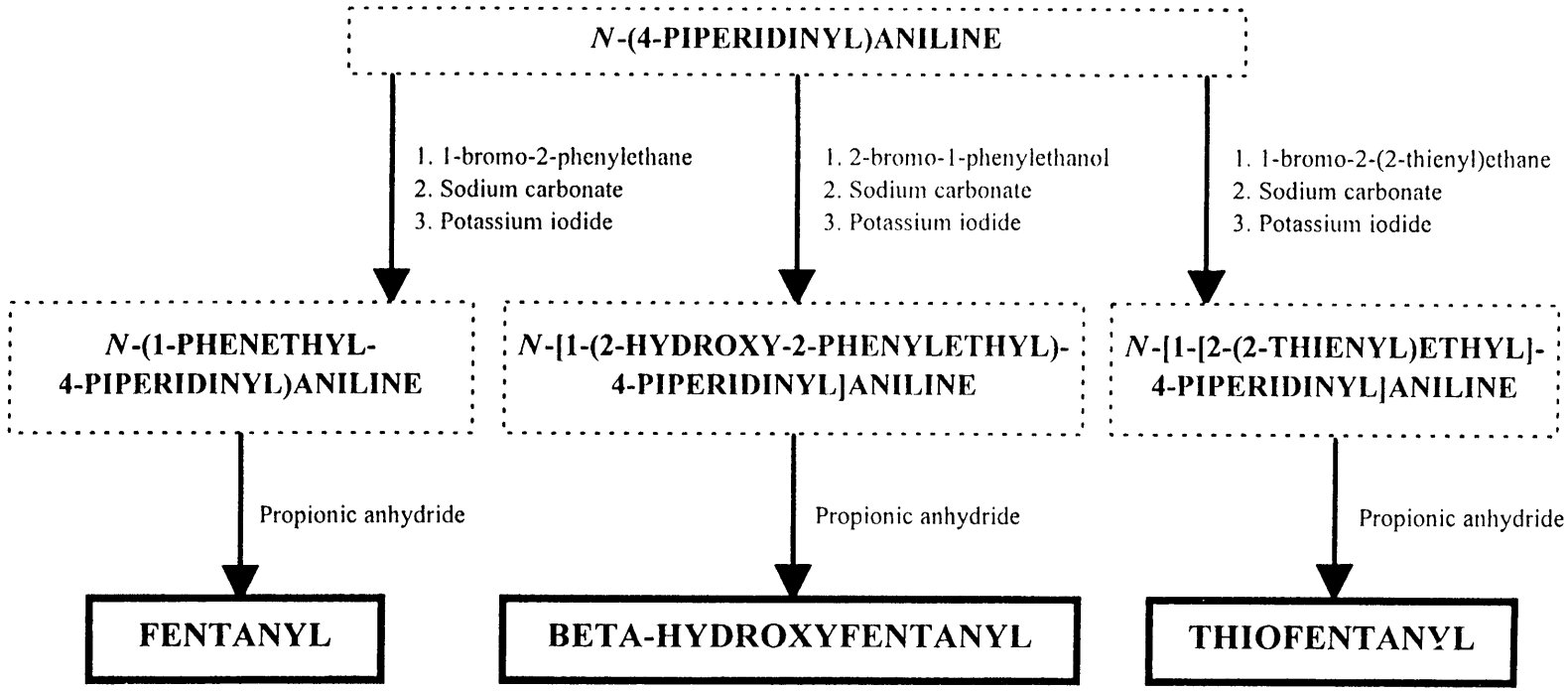


ILLICIT MANUFACTURE OF FENETYLLINE



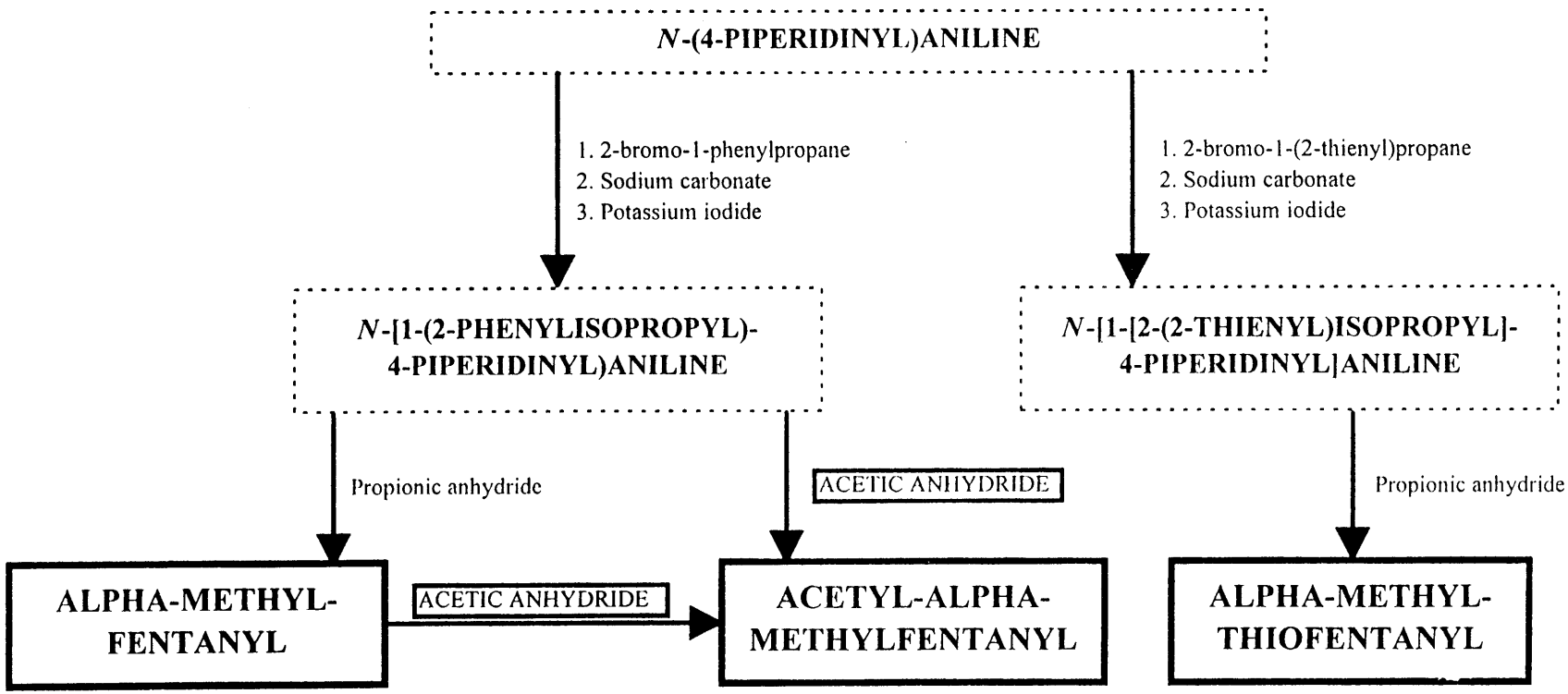
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME I: BETA-HYDROXYFENTANYL, FENTANYL, THIOFENTANYL



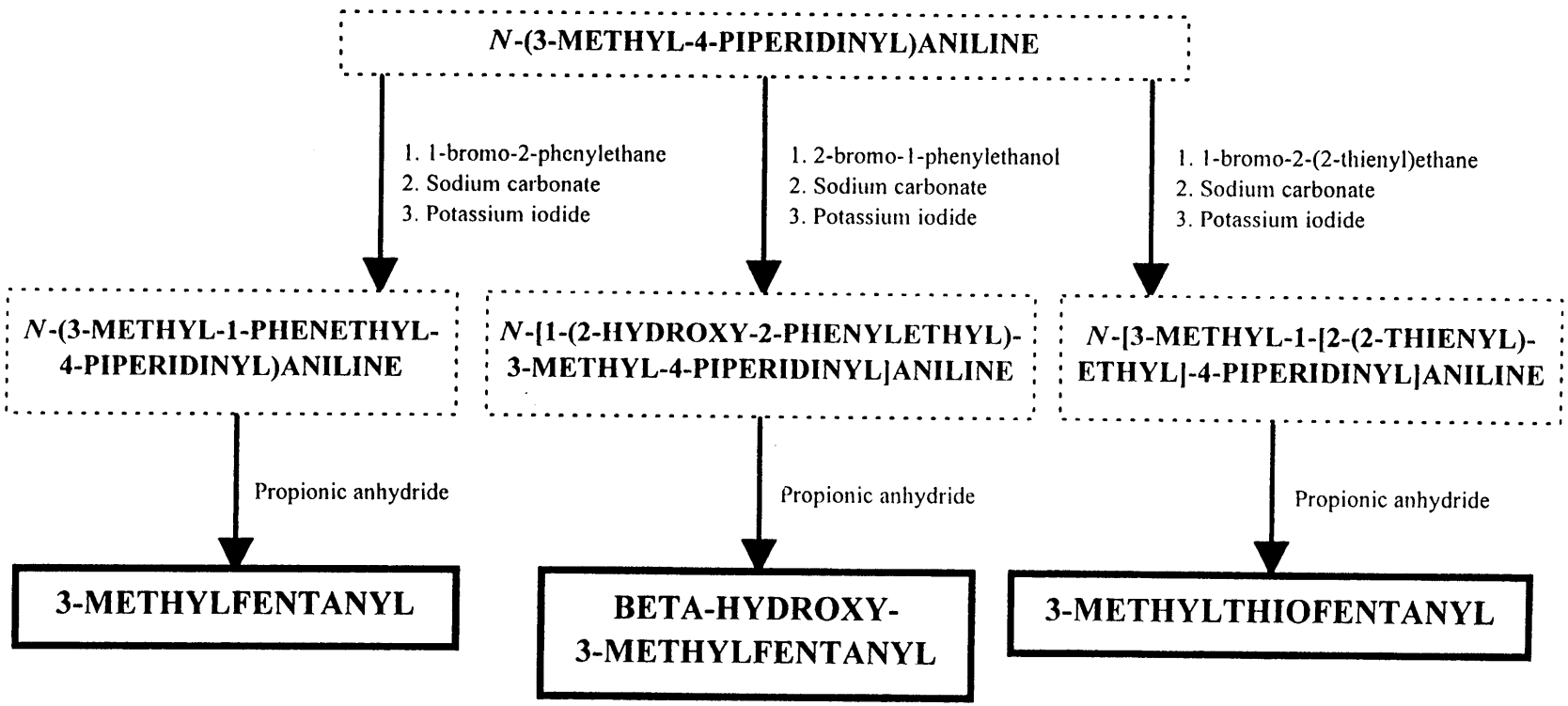
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME II: ACETYL-ALPHA-METHYLFENTANYL, ALPHA-METHYLFENTANYL, ALPHA-METHYLTHIOFENTANYL



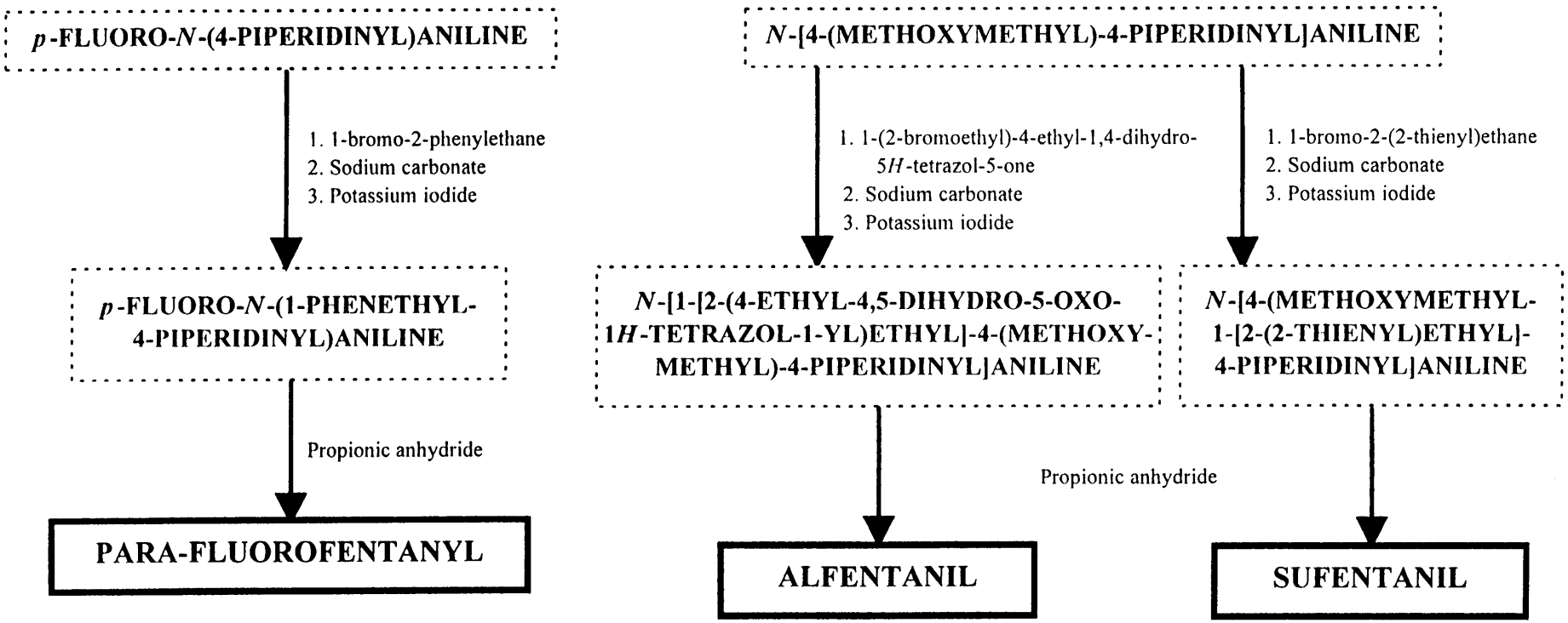
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME III: BETA-HYDROXY-3-METHYLFENTANYL, 3-METHYLFENTANYL, 3-METHYLTHIOFENTANYL



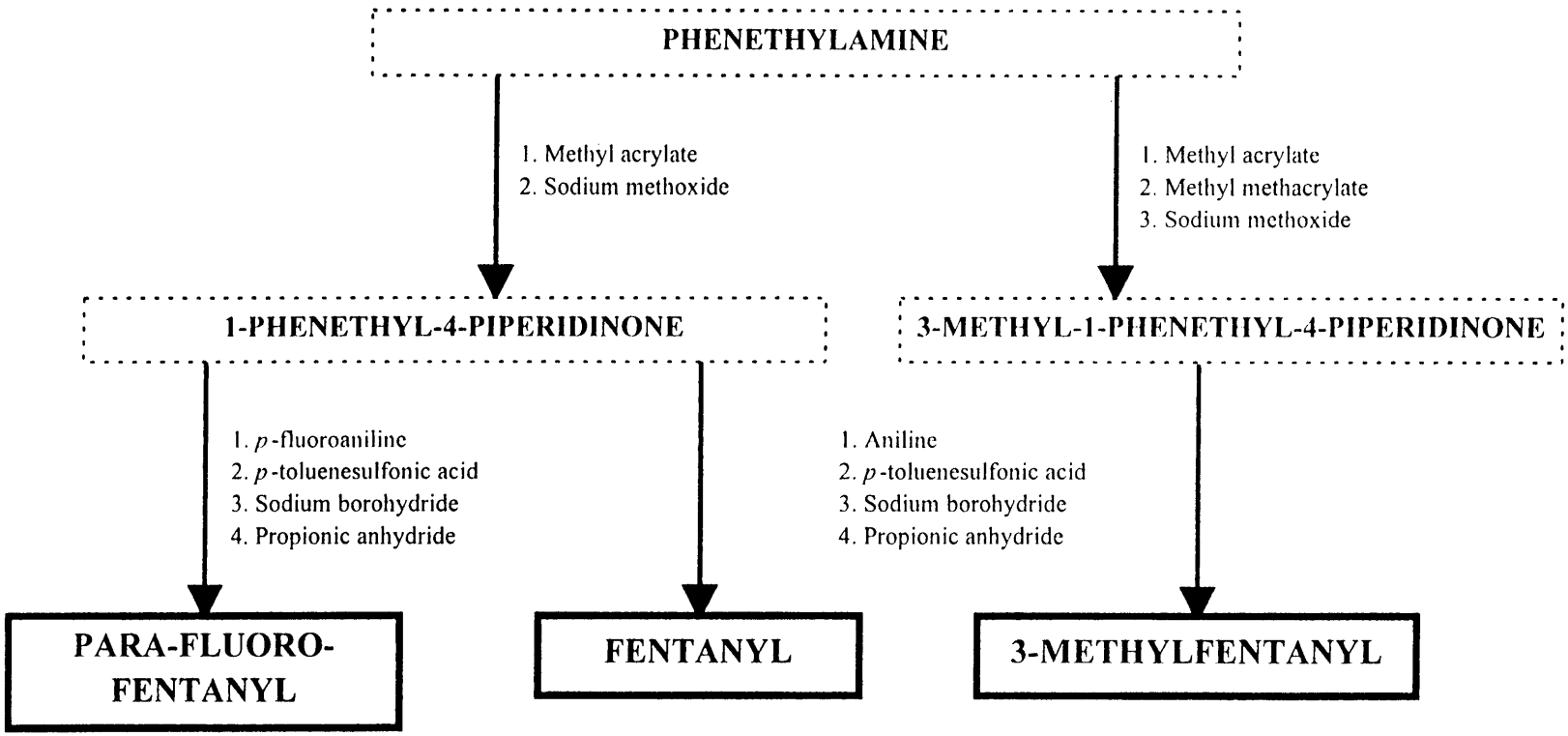
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME IV: ALFENTANIL, PARA-FLUOROFENTANYL, SUFENTANIL



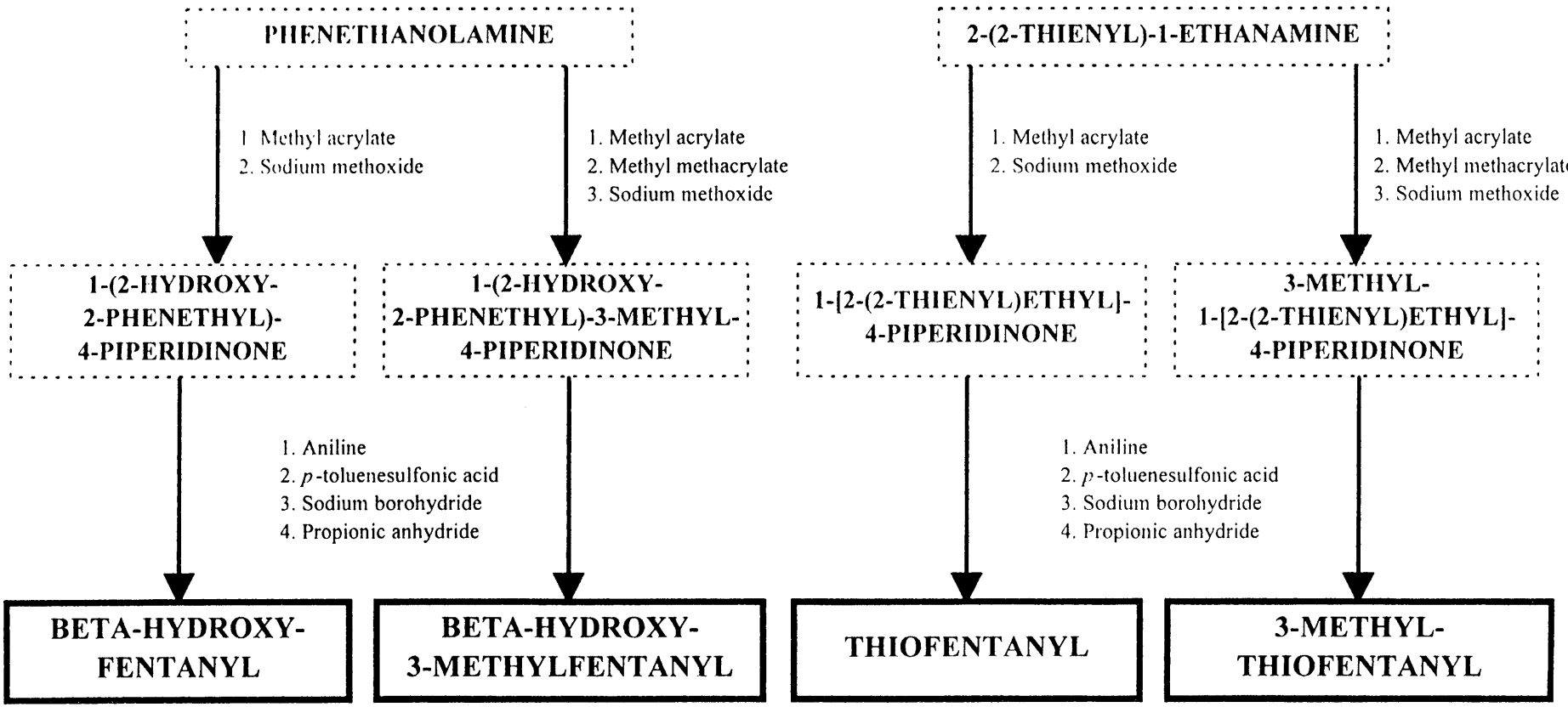
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME V: FENTANYL, 3-METHYLFENTANYL, PARA-FLUOROFENTANYL



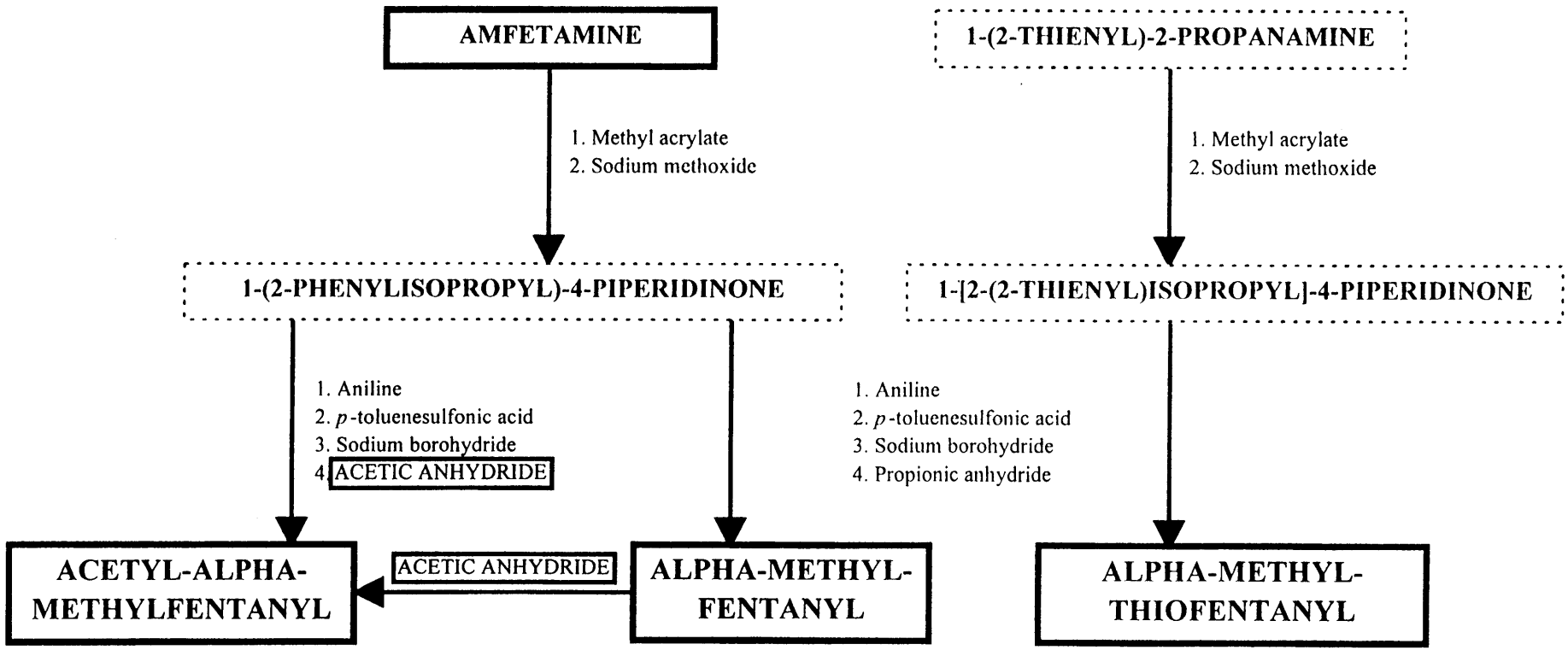
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME VI: BETA-HYDROXYFENTANYL, BETA-HYDROXY-3-METHYLFENTANYL, THIOFENTANYL, 3-METHYLTHIOFENTANYL



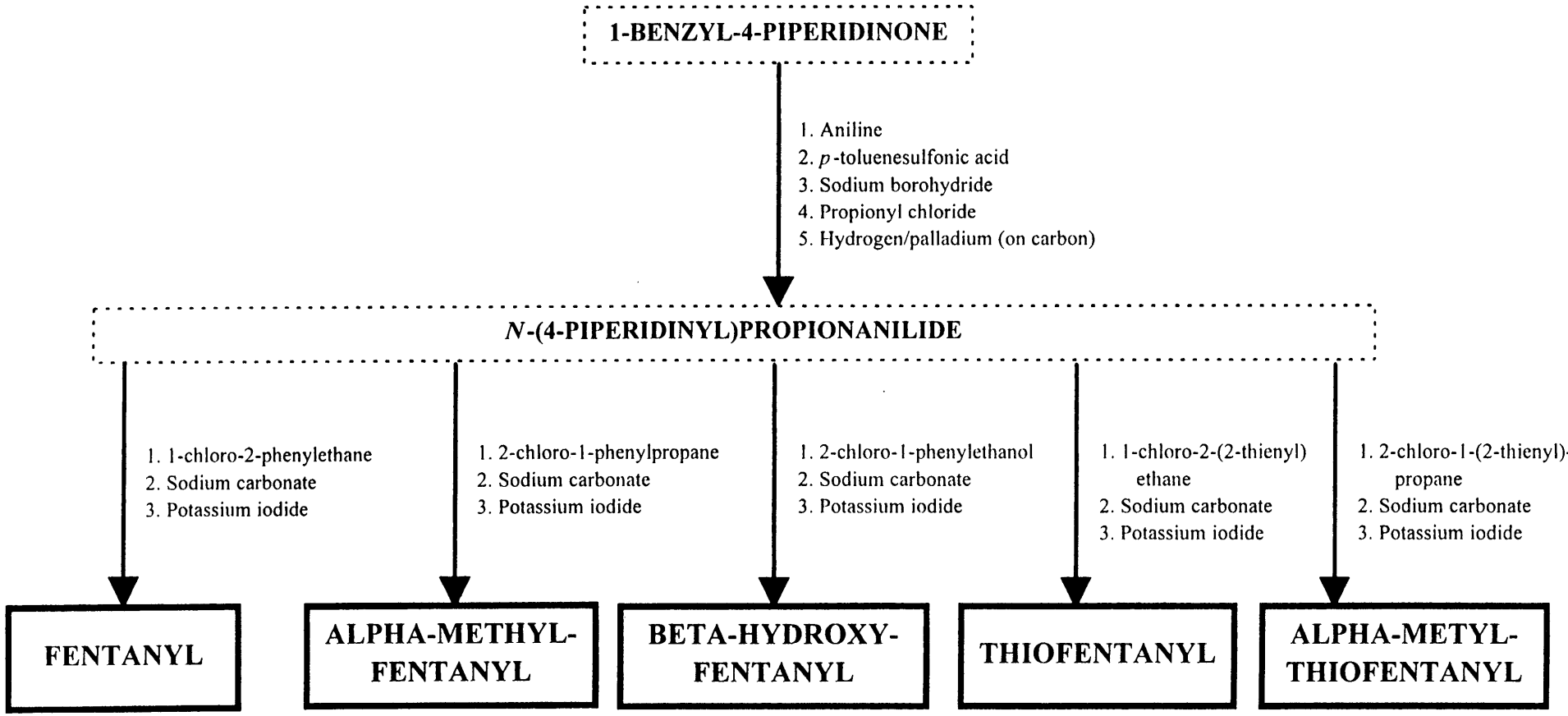
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME VII: ACETYL-ALPHA-METHYLFENTANYL, ALPHA-METHYLFENTANYL, ALPHA-METHYLFHIOFENTANYL



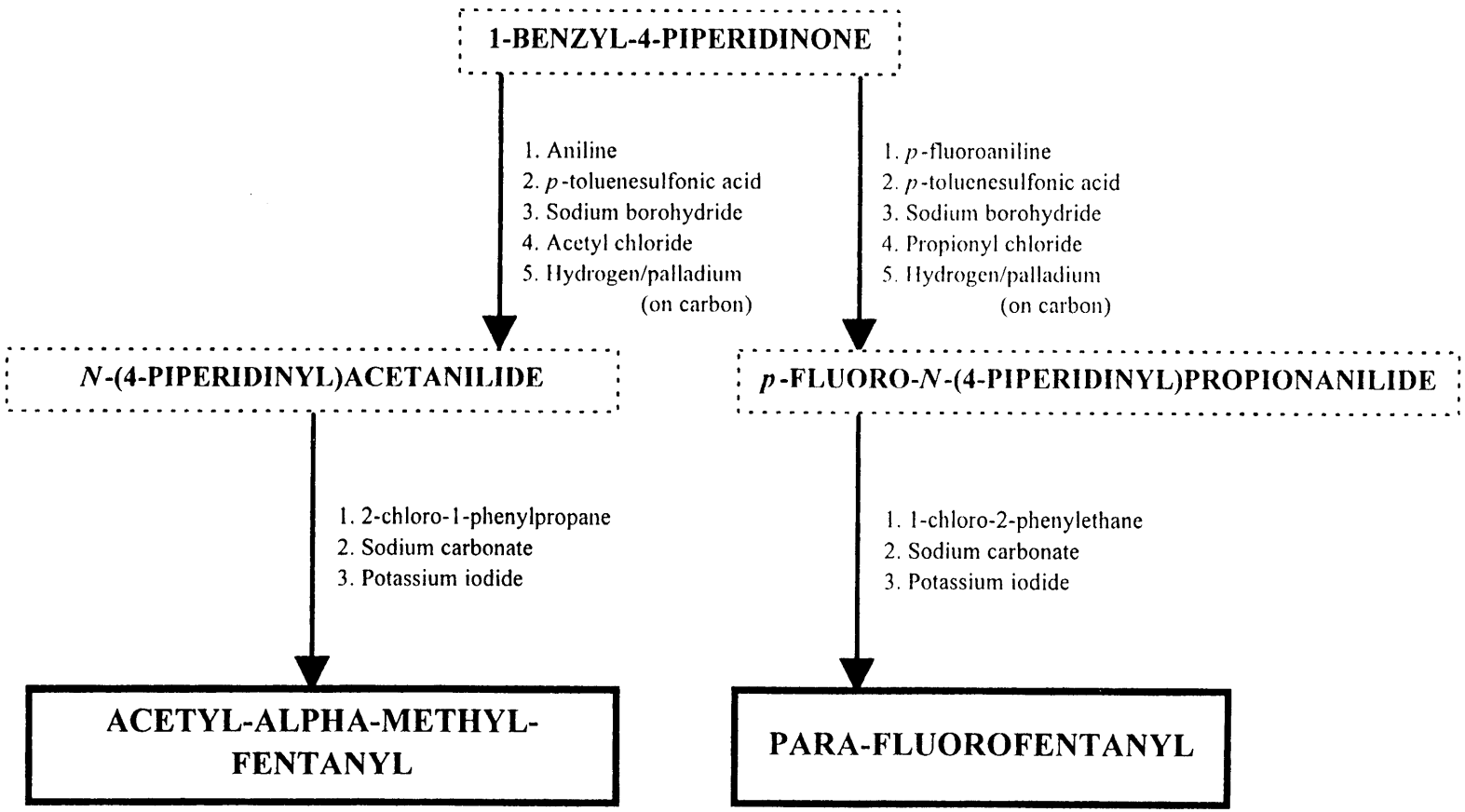
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME VIII: ALPHA-METHYLFENTANYL, ALPHA-METHYLTHIOFENTANYL, BETA-HYDROXYFENTANYL, FENTANYL, THIOFENTANYL



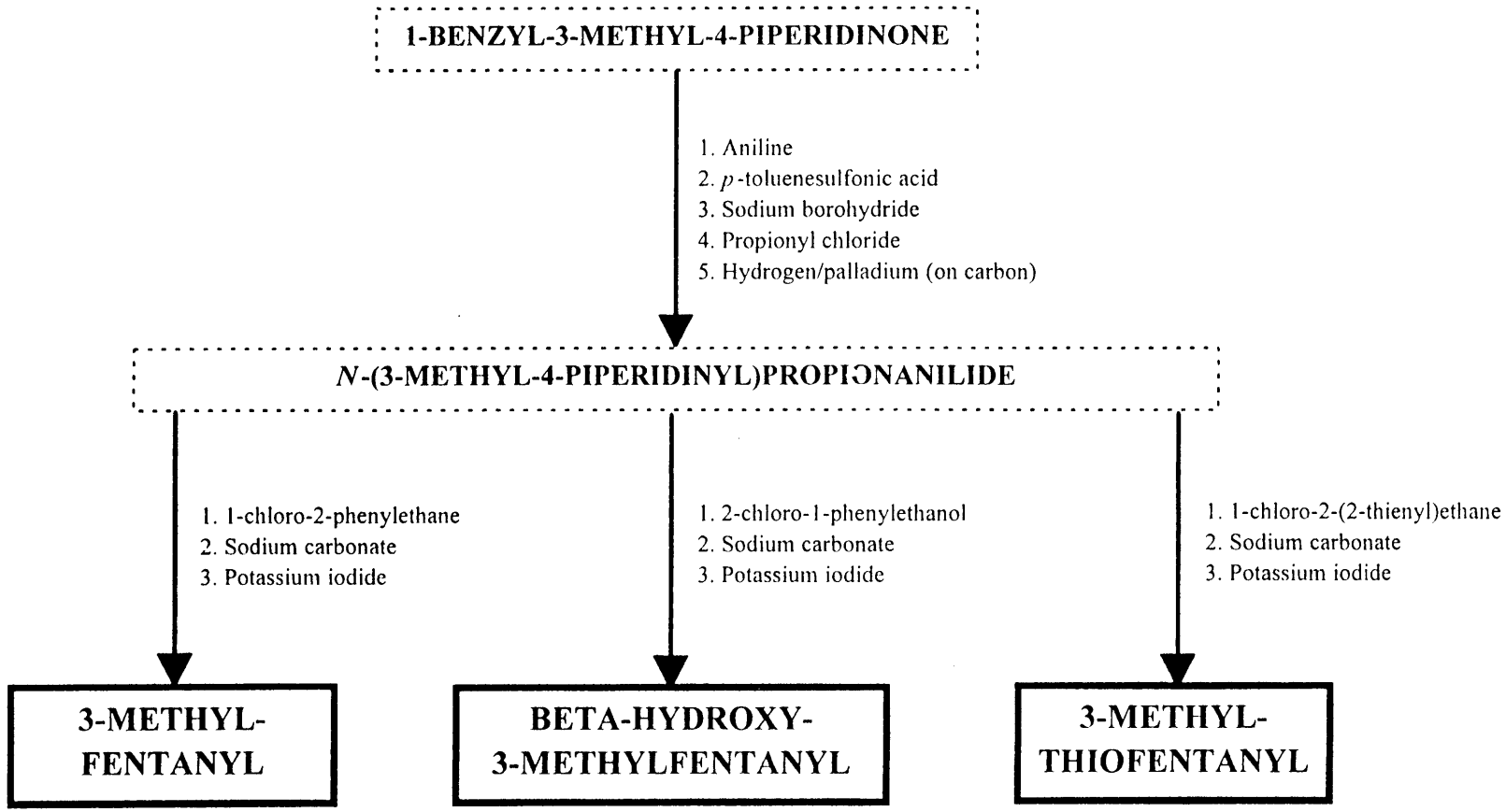
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME IX: ACETYL-ALPHA-METHYLFENTANYL, PARA-FLUOROFENTANYL



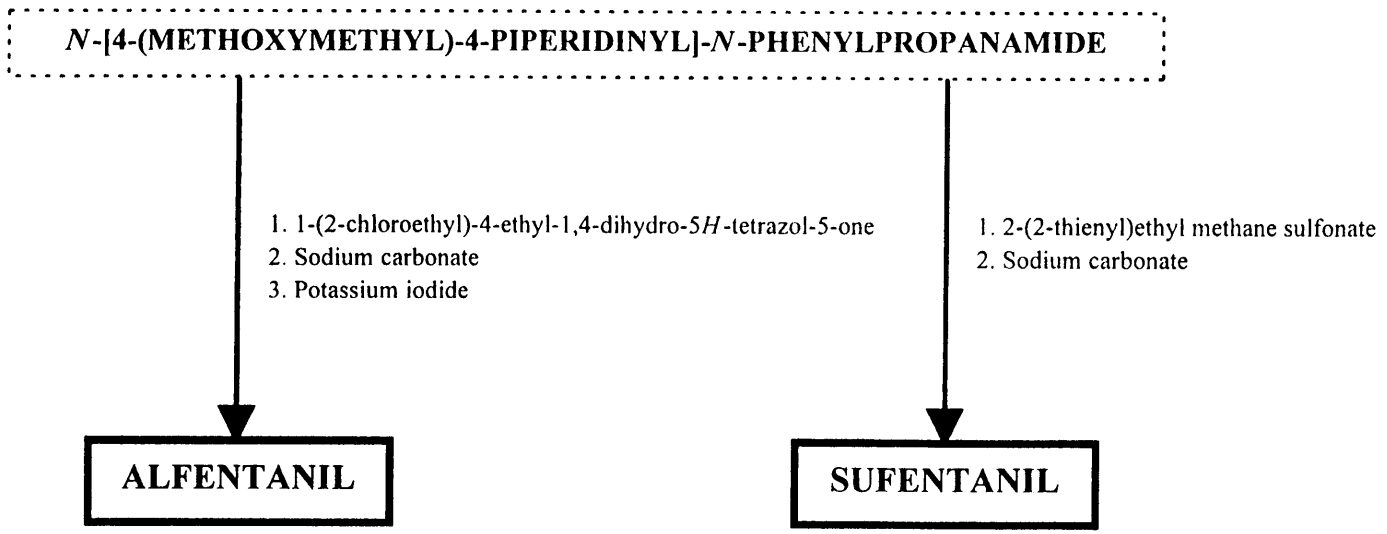
ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

SCHEME X: BETA-HYDROXY-3-METHYLFENTANYL, 3-METHYLFENTANYL, 3-METHYLTHIOFENTANYL

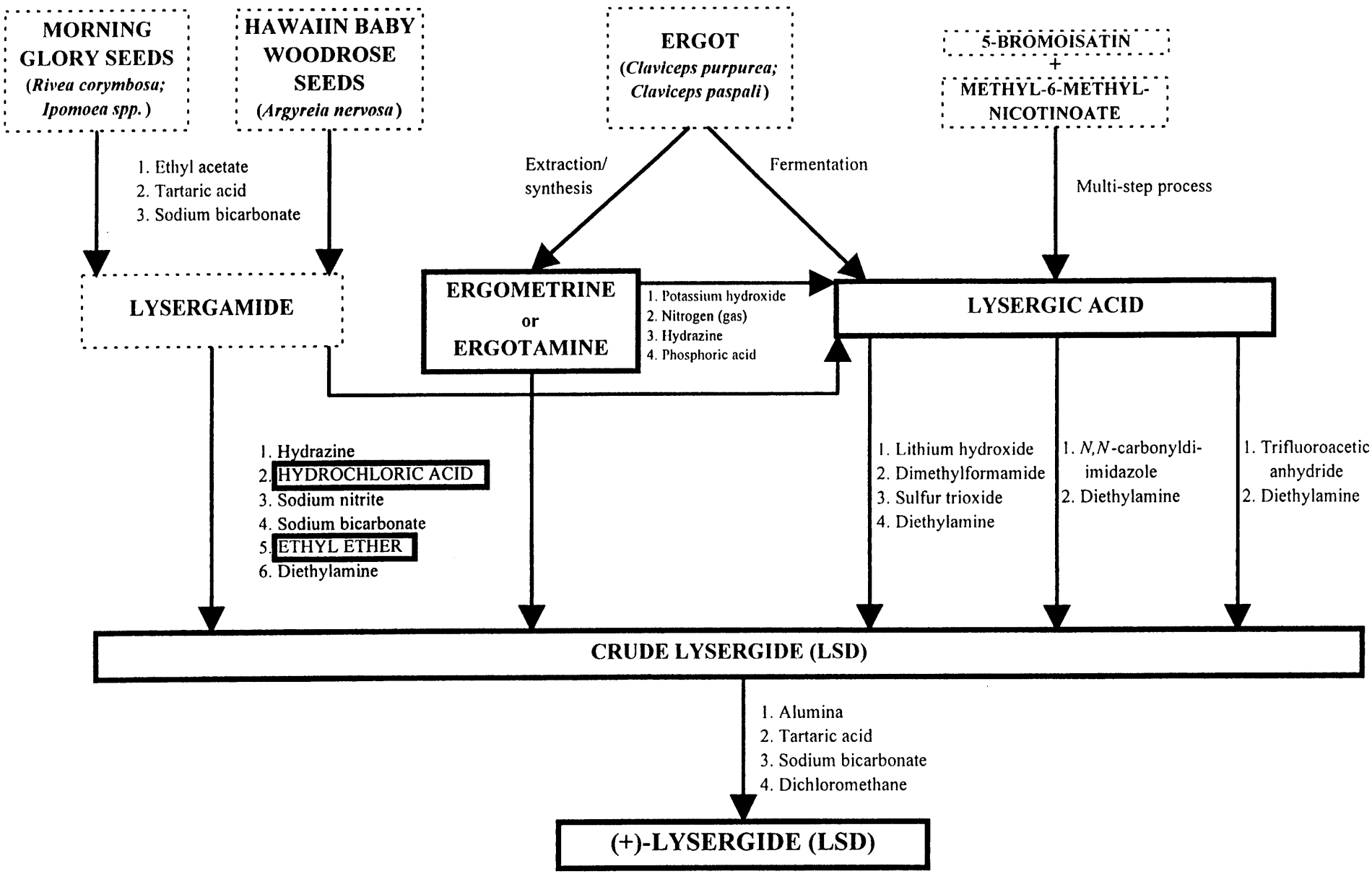


ILLICIT MANUFACTURE OF FENTANYL AND ITS ANALOGUES

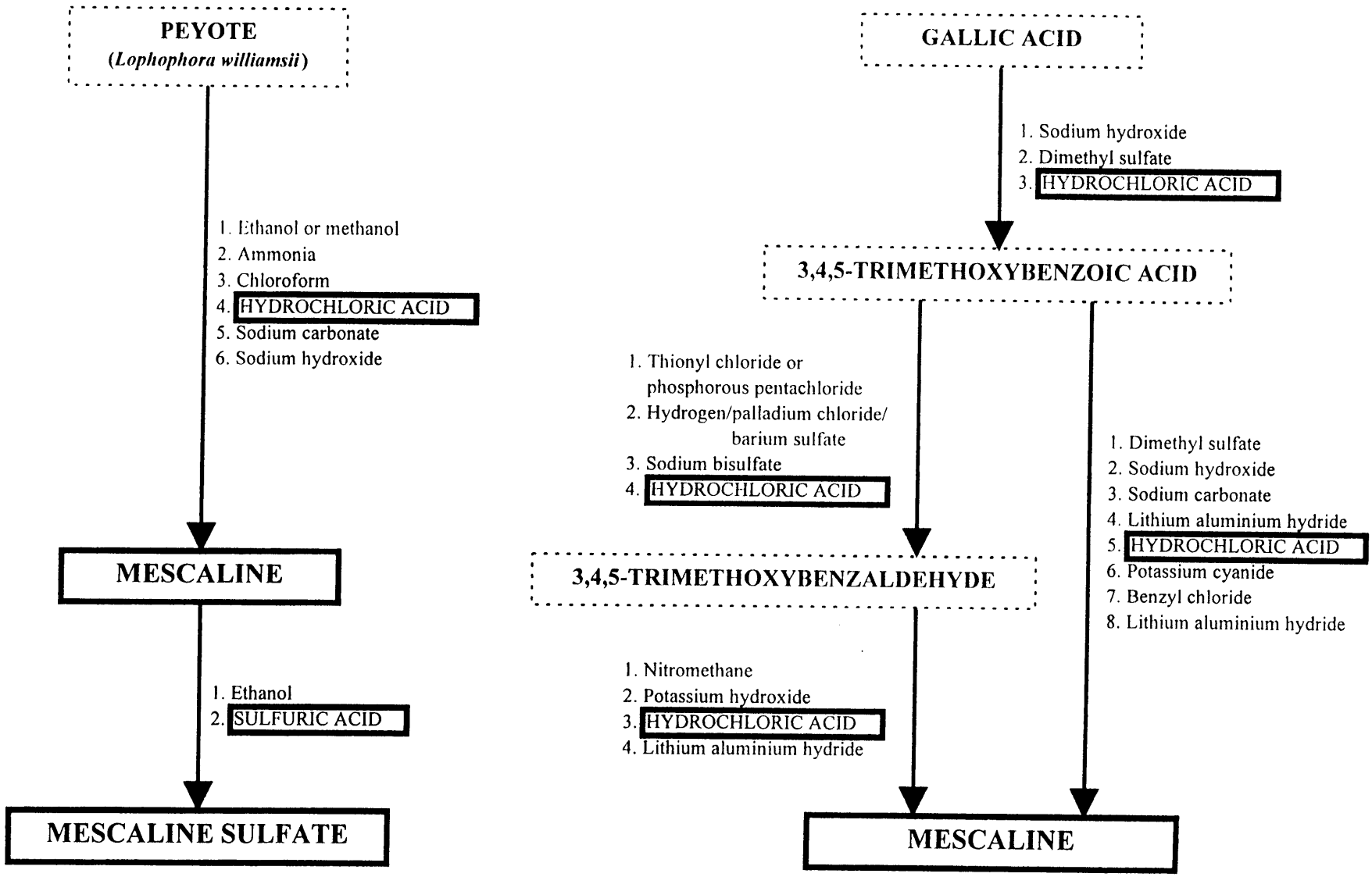
SCHEME XI: ALFENTANIL, SUFENTANIL



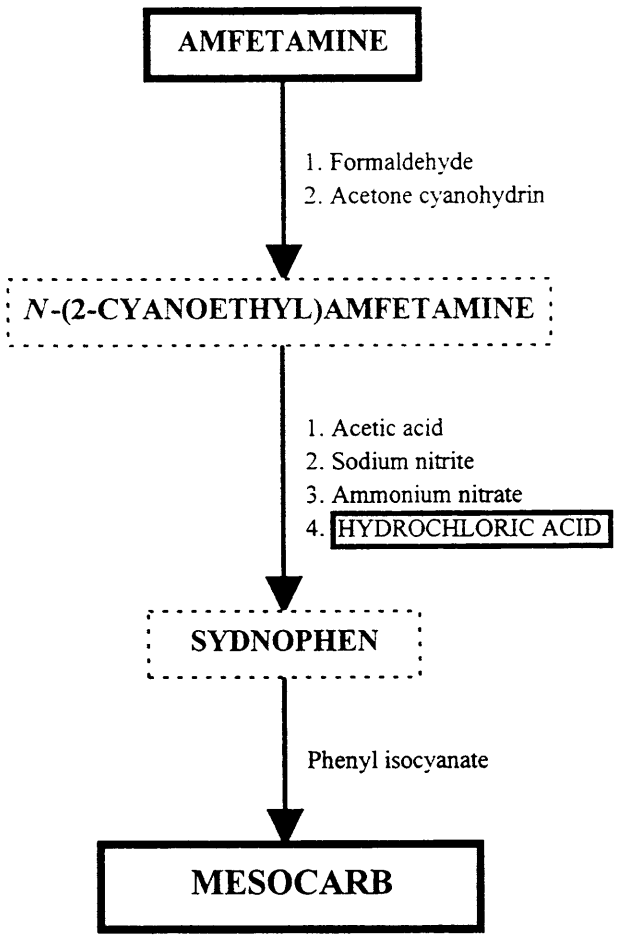
ILLICIT PRODUCTION/MANUFACTURE OF (+)-LYSERGIDE (LSD)



ILLICIT PRODUCTION/MANUFACTURE OF MESCALINE

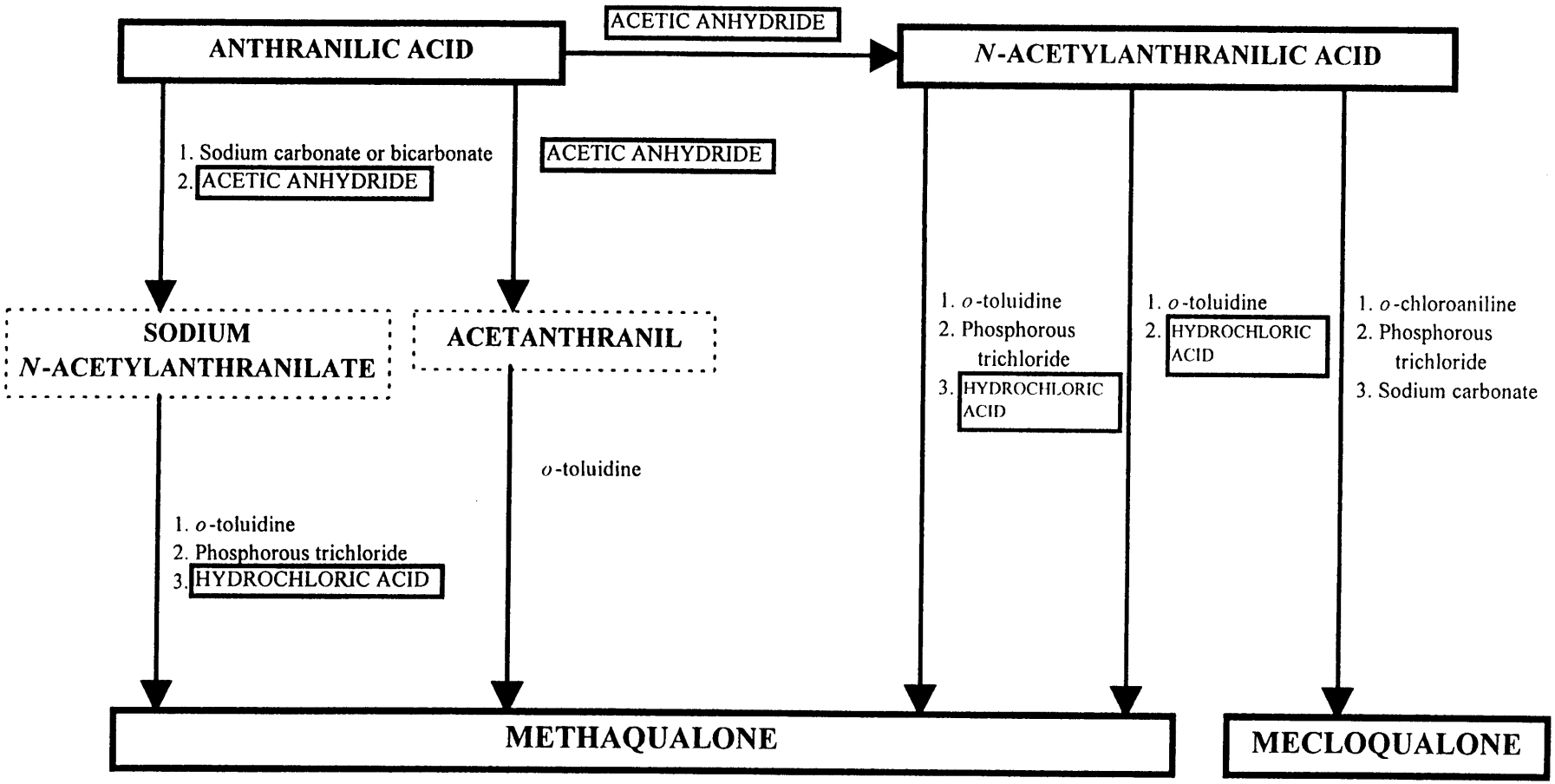


ILLICT MANUFACTURE OF MESOCARB



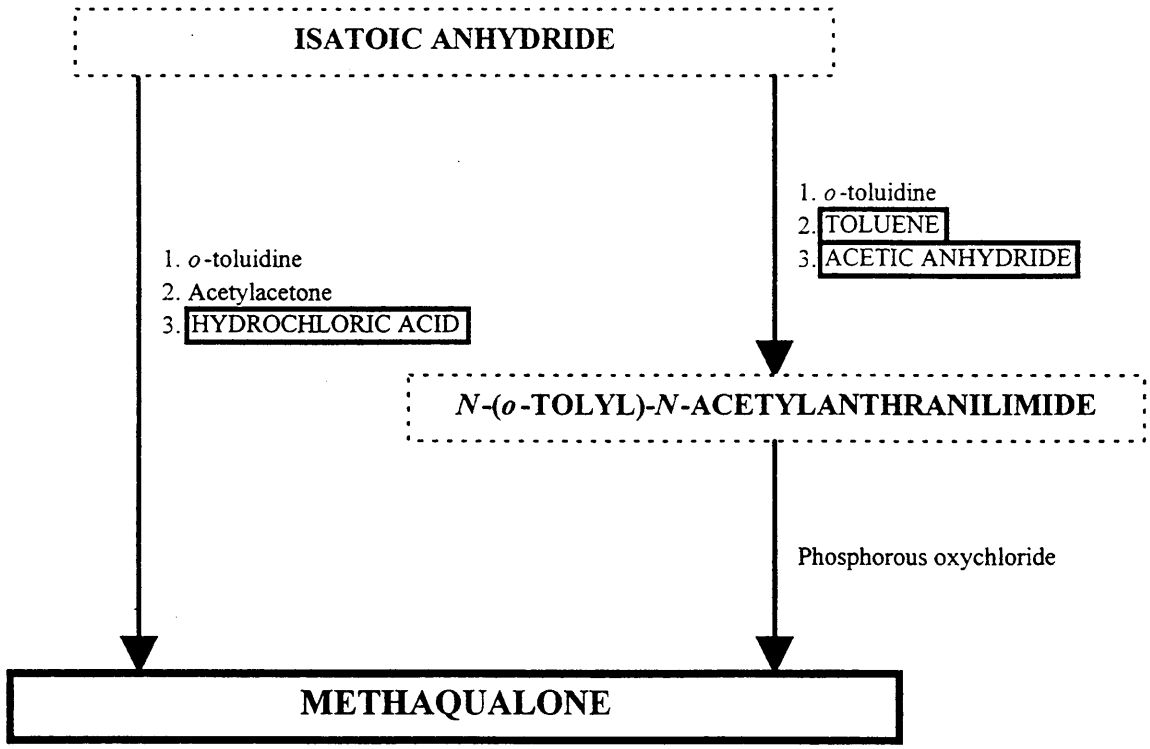
ILLICIT MANUFACTURE OF METHAQUALONE AND MECLOQUALONE

SCHEME I: METHAQUALONE, MECLOQUALONE

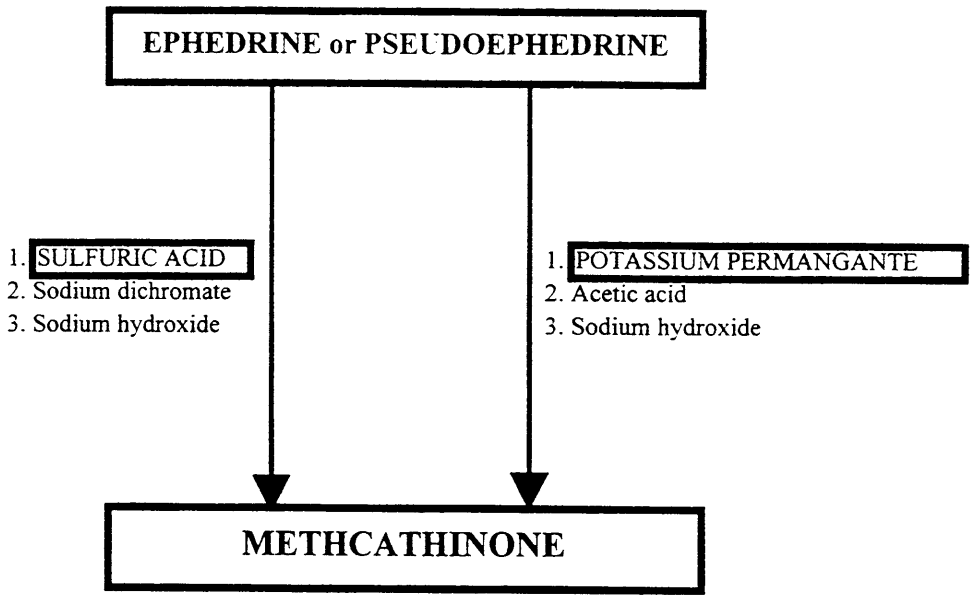


ILLICIT MANUFACTURE OF METHAQUALONE AND MECLOQUALONE

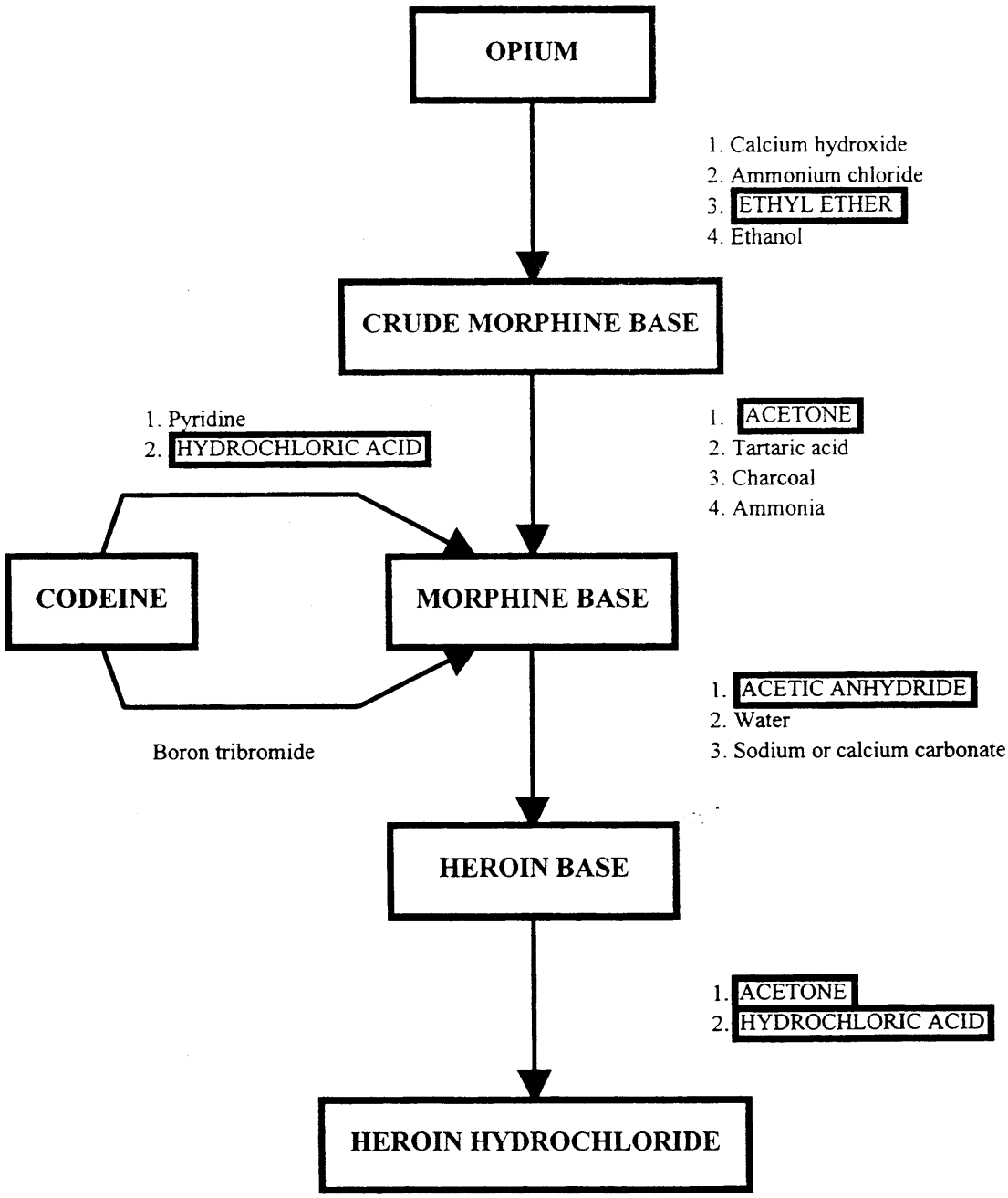
SCHEME II: METHAQUALONE



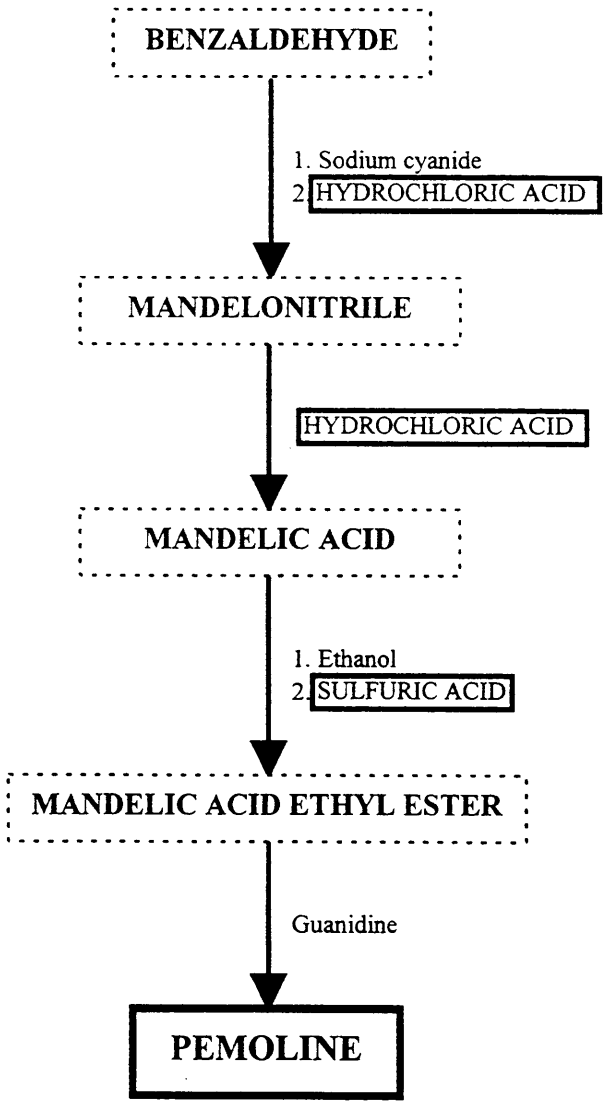
ILLICIT MANUFACTURE OF METHCATHINONE



ILLICIT PRODUCTION/MANUFACTURE OF MORPHINE/HEROIN

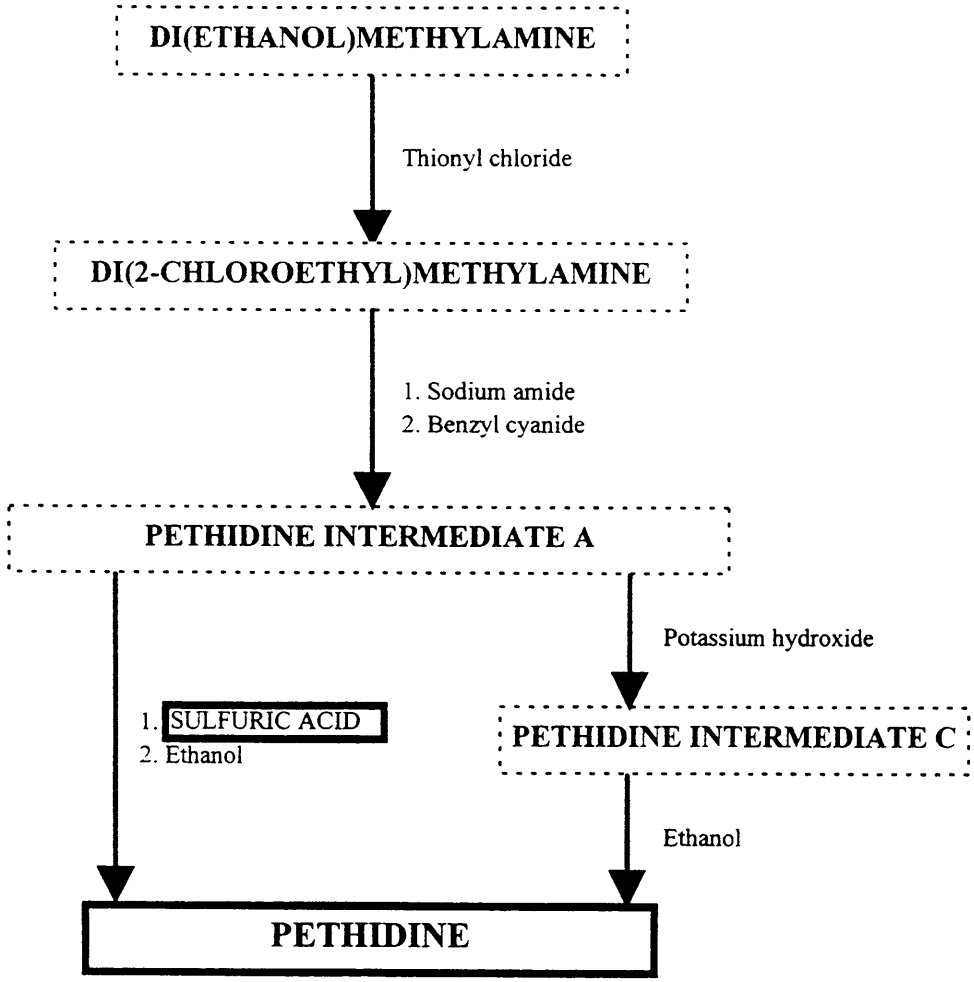


ILLICIT MANUFACTURE OF PEMOLINE



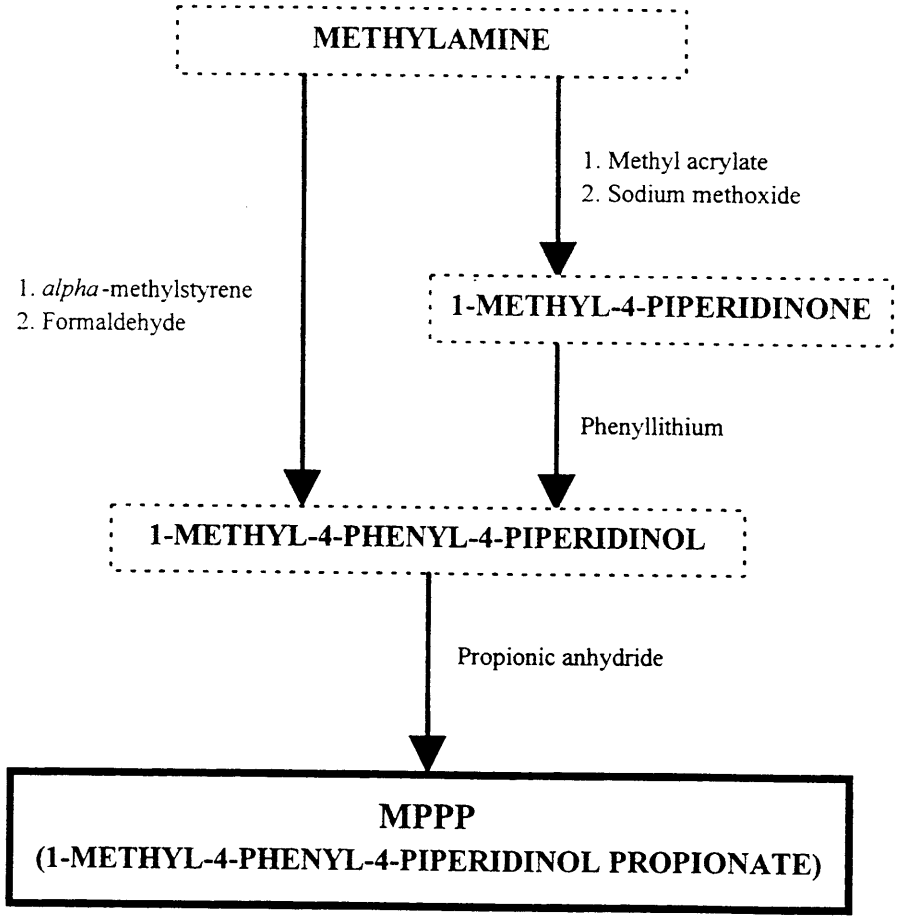
ILLICIT MANUFACTURE OF PETHIDINE AND ITS ANALOGUES

SCHEME I: PETHIDINE



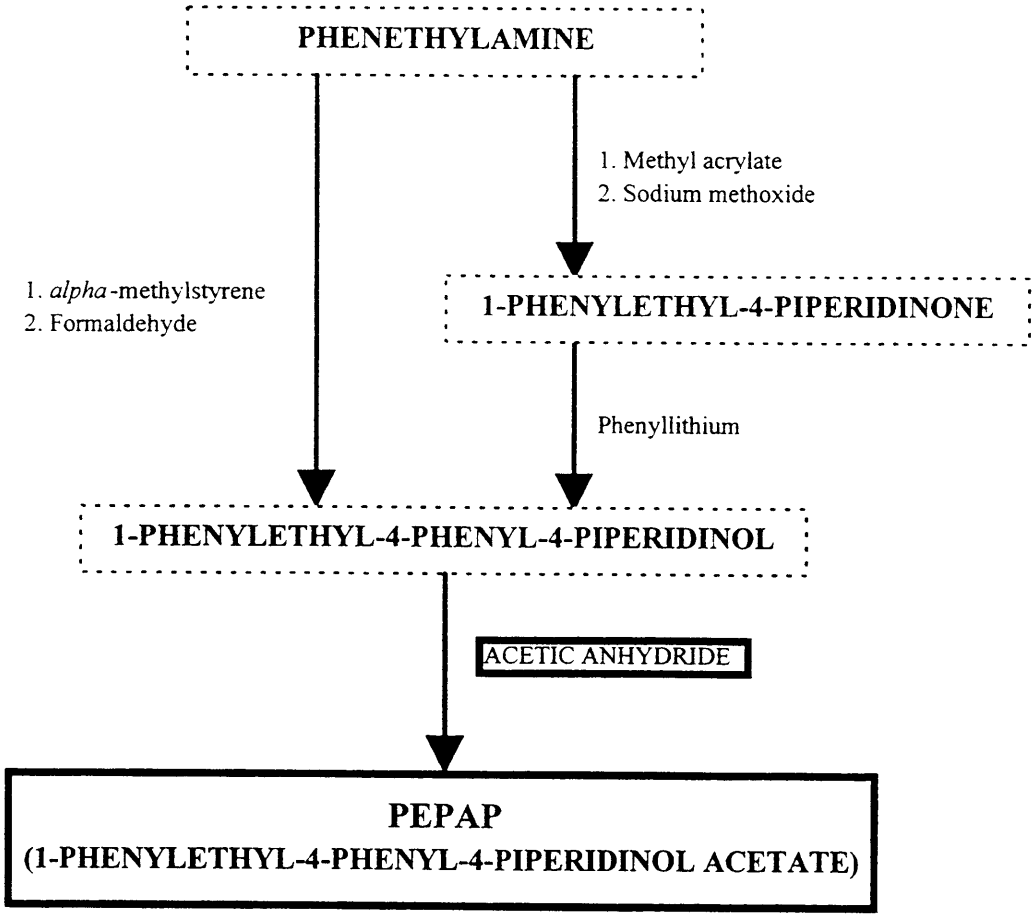
ILLICIT MANUFACTURE OF PETHIDINE AND ITS ANALOGUES

SCHEME II: MPPP



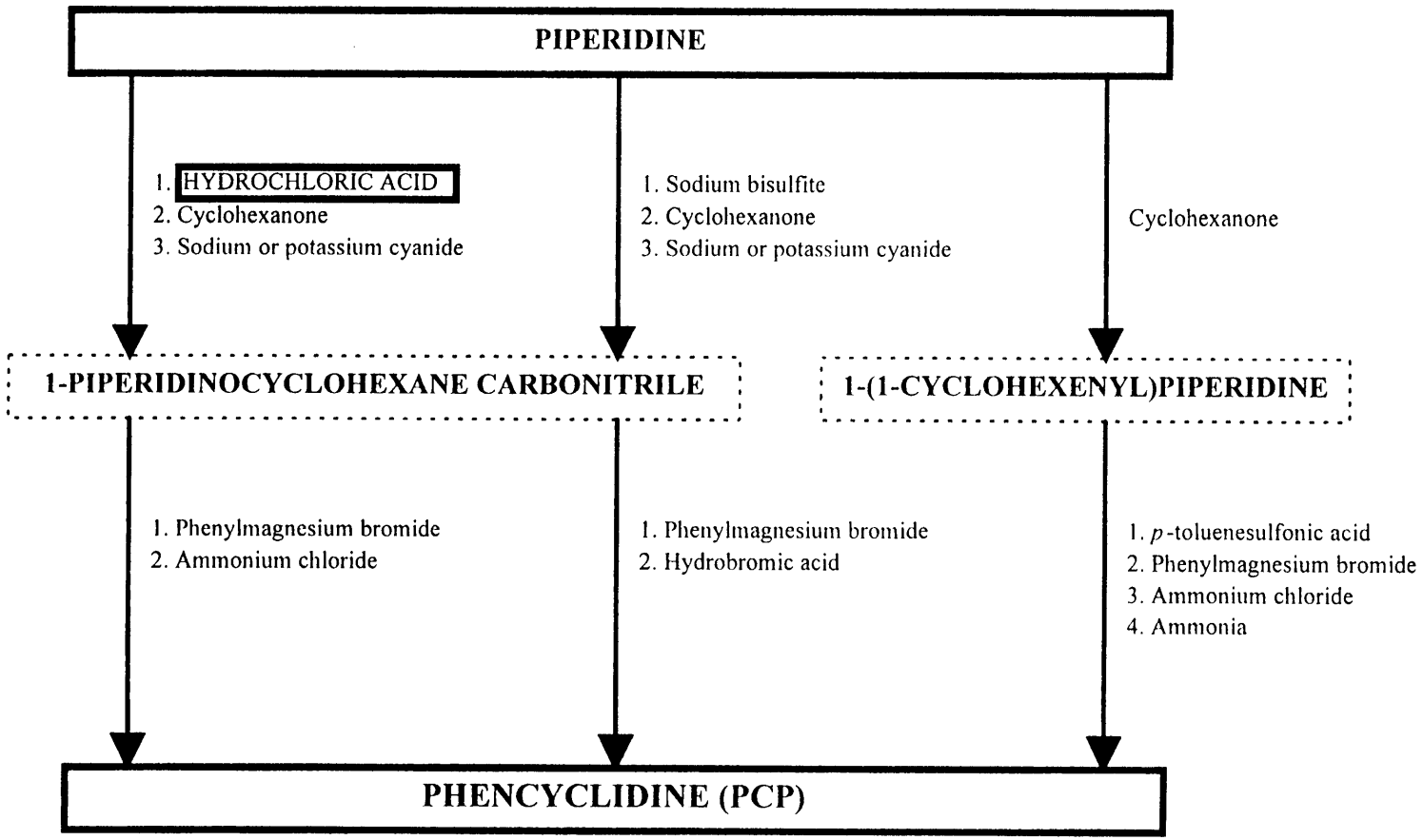
ILLICIT MANUFACTURE OF PETHIDINE AND ITS ANALOGUES

SCHEME III: PEPAP



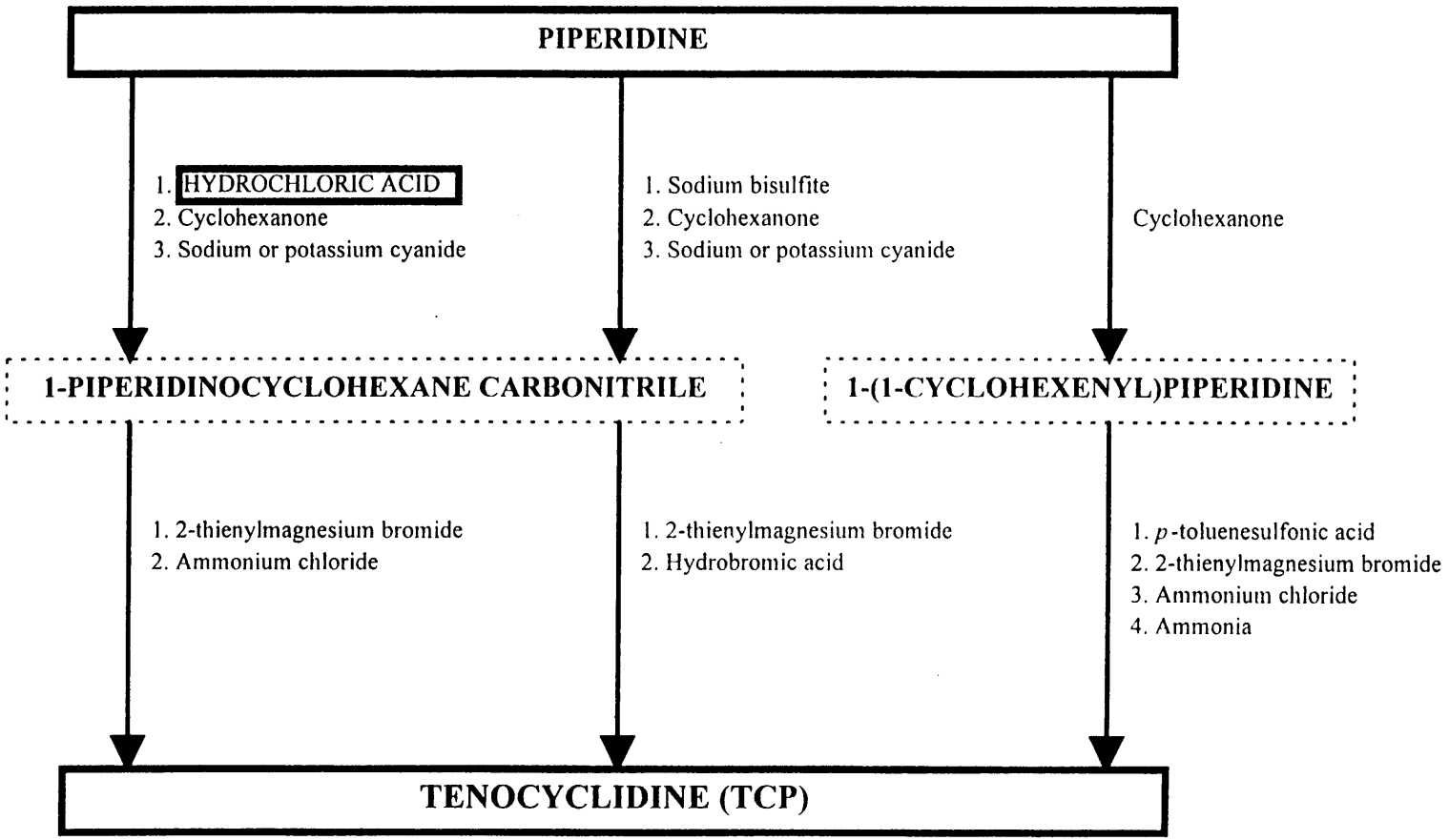
ILLICIT MANUFACTURE OF PHENCYCLIDINE AND ITS ANALOGUES

SCHEME I: PHENCYCLIDINE (PCP)



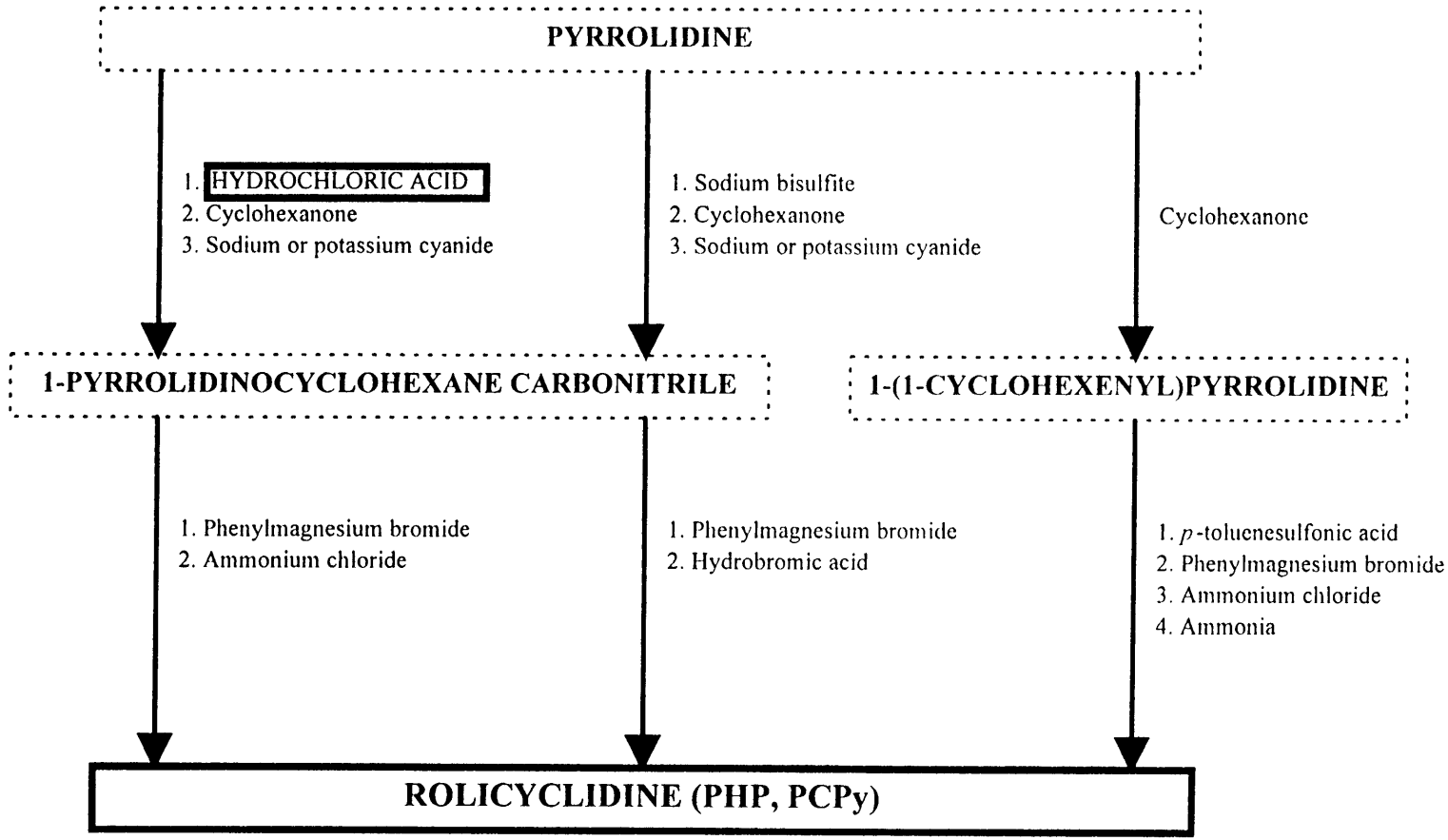
ILLICIT MANUFACTURE OF PHENCYCLIDINE AND ITS ANALOGUES

SCHEME II: TENOCYCLIDINE (TCP)



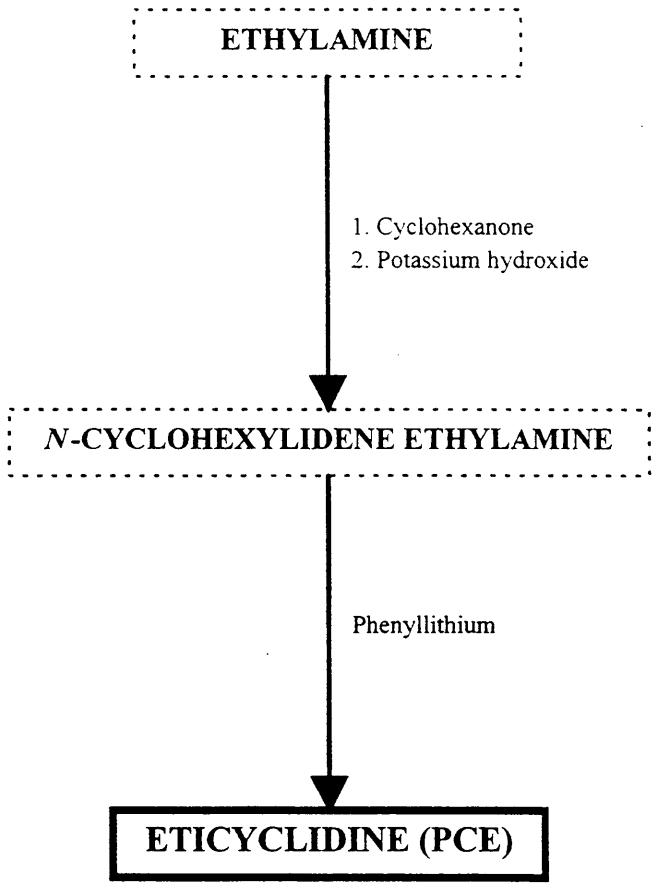
ILLICIT MANUFACTURE OF PHENCYCLIDINE AND ITS ANALOGUES

SCHEME III: ROLICYCLIDINE (PHP, PCPy)

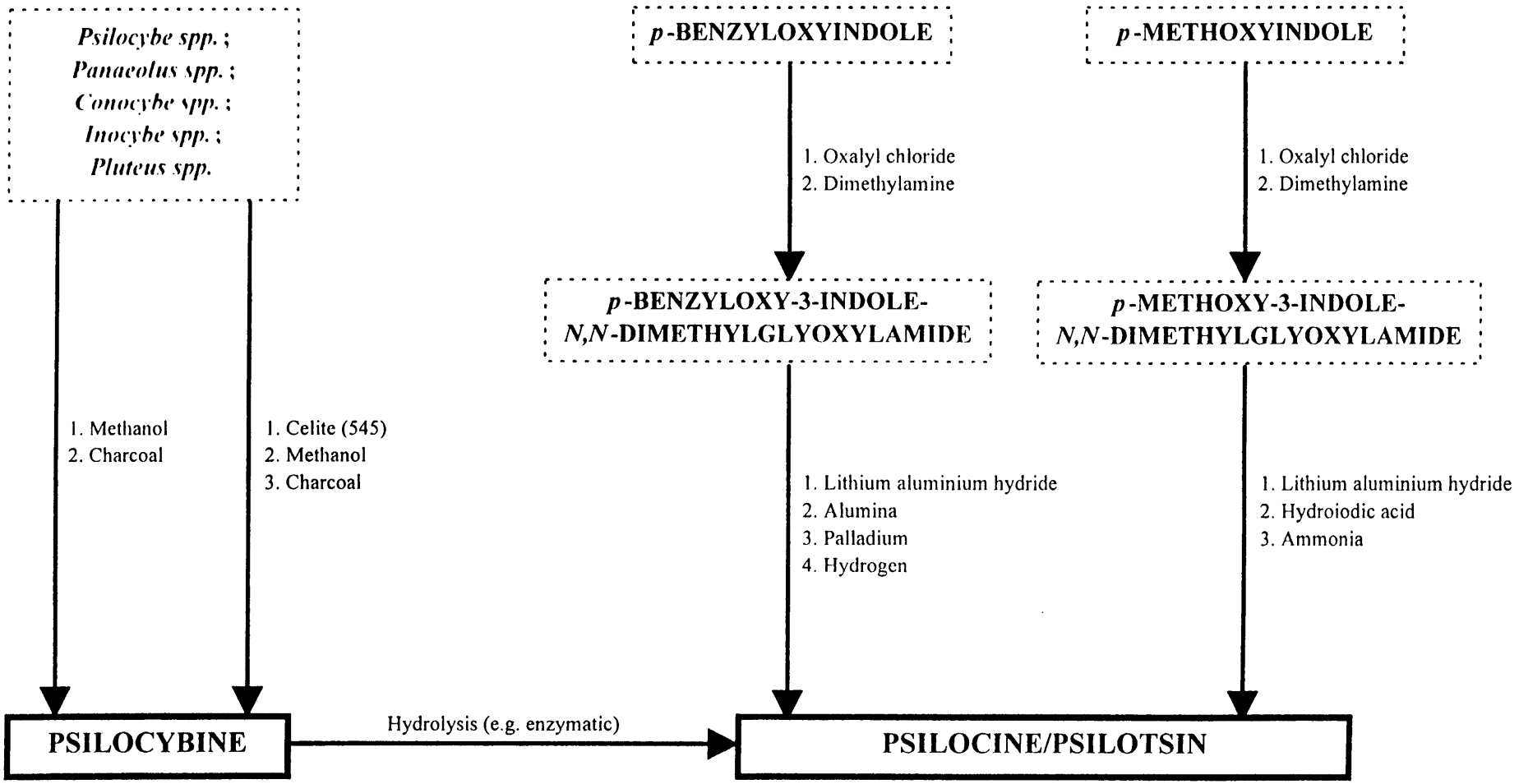


ILLICIT MANUFACTURE OF PHENCYCLIDINE AND ITS ANALOGUES

SCHEME IV: ETICYCLIDINE (PCE)



ILLICIT PRODUCTION/MANUFACTURE OF PSILOCYBINE AND PSILOCINE/PSILOTSIN



INDEX

Synthesis/processing schemes for drugs under international control

D. SUBSTANCES LESS FREQUENTLY SYNTHESIZED IN CLANDESTINE LABORATORIES

SUBSTANCES LESS FREQUENTLY SYNTHESIZED IN CLANDESTINE LABORATORIES *

Barbiturates

Benzodiazepines

4-bromo-2,5-dimethoxyphenethylamine (2-CB) **

Cocaine (synthetic)

N,N-dimethylamfetamine **

N,N-dimethylphenethylamine **

Dronabinol (= synthetic tetrahydrocannabinol)

Hydromorphone

Methadone

5-methoxy-3,4-methylenedioxyamfetamine (MMDA)

3,4-methylenedioxy-*N,N*-dimethylamfetamine (MDMMA) **

1-(3,4-methylenedioxyphenyl)-2-butanamine (BDB) **

N-methyl-1-(3,4-methylenedioxyphenyl)-2-butanamine (MBDB) **

Methylphenidate

Para-methoxymetamfetamine (PMMA) **

Phenmetrazine

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* *Substances listed in alphabetical order.*

** *Not under international control, but of increasing importance as related to their abuse.*

E. SUBSTANCES FREQUENTLY USED IN THE CLANDESTINE PRODUCTION/MANUFACTURE OF NARCOTIC DRUGS AND PSYCHOTROPIC SUBSTANCES
(Article 12, 1988 Convention)

!!!! GENERAL SAFETY WARNING !!!!

Within the group of controlled precursors and essential chemicals, there are HIGHLY FLAMMABLE AND EXPLOSIVE as well as HIGHLY CORROSIVE substances.

Therefore,

- **When handling suspected material:**

  - **NEVER TASTE or SNIFF suspected material;**
  - **DO NOT SMOKE;**
  - **keep away from sources of ignition and heat (e.g. motors, lighters, direct sun light, hot plates);**
  - **wear safety goggles and suitable gloves (e.g. latex, vinyl);**
  - **handle the material at a well-ventilated place;**
  - **do not eat and drink while handling the material;**
  - **take special care when transporting the material, follow the guidelines recommended for the transport of hazardous chemicals.**

- **In case of an accident:**

  - **immediately take off contaminated clothing;**
  - **in case of contact with skin and/or eyes, rinse immediately with plenty of water and seek medical advice;**
  - **in case of spillage of larger amounts, stop smoking, evacuate the area and inform the fire brigade.**

- **Store the suspected material in a separate room which should be well ventilated, cool, dry and fireproof. Store the material in well closed containers. Follow the more detailed guidelines for storage given below.**

- **Do not dispose of suspected materials by pouring them into the canalization system or by throwing them into the household garbage. Instead forward them to a company/organization authorized for the collection and the disposal of hazardous waste.**

ACETIC ANHYDRIDE

Other Names:

Acetanhydrid, -e
Acetic acid anhydride
Acetic oxide
Acetyl acetate
Acetyl anhydride
Acetyl ether
Acetyl oxide
Anhydride acétique
Anhydride éthanoique
Anidride acetica
Anídrido acético
Anidrido etanoico
Azijnzuur anhydride
Essigsäureanhydrid
Ethanoic acid anhydride
Ethanoic anhydrate
Ethanoic anhydride
Ethanoic anydride
Octowy bezwodnik
Oxido acetico
Oxido de acetilo
Oxyde acétique
Oxyde acétylique

Physical Appearance:

- Mobile, colourless liquid;
- Penetrating, choking, characteristic odour, closely related to that of vinegar.

Dangerous Properties:

- Corrosive;
- Vapours irritating to eyes, nose and throat;
- Can react vigorously with oxidizing materials;
- Reacts violently on contact with water or steam.

Storage and Handling:

- Keep in a dry, fireproof place.
- Store in containers lined with stainless steel or polyethylene.
- Separate from oxidants, strong bases and alcohols.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles or a face shield, protective clothing and gloves.

- In case of:
  - inhalation: → fresh air, rest, place in half-sitting position,
    → seek medical advice;
  - contact with skin: → remove contaminated clothing,
    → flush skin with plenty of water or shower,
    → seek medical advice;
  - contact with eyes: → immediately rinse with plenty of water (min. 10 minutes),
    → immediately seek medical advice;
  - ingestion: → drink a lot of water,
    → DO NOT induce vomiting,
    → immediately seek medical advice.
- In case of fire, DO NOT use water-based extinguishers.

ACETONE

Other Names:

Aceton, -a, -um
Acétone
Acido piroacetico
β-cétopropane
Diméthylcétal
Diméthylcétone
Diméthylformaldéhyde
Dimethylketone
Esprit pyroligneux
Ether pyroacétique
β-ketonepropane
β-ketopropane
Methyl ketone
Propanone
2-propanone
Propan-2-one
Pyroacetic acid
Pyroacetic ether
Quetona de metilo

Physical Appearance:

- Colourless liquid;
- Volatile with sweetish, characteristic odour.

Dangerous Properties:

- Highly flammable;
- Skin and severe eye irritant;
- Inhalation and ingestion produce headaches, dizziness and vomiting

Storage and Handling:

- Store in closed containers, at a temperature not exceeding 15°C.
- Keep containers in a well-ventilated place, away from heat, sparks and flames.
- Separate from oxidants.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ flush skin with plenty of water or shower,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ DO NOT induce vomiting,
	→ seek medical advice.

N-ACETYLANTHRANILIC ACID

Other Names:

2-acetamidobenzoic acid
o-acetamidobenzoic acid
ortho-acetamidobenzoic acid
o-(acetylamino)benzoic acid
N-acetylaminobenzoic acid
1-acetylamino-2-carboxybenzene
N-acetylanthranilsäure
Anthranilic acid, *N*-acetyl-
Benzoic acid, 2-(acetylamino)-
2-carboxyacetanilide

Physical Appearance:

- Fine white or off-white crystalline powder.

Dangerous Properties:

- Harmful if swallowed.

Storage and Handling:

- Store in tightly closed containers in a cool, dry area.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

ANTHRANILIC ACID

Other Names:

Acide 2-aminobenzoïque	*o*-anthranilic acid
Acide anthranilique	Anthranilsäure
Acido antranílico	Carboxyanilin, -e
Acido *orto*-aminobenzoico	2-carboxyanilin, -e
2-aminobenzoesäure	*o*-carboxyaniline
2-aminobenzoic acid	*ortho*-carboxyanilline
o-aminobenzoic acid	NCI-CO 1730
ortho-aminobenzoic acid	Vitamin L
1-amino-2-carboxybenzene	Vitamino L1

Physical Appearance:

- White to pale yellow powder;
- Sweetish taste.

Dangerous Properties:

- Harmful if swallowed;
- Irritating to eyes and the respiratory tract.

Storage and Handling:

- Store in tightly closed containers and in a cool, dry area.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

EPHEDRINE

Other Names:

base:

Eciphin
Efedrin
Ephedrate
Ephedremal
Ephedrin, -um
(−)-ephedrin, -e
l-ephedrin, -e
Ephedrina anidra
Ephedrina emiidrato
L(−)-ephedrine
(−)-(1*R*,2*S*)-ephedrine
(−)-*erythro*-ephedrine
1(*R*),2(*S*)-*erythro*-(−)-ephedrine
Ephédrine anhydre
Ephedrine anhydrous
Ephédrine hémihydratée
Ephedrin hemihydrat
dl-ephedrinum
Ephedrinum anhydricum
Ephedrinum hemihydricum
Ephedrinum hydratum
Ephedrin, wasserfreies
Ephedrivo
α-hydroxy-β-methylamine propylbenzene
1-hydroxy-2-methylamino-1-phenyl-propane
α-hydroxy-β-methylaminopropylbenzene
I-Sedrin
Lexofedrin
α-[1-(methylamino)ethyl]benzene methanol
α-[1-(methylamino)ethyl]benzene-methanol
[*R*-(*R**,*S**)]-α-[1-(methylamino)ethyl]-benzenemethanol
α-[1-(methylamino)ethyl]benzyl alcohol
1-α-(1-methylaminoethyl)benzyl alcohol
2-methylamino-1-phenylpropanol
2-methylamino-1-phenylpropan-1-ol
2-methylamino-1-phenyl-1-propanol
(1*R*,2*S*)-2-methylamino-1-phenyl-1-propanol
(1*R*,2*S*)-2-methylamino-1-phenyl-propan-1-ol hemihydrate
1-phenyl-1-hydroxy-2-methylamino-propane
1-phenyl-2-methylamino-1-propanol
1-phenyl-2-methylaminopropanol
Racephedrine

hydrochloride:

Astmaphedrine
Biophedrin
Caniphedrin
Efedrina chloridrato
Efedron
Efetonina
Eggophedrin
Ephédrine chlorhydrate
Ephedrine chloride
Ephedrine hydrochloride
(−)-ephedrine hydrochloride
Ephedrinhydrochlorid
Ephedrini hydrochloricum
Ephedrinium chloratum
Ephedrinum chloratum
l-ephedrinum hydrochloricum
dl-ephedrinum hydrochloricum
Ephedronguent
Ephedrosst
Ephetonin, -e
Fedrine
(−)-(1*R*,2*S*)-*N*-(1-hydroxy-1-phenyl-prop-2-yl)-*N*-methylammonium hydrochloride
[*R*-(*R**,*S**)]-α-(1-(methylamino)ethyl)-benzenemethanol hydrochloride
dl-α-(1-(methylamino)ethyl)benzyl alcohol hydrochloride
Minus ephedrine hydrochloride

1-phenyl-2-methylaminopropanol-1 hydrochloride
Racephedrine hydrochloride
Reukap
Sanedrine

sulfate:

Benzenemethanol, α-[1(methylamino)-ethyl]-, [*R*-(*R**,*S**)]-, sulfate (2:1)
Ectasuleminus
(−)-ephedrine sulfate (2:1)
Ephedrine sulfate
Ephedrini sulfas
Ephedsol
Isofedrol
Iso-phedrizem
1-α-[1-(methylamino)ethyl]benzyl alcohol sulfate
NCI-C55652
1-phenyl-2-methylaminopropanol-1 sulfate
Sal-Phedrine
Spaneph

Physical Appearance:

base: - Crystals/waxy solid crystals or granules;
- Soapy feel.

hydrochloride: - Orthorhombic needles.

sulfate: - Crystals/orthorhombic needles;
- White or slightly reddish yellow crystals.

Dangerous Properties:

- Harmful if swallowed.

Storage and Handling:

- Keep in well-closed containers, protected from light.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u> → remove contaminated clothing,
→ wash with plenty of water and soap,
→ seek medical advice if necessary;

<u>contact with eyes:</u> → immediately rinse with plenty of water (min. 10 minutes),
→ seek medical advice;

<u>ingestion:</u> → rinse mouth with plenty of water,
→ if feeling unwell, immediately seek medical advice.

ERGOMETRINE

Other Names:

base:

Acide lysergique 2-hydroxy-1-méthyl-éthylamide
Acide lysergique 2-propanolamide
[8β(*S*)]-9,10-didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methylergoline-8-carboxamide
9,10-didehydro-*N*-[(*S*)-2-hydroxy-1-methylethyl]-6-methylergoline-8β-carboxamide
9,10-didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methylergoline-8-carboxamide
9,10-didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methylergoline-8β-carboxamide
Ergoatetrine
Ergobasine
Ergoklinine
Ergoline-8-carboxamide, 9,10 didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methyl-
Ergoline-8-carboxamide, 9,10-didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methyl-, [8β(*S*)]-
Ergometrinin
Ergometrinum
Ergonovine
Ergostetrine
Ergotocine
Hydroxymethylethyllysergamide
N-(2-hydroxy-1-methylethyl)-*D*(+)-lysergamide
N-[(*S*)-2-hydroxy-1-methylethyl]-lysergamide
N-[(*S*)-2-hydroxy-1-methylethyl]-*D*-lysergamide
N-[α-(hydroxymethyl)ethyl]-*D*-lysergamide
N-[1-(hydroxymethyl)ethyl]-*D*-lysergamide
Hydroxypropyllysergamide
D(+)-lysergic acid β-hydroxy-isopropylamide
D-lysergic acid 1-(hydroxymethyl)-ethylamide
Lysergic acid propanolamide
D-lysergic acid 1,2-propanolamide
D-lysergic acid *L*-2-propanolamide
Dextro-lysergic acid *levo*-2-propanol-amide
Margonovine
Secacornine

maleate:

Arconovina
Cornocentin
Cryovinal
9,10-didehydro-*N*-[(*S*)-2-hydroxy-1-methylethyl]-6-methylergoline-8β-carboxamide maleate (1:1)
Ergofar
Ergoline-8-carboxamide, 9,10-didehydro-*N*-(2-hydroxy-1-methylethyl)-6-methyl-, [8β(*S*)]-, (*Z*)-2-butenedioate (1:1)
Ergomal
Ergomed
Ergomet
Ergometrina maleato
Ergométrine (maléate d')
Ergometrine Maleate
Ergometrinhydrogenmaleat
Ergometrini hydrogenomaleas
Ergometrini maleas
Ergometrinium hydrogenmaleinicum
Ergometrinum hydrogenmaleinicum
Ergometrinum maleicum
Ergomine
Ergonovine Bimaleate
Ergonovine Maleate
Ergostabil
Ergoton-B
Ergotrate
Ergotrate Maleate
Ermalate
Ermetrin, -e
Hemogen

(6*aR*,9*R*)-4,6,6*a*,7,8,9-hexahydro-*N*-[(2*S*)-1-hydroxyprop-2-yl]-7-methylindolo[4,3-*fg*]quinoline-9-carboxamide
(+)-*N*-[(2*S*)-1-hydroxyprop-2-yl]-*D*-lysergamide
Margonovine
Metriclavin
Metrisanol
Novergo
Panergal
Secometrine
Syntometrine
Takimetrin
Uteron

tartrate:

Basergin
Ergomar "Nordson"
Ergobasine tartrate
Ergonovine tartrate
Ergonovinum tartaricum
Ergostetrine tartrate
Ergotocine tartrate
Neofemergen
Neo-Femergin

Physical Appearance:

base:	Tends to form solvated colourless crystals.
hydrochloride:	Needles.
maleate:	White or yellowish, odourless, crystalline powder.
tartrate:	White or slightly reddish yellow crystals.

Dangerous Properties:

- Highly toxic;
- Ingestion results in vomiting, diarrhoea, unquenchable thirst, confusion and unconsciousness;
- Chronic poisoning arises from ingestion of grain contaminated with ergot.

Storage and Handling:

- Store in tightly closed amber-coloured containers in cool, dry areas and at a temperature of 2°C to 8°C.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing, → wash with plenty of water and soap, → seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes), → seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water, → if feeling unwell, immediately seek medical advice.

ERGOTAMINE

Other Names:

base:

N-(5-(benzyl-10*b*-hydroxy-2-methyl)-3,6-dioxoperhydrooxazolo-(3,2-*a*)pyrrolo-(2,1-*c*)pyrazin-2-yl)-*D*-lysergamide
5'-benzyl-12'-hydroxy-2'-methyl-ergotaman-3',6',18-trione
Ergotaman-3',6',18-trione, 12'-hydroxy-2'-methyl-5-phenylmethyl-
Ergotaman-3',6',18'-trione, 12'-hydroxy-2'-methyl-5'-(phenylmethyl)-, (5'α)-
12-hydroxy-2-methyl-5-*alpha*-(phenyl-methyl)-ergotaman-3,6,18-trione
12'-hydroxy-2'-methyl-5'-(phenyl-methyl)-ergotaman-3',6',18-trione
12'-hydroxy-2'-methyl-5'α-(phenyl-methyl)-ergotaman-3',6',18-trione
12'-hydroxy-2'-methyl-3',6',18-trioxo-5-benzylergotaman
(5'*S*)-12'-hydroxy-2'-methyl-3',6',18-trioxo-5-benzylergotaman, (+)-

succinate:

Ergoton-A

tartrate:

Avetol
Bellergal
Cafergot
Cornutamin
Effergot
Ergkatal
Ergocaf
Ergo Caffein
Ergomar
Ergostat
Ergotamina tartrato
Ergotamine (tartrate d')
Ergotamine tartrate
Ergotamini tartras
Ergotaminium tartaricum
Ergotamintartrat
Ergotaminum tartaricum
Ergotan
Ergotartrat
Ergotatropin
Exmigra
Exmigrex
Femergin
Gynergeen
Gynergen
Lanatrate
Lingraine
Lingrän
Lingrene
Medihaler-Ergotamine
Migral Rigetamine
Migretamine
Migril
Migwell
Secagyn
Secupan
Wigraine

Physical Appearance:

base:	Very hygroscopic crystals.
hydrochloride:	Crystals (small rectangular plates).
tartrate:	Slightly hygroscopic, colourless, odourless crystals or a white or yellowish white crystalline powder.

Dangerous Properties:

- Highly toxic;
- Ingestion results in vomiting, diarrhoea, unquenchable thirst, confusion and unconsciousness;
- Chronic poisoning arises from ingestion of grain contaminated with ergot.

Storage and Handling:

- Store in tightly closed amber-coloured containers in cool, dry areas and at a temperature of 2°C to 8°C.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

ETHYL ETHER

Other Names:

Aether anaestheticus
Anaesthetic ether
Anesthesia ether
Anesthetic ether
Diäthyläther
Diethoxyethane
Diethyl ether
Diethyl oxide
Dioxyde d'éthyle
Dwuetylowy eter
Etere dietilico
Etere etilico
Eter etílico
Eter sulfúrico
Ethane, 1,1'-oxybis-
Ethane oxyéthane
Ether
Ether anesthésique
Ether éthylique
Ether pro narcosi
Ether sulfurique
Ethoxyethane
Ethyl oxide
Etoxietano
3-oxapentane
1,1'-oxybisethane
1,1'-oxybis [ethane]
Oxyde d'éthyle
Pronarcol
RCRA Waste Number U117
Solvent ether
Sulfuric ether

Physical Appearance:

- Colourless, mobile, volatile liquid;
- Sweet pungent odour;
- Burning taste.

Dangerous Properties:

- **EXTREMELY FLAMMABLE;**
- May form explosive peroxides;
- Mildly toxic by inhalation, moderately toxic by ingestion;
- Skin and severe eye irritant.

Storage and Handling:

- Store in well-closed containers at a well-ventilated, cool, dark, fireproof place.
- Separate from oxidants.

- Keep away from open flame and sparks - NO SMOKING.
- DO NOT empty into drains.
- Take precautionary measures against static discharge.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:
  inhalation: → fresh air, rest,
  → seek medical advice;

contact with skin:	→ remove contaminated clothing, → in case of frostbite DO NOT remove contaminated clothing, → flush skin with plenty of water or shower, → seek medical advice if necessary;
contact with eyes:	→ immediately rinse with plenty of water (min. 10 minutes), → seek medical advice;
ingestion:	→ drink a lot of water, → DO NOT induce vomiting, → immediately seek medical advice.

HYDROCHLORIC ACID

Other Names:

Acide chlorhydrique	Chloorwaterstof
Acido clorhídrico	Chlorwasserstoff
Acido cloridrico	Concentrated hydrochloric acid
Acidum hydrochloricum	Hydrogen chloride
Acidum hydrochloricum concentratum	Muriatic acid
Chlorohydric acid	Salzsäure
Chlorowodor	Spirit of salt

Physical Appearance:

- Clear, colourless to light yellow, fuming liquid;
- Pungent odour.

Dangerous Properties:

- Strongly corrosive;
- Vapours irritant to the mucous membranes, to the eyes and the respiratory tract;
- More severe exposures result in pulmonary edema.

Storage and Handling:

- Store below 30°C in airtight containers of glass or other inert material.
- Separate from oxidants and strong bases.

- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles or a face shield, protective clothing and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest, place in half-sitting position, → seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing, → flush skin with plenty of water or shower, → seek medical advice;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes), → immediately seek medical advice;
<u>ingestion:</u>	→ drink a lot of water, → DO NOT induce vomiting, → immediately seek medical advice.

ISOSAFROLE

Other Names:

Benzene, 1,2-(methylenedioxy)-4-propenyl-	3,4-(methylenedioxy)-1-propenylbenzene
1,3-benzodioxole, 5-(1-propenyl)-	5-(1-propenyl)-1,3-benzodioxole
1,2-(methylenedioxy)-4-propenylbenzene	4-propenylcatechol methylene ether
	4-propenyl-1,2-methylenedioxybenzene

Physical Appearance:

- Colourless, viscous liquid;
- Sweet, anise-like odour.

Dangerous Properties:

- Moderately toxic by ingestion;
- Poisonous by parenteral routes;
- Experimental carcinogen and tumorigen;
- Skin irritant;
- When heated to decomposition, isosafrole emits acrid smoke and fumes.

Storage and Handling:

- Keep in cool place protected from light.

- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ seek medical advice.

LYSERGIC ACID

Other Names:

Acide ergoline-8β-carboxylique, didéhydro-9,10 méthyl-6
Acide indolo(4,3-*fg*)quinoline ergoline-8-carboxylique
Acide lysergique
(8β)-9,10-didehydro-6-methylergoline-8-carboxylic acid
9,10-didehydro-6-methylergoline-8β-carboxylic acid
Ergoline-8β-carboxylic acid, 9-10-didehydro-6-methyl-
(+)-lysergic acid
D(+)-lysergic acid
D-lysergic acid
d-lysergic acid

Physical Appearance:

- Crystal plates or white crystalline powder.

Dangerous Properties:

- Highly toxic;
- Ingestion results in vomiting, diarrhoea, unquenchable thirst, confusion and unconsciousness.

Storage and Handling

- Store in tightly closed containers in a cool place, protected from light.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

3,4-METHYLENEDIOXYPHENYL-2-PROPANONE

Other Names:

5-acetonyl-1,3-benzodioxole
1-(acetonyl)-3,4-methylenedioxybenzene
1-(1,3-benzodioxol-5-yl)-2-propanone
1,3-benzodioxol-5-ylpropan-2-one
3,4-MDP-2-P
MD-P2P
3,4-methylenedioxybenzyl methyl ketone
3,4-methylenedioxyphenylacetone
3,4-methylenedioxyphenyl-2-propanone
1-(3,4-methylenedioxyphenyl)-2-propanone
Methyl piperonyl ketone
Piperonalacetone
Piperonyl methyl ketone
PMK
2-propanone, 1-(1,3-benxodioxol-5-yl)-
2-propanone, 1-[3,4-(methylenedioxy)-phenyl]-
2-propanone, (3,4-(methylenedioxy)-phenyl)-

Physical Appearance:

- Liquid;
- Odour of anise.

Dangerous Properties:

- Irritating to skin and eyes.

Storage and Handling:

- Store in stainless steel or containers with a thin lining for long-term storage.
- For short term storage and transportation carbon steel containers are suitable.

- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ immediately seek medical advice.

METHYL ETHYL KETONE

Other Names:

Acetonersatz
Aethylmethylketon
Butanone
2-butanone
Butane-2-one
Butanone-2
3-Butanone
Ethyl methyl cetone
Ethylméthylcétone
Ethylmethylketon
Ethyl methyl ketone
Ketobutan
MEC
MEETCO
MEK
Methyl acetone
Méthyléthylcétone
Methylethylketon, -e
Methyloethyloketone
Metiletilchetone
Metyloetyloketone

Physical Appearance:

- Colourless liquid;
- Fragrant, mint-like, moderately sharp odour.

Dangerous Properties:

- Highly flammable;
- Skin and severe eye irritant;
- Inhalation and ingestion produce headaches, dizziness and vomiting (less toxic than acetone).

Storage and Handling:

- Store in closed containers, at a temperature not exceeding 15°C.
- Keep containers in a well-ventilated place, away from heat, sparks and flames.
- Separate from oxidants.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ flush skin with plenty of water or shower,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ DO NOT induce vomiting,
	→ seek medical advice.

PHENYLACETIC ACID

Other Names:

Acide benzène acétique	PAA
Acide phénylacétique	2-phenylacetic acid
Acide α-toluique	ω-phenylacetic acid
Acido bencenoacético	*omega*-phenylacetic acid
Acido fenilacético	Phenylessigsäure
Acido α-toluico	Phenylethanoic acid
Benzeneacetic acid	α-toluic acid
Fema No. 2878	Toluylic acid

Physical Appearance:

- White powder;
- Very disagreeable, pungent odour.

Dangerous Properties:

- Moderately toxic by ingestion, subcutaneous and intraperitoneal routes;
- Experimental teratogen;
- Combustible when exposed to heat or flame;
- When heated to decomposition it emits acrid smoke and irritating fumes.

Storage and Handling:

- Store in dark bottles in a cool, dry area.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

1-PHENYL-2-PROPANONE

Other Names:

Benzyl methyl ketone	Phenylmethyl methyl ketone
BMK	Phenyl-2-propanone
Methyl benzyl ketone	3-phenyl-2-propanone
Phenylacetone	P2P
α-phenylacetone	2-propanone, 1-phenyl-

Physical Appearance:

- Colourless or yellowish, moderately viscous liquid.

Dangerous Properties:

- Flammable;
- Irritating to skin and eyes.

Storage and Handling:

- Store in tightly closed containers in a cool, dry area, protected from light.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

inhalation:	→ fresh air, rest,
	→ seek medical advice;
contact with skin:	→ remove contaminated clothing,
	→ flush skin with plenty of water or shower,
	→ seek medical advice if necessary;
contact with eyes:	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
ingestion:	→ drink a lot of water,
	→ seek medical advice.

PIPERIDINE

Other Names:

Azacyclohexane
Cyclopentimine
Cypentil
Hexahydropyridin, -e
Hexazane
Pentamethylenimin, -e
Perhydropyridine
Piperidin

Physical Appearance:

- Colourless or yellowish liquid;
- Intensive, characteristic, unpleasant odour.

Dangerous Properties:

- Highly flammable;
- Corrosive;
- Toxic by inhalation and in contact with skin.

Storage and Handling:

- Store in tightly closed containers in a cool, dry and fireproof place.
- Separate from oxidants and acids.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles or a face shield, protective clothing and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest, place in half-sitting position, → seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing, → flush skin with plenty of water or shower, → seek medical advice;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes), → immediately seek medical advice;
<u>ingestion:</u>	→ drink a lot of water, → immediately seek medical advice.

PIPERONAL

Other Names:

1,3-benzodioxole-5-carboxaldehyde
3,4-dihydroxybenzaldehyde methylene ketal
3,4-dimethylenedioxybenzaldehyde
Dioxymethyleneprotocatechuic aldehyde
5-formyl-1,3-benzodioxole
5-formylbenzodioxole
Geliotropin
Heliotropin
3,4-(methylenedioxy)benzaldehyde
Piperonaldehyde
Piperonylaldehyde
Protocatechuic aldehyde methylene ether

Physical Appearance:

- Colourless, lustrous, needle-shaped crystals;
- Heliotrope odour.

Dangerous Properties:

- Moderately toxic by ingestion and intraperitoneal routes;
- Can cause central nervous system depression;
- Irritant to skin;
- Combustible when exposed to heat or flame;
- Can react with oxidizing materials.

Storage and Handling:

- Store at a cool place protected from light.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

POTASSIUM PERMANGANATE

Other Names:

Cairox
Chameleon mineral
Condy's crystals
Kalii Permanganas
Kaliumpermanganaat
Kaliumpermanganat
Permanganate de potassium
Permanganate of potash
Permanganato de potasio
Permanganato di potassio
Permaganic acid ($HMnO_4$), potassium salt

Physical Appearance:

- Dark purple or bronze-like, odourless crystals;
- Almost opaque by transmitted light and of a blue metallic luster by reflected light;
- Sweet with a stringent aftertaste;
- Stable in air.

Dangerous Properties:

- Explosions may occur in case of contact with organic or other oxidizable substances, in solution or in the dry state.

Storage and Handling:

- Store in well closed containers (bottles and drums) at ambient temperature with open vents.
- Avoid contact with organic substances.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

<u>inhalation:</u>	→ fresh air, rest, place in half-sitting position,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ flush skin with plenty of water or shower,
	→ seek medical advice;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ immediately seek medical advice.

PSEUDOEPHEDRINE

Other Names:

base:

Benzenemethanol, α-[1-(methylamino)-ethyl]-, [*S*-(*R**,*R**)]-
Ephedrin(e)
ψ-ephedrine
(−)-ephedrin(e)
d-ψ-ephedrine
(+)-ψ-ephedrine
l-ephedrine
L(+)-ψ-ephedrine
trans-ephedrine
(−)-(1*R*,2*S*)-ephedrine
(−)-*erythro*-ephedrine
1(*R*),2(*S*)-*erythro*-(−)-ephedrine
α-hydroxy-β-methylaminopropylbenzene
Isoephedrine
d-isoephedrine
α-[1-(methylamino)ethyl]benzene methanol
α-[1-(methylamino)ethyl]benzenemethanol
[*S*-(*R**,*R**)]-α-[1-(methylamino)ethyl]-benzenemethanol
α-[1-(methylamino)ethyl]benzyl alcohol
2-methylamino-1-phenyl-1-propanol
(+)-2-methylamino-1-phenylpropan-1-ol
(1*R*,2*S*)-2-methylamino-1-phenyl-1-propanol
(+)-(1*S*,2*R*)-2-(methylamino)-1-phenyl-1-propanol
DL-threo-2-(methylamino)-1-phenyl-propan-1-ol
(1*R*,2*S*)-2-methylamino-1-phenylpropan-1-ol hemihydrate
1-phenyl-1-hydroxy-2-methylamino-propane
1-phenyl-2-methylaminopropanol
1-phenyl-2-methylamino-1-propanol
L-(+)-pseudoephedrine
d-pseudoephedrine
(+)-(1*S*,2*S*)-pseudoephedrine
Sudafed

hydrochloride:

Actifed
Afrinol
Allent
Ambenyl-D
Atridine
Benafed
Benazma
Benylin
Brexin
Benzenemethanol, α-[1-(methylamino)-ethyl], [*S*-(*R**,*R**)]-, hydrochloride
Cenafed
Congestac
Co Tylenol
Daycare
Decofed
Deconamine
Decongestant Syrup
D-Feda
Dimacol
Dorcol
d-ψ-ephedrine hydrochloride
d-isoephedrine hydrochloride
Eltor
Emprazil
Fedahist
Fedrazil
First Sign
Galpseud
Halofed
Histalet
(α*R*,β*R*)-β-hydroxy-α-methylphenethyl-*N*-methylammonium chloride
(+)-(α*S*,β*S*)-β-hydroxy-α-methyl-phenethyl-*N*-methylammonium chloride
Intensin
Isoclor
Isofedrin
Kronofed-A
Linctifed
(+)-(1*S*,2*S*)-2-methylamino-1-phenyl-propan-1-ol hydrochloride

Myfedrine
Naldegesic
Narixan
Nasa-12
Neofed
Novafed 120
Novahistine
Oranyl
Otrinol
Paragesic
PediaCare
Phenergan-D
Profedrine
(+)-pseudoephedrine hydrochloride
Pseudofrin
Repedrina
Rhinalair
Robidrine
Robitussin
Ro-Fedrin
Rondec
Sancos Co
Seudotabs
Sinarest
Sine-Aid
Sine-Off
Sinufed
Sudafed
Sudanyl
Sudomyl
Sudelix
Sufedrin
Suolelix
Symptom 2
Triocos
Triphed
Tusaphed
Tussafed
Tussifed
Tylenol
Ursinus
Wal-Phed

resinate:

Pseudoephedrine Polistirex

sulfate:

Afrinol
Benzenemethanol, α-[1-(methylamino)-ethyl]-, [S-(R^*,R^*)]-, sulfate (2:1)
Chlortrimeton Decongestant
Congesteze
Disophrol
Drixora
Drixoral
Halin
Polaramine
(+)-pseudoephedrine sulfate (2:1)

Physical Appearance:

base:	Crystals.
hydrochloride:	Needles.
sulfate:	White odourless crystals or crystalline powder.

Dangerous Properties:

- Harmful if swallowed.

Storage and Handling:

- Keep in well-closed containers, protected from light.

- Handle at a well-ventilated place.
- Wear safety goggles, gloves and a dust mask.
- Avoid contact with skin and eyes.
- Do not eat, drink or smoke while handling the substance.

- In case of:

contact with skin:	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
contact with eyes:	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
ingestion:	→ rinse mouth with plenty of water,
	→ if feeling unwell, immediately seek medical advice.

SAFROLE

Other Names:

5-allyl-1,3-benzodioxole	1,3-benzodioxole, 5-(2-propenyl)-
Allylcatechol methylene ether	1,2-methylenedioxy-4-allylbenzene
Allyldioxybenzene methylene ether	3,4-methylenedioxyallylbenzene
4-allyl-1,2-methylenedioxybenzene	5-(2-propenyl)-1,3-benzodioxole
4-allyl-1,2-(methylenedioxy)benzene	Rhyuno oil
1-allyl-3,4-methylenedioxybenzene	Safrol
m-allylpyrocatechin methylene ether	Safrole MF
4-allylpyrocatechol formaldehyde acetal	Shikimole
Allylpyrocatechol methylene ether	Shikomol

Physical Appearance:

- Colourless or slightly yellow liquid or crystals;
- Sassafras odour.

Dangerous Properties:

- Moderately toxic by ingestion;
- Poisonous by parenteral routes;
- Experimental carcinogen and neoplastigen;
- Irritant to skin;
- Combustible when exposed to heat or flame;
- When heated to decomposition it emits acrid smoke and irritating fumes.

Storage and Handling:

- Keep in a cool place protected from light.

- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ seek medical advice.

SULFURIC ACID

Other Names:

Acide sulfurique
Acido sulfurico
Bov
Dipping acid
Hydroot
Hydrogen sulfate
Matting acid
Nordhausen acid
Oil of Vitriol
Schwefelsäurelösungen
Schwefelsäure
Spent sulfuric acid
Spirit of Sulfur
Sulphuric acid
Vitriol brown oil
Vitriol, oil of
Zwavelzuuroplossingen

Physical Appearance:

- Clear, colourless, odourless, oily liquid;
- More viscous than water.

Dangerous Properties:

- Extremely corrosive to all body tissues;
- Reacts with water or steam to produce heat.

Storage and Handling:

- Store in airtight containers of glass or other inert material (unbreakable packaging if possible).
- Keep separate from combustible substances, reducing agents and bases.
- Ventilate at floor level.

- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles or a face shield, protective clothing and gloves.
- **<u>UNDER NO CIRCUMSTANCES</u> ADD WATER TO SULFURIC ACID.**

- In case of:

<u>inhalation:</u>	→ fresh air, rest, place in half-sitting position,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ flush with plenty of water of shower,
	→ seek medical advice;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ immediately seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ DO NOT induce vomiting,
	→ immediately seek medical advice.

- In case of fire in immediate vicinity, DO NOT use water-based extinguishers.

TOLUENE

Other Names:

Antisal 1a
Benzene, methyl-
Methacid, -e
Methane, phenyl-
Methyl benzene
Methylbenzene
Méthylbenzène
Méthylphène
Methylbenzol
NCI-C07272
Phenyl methane
Phenylmethane
Phénylméthane
RCRA Waste Number U220
Toluen
Toluène
Tolueen
Tolu-sol
Toluol
Toluolo

Physical Appearance:

- Mobile, refractive, colourless, highly inflammable liquid;
- Benzene-like odour.

Dangerous Properties:

- Highly flammable;
- Moderately toxic by ingestion and inhalation;
- Inhalation of higher doses results in headache, nausea, impairment of coordination and reaction time;
- Skin and severe eye irritant;
- Experimental teratogen, mutation data reported;
- Incompatible with strong oxidants.

Storage and Handling:

- Store in airtight containers at a fireproof place.
- Separate from oxidants.

- Keep away from open flame and sparks, no smoking.
- Handle at a well-ventilated place, under a hood or with respiratory protection.
- Wear safety goggles and gloves.

- In case of:

<u>inhalation:</u>	→ fresh air, rest,
	→ seek medical advice;
<u>contact with skin:</u>	→ remove contaminated clothing,
	→ wash with plenty of water and soap,
	→ seek medical advice if necessary;
<u>contact with eyes:</u>	→ immediately rinse with plenty of water (min. 10 minutes),
	→ seek medical advice;
<u>ingestion:</u>	→ drink a lot of water,
	→ DO NOT induce vomiting,
	→ immediately seek medical advice.

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Piperonal, Potassium Permanganate, Toluene, Safrole, Isosafrole and Sulfuric Acid
to Table II of the Annex to the 1988 United Nations Convention against Illicit Traffic
in Narcotic Drugs and Psychotropic Substances (1991).

F. MAJOR RECOMMENDATIONS RELATED TO:

1) PRE-TRIAL DESTRUCTION OF LARGE SEIZURES OF CONTROLLED DRUGS, PRECURSORS AND ESSENTIAL CHEMICALS

2) CLANDESTINE LABORATORY INVESTIGATION

1) PRE-TRIAL DESTRUCTION OF SEIZED NARCOTIC DRUGS, PSYCHOTROPIC SUBSTANCES, PRECURSORS AND ESSENTIAL CHEMICALS[1]

I. Legal/administrative aspects

For the purpose of effectively implementing article 14, paragraph 5, of the Convention (1988) in relation to the pre-trial destruction or other lawful disposal of seized narcotic drugs, psychotropic substances and other substances referred to in that paragraph (hereafter collectively called "substances"), the Expert Group Meeting recommended that States consider adopting measures to give legal effect to the following:

(a) The seizing officer should prepare an inventory at the time of seizure. The inventory should contain particulars of:

(i) The substance seized, its gross weight and, where practicable, its net weight;

(ii) The quantity/volume of substance seized;

(iii) The date, time and place of seizure;

(iv) The name and title of the officer making the seizure and the name, address and identity of any suspect or witness;

(v) A description of packaging including seals, marks and any other identifying features;

(vi) Where appropriate, confirmation of inventory by a judicial officer, prosecutor or other independent authority;

(b) The seizing officer should also prepare a report of the seizure as soon as possible after seizure, which should include particulars of:

(i) The time, place and date of seizure;

(ii) The identity of the seizing officer and all persons present;

(iii) The circumstances in which seizure took place;

(iv) A description of the vehicle, vessel, place or person searched and the location where the substance was found;

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[1] Report on the Meeting of the Expert Group on Pre-Trial Destruction of Seized Narcotic Drugs, Psychotropic Substances, Precursors and Essential Chemicals, Vienna, 13-17 November 1989 (E/CN.7/1990/7/Add.1).

Report on the Meeting of the Expert Group on Pre-Trial Destruction of Seized Narcotic Drugs, Psychotropic Substances, Precursors and Essential Chemicals, Bangkok, 22-26 October 1990 (E/CN.7/1991/CRP.5).

(v) A description of the substance found;

(vi) A description of packaging, seals and other identifying features;

(vii) A description of quantity, volume and units and the measurement method employed;

(viii) A description of any preliminary identification test used and results (test kit);

(ix) Statements of suspects and witnesses;

(x) Any other matter;

(c) Visual records of the seizure could be made to record the time, site, subject matter and place where the substance was found, as well as the circumstances in which the seizure took place;

(d) Samples should be taken for evidentiary purposes before seized substances are destroyed or otherwise disposed of. They should be taken in sufficient quantities to ensure adequate identification of each substance. Sampling should follow internationally acceptable procedures such as those contained in the manuals for use by national narcotic laboratories (ST/NAR/... series);

(e) Where necessary, a chemical analysis should be carried out on samples to determine the nature, quality and quantity of the substance contained therein. The analysis should be carried out and reported on as soon as possible after seizure to minimize the risk of physical or chemical change occurring;

(f) All movements of seized narcotic substances and samples thereof should be identified and recorded to ensure that there is sufficient proof that what was moved, sampled, stored, analysed or destroyed was what was seized;

(g) Appropriate security measures should be established and implemented to ensure that seized substances and samples thereof may not be unlawfully interfered with, used, taken or disposed of at any time following seizure until lawful disposal;

(h) Where appropriate and possible:

(i) The presence of alleged offenders or their representative should be secured at the time when samples are taken;

(ii) Additional samples should be taken to enable experts nominated by the alleged offenders to make an independent analysis;

(iii) Measures should be taken to ensure the security, objectivity and impartiality of those involved in carrying out such an analysis;

(iv) Sanctions should be established for officials who unlawfully interfere with, use, take or dispose of seized substances or samples thereof. Such

sanctions should also apply to experts and other persons who corruptly interfere with, or falsify the results of, analysis;

(i) In relation to the destruction or other disposal of seized substances:

(i) All seized substances should be destroyed or otherwise disposed of as soon as possible after seizure, except to the extent necessary to ensure successful prosecution and the due administration of justice;

(ii) Destruction or other disposal should be permitted immediately following the taking of samples where storage or security cannot be properly maintained or there is an imminent threat to life or property;

(iii) Decisions on method, procedure, timing and location of destruction or other disposal should be made by duly authorized persons. These decisions should be made on the basis of expert advice, with a view to preventing further illicit use while protecting human safety and the environment;

(iv) Adequate records (including visual records) should be made of destruction or other disposal to ensure successful prosecution and to maintain public confidence in the administration of justice;

(v) States adopting laws on pre-trial destruction of seized substances consistent with the provisions of article 14, paragraph 5, of the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (E/CONF.82/15 and Corr.2) should, as far as possible, apply them to any seizures made prior to their adoption.

For the purpose of implementing article 9, paragraph 1, of the Convention, particularly in order to enhance the effectiveness of co-operation between law enforcement agencies, the Meeting also recommended that States exchange intelligence on packaging, seals and other relevant seizure information to facilitate identification of the origin of seized substances.

II. Technical/scientific aspects

These recommendations contain changes and additions suggested by the Expert Group which dealt with these aspects:

(a) Prior to making a seizure at an illicit drug manufacturing site or other facility involving potentially hazardous chemicals, the seizing officer should seek the expert advice of a duly authorized forensic chemist;

(b) If possible, the seizing officer should be accompanied to such potentially hazardous sites by a duly authorized forensic chemist at the time of seizure;

(c) All officers and forensic chemists taking part in such operations involving hazardous substances should be adequately trained to carry out the relevant procedures in order to ensure their own safety and the safety of others at the site;

(d) Samples should be taken by the chemist accompanying the officer, or by the seizing officer upon the advice of the chemist;

(e) Samples should be stored under conditions that reduce to a minimum the risk of chemical changes and inherent hazards such as spontaneous combustion and explosion;

(f) Methods of destruction should be cost-effective in relation to other available alternatives, safely conducted and environmentally sound, and should allow for a choice wherever possible;

(g) For the destruction of plant materials, cannabis resin and opium, either incineration[2] or open-air burning[3] should be the method of choice, the former being preferred whenever possible, funds and logistics permitting;

(h) For the destruction of other drugs, including powders, compressed blocks and pharmaceutical preparations, incineration should be the method of choice, giving the greatest degree of operator and environmental safety, but with attendant high costs;

(i) Where operational field conditions or cost make the use of the best option impossible, a due balance must be struck between operator safety, environmental concerns and security;

(j) For the disposal of solvents and precursor chemicals, either recycling/resale or incineration is, in most circumstances, preferable to the other methods of destruction;

(k) Countries should be asked to consider preparation of a list of chemical companies that may be interested in the purchase of such seized solvents and chemicals. In order to prevent diversion into illicit traffic, every such sale must be investigated, carefully monitored and controlled;

(l) In accordance with article 5 of the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, the proceeds or property confiscated, or a substantial part thereof, should be used to supplement capital and operating costs involved in the storage and destruction of seized substances;

(m) In view of the significance of the biological treatment of drugs and chemicals as an economical and effective destruction alternative, research and development in this area should be intensified and the funds to support and co-ordinate such activities should be made available to the United Nations International Drug Control Programme;

(n) The disposal in the high seas of drug substance or precursor chemicals should be considered unacceptable as a method of destruction.

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[2] Incineration is burning by controlled flame in an enclosed area with appropriate safeguards to prevent the release of inorganic acid or toxic gases, e.g. dioxins, and particulate matter into the atmosphere, ensuring the maximum possible combustion of the material.

[3] Open-air burning is burning by controlled or uncontrolled flame, the combustion products being released directly into the atmosphere.

2) CLANDESTINE LABORATORY INVESTIGATION[4]

I. General recommendations

Recognizing the complementary roles of forensic chemists and law enforcement officers in the investigation of clandestine laboratory investigations, the Expert Group made the following recommendations:

(a) Information related to the identification of clandestine laboratories should be shared by forensic chemists and by law enforcement officers to permit complementary analysis;

(b) All clandestine laboratory seizures should entail careful planning of the raid, standardized procedures for laboratory assessment and processing, and proper strategies for dismantling the seized laboratories that would ensure personal safety and minimize negative effects on the environment;

(c) All law enforcement officers and forensic chemists taking part in clandestine laboratory seizures should be adequately trained to carry out the relevant procedures in order to ensure their own safety and the safety of others at or near the site;

(d) Standardized national training programmes covering all aspects of clandestine laboratory investigations should be devised and made available to forensic chemists and law enforcement personnel, including safety aspects related to such investigations;

(e) Forensic chemists should be trained in the statutory requirements and legal practices related to offences in their countries and in the presentation of evidence by experts;

(f) The United Nations International Drug Control Programme should provide similar training programmes for forensic chemists and law enforcement personnel from developing countries, tailored to meet the individual needs of those countries;

(g) Law enforcement officers should, whenever possible, involve forensic chemists in all aspects of clandestine laboratory investigations, including initial investigations, raid planning, laboratory seizures and laboratory processing (including dismantling);

(h) Forensic chemists should cooperate closely with all judicial authorities to ensure the development of accurate and technically correct interpretation of evidentiary material and subsequent testimony;

(i) Forensic chemists should be regarded as a source of expert opinion for the implementation of articles 12 and 13 of the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988, and countries that have not yet ratified that Convention should do so at their earliest convenience;

(j) National regulatory agencies should establish standardized reporting systems for the collection and storage of scientific data and information on clandestine laboratories, and the United Nations International Drug Control Programme should act as a central repository of

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[4] Report on the Meeting of the Expert Group on Clandestine Laboratory Investigation, Seoul, 2-6 December 1991 (E/CN.7/1992/CRP.8).

stored information for international dissemination and should suggest minimum reporting requirements;

(k) States should maintain a watching brief on drug trends and on clandestine drug production and manufacturing, including the scientific examination of clandestinely produced materials;

II. Tasks for law enforcement officers and forensic chemists

A. Grounds for suspicion of existence of clandestine laboratory operation

A number of circumstances, incidents and sources of information available to forensic chemists and law enforcement officers could point to the possible existence of clandestine laboratories. Those are as follows:

(a) Chemical watch programmes for monitoring the acquisition of precursors and essential chemicals by unauthorized persons;

(b) Watch programmes for monitoring the acquisition of laboratory equipment;

(c) Analysis of laboratory results that could indicate the availability of new drugs and formulations;

(d) Chemical characterization by impurity profiling and comparison studies of seized material to establish links between samples and to identify new drug supply sources;

(e) Results of body fluid analyses from post-mortem cases and cases involving persons caught driving while using drugs that could serve to identify the use of novel drugs and mixtures, pointing to clandestine laboratory activity;

(f) Unrelated police investigations;

(g) Informants;

(h) Undercover agents;

(i) Customs investigations relating to the importation and attempted smuggling of controlled or unusual chemicals;

(j) The admission of individuals in hospital emergency departments as a result of exposure to chemicals;

(k) Suspicious smells emanating from premises;

(l) Fires and explosions of undetermined or unusual reason;

(m) New and unusual construction of premises;

(n) Excessive or unusual water and/or electricity consumption.

It is essential that information be analysed by forensic chemists and law enforcement officers jointly. Well-founded suspicion of the existence of a clandestine laboratory could be followed up by analysing samples taken from around the suspected site, such as the air, rubbish discarded from the premises or sewer effluent.

B. Tasks involved in clandestine laboratory investigations:

(a) Planning the raid:

(i) Based on investigative information, a forensic chemist and law enforcement authorities should determine the type and size of the clandestine laboratory in question. Using intelligence information, the forensic chemist should assess possible manufacturing or production schemes and should estimate the quantity of chemicals needed to complete the reaction process;

(ii) A strategy should be developed for the initial entry into the clandestine laboratory. Consideration should be given to procedures that would minimize personal risk to the entry team. Based on potential chemicals and equipment, a briefing on hazards should be given to all personnel participating in the raid;

(iii) The law enforcement agency involved should give notification to ancillary agencies, including other enforcement agencies as required, the fire department, hospitals, a hazardous waste contractor, the health authorities and environmental agencies;

(iv) For each phase of the seizure, participants should be assigned specific roles and duties;

(v) It may also be important to examine the personal and criminal background of the suspects in question.

(b) Assessing the clandestine laboratory:

(i) The health and safety risks of the clandestine laboratory in question should be determined;

(ii) The atmosphere of the laboratory should be tested and remedied as necessary;

(iii) Operating equipment should be turned off and the premises should be ventilated if appropriate;

(iv) The physical security of the premises should be ensured;

(c) Processing the clandestine laboratory:

(i) Evidence in the form of videos, photographs and fingerprints should be collected;

(ii) Law enforcement officers should select evidentiary material, as required, on the advice of the forensic chemist;

(iii) Representative samples should be taken for evidentiary purposes in sufficient quantities to ensure adequate identification of each substance involved;

(iv) Under the guidance of the forensic chemist, the chemical apparatus used in the clandestine laboratory should be dismantled;

(v) The forensic chemist should be prepared to assist in interviewing suspects; the forensic chemist should act only as an "interpreter" and should not get directly involved in such interview;

(vi) If necessary, law enforcement officers, in conjunction with the forensic chemist, should perform the necessary procedures to decontaminate suspects.

Personnel participating in a clandestine laboratory seizure should carry out the following activities before leaving the premises for the last time:

(a) The premises should be inspected to ensure that they are physically safe and that all of the necessary evidence has been collected;

(b) Measures should be taken to protect the general public from potential hazardous conditions in the clandestine laboratory by restricting access to the premises and by posting appropriate warning signs.

After the completion of the on-site clandestine laboratory investigation, authorities should take measures to minimize long-term risk to the security and health of the general public by arranging for proper handling, storage and final disposal of the chemicals from the clandestine laboratory. Notifications should be given by the law enforcement authorities to the owners of the premises, if they are not suspects, and to the health and environmental authorities.

Disposal of seized chemicals and drugs should be in line with environmentally sound practices such as those proposed by the Expert Group on the Pre-Trial Destruction of Seized Narcotic Drugs, Psychotropic Substances, Precursors and Essential Chemicals held at Bangkok from 22 to 26 October 1990 (E/CN.7/1991/CPR.5, paragraph 8).

ANNEX

United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988

Article 12

SUBSTANCES FREQUENTLY USED IN THE ILLICIT MANUFACTURE OF NARCOTIC DRUGS OR PSYCHOTROPIC SUBSTANCES

1. The Parties shall take the measures they deem appropriate to prevent diversion of substances in Table I and Table II used for the purpose of illicit manufacture of narcotic drugs or psychotropic substances, and shall co-operate with one another to this end.

2. If a Party or the Board[1] has information which in its opinion may require the inclusion of a substance in Table I or Table II, it shall notify the Secretary-General and furnish him with the information in support of that notification. The procedure described in paragraphs 2 to 7 of this article shall also apply when a Party or the Board has information justifying the deletion of a substance from Table I or Table II, or the transfer of a substance from one Table to the other.

3. The Secretary-General shall transmit such notification, and any information which he considers relevant, to the Parties, to the Commission, and, where notification is made by a Party, to the Board. The Parties shall communicate their comments concerning the notification to the Secretary-General, together with all supplementary information which may assist the Board in establishing and assessment and the Commission[2] in reaching a decision.

4. If the Board, taking into account the extent, importance and diversity of the licit use of the substance, and the possibility and ease of using alternate substances both for licit purposes and for the illicit manufacture of narcotic drugs or psychotropic substances, finds:

(*a*) That the substance is frequently used in the illicit manufacture of a narcotic drug or psychotropic substance;

(*b*) That the volume and extent of the illicit manufacture of a narcotic drug or psychotropic substance creates serious public health or social problems, so as to warrant international action,

it shall communicate to the Commission an assessment of the substance, including the likely effect of adding the substance to either Table I or Table II on both licit use and illicit manufacture, together with recommendations of monitoring measures, if any, that would be appropriate in the light of its assessment.

5. The Commission, taking into account the comments submitted by the Parties and the comments and recommendations of the Board, whose assessment shall be determinative as to scientific matters, and also taking into due consideration any other relevant factors, may decide by a two-thirds majority of its members to place a substance in Table I or Table II.

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[1] International Narcotic Control Board (Art.1 (*a*))

[2] Commission on Narcotic Drugs of the Economic and Social Council of the United Nations (Art.1 (*c*))

6. Any decision of the Commission taken pursuant to this article shall be communicated by the Secretary-General to all States and other entities which are, or which are entitled to become, Parties to this Convention, and to the Board. Such decision shall become fully effective with respect to each Party one hundred and eighty days after the date of such communication.

7. (*a*) The decisions of the Commission taken under this article shall be subject to review by the Council[3] upon the request of any Party filed within one hundred and eighty days after the date of notification of the decision. The request for review shall be sent to the Secretary-General, together with all relevant information upon which the request for review is based.

(*b*) The Secretary-General shall transmit copies of the request for review and the relevant information to the Commission, to the Board and to all the Parties, inviting them to submit their comments within ninety days. All comments received shall be submitted to the Council for consideration.

(*c*) The Council may confirm or reverse the decision of the Commission. Notification of the Council's decision shall be transmitted to all States and other entities which are, or which are entitled to become, Parties to this Convention, to the Commission and to the Board.

8. (*a*) Without prejudice to the generality of the provisions contained in paragraph 1 of this article and the provisions of the 1961 Convention, the 1961 Convention as amended and the 1971 Convention, the Parties shall take the measures they deem appropriate to monitor the manufacture and distribution of substances in Table I and Table II which are carried out within their territory.

(*b*) To this end, the Parties may:

(i) Control all persons and enterprises engaged in the manufacture and distribution of such substances;

(ii) Control under licence the establishment and premises in which such manufacture or distribution may take place;

(iii) Require that licensees obtain a permit for conducting the aforesaid operations;

(iv) Prevent the accumulation of such substances in the possession of manufactures and distributors, in excess of the quantities required for the normal conduct of business and the prevailing market conditions.

9. Each Party shall, with respect to substances in Table I and Table II, take the following measures:

(*a*) Establish and maintain a system to monitor international trade in substances in Table I and Table II in order to facilitate the identification of suspicious transactions. Such monitoring systems shall be applied in close co-operation with manufacturers, importers, exporters, wholesalers and retailers, who shall inform the competent authorities of suspicious orders and transactions.

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[3] Economic and Social Council of the United Nations (Art.1 (*k*))

(*b*) Provide for the seizure of any substance in Table I or Table II if there is sufficient evidence that it is for use in the illicit manufacture of a narcotic drug or psychotropic substance.

(*c*) Notify, as soon as possible, the competent authorities and services of the Parties concerned if there is reason to believe that the import, export or transit of a substance in Table I or Table II is destined for the illicit manufacture of narcotic drugs or psychotropic substances, including in particular information about the means of payment and any other essential elements which led to that belief.

(*d*) Require that imports and exports be properly labelled and documented. Commercial documents such as invoices, cargo manifests, customs, transport and other shipping documents shall include the names, as stated in Table I or Table II, of the substances being imported or exported, the quantity being imported or exported, and the name and address of the exporter, the importer and, when available, the consignee.

(*e*) Ensure that documents referred to in subparagraph (d) of this paragraph are maintained for a period of not less than two years and may be made available for inspection by the competent authorities.

10. (*a*) In addition to the provisions of paragraph 9, and upon request to the Secretary-General by the interested Party, each Party from whose territory a substance in Table I is to be exported shall ensure that, prior to such export, the following information is supplied by its competent authorities to the competent authorities of the importing country:

(i) Name and address of the exporter and importer and, when available, the consignee;

(ii) Name of the substance in Table I;

(iii) Quantity of the substance to be exported;

(iv) Expected point of entry and expected date of dispatch;

(v) Any other information which is mutually agreed upon by the Parties.

(*b*) A Party may adopt more strict or severe measures of control than those provided by this paragraph if, in its opinion, such measures are desirable or necessary.

11. Where a Party furnishes information to another Party in accordance with paragraphs 9 and 10 of this article, the Party furnishing such information may require that the Party receiving it keeps confidential any trade, business, commercial or professional secret or trade process.

12. Each Party shall furnish annually to the Board, in the form and manner provided for by it and on forms made available by it, information on:

(*a*) The amounts seized of substances in Table I and Table II and, when known, their origin;

(*b*) Any substance not included in Table I or Table II which is identified as having been used in illicit manufacture of narcotic drugs or psychotropic substances, and which is deemed by the Party to be sufficiently significant to be brought to the attention of the Board;

(*c*) Methods of diversion and illicit manufacture.

13. The Board shall report annually to the Commission on the implementation of this article and the Commission shall periodically review the adequacy and propriety of Table I and Table II.

14. The provisions of this article shall not apply to pharmaceutical preparations, nor to other preparations containing substances in Table I or Table II that are compounded in such a way that such substances cannot be easily used or recovered by readily applicable means.

Table I

N-acetylanthranilic acid
Ephedrine
Ergometrine
Ergotamine
Isosafrole
Lysergic acid
3,4-methylenedioxyphenyl-2-propanone
1-phenyl-2-propanone
Piperonal
Pseudoephedrine
Safrole

The salts of the substances listed in this Table whenever the existence of such salts is possible.

Table II

Acetic anhydride
Acetone
Anthranilic acid
Ethyl ether
Hydrochloric acid*
Methyl ethyl ketone
Phenylacetic acid
Piperidine
Potassium permanganate
Sulphuric acid*
Toluene

The salts of the substances listed in this Table whenever the existence of such salts is possible.

* The salts of hydrochloric acid and sulphuric acid are specifically excluded from Table II.

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