MDMA Frequently Asked Questions

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I. Introduction

Disclaimer:

This file is an attempt to collect some of the information about MDMA that is floating around on the net in various stages of organization into one easy-to-read document. Ideally, everything that anyone would want to know about MDMA would be included in this document. In practice, there will always be some useful bit of information that haven't made it in yet.. If you find anything that you feel should be added, changed, deleted, or properly credited, please let the maintainer know (address given above).

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Credits:

Many people on the net have provided, knowingly or not, much of the information that went into making this FAQ document. In particular, the largest contributors were:

- Jon M. Taylor (jmt0165@u.cc.utah.edu), First Author / Editor
- David Honig (honig@ics.uci.edu), assembler of the first proto-FAQ for MDMA.
- Lamont Granquist, author of the new Chemistry survey inserted into the FAQ 27 May 1994, and provider of general wisdom.
- R. Jesse, author/editor of the Behavioral Safety Concerns, and Using MDMA Many Times sections.

Updates:

- Feb 2009: by Erowid : Update of Dosing section.
- Jan 2005: by Erowid : Update of Raves section.
- Apr 2004: by Erowid : Major update to MDMA & Parkinson's Myth section.
- 2001-2003: by Erowid : Minor link and typo updates.
- Jan 20, 1996 : Taylor ? : Updated links, added new links.
- Feb 15 & May 27, 1994 : Taylor, Jesse : Modified dosing information; added supplemental dosing note, Added III. Safety and Neurotoxicity Discussion, Added Note on Using MDMA Many Times (R. Jesse), Replaced Chemistry section with Lamont Granquist's new survey, Added more references

II. General

MDMA (also commonly known as Ecstacy, X, E, XTC, Adam, etc.) is a semi-synthetic chemical compound. In its pure form, it is a white crystalline powder. It usually seen in capsule form, in pressed pills, or as loose powder. Average cost ranges from $10-$30 (U.S.) a dose. Common routes of administration are swallowing or snorting, although it can be smoked or injected as well. Currently, MDMA is on the U.S. Schedule I of controlled substances, and is illegal to manufacture, possess, or sell in the United States. Most other countries have similar laws.

According to Nicholas Saunders (1993), "MDMA was patented as long ago as 1913 by the German company Merck. [...] The patent doesn't mention uses." See PIHKAL (Shulgin & Shulgin 1991) or Shulgin 1986 for more history, including how Alexander Shulgin brought the drug to the attention of psychotherapists in the 1970s.

Dosing:

Usual doses of MDMA range from around 80 to 160 milligrams (orally), though monks have used lower doses (40-60 mg) to assist meditation, and therapists have sometimes taken similarly low doses to become more in tune with clients. Response to the drug is not strictly proportional to body weight.

When MDMA is taken by mouth, the effects manifest about 30-45 minutes later; snorting, smoking or injecting produces much quicker onset. The primary effects usually reach a plateau at T+1:00 (one hour after taking the dose) to T+1:30, stay there for some two hours, then start tapering gradually. The primary effects are pretty much over by T+4:00 to T+6:00. Secondary effects (afterglow) may be felt for days, and tertiary psychological effects (e.g. improved outlook) may last indefinitely.

Supplemental dosing: If you have taken an ordinary dose of MDMA (say 2 mg/kg), you like where you are at about T+1:30 (you will have reached plateau by then), and would like to prolong your stay there, take a supplement equal to about 1/3 to 1/2 the initial dose. Taking much more than this is likely to induce or increase unwanted side effects without providing additional benefit in return.

Contraindications and overdose information:

MDMA causes an increase in blood pressure and pulse rate, modest in most people, similar to moderate exercise. Because of this, and because a few people may have a more pronounced cardiac response to MDMA, people with a history of high blood pressure, heart trouble, or stroke are advised not to use MDMA, or at the very least are advised to start with a much lower than average dose. The same warning applies to people who are hypersensitive to drugs. Liver or kidney problems may also contraindicate MDMA use. It is, of course, desirable to hear from your physician that you're in good overall health before ingesting any powerful substance.

Deaths have been reported of some MDMA users who were also taking Monoamine Oxidase Inhibitors (MAOIs are often prescribed as antidepressants). MDMA is *not* recommended to anyone taking any MAOI. Ask your doctor or pharmacist if you're unsure whether a drug you are taking is an MAOI. Also be aware that some antidepressants (e.g. Prozac and Zoloft) may inhibit some of the effects of MDMA.

MDMA is thought by many to be a fairly safe drug, as long as you keep track of what your body is telling you (see Section III below for more discussion of safety). The euphoria that it induces can make it easy to ignore bodily distress signals, so be watchful for things like dehydration (drink lots of water or fruit juices!), muscle cramping, dizziness, exhaustion or overexertion. Several reports from England tell of dosed ravers dancing themselves into severe dehydration and heat exhaustion that required hospitalization and in a few cases resulted in death. An MDMA overdose is characterized by high pulse or blood pressure, faintness, muscle cramping, or

panic attacks. If you experience any of these symptoms, sit down, rest, and drink some fruit juice, water, or a gatorade-type sports drink. In the unlikely event someone has a more severe reaction, e.g. loss of consciousness or seizures, get medical help as soon as possible.

Effects:

The physical effects of usual doses of MDMA are subtle and variable: some users report dryness of mouth, jaw clenching, teeth grinding, nystagmus (eye wiggles), sweating, or nausea. Others report feelings of profound physical relaxation. At higher doses (overdoses), the physical effects of MDMA resemble those of amphetamines: fast or pounding heartbeat, sweating, dizziness, restlessness, etc.

The psychological effects are a bit more difficult to describe, since they are many and of widely varying effects. The major ones are:

Entactogenesis ("touching within")
This is a generalized feeling that all is right and good with the world. People on MDMA often describe feeling "at peace" or experiencing a generalized "happy" feeling. Also, common everyday things may seem to be abnormally beautiful or interesting. Alexander Shulgin reported that mountains that he had observed many times before appeared to be so beautiful that he could barely stand looking at them.

Empathogenesis
Empathogenesis is a feeling of emotional closeness to others (and to one's self) coupled with a breakdown of personal communication barriers. People on MDMA report feeling much more at ease talking to others and that any hangups that one may have with regard to "opening up" to others may be reduced or even eliminated. This effect is partially responsible for MDMA's being known as a "hug drug" - the increased emotional closeness makes personal contact quite rewarding.

Many people use MDMA primarily for this effect, reporting that it makes potentially awkward or uncomfortable social situations (singles bars, dance clubs, etc.) much more easily dealt with. "[Conversation] just flows like water" said one person. "It seems like you know exactly what to say and when to say it. It's like a filter between what you want to express and what comes out of your mouth that you didn't even know existed is stripped away." This same person also reported that they used to use alcohol for many of these same reasons, but found MDMA to be more effective.

An enhancement of the senses
MDMA can significantly enhance (sometimes distort) the senses - touch, proprioception, vision, taste, smell. MDMAers can sometimes be seen running their hands over differently textured objects repeatedly, tasting and smelling various foods/drinks. This effect also contributes to the "hug drug" effect because of the novel feeling of running one's hands over skin and having one's skin rubbed by someone else's hands.

Before it was made illegal, MDMA was gaining a reputation among the psychiatric community as a valuable therapeutic tool. People under its influence often report seeing their lives in a whole new light. "I was completely blown away the first time I did X" said the same person quoted above. "I saw some of my problems that I didn't even know I had! All of a sudden, It seemed like the source, nature and sometimes even the solution of all my personal difficulties were completely obvious." Surfacing of repressed memories has also been reported.

Despite the legal risks surrounding Schedule I drugs, some therapists are still using MDMA in their practices. For a report on the subjective experiences and psychological/behavioral sequelae of 20 psychiatrists who took

MDMA, see "Phenomenology and Sequelae of 3,4 Methylenedioxy-methamphetamine Use" (Liester, Grob, Bravo, and Walsh) in J. Nervous and Mental Disease, Vol 180, No. 6, June 1992, Serial No. 1315.

Most people find the MDMA state so valuable by itself that it's not clear there's much to be gained from combining MDMA with most other substances (though the combination of of MDMA with LSD seems to have a strong following). Further, combining drugs ("polydrug use" and "polydrug abuse") complicates the medical and behavioral safety picture. For this reason, it is not a recommended practice in the absence of expert guidance. Here is a chart of commonly encountered drugs and some of their reactions when combined with MDMA:

Drug	Reaction Information
Marijuana	Not known for dangerous reactions. MJ is habit-forming for some users.
LSD	Not known for dangerous reactions.
Amphetamines	Amphetamine overdosage probability is dramatically increased. Strongly discouraged. Speed is addictive.
Cocaine	Same as Amphetamines. Cocaine is addictive.
Heroin or other opiates	No dangerous reaction, but the stimulant effect of MDMA may mask the opiate's sedative effect and increase the likelihood of overdose. The opiates are addictive.
Tobacco	Not known for dangerous reactions. Tobacco is highly addictive and carcinogenic.
Alcohol	Same danger as opiates, also can dangerously exacerbate the dehydration that MDMA normally causes. Not recommended. Alcohol is habit-forming for some users.

Note that this chart does not cover cross-reactions of mental effects. This will be covered in the next section.

Notes on having a rewarding time:

MDMA is used by different people for different things. Because the drug has such a wide range of effects, it can add to almost any activity. Here are some of the more common activities than people take MDMA and engage in.

Raves

Raves are common settings for taking MDMA. Raves are a type of dance party associated with particular sub-cultures, dance, and musical styles. Although many extensive descriptions of raves exist elsewhere, understanding raves is also key to understanding the recreational use of MDMA. Unlike most adult dance parties and commercial clubs, raves tend to disallow the use of alcohol and do not sell alcohol on site. Most raves are, instead, oriented around the use of MDMA and other psychoactive stimulants and psychedelics instead of alcohol. The 'Rave Culture' is also characterized by promoting non-violent, friendly, safe spaces for people to dance and express themselves. Many rave goers do not take MDMA, but simply enjoy the non-alcohol music venues, dance spaces, good DJs, and the more open, friendly 'vibe' of rave culture events and parties. MDMA's stimulant and analgesic (pain killing) effects and its enhancement of proprioception (deep body sense) make movement feel easier and more pleasant, so ravers on MDMA often dance for long periods of time (remember to drink water and eat to replace lost fluid and electrolytes!). The feeling of unity and shared ecstatic joy at a successful rave can be overwhelmingly wonderful. Some ravers regard this as spiritual or religious practice. Entire

encyclopedia sets could now be devoted to the topic of raves: for more info, see google search, alt.rave FAQ, wikipedia, etc.

Self-psychotherapy
Since MDMA can catalyze a broad range of psychotherapeutic effects (surfacing of repressed memories, dealing with emotional issues, etc.), MDMAers sometimes will trip by themselves or with a trusted guide, and spend the experience thinking about their lives. It has been said that "one hit of X [MDMA] is worth 3 months of conventional psychotherapy". Whether that is an exaggeration or not, MDMA has been praised by many psychotherapists as a notably effective means of dealing with personal issues. People who have had an MDMA experience of this kind often will want to talk to some people they are close to in order to discuss what MDMA has made them more aware of.

A substitute for speed
MDMA is also sometimes used for some of the same things that amphetamines are used for, typically activities that require concentration, motivation, creativity, or energy. Doing homework, studying, writing, playing video games, and dieting are some of the many activities that MDMA may facilitate.

The sensorium
The sensory enhancement of MDMA can make sensual activities unusually enjoyable. Touching can become such an intensely pleasurable sensation that close personal contact (sexual or otherwise) can be quite fun, especially when coupled with MDMA's empathogenic effects. Hugging someone and running your hands over them are such a common thing to see people on MDMA doing that it is known to some as the 'Hug Drug'. Eating, drinking, smelling flowers and even the sensations of waste elimination can become special experiences on MDMA.

MDMA can also be mixed with other drugs for a different experience. The health hazards of each of these combinations were discussed in the section on contraindications. Here are the mental effects: (note that this is based on subjective information. Personal reactions may differ.)

Drug	Information
Marijuana	Fun, but can cloud the mental effects of the MDMA. Have to smoke more before you notice it.
LSD	Can go very well together. LSD and MDMA is commonly known as "XL" or "candyflipping". Most prefer quite low doses of LSD.
Amphetamines	You're already speeding. Why bother? Health risks noted in contraindications section.
Cocaine	Similar to Amphetamines.
Heroin or other opiates	In terminal cancer patients, MDMA has restored the lucidity that is often obscured by opiates given for pain.
Tobacco	Tastes good, if you're into it. Easy to smoke too much.
Alcohol	Can cloud the desired effects of MDMA. Dehydrating.

Drug Quality

To have a rewarding time on MDMA, you need to have good quality MDMA. The only way to maximize your chance of getting the real thing is to know & trust your supplier. Note that MDMA is not known for causing strong visual distortions. If you take some "MDMA" and notice that a predominant effect is trippy visuals, what you got was probably not pure MDMA, or MDMA at all.

Note on Using MDMA Many Times:

Most users of MDMA who have taken the drug many times report that after some number of sessions, varying by person from a few to a few dozen, the desirable effects of the drug are no longer as pronounced. Said one, "it loses its magic." Another person who used MDMA perhaps a dozen times (separated by weeks to months) noted the dropoff, waited three years (!), tried an ordinary dose of high-quality MDMA again, and found that the annoyance of the physical side effects outweighed the greatly diminished positive effects. He has sadly given up the drug. Others who have had fifty or more MDMA sessions still find them to be worthwhile on balance.

This MDMA effect dropoff might be explained by a psychological mechanism: loss of novelty. (On the other hand, people who have experienced MDMA effect dropoff generally report that there is not a similar dropoff in the effects of other psychedelics with which they are equally or more experienced, e.g. LSD and DMT.) Or the dropoff might be caused by lasting neurophysiological or neurological "changes" to the brain from exposure to MDMA, the prior state of the changed structures being necessary for ecstatic MDMA experiences. It is an as-yet-unanswered question whether such changes, if they happen, are best regarded as harmful, neutral, or beneficial.

If you choose to use MDMA, the lesson here may be to spend your first few sessions wisely and cherish them. Later sessions may never seem as ecstatic.

III. Safety and Neurotoxicity Discussion

Behavioral Safety Concerns

As noted, a primary psychological effect of MDMA is to make the user feel "safe", at peace with the world, pleasantly reconciled to things as they are, and things however they will be. This can remarkably diminish one's ability to make sound judgements during the session. Examples:

- It becomes easy to want to prolong the MDMA state by taking more and more of the drug (or of other drugs), beyond what you would judge wise or worthwhile when not under its influence.
- It becomes easier to have unsafe sex. You may "forget," judge that the risk of infection is very small, or feel that infection wouldn't be such a terrible thing after all. If you think you might have sex while on MDMA, it may help you and your partner to stay safe if you lay out safer sex supplies before dosing in a place you'll be sure to see them later, and agree beforehand that you'll use them if the occasion arises.

Another danger stems from MDMA's lessening of the awareness of pain (whether through chemical analgesia, or through psychological analgesia). Combined with the extra energy the drug gives, it becomes easy to sustain bruises, blisters, or other bodily damage from extensive dancing, hiking, climbing, etc., without noticing it until after the damage is done.

Under MDMA, it may seem "right" to make immediate changes in relationships (increasing or decreasing commitment) of all kinds. The fresh points of view appreciated during an MDMA session are one of the drug's most prized benefits, but it is probably unwise to actually make lasting relationship changes until you have a chance to see how you feel about them after the drug and its afterglow wear off.

Neurotoxicity?

One claimed effect of MDMA use is lowered brain serotonin levels. One study (Peroutka) found no evidence for this, but at least two others (Ricaurte) have found significantly reduced serotonin metabolite levels, the more recent study showing a 30% average difference between the control group of non-MDMA users and the experimental group consisting of people who had used MDMA about 75 times each, on average. (Note though, that some of these studies used psychiatric patients or "polydrug abusers" - not representative user samples.)

What does this mean for users? Anecdotal evidence from years of legal and illegal use suggests that this is not of much concern for most people. Some folks, however, report periods of depression after using MDMA, on rare occasion severe depression. Considering that a primary action of many antidepressant drugs (MAOIs, SSRIs) is to increase brain serotonin levels, a connection between MDMA use and subsequent depression is not unbelievable. Psychological factors - sadness at returning to an ordinary state of consciousness after ecstasy - may also account for feeling down for a while. In any event, most users report the opposite: feelings of well-being or gentle euphoria in the days following an MDMA session. To get a better understanding of why the serotonin system may be critical to normalcy for some individuals and less so for others, see Listening to Prozac by Peter D. Kramer (Viking 1993). The entire book is worthwhile, but note pages 134-136 especially.

There is solid experimental evidence that MDMA, administered in large doses and/or repeatedly, causes partial loss of serotonergic neurons in laboratory animals. Uncertain is whether this loss is permanent, reversible, or important. One study found in the rat nearly 100% recovery within a year. In another study (Ricaurte), non-human primates were dosed with MDMA and their brains were examined for morphological changes. Ricaurte found that there was no effect after 2.5 mg/kg oral doses given every two weeks, for a total of eight doses. But after a single oral dose of 5 mg/kg, he observed a 20% reduction in serotonin and its metabolite 5-HIAA, only in the thalamus & hypothalamus. There appeared to be some regrowth over time, not necessarily complete, and also some "collateral sprouting" - growth of other types of neurons in the reduced serotonin areas.

Note that in all of the animal studies, even when there are quite large serotonin system reductions (up to 90% in high MDMA dose rat studies), no behavioral deficits are observed.

It is also uncertain how these studies would extrapolate to humans - the human brain may well be more or less sensitive, or sensitive in different areas, compared with other animals. In any case, what is known is that there are no reported cases that link behavior changes in humans with MDMA-induced serotonin system changes or neuronal loss. And, the long-term human behavior changes that are noted (in studies and from anecdotal case reports) are generally regarded as positive - lowered impulsiveness and hostility, improved social/interpersonal functioning, changes in religious/spiritual orientation or practice, etc.

One of the reasons so little is known about the lasting effects of MDMA on the human brain is that no subjects (to date) have recorded their drug use history, then volunteered their brains for post-mortem study. If you would like to consider doing this, you can get donor information at 1-800-UM-BRAIN.

Studies with live human subjects are also underway - both volunteers and donations are needed. One good source of current info is the Multidisciplinary Association for Psychedelic Studies (MAPS) - see "Organizations" at the end of the FAQ.

Immune System

Some users of MDMA report an apparent decrease in resistance to disease, especially with frequent MDMA use. It is unknown how much of this may be due to the pharmacological "body load" of MDMA, to staying up all night and dancing, to increased physical contact with people with colds, to suppressed appetite and poor nutrition, etc.

Preventive Measures

A fundamental precaution is to stay well hydrated. Drink water frequently during the MDMA session, and moreso if you're physically active. Under the influence, time can pass surprisingly quickly. It is useful if trip guides or trip buddies remind each other to drink water often.

For those who are concerned about the possibility of serotonin level or serotonin system changes in humans with therapeutic doses of MDMA, some researchers reckon changes can be lessened or prevented by taking antioxidants. In an article titled "Phenethylamines, Free Radicals, and Antioxidants" (MAPS Newsletter, Volume IV Number 1), author Brian Leibovitz suggests in Table 1 taking as a preventive measure the following: 5 mg B-Carotene; 2 grams Bioflavonoids; 100 mg Coenzyme Q10; 2-4 grams L-Ascorbic acid; 1 gram L-Carnitine; 2 grams N-Acetylcysteine (NAC); 250 ug Selenium, and 1,000 IU Vitamin E. "There is nothing magic about the doses listed; it is my best estimate based on present knowledge in nutrition." If you don't feel like buying out the local vitamin store, taking a subset of these (even just the ascorbic acid - vitamin C) could well be helpful.

And, if you're really concerned, recent non-human animal research suggests that most or all of the serotonin system reduction may be prevented by taking Prozac (fluoxetine) 0-6 hours after taking the MDMA (see McCann and Ricuarte in J. Clinical Psychopharmacology, 13 (3):pp. 214-217, 1993). One might speculate that other SSRI drugs (Zoloft, Paxil) may work too. Note, however, that some people report that Prozac taken before or in the early part of an MDMA session lessens some of the desirable effects of the MDMA.

Conclusion?

One take on all this information is that there are a great many questions unanswered by research as yet. Thus a conservative, prudent assumption is that the risk of some kind of subtle neurological "damage" in humans from MDMA use is not zero. Yet there is no behavioral evidence of neurological harm in humans (and there is considerable evidence of psychological benefits) - this in many years of legal use (before 1985 in the US), and quite widespread illegal use since then.

Given any non-zero risk, it makes sense to examine the benefit side of the equation, and take the drug only when you expect to get some tangible positive outcome from it that you feel makes taking the risk worthwhile.

IV. Chemistry

Introduction:

All information here is to be used at your own risk. The procedures documented in this file, if carried out by unlicensed individuals would violate laws against controlled substances in most countries and could result in

criminal charges being filed. If carried out by individuals unskilled at chemistry they could result in serious bodily harm.

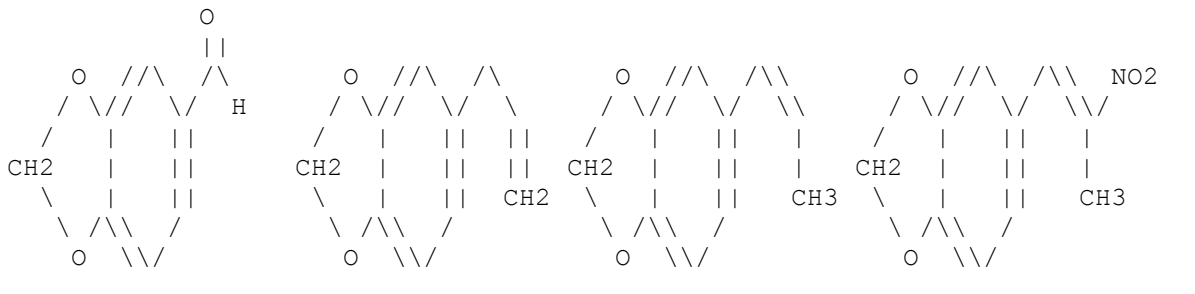
MDMA ("Ecstasy") is a semi-synthetic compound which can be made relatively easily from available precursors. Synthesis instructions exist which can be followed by an amateur with very little knowledge of chemistry. However, people with less than 2 years of college chemistry experience would probably not be capable of sucessfully synthesizing MDMA, and would either botch it in the best case or kill themselves in the worst case. For those interested in the techniques involved in synthesizing MDMA, a good book for self-learning is the following:

Zubrick, James W. "The Organic Chem Lab Survival Manual:
A Students Guide to Techniques." ISBN #0471575046.
Wiley John&Sons Inc. 3rd ed.

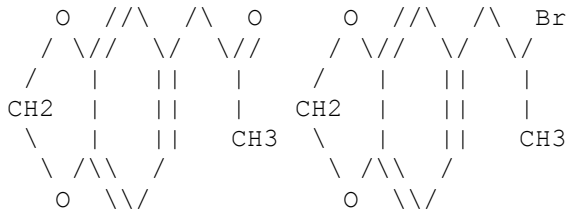
It is recommended that this book should be supplemented with at **least** one more of the 'dry' and technical O-Chem lab manuals available at any college bookstore. It is not recommend that the information from these books or herein this file be used to synthesize MDMA for the previously stated reasons. Knowledge, however, is not (yet) illegal.

Precursors:

The following chemicals are some of the more important ones in the synthesis of MDMA and related chemicals:



piperonal safrole isosafrole beta-nitroisosafrole



MDP-2-P 3,4-methylenedioxy-phenyl-2-bromopropane

- safrole: 3,4-methylenedioxyallylbenzene, 1-(3,4-methylenedioxyphenyl)-2-propene
- isosafrole: 3,4-methylenedioxypropenylbenzene, 1-(3,4-methylenedioxyphenyl)-1-propene
- MDP-2-P: 3,4-methylenedioxyphenyl-2-propanone, 3,4-methylenedioxyphenylacetone, 3,4-methylenedioxybenzyl methyl ketone, piperonylacetone
- piperonal: 3,4-methylenedioxybenzaldehyde, heliotropin
- beta-nitroisosafrole: 3,4-methylenedioxyphenyl-2-nitropropene

Safrole, isosafrole, MDP-2-P, piperonal and beta-nitroisosafrole are the most commonly found precursors to MDMA in clandestine labs.

Synthetic Routes:

For an overview of MDMA synthetic routes it is suggested that the readers familiarize themselves very thoroughly with the following reference:

Dal Cason-TA. "An Evaluation of the Potential for Clandestine Manufacture of 3,4-Methylenedioxyamphetamine (MDA) Analogs and Homologs." Journal of Forensic Sciences. Vol 35(3):675-697. May 1990.

The most common synthetic routes for production of MDA, MDMA, MDE (MDEA), and MDOH are from the precursor MDP-2-P. To get MDP-2-P first a natural source of safrole is acquired. Safrole can be extracted from sassafras oil, nutmeg oil, or several other sources which have been abundantly documented in _Chemical Abstracts_ over the years. The safrole is then easily isomerized into isosafrole when heated with NaOH or KOH. The isosafrole is then oxidized into MDP-2-P. This latter procedure has been most clearly presented in _Phenethylamines I Have Known and Loved_ by Alexander Shulgin under synthesis #109 (MDMA). The synthesis of MDP-2-P from isosafrole will require the use of a vacuum pump to evaporate the solvent from the final product in vacuo. An aspirator will not, unfortunately, be sufficient.

Once the MDP-2-P is synthesized there are several synthetic routes which can be taken:

1. Sodium Cyanoborohydride
2. Aluminum Amalgam
3. Sodium Borohydride
4. Raney Nickel Catalysis
5. Leukart Reaction via N-formyl-MDA
6. Leukart Reaction via N-methyl-N-formyl-MDA

The sodium cyanoborohydride method is probably the one most attractive to clandestine chemists. From the Dal Cason reference:

"It requires no knowledge of chemistry, has a wide applicability, offers little chance of failure, produces good yields, does not require expensive chemical apparatus or glassware, and uses currently available (and easily synthesized) precursors"

The aluminum amalgam synthesis is often used but has a slightly higher risk of failure and is not as versatile. The Raney Ni synthesis is more dangerous and requires special equipment to be done right (although this scheme is used in a significant number of clandestine labs). The sodium borohydride requires harsher conditions for the chemicals (ie. reflux) than sodium cyanoborohydride or aluminum amalgam and produces lower yields. The Leukart reaction is 2-step with lower yields and requires chemical apparatus.

There are also two synthetic methods which proceed directly from safrole rather than through isosafrole. The first is the Ritter reaction which goes through the intermediate N-acetyl-MDA. The Ritter reaction is time-consuming, requires a degree of laboratory skill and produces poor yields. The other method uses HBr to produce 3,4-methylenedioxyphenyl-2-bromopropane which is then converted into MDA or MDMA. This scheme produces poor yields, and Dal Cason referenced the australian journal _ANALOG_ where a hazard had been documented. It is, however, attractive for its sheer simplicity. It requires no specialized chem equipment or reagents at all.

Beta-nitroisosafrole is a less used precursor, but there is a large literature on the synthesis and reduction of nitro alkenes. This synthetic route isn't as popular due to the easier availability of precursors for MDP-2-P, and it also results in MDA which must then be further processed to give MDMA or any other N-alkyl homolog of MDA. There are numerous ways to convert beta-nitroisosafrole to MDA: LiAlH4, AlH3, electrolytic, Na(Hg), BH3 - THF / NaBH4, Raney Ni catalyst, Pd / BaSO4 catalyst, Zn (Hg). Beta-nitroisosafrole, when used, is commonly synthesized from piperonal. Beta-nitroisosafrole can also be used as a precursor for MDP-2-P, but this is not commonly done.

There are other synthetic routes, such as the use of substituted 3,4-methylenedioxycinnamic acid or the construction of alkyenedioxy bridges from dihydroxy compounds. These, however, are typically not used for a variety of reasons (difficulty, multiple-step, special equipment, etc). It is also possible to synthesize N-alkyl derivatives of MDA from MDA (e.g. synthesizing MDMA from MDA) but this is not commonly done in clandestine labs.

Methylamine

Methylamine is a chemical which is technically not a "precursor" to MDMA, but it is necessary in most of the syntheses. It is also a watched chemical. A private citizen ordering methylamine from a chemical supply company would get the undivided attention of the local DEA. Methylamine can be diverted in small quantities by individuals working in legitimate chemical labs. In some cases this "diversion" is simply theft. It is not recommended that any persons engage in this activity, but it remains a common source of methylamine (along with many other chemicals).

Methylamine can be synthesized through hydrolyzing N-methylacetamide via refluxing it with concentrated HCl. Dump a gallon of concentrated HCl in a large RB flask, dump in a mole or two of N-methylacamide and reflux the hell out of it for about 2 days. This leaves water, methylamine and acetic acid. Boil off the water, and strip the acetic acid off with a vacuum pump and what's left is the methylamine. Some acetic acid may be left over, but it shouldn't affect the cyanoborohydride reaction.

It can also be synthesized by doing a large hypohalite Hofmann degradation on acetamide with bleach and lye. Heat it up and distill off the water/methylamine from the basic mush and catch it in HCl. Boil off the water/acid distillate and the result is methylamine HCl.

N-methylacetamide is unlikely to be watched, and acetamide is almost certainly not watched.

Some syntheses use N-methylformamide as an alternative to methylamine, but it is unlikely that there would be any advantage to using it. The 3 syntheses focused on in this file (HBr, cyanoborohydride and aluminum amalgam) all use methylamine.

Secrets of Methamphetamine Manufacture has both a synthesis of methylamine and a synthesis of N-methylformamide, but i haven't had a chance to peruse the book to comment on them.

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Summary:
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oil of sassafras -------> safrole ----------> isosafrole --------> MDP-2-P
               (extraction)  |  (isomerization)         (synthesis)   |
                             |                                        |
                             V                                        V
                    *1. safrole + HBr           *1. sodium cyanoborohydride
                     2. Ritter reaction         *2. aluminum amalgam
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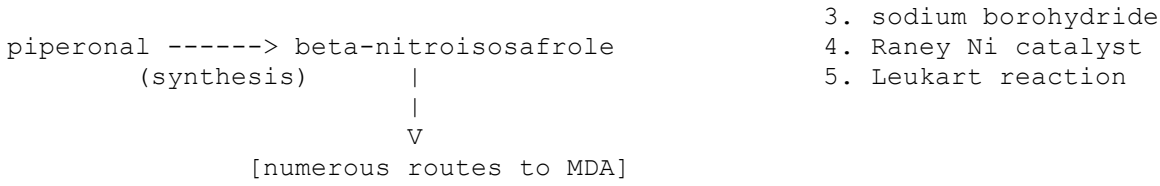

- the sodium cyanoborohydride method is the preferred method
- the safrole + HBr route is attractive due to its sheer simplicity
- the aluminum amalgam route is as useful as cyanoborohydride, but may have a slightly higher risk of failure.

"Popular" Literature:

Psychedelic Chemistry:
Contains instructions for isomerizing safrole, a synthesis of MDP-2-P from isosafrole, and a synthesis which uses the Leukart reaction. The synthesis of MDP-2-P is better presented in PiHKAL and the Leukart reaction is is not a recommended synthesis. Also, please see "ROAD HAZARDS" below, on the dangerous typos in this synthesis.

Secrets of Methamphetamine Manufacturing:
Contains instructions for synthesizing MDMA via the safrole + HBr method. This is the simple and dirty way to synthesize MDMA. Pay attention to the part where it tells you to make sure that you've got all the ether evaporated before placing it in the reaction bomb... for your own good. References to the original journal articles and Chem Abstracts are included. It also has synthesis instructions for methylamine and N-methylformamide, but i haven't had a chance to read them.

PiHKAL #100 (MDA):
Synthesis of beta-nitroisosafrole from piperonal, synthesis of MDA from beta-nitroisosafrole using lithium aluminum hydride, synthesis of MDA from MDP-2-P using sodium cyanoborohydride. The latter is probably the most useful. Although piperonal is commonly used to synthesize beta-nitroisosafrole. LAH is somewhat dangerous.

PiHKAL #105 (MDDM):
Synthesis of MDDM (N,N-dimethyl-MDA) from MDP-2-P using sodium cyanoborohydride. This stuff isn't terribly active, its just another example of a sodium cyanoborohydride synthesis.

PiHKAL #106 (MDE):
Synthesis of MDE from MDA via N-acetyl-MDA. Synthesis of MDE from MDP-2-P using aluminum amalgam. Synthesis of MDE from MDP-2-P using sodium cyanoborohydride. The latter two are the most useful. Synthesizing MDE from MDA is not particularly useful to clandestine chemists.

PiHKAL #109 (MDMA):
Synthesis of MDMA from MDA via N-formyl-MDA. Synthesis of MDP-2-P from isosafrole. Synthesis of MDP-2-P from beta-nitro- isosafrole. Synthesis of MDMA from MDP-2-P using aluminum amalgam. The synthesis of MDP-2-P from isosafrole and the aluminum amalgam synthesis are probably the most useful. The synthesis of MDP-2-P from beta-nitroisosafrole might be useful, but most often beta-nitroisosafrole is used to produce MDA directly. Synthesizing MDMA from MDA is not particularly useful to clandestine chemists.

PiHKAL #114 (MDOH):
Synthesis of MDOH from MDP-2-P using sodium cyanoborohydride. This stuff is active, and the synthesis is useful. I don't know of any explicit synthesis for MDMA using sodium cyanoborohydride, but it can be done simply by substituting the correct number of moles of methylamine for ethylamine in the MDE synthesis. Also, substituting methylamine for ethylamine in the cyanoborohydride synthesis produces slightly better yields.

Road Hazards:

Chemical Abstracts 52, 11965c (1958):
In the synthesis of MDA from MDP-2-P this reference has a misprint that should read "add 100 ml H2O" instead of "add 100 ml H2O2" which would cause an explosion. Chemistry is dangerous, and a little ignorance can cause spectacular pyrotechnics...

Psychedelic Chemistry:
The synthesis for MDA/MDMA is the same as the above Chemical Abstracts reference including the explosive typo. There is also another typo which should read "75 ml 15% HCl" instead of "57ml 15% HCl." This might simply mess your yields up.

Et20/THF:
AKA diethyl ether and tetrahydrofuran. These two chemicals form explosive peroxides when they are exposed to air for extended periods of time, and which are easily set off by refluxing (for example). These are likely the cause of most explosions and fires in amphetamine labs. Do not play around with these chemicals, and if you use them, know what you are doing.

MDP-2-P:
"piperonylacetone" is an ambiguous term which might refer to the 4-carbon analogue of MDP-2-P. Shulgin has noted that at least one chemical supply house has sold this 4-carbon analogue as "piperonylacetone." The correct piperonylacetone (MDP-2-P) is sassafras-smelling oil that is yellow colored. The incorrect piperonylacetone has a weak terpene smell and is white and crystalline. Substitution will merely result in some interesting 4-carbon analogues of MDMA which are probably totally inactive. See PiHKAL #109 (MDMA).

LAH:
Lithium Aluminum Hydride (LiAlH4), is a chemical which explodes on contact with water, and can be set off by moisture in the air. It should only be used under an inert atmosphere, which requires special equipment.

Various and Miscellany

Rumor Control

There is a lot of misinformation out there about MDMA. Here are some commonly heard rumors and facts about them.

Rumor #1: MDMA drains your spinal fluid, ruins your back, etc.

Untrue. This urban legend apparently started because some pharmacological studies are done by giving subjects MDMA, then withdrawing cerebrospinal fluid samples for analysis via spinal tap. It is "MDMA research", not "MDMA" that may drain your spinal fluid!

Rumor #2: MDMA causes brain damage similar to Parkinson's disease
Unfortunately the MDMA & Parkinson's issue became much more complicated between 1999 and 2003. Most simply, there is very little evidence that MDMA causes Parkinson's disease and there is evidence to suggest it does not.

First, this rumor was initially cited in the late 1980s because of the confusion between MDMA and MPTP. One of the reasons that Parkinson's is associated in people's minds with "designer drugs" is that in the mid 1980s, a toxic contaminant in a batch of a synthetic analog of Demerol caused massive dopamine-system damage to the users unfortunate enough to try it. Many users started having Parkinson's symptoms and the US Congress rushed to pass the Analogue Drug Laws partially as a result of the media frenzy surrounding this tragedy. The contaminant is called MPTP and more information about this can be found in the Erowid MPTP Vault.

Second, in 1999 the first medical case report of an ecstasy user developing Parkinson's symptoms was reported by Mintzer. Following this case report, there were two additional case reports of ecstasy users who developed Parkinson's-like symptoms (Kuniyoshi 2003, O'Suilleabhain 2003) but none of the reports included any evidence of causal connection. The difficulty here is that there are literally tens of millions of ecstasy users in the U.S. alone, most of them young, and simply finding a small number of these who develop a rare disease cannot be assumed to indicate a causal relationship between the behavior and the disease. This also does not mean there is no connection, simply that it remains very speculative.

Third, in a paper published in 2002 in the prestigous journal Science, one of the key ecstasy brain damage researchers, George Ricaurte, reported that "a single dose of ecstasy" could cause Parkinson's. This 'fact' was trumpeted by virtually every news outlet in the U.S. and was big news. Unfortunately for Dr. Ricaurte, it was soon discovered that he had accidentally given the monkeys methamphetamine instead of MDMA and methamphetamine is a known dopamine neurotoxin. It is important to note, however, that methamphetamine has **NOT** been found to cause Parkinson's disease, further damaging Ricaurte's credibility. For more information about this, see Major Error in Ecstasy Research, by Erowid.

For an overview of this issue, please see the 2003 paper by Kish: What Is the Evidence That Ecstasy (MDMA) Can Cause Parkinson's Disease?.

Analogues and related compounds:

MDMA has several chemical "cousins" which have different effects. PIHKAL is an excellent reference to find out about them. Briefly, here are descriptions of some of the more common ones:

MDA (3,4-methylenedioxyamphetamine):
MDA was popular for a while during the 70s, when it was known as the 'Love Drug' (a nickname sometimes associated with MDMA as well). It is similar to MDMA in its effects, but is slightly more stimulating. It has been shown in laboratory studies to be approximately twice as neurotoxic as MDMA, though in some 30 years of human use, case reports do not suggest that it has caused behavioral or psychological problems.

MDE or MDEA (N-ethyl-methylendioxyamphetamine):

Commonly called "Eve" (if MDMA is "Adam", MDE is "Eve", get it?), MDE is similar to MDMA, though it seems to turn the subject inwards and invite less communication than does MDMA, though in some

MMDA (3-methoxy-4,5-methylenedioxyamphetamine):
Often confused with the similarly-named but chemically different MDMA. MMDA is reported to generate interesting, closed-eye hallucinations - "brain movies", or conscious dreams.

MBDB (N-methyl-1-(1,3-benzodioxol-5-yl)-2-butanamine):
Differs structurally from MDMA only by the addition of an extra carbon to the MDMA chain. Effects are similar to MDA.

References and Related Reading:

Adamson, Sophia
Through the Gateway of the Heart.
Four Trees Publications, San Francisco, 1985. 197 pages.
A collection of stories about drug experiences, primarily with MDMA, and also with 2C-B and other psychedelics, typically taken with MDMA.

Beck, J. and Marsha Rosenbaum.
In Pursuit of Ecstasy.
SUNY Press, 1994.

Del Cason, TA.
"An Evaluation of the Potential for Clandestine Manufacture of 3,4-Methylenedioxyamphetamine (MDA) and Analogs and Homologs."
Journal of Forensic Sciences. Vol 35(3):675-697, May 1990.
Synthesis of MDMA and related chemicals.

Eisner, Bruce
Ecstacy: the MDMA Story.
Ronin Publishing, inc. Box 1035 Berkeley, CA 94701, 1989 (revised 1993). 228 pages.

Naranjo, Claudio
The Healing Journey: New Approaches to Consciousness.
Published by Random House (paperback: Ballentine), 1973. 197 pages.
Accounts of groundbreaking therapeutic uses of MDA, MMDA, Harmaline, and Ibogaine.

Peroutka, SJ, ed.
Ecstasy: The Clinical, Pharmacological and Nerotoxicological Effects of the Drug MDMA.
Kluwer Academic Publishers, 1990.
A collection of authorititative papers on nearly every aspect of MDMA.

Saunders, Nicholas.

Ecstasy: Dance, Trance & Transformation
E for Ecstasy
Published by N. Saunders, 14 Neal's Yard, London WC2H 0DP England, 1993. 318 pages.
Full overview of MDMA, also includes the latest version of Alexander Shulgin's MDMA bibliography. Extensive references with summaries.

Shulgin, Alexander
"The Background and Chemistry of MDMA."
Journal of Psychoactive Drugs. Vol 18(4)"291-304, Oct-Dec 1986.
"Suggested entrypoint in the literature to the history, chemistry and controversy surrounding MDMA - a FAQish document," says lamontg.

Shulgin, Alexander, Sargent, and C.Naranjo. 1967.
"The chemistry and psychopharmacology of nutmeg and of several related phenylisopropylamines."
In D.H. Efron [ed.]: Ethnopharmacologic search for psychoactive drugs. U. S. Dept. of H. E. W., Public Health Service Publication No. 1645. Pp. 202-214. Discussion: ibid. pp. 223-229. 49

Shulgin, Alexander and Ann
PIHKAL: A Chemical Love Story. (online)
Transform Press, Box 13675, Berkeley, CA 94701, 1991. 1008 pages.
The first part of this book contains autobiographical accounts of the Shulgins' life history and experiments with psychoactive drugs. The second part describes the synthesis, dosage and effects of 179 different compounds in the phenethylamine family, including MDMA and several of its analogues.