



# INFORMATION BRIEF

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NDIC

## Iodine

### in Methamphetamine Production

#### Overview

Iodine crystals, which are used legally for a variety of commercial and medical purposes, frequently are used illegally to produce high quality d-methamphetamine. The following ephedrine/pseudoephedrine reduction method utilizes iodine in the production process.

- **Iodine/red phosphorus.** The principal chemicals are ephedrine or pseudoephedrine, iodine, and red phosphorus. The required hydriodic acid in this variation of the hydriodic acid/red phosphorus method is produced by the reaction of iodine in water with red phosphorus. This method yields high quality d-methamphetamine. Another iodine/red phosphorus method, limited to small production batches, is called the cold cook method because the chemicals, instead of being heated, are placed in a hot environment such as in direct sunlight.

The federal government regulates the sale of iodine crystals, which are readily available for legitimate use. However, it is illegal to import, export, purchase, or sell iodine crystals in the United States if they are used or intended to be used in the production of methamphetamine. Methamphetamine producers typically acquire iodine crystals through theft or diversion, from Mexican criminal groups

that smuggle iodine into the United States across the U.S.–Mexico border, or by purchasing and crystallizing iodine tincture, the sale of which is not regulated in most U.S. states.

#### Iodine Used in Methamphetamine Production

Methamphetamine producers use iodine crystals to produce hydriodic acid, the preferred reagent in the ephedrine/pseudoephedrine reduction method of d-methamphetamine production. A reagent is a chemical used in reactions to convert a precursor into a finished product. The reagent does not become part of the finished product. The regulation of hydriodic acid by the Drug Enforcement Administration (DEA) in 1993 rendered the chemical virtually unavailable in the United States.

Hydriodic acid can be produced by combining iodine crystals with water and some form of phosphorus, including red phosphorus, hypophosphorous acid, or phosphorous acid. In the methamphetamine production process, iodine crystals may be used to prepare hydriodic acid in a separate step or may be introduced directly into the synthesis of the methamphetamine.

## **Iodine Production and Availability**

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Iodine—called yodo in Spanish and black in slang terms—is a naturally occurring element that is commercially available as crystals or as a tincture. Iodine crystals usually are available as bluish-black or violet crystals that have a metallic luster. In its gaseous state iodine is violet in color. Typically, iodine emits a sharp, distinct odor. Iodine tincture—a solution of iodine in alcohol—is widely available.

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### **Iodine Tincture**

Small-scale methamphetamine producers who are unable to obtain iodine crystals occasionally produce them from iodine tincture by mixing iodine tincture with hydrogen peroxide. This is a time-consuming process that yields a very small amount of iodine crystals in relation to the amount of tincture and hydrogen peroxide used.

Iodine tincture for human antiseptic use on wounds and scrapes usually is sold in small quantities, typically in 1-ounce bottles containing 2 percent iodine. These small bottles are sold for \$1 to \$2. “Strong” iodine tincture (7% concentration) for veterinary use is sold in various sizes from 16-ounce bottles to 50-gallon drums. A 16-ounce bottle of strong iodine is sold for \$4 to \$6. The primary ingredients in iodine tincture are ethyl alcohol and water.

Iodine tincture is not regulated by law and is sold in retail stores, pharmacies, and farm supply stores. It can be obtained easily via the Internet from horse and farm supply sites and online pharmacies.

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Iodine crystals are widely available and have the following legitimate uses:

- As a derivative used to make chemicals and polymers, sanitation and cleaning compounds, pharmaceuticals, nylon fibers, dyes and ink, and photographic film
- As a developer to help crime scene investigators discover latent fingerprints on paper surfaces
- As a nutritional supplement in table salt
- As a common ingredient in dietary supplements for livestock
- As an element in the production of electric light bulbs
- As a water purification and swimming pool sanitization chemical
- As a topical antiseptic for humans, horses, and cattle after the crystals are made into iodine tincture

Iodine crystals may be purchased from a variety of businesses. Crystals typically are available for sale at chemical supply stores, feed and tack stores, and veterinary clinics and suppliers. Iodine also is widely available on the Internet. One online pharmacy, for example, sells iodine crystals in ounce quantities for approximately \$14. One pound of iodine crystals retails for approximately \$160. A rancher with a large farm typically may use up to 2 ounces to treat a herd in 1 year. A methamphetamine producer, on the other hand, may use 2 to 4 pounds to produce 1 pound of methamphetamine.

Companies in several countries throughout the world produce and sell iodine crystals commercially. Chilean companies were the world’s largest producers of iodine in 2000, followed by Japanese and U.S. companies. Overall, worldwide iodine production increased from 13,726 tons in 1994 to 18,993 tons in 2000. Iodine crystal producers sell the chemical to companies that either use iodine in manufacturing processes or sell it wholesale.

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## Legislation and Control

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The Comprehensive Methamphetamine Control Act of 1996 identifies iodine as a List II chemical. DEA mandates that detailed records be kept for sales of iodine crystals that exceed the threshold of 0.4 kilogram established in 2000. Anyone who sells a total of 0.4 kilogram (13.98 ounces) of iodine crystals to an individual, corporation, business, or other legal entity in a 30-day reporting period must obtain data identifying the purchaser, keep records of the transactions for 2 years, and report any suspicious transactions to DEA. This rule does not apply to iodine tinctures or other iodine mixtures.

The possession, distribution, and use of listed chemicals, including iodine, are subject to the following prohibitions: 21 U.S.C. § 841(c)(1)–(3) prohibits any person from knowingly or intentionally possessing or distributing a listed chemical with the intent, knowledge, or belief that the chemical will be used to manufacture a controlled substance. It also prohibits a person from knowingly or intentionally evading established recordkeeping or reporting requirements.

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### Feed Store Owner Convicted

On May 15, 2002, a federal jury convicted a feed store owner in Sallisaw, Oklahoma, on 12 criminal charges for selling iodine crystals to methamphetamine producers. The charges included conspiracy to distribute listed chemicals, possession and distribution of listed chemicals, conspiracy to commit money laundering, and money laundering. From January 1998 through September 2000, the store owner purchased nearly 5,000 pounds of iodine crystals at a cost of \$8 per ounce and sold the crystals for \$50 per ounce to individuals from Arkansas, Kansas, Missouri, and Oklahoma. During the trial witnesses testified that the store owner knew the crystals were to be used to manufacture methamphetamine.

Source: U.S. Attorney Eastern District of Oklahoma; *Associated Press*.

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Further, 21 U.S.C. § 843(a)(7) prohibits any person from knowingly or intentionally manufacturing, distributing, exporting, or importing any equipment, chemical product, or material that may be used to manufacture a controlled substance or listed chemical. The maximum penalties for each violation of 21 U.S.C. § 841(c)(1)–(3) or 21 U.S.C. § 843(a)(7) are 10 years' imprisonment, a \$250,000 fine, or both. Penalties are doubled for second or subsequent convictions.

In California iodine sales and purchases are subject to even more stringent regulation. Section 11107.1 of the California Health and Safety Code requires recordkeeping of all iodine crystal sales regardless of the amount, and sales are limited to 8 ounces of iodine in a 30-day period to any individual. The seller must retain the original bill of sale for 3 years and maintain a record of sale that includes the purchaser's name, address, driver's license number or other state-issued identification number, license plate number, and a description of how the purchaser will use the iodine. Both the purchaser and seller must sign the record. The purchaser must also maintain a record for 3 years that includes the place and date of purchase, a description of the purchase, the quantity purchased, and the cost of the purchase. The records maintained by both the seller and purchaser must be made available to law enforcement upon request. The sale of iodine tincture in the amount of \$100 or less is exempt from these requirements.

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### Theft, Diversion, and Smuggling

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Law enforcement reporting indicates that the theft and diversion of iodine crystals occur most frequently in the western half of the United States, particularly in states where methamphetamine production and abuse are prevalent. Law enforcement officials in Arizona, California, Idaho, Nevada, New Mexico, Oklahoma, and Oregon have reported numerous incidents of iodine theft and diversion. Most of these incidents occurred at businesses that appear to be legitimate. Feed and tack stores, also

primary sources for the cutting agent MSM (methylsulfonylmethane), are particular targets.

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### **MSM As Cutting Agent**

MSM is commonly used as a nutritional supplement for horses and humans. Methamphetamine produced in Mexico and southwestern states commonly is cut with MSM—a white powder with a low melting point (109°C). It is highly soluble and readily mixes with most substances without leaving a residue, making it a suitable cutting agent for methamphetamine.

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Individuals attempting to divert iodine to produce methamphetamine may exhibit one or more of the following suspicious behaviors:

- Customer does not have a legitimate reason to purchase iodine or cannot justify the quantity requested.
- Customer purchases iodine crystals for animal use but has little knowledge of horses, cattle, or other livestock.
- Customer resists providing personal information.
- Customer repeatedly purchases the maximum amount permitted by law at the shortest interval permitted.
- Customer simultaneously purchases iodine and other products that are used to produce methamphetamine such as acetone, alcohol, camp stove fuel, ether, drain cleaner, muriatic acid, rock salt, road flares, unusual quantities of matches, or the cutting agent MSM.
- Customer purchases over 4 fluid ounces of iodine tincture and purchases hydrogen peroxide at the same time.

Methamphetamine producers also obtain iodine crystals from Mexican criminal groups that

smuggle the crystals from Mexico into the United States. U.S. Customs Service (USCS) seizures of iodine at ports of entry (POEs) along the U.S.–Mexico border increased from approximately 780 kilograms in 2000 to approximately 2,140 kilograms in 2001. Most seizures occurred in Southern California at the San Ysidro and Otay Mesa POEs. Seizures also were made at POEs in Arizona and Texas.

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### **Hazards Associated With Iodine**

Iodine is a potentially dangerous chemical that can cause serious injury if handled improperly. This poses particular concerns for law enforcement officers or civilians who encounter iodine at methamphetamine production sites. If iodine comes in contact with the skin it can result in painful irritation and chemical burns. Contact with the eyes can cause redness, burns, and permanent damage. Inhalation of iodine gas can lead to respiratory problems or even death. Iodine has sufficient vapor pressure to allow toxic levels of iodine gas to build up in a closed container. Law enforcement officials should open containers of iodine in a well-ventilated area while wearing appropriate respiratory protection. Irritation can occur before the odor is detected.

Law enforcement officers who come into contact with iodine crystals should exercise extreme caution when handling, storing, or transporting the chemical. Boots, gloves, eye protection, and respiratory gear should be worn when exposure to iodine is likely. Although iodine alone is not flammable, it is a strong oxidizer that can ignite or cause explosions when mixed with other combustibles or reducing agents such as alkali metals, ammonia, and phosphorus. Iodine should be stored in a tightly sealed container in a cool, dry area away from direct sunlight, drastic temperature changes, and chemical substances that react violently when mixed with iodine.

## **Outlook**

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The use of iodine in methamphetamine production is likely to increase. Iodine is readily available, and its chemical properties allow it to be converted easily into hydriodic acid, the preferred reagent in the illicit production of d-methamphetamine. Federal and state chemical control laws, which include reporting rules, maximum purchase thresholds, and sentencing guidelines, are effective tools that law enforcement officials may use to counter this threat. As states continue to develop more stringent regulations regarding the sale and purchase of iodine crystals, methamphetamine producers increasingly will attempt to obtain iodine crystals through theft, diversion, or from Mexican criminal groups that smuggle iodine across the Southwest Border into the United States. Producers may also acquire larger quantities of iodine tincture and convert it to crystals.

## **Sources**

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Arizona Attorney General's Office

*Associated Press*

California Health and Safety Code

Executive Office of the President

Office of National Drug Control Policy

High Intensity Drug Trafficking Areas

National Methamphetamine Chemical Initiative

*Journal of the Clandestine Laboratory Investigating Chemists Association*

Mallinckrodt Baker Inc., [www.jtbaker.com](http://www.jtbaker.com)

Roskill Report on Metals and Minerals, [www.roskill.co.uk](http://www.roskill.co.uk)

U.S. Department of Health and Human Services

Centers for Disease Control and Prevention

National Institute for Occupational Safety and Health

U.S. Department of Homeland Security

U.S. Customs Service

U.S. Department of Justice

Drug Enforcement Administration

Diversion Control Program

U.S. Attorney's Office

Eastern District of Oklahoma

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