



# Conserve O Gram

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## DDT Health And Safety Update

DDT (dichloro diphenyl trichloroethane) is a chemical substance that was commonly used to sterilize hospital instruments, spray foods, and prevent insect infestations in museum objects from 1940 until the 1970s. In museums, DDT was applied directly on ethnographic and biological specimens; used in protective coatings; used as a preservative for library materials; and as a valued disinfectant for animal specimens. DDT may also be found on archeological collections as a residual from soil treatment.

DDT was used frequently because it was one of least expensive pesticides available and remained effective for long periods. Insects generally did not develop a resistance to it. Specimens treated with DDT were dusted with DDT powder, or sprayed with a solution containing DDT. Sometimes, museum staff first combined DDT with Lindane (gamma benzene hexachloride) or mineral oils before its application on specimens.

The standard poison used against pests was a mixture of 42.5% DDT and 42.5% carbaryl (such as Sevin®). DDT was patented for use in 1940, and all specimens treated during the following decades may contain traces of it. Evidence indicates that the use of DDT peaked in the 1950s. In 1972, DDT was outlawed in the United States because of its devastating environmental effects. Birds and other insectivores ate poisoned insects, leading to reproductive disorders and increased mortality rates in collected and natural populations.

The primary source of exposure to DDT in museums is contact with objects treated with the substance. The poisonous by-products of DDT do not readily decompose; they can remain in

the environment for long periods. DDE (dichloro diphenyl dichloroethylene), a breakdown product of DDT, is also harmful. In addition, some museum personnel maintained stores of DDT and used it after 1972. Museum staff must exercise precaution in handling objects suspected of containing DDT.

### *Properties*

- Colorless crystals or white to slightly off-white powder
- Odorless or slightly aromatic odor

### *Synonyms*

- Dichloro diphenyl trichloroethane
- Chlorophenothane
- Dicophane
- 1,1,1-trichloro-2, 2-bis-(p-chlorophenyl)ethane

### *OSHA Standard*

Permissible Exposure Limit (PEL): 1 milligram per cubic meter (relatively high)

Designation: Absorbed through the skin

### *Health Related Effects*

*Routes of Entry:* Skin absorption, inhalation, and ingestion

*Organs Affected:* Stomach, intestines, heart, blood vessels, kidneys, nervous system, lymphatic system, reproductive system, endocrine system, and skin

*Acute (short-term) Effects:* Nausea, vomiting, headache, neurological changes (tremor or exaggeration of reflexes), facial numbness, partial paralysis, convulsions, loss of perception and vibratory sensation, moderately rapid respiration, slow to normal pulse

*Chronic (long-term) Effects:* Kidney and liver dysfunction, general weakening of the immune system (decreased rate of lymphoproliferation)

*Carcinogenic Effects:* A possible human carcinogen that may cause non-Hodgkin's lymphoma; breast cancer; soft tissue sarcoma; Hodgkin's disease; multiple myeloma pancreatic, skin, lung, and liver cancer

*Reproductive Effects:* Potentially causes chromosomal aberrations, interferes with the healthy balance of estrogen and testosterone, can be passed in breast milk to infants, can shorten the duration of lactation in women, leads to erectile dysfunction in rats, causes feminization in numerous animal species, softens the shells of bird eggs. DDT and DDE are both known endocrine disrupters.

### **Testing for DDT**

Testing for DDT is a complicated process; only certified laboratories can do it. Compounds are extracted and generally identified using gas chromatography. For more information or to find a testing laboratory contact:

Environmental Protection Agency  
Office of Pesticide Programs  
Public Regulatory Docket (7502C)  
Ariel Rios Building  
1200 Pennsylvania Ave., NW  
Washington, D.C. 20460  
(703) 305-5805  
[www.epa.gov/pesticides](http://www.epa.gov/pesticides)  
National Institute for Occupational Safety  
and Health  
Hubert H. Humphrey Building  
200 Independence Ave., SW  
Room 715-H  
Washington, DC 20201  
1-800-35-NIOSH

[www.cdc.gov/niosh](http://www.cdc.gov/niosh)

Additional assistance is available from the following organizations:

American Conference of Governmental  
Industrial Hygienists  
1330 Kemper Meadow Dr.  
Cincinnati, OH 45240  
(513) 742-2020  
[www.acgih.org](http://www.acgih.org)

American Industrial Hygiene Association  
2700 Prosperity Ave., Suite 250  
Fairfax, VA 22031  
(703) 849-8888  
[www.aiha.org](http://www.aiha.org)

National Pesticide Telecommunications  
Network  
Oregon State University  
333 Weniger  
Corvallis, OR 97331  
1-800-858-7378  
<http://ace.orst.edu/info/nptn>

### **Handling, Storage, and Use Precautions**

Generally, unless confirmed to be safe, treat all specimens prepared before 1972 as though they contain DDT, DDE, or other toxic compounds. Any exhibited specimens from this period should be enclosed in an exhibit case. Such specimens should never be used in hands-on interpretation.

- Handle contaminated specimens as little as possible. Never touch specimens with bare skin. Wear nitrile gloves and a protective smock or apron. Change gloves frequently and make sure they do not fit too snugly.
- Wear a respirator fitted with N100 filters (or P100 for oily particles). Follow all OSHA guidelines for respirator use (see *Conserve O Gram 2/13*).
- Always discard gloves as hazardous waste, and wash hands after working with the specimens. Keep all smocks and aprons clean. Do not wash them with other fabrics.

- Label museum storage cabinets housing specimens suspected of, or known to be contaminated with DDT, with a warning sign indicating “**DDT.**” Prepare and post a written set of instructions for handling contaminated materials.
- In case of ingestion of any substance that may have been treated with DDT, consult a poison control center.

DDT can be stored in fat tissues and may be extracted from the body in urine and breast milk. In order to avoid passing DDT to an infant, women who may have had contact with DDT are advised not to breast-feed.

Be cautious whenever handling objects contaminated with DDT, but remember that the poison will not harm you if the standard safety guidelines are followed.

### References

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<<http://www.epa.gov/oppfead1/safety/healthcare/handbook/handbook.pdf>>

Zycherman, Linda, and Richard Schrock (eds). *A Guide to Museum Pest Control*. Washington, D.C.: Foundation of the American Institute for Conservation of Historic and Artistic Works, 1988.

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