

**TOXICOLOGICAL PROFILE FOR
ETHION**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry**

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UPDATE STATEMENT

Toxicological profiles are revised and republished as necessary, but no less than once every three years. For information regarding the update status of previously released profiles, contact ATSDR at:

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FOREWORD

This toxicological profile is prepared in accordance with guidelines* developed by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Environmental Protection Agency (EPA). The original guidelines were published in the *Federal Register* on April 17, 1987. Each profile will be revised and republished as necessary.

The ATSDR toxicological profile succinctly characterizes the toxicologic and adverse health effects information for the hazardous substance described therein. Each peer-reviewed profile identifies and reviews the key literature that describes a hazardous substance's toxicologic properties. Other pertinent literature is also presented, but is described in less detail than the key studies. The profile is not intended to be an exhaustive document; however, more comprehensive sources of specialty information are referenced.

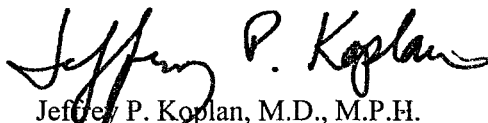
The focus of the profiles is on health and toxicologic information; therefore, each toxicological profile begins with a public health statement that describes, in nontechnical language, a substance's relevant toxicological properties. Following the public health statement is information concerning levels of significant human exposure and, where known, significant health effects. The adequacy of information to determine a substance's health effects is described in a health effects summary. Data needs that are of significance to protection of public health are identified by ATSDR and EPA.

Each profile includes the following:

- (A) The examination, summary, and interpretation of available toxicologic information and epidemiologic evaluations on a hazardous substance to ascertain the levels of significant human exposure for the substance and the associated acute, subacute, and chronic health effects;
- (B) A determination of whether adequate information on the health effects of each substance is available or in the process of development to determine levels of exposure that present a significant risk to human health of acute, subacute, and chronic health effects; and
- (C) Where appropriate, identification of toxicologic testing needed to identify the types or levels of exposure that may present significant risk of adverse health effects in humans.

The principal audiences for the toxicological profiles are health professionals at the Federal, State, and local levels; interested private sector organizations and groups; and members of the public.

This profile reflects ATSDR's assessment of all relevant toxicologic testing and information that has been peer-reviewed. Staff of the Centers for Disease Control and Prevention and other Federal scientists have also reviewed the profile. In addition, this profile has been peer-reviewed by a nongovernmental panel and was made available for public review. Final responsibility for the contents and views expressed in this toxicological profile resides with ATSDR.



Jeffrey P. Koplan, M.D., M.P.H.

Administrator

Agency for Toxic Substances and
Disease Registry

*Legislative Background

The toxicological profiles are developed in response to the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499) which amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund). This public law directed ATSDR to prepare toxicological profiles for hazardous substances most commonly found at facilities on the CERCLA National Priorities List and that pose the most significant potential threat to human health, as determined by ATSDR and the EPA. The availability of the revised priority list of 275 hazardous substances was announced in the *Federal Register* on October 21, 1999 (64 FR 56792). For prior versions of the list of substances, see *Federal Register* notices dated April 17, 1987 (52 FR 12866); October 20, 1988 (53 FR 41280); October 26, 1989 (54 FR 43619); October 17, 1990 (55 FR 42067); October 17, 1991 (56 FR 52166); October 28, 1992 (57 FR 48801); February 28, 1994 (59 FR 9486); April 29, 1996 (61 FR 18744); and November 17, 1997 (62 FR 61332). Section 104(i)(3) of CERCLA, as amended, directs the Administrator of ATSDR to prepare a toxicological profile for each substance on the list.

QUICK REFERENCE FOR HEALTH CARE PROVIDERS

Toxicological Profiles are a unique compilation of toxicological information on a given hazardous substance. Each profile reflects a comprehensive and extensive evaluation, summary, and interpretation of available toxicologic and epidemiologic information on a substance. Health care providers treating patients potentially exposed to hazardous substances will find the following information helpful for fast answers to often-asked questions.

Primary Chapters/Sections of Interest

Chapter 1: Public Health Statement: The Public Health Statement can be a useful tool for educating patients about possible exposure to a hazardous substance. It explains a substance's relevant toxicologic properties in a nontechnical, question-and-answer format, and it includes a review of the general health effects observed following exposure.

Chapter 2: Health Effects: Specific health effects of a given hazardous compound are reported by *route of exposure*, by *type of health effect* (death, systemic, immunologic, reproductive), and by *length of exposure* (acute, intermediate, and chronic). In addition, both human and animal studies are reported in this section.

NOTE: Not all health effects reported in this section are necessarily observed in the clinical setting. Please refer to the Public Health Statement to identify general health effects observed following exposure.

Pediatrics: Four new sections have been added to each Toxicological Profile to address child health issues:

- Section 1.6** **How Can Ethion Affect Children?**
- Section 1.7** **How Can Families Reduce the Risk of Exposure to Ethion?**
- Section 2.7** **Children's Susceptibility**
- Section 5.6** **Exposures of Children**

Other Sections of Interest:

- Section 2.8** **Biomarkers of Exposure and Effect**
- Section 2.11** **Methods for Reducing Toxic Effects**

ATSDR Information Center

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E-mail: atsdric@cdc.gov **Internet:** <http://www.atsdr.cdc.gov>

The following additional material can be ordered through the ATSDR Information Center:

Case Studies in Environmental Medicine: Taking an Exposure History—The importance of taking an exposure history and how to conduct one are described, and an example of a thorough exposure history is provided. Other case studies of interest include *Reproductive and Developmental Hazards*; *Skin Lesions and Environmental Exposures*; *Cholinesterase-Inhibiting Pesticide Toxicity*; and numerous chemical-specific case studies.

Managing Hazardous Materials Incidents is a three-volume set of recommendations for on-scene (prehospital) and hospital medical management of patients exposed during a hazardous materials incident. Volumes I and II are planning guides to assist first responders and hospital emergency department personnel in planning for incidents that involve hazardous materials. Volume III—*Medical Management Guidelines for Acute Chemical Exposures*—is a guide for health care professionals treating patients exposed to hazardous materials.

Fact Sheets (ToxFAQs) provide answers to frequently asked questions about toxic substances.

Other Agencies and Organizations

The National Center for Environmental Health (NCEH) focuses on preventing or controlling disease, injury, and disability related to the interactions between people and their environment outside the workplace. *Contact:* NCEH, Mailstop F-29, 4770 Buford Highway, NE, Atlanta, GA 30341-3724 • Phone: 770-488-7000 • FAX: 770-488-7015.

The National Institute for Occupational Safety and Health (NIOSH) conducts research on occupational diseases and injuries, responds to requests for assistance by investigating problems of health and safety in the workplace, recommends standards to the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA), and trains professionals in occupational safety and health. *Contact:* NIOSH, 200 Independence Avenue, SW, Washington, DC 20201 • Phone: 800-356-4674 or NIOSH Technical Information Branch, Robert A. Taft Laboratory, Mailstop C-19, 4676 Columbia Parkway, Cincinnati, OH 45226-1998 • Phone: 800-35-NIOSH.

The National Institute of Environmental Health Sciences (NIEHS) is the principal federal agency for biomedical research on the effects of chemical, physical, and biologic environmental agents on human health and well-being. *Contact:* NIEHS, PO Box 12233, 104 T.W. Alexander Drive, Research Triangle Park, NC 27709 • Phone: 919-541-3212.

Referrals

The Association of Occupational and Environmental Clinics (AOEC) has developed a network of clinics in the United States to provide expertise in occupational and environmental issues. *Contact:* AOEC, 1010 Vermont Avenue, NW, #513, Washington, DC 20005 • Phone: 202-347-4976 • FAX: 202-347-4950 • e-mail: aoec@dgs.dgsys.com • AOEC Clinic Director: <http://occ-env-med.mc.duke.edu/oem/aoec.htm>.

The American College of Occupational and Environmental Medicine (ACOEM) is an association of physicians and other health care providers specializing in the field of occupational and environmental medicine. *Contact:* ACOEM, 55 West Seegers Road, Arlington Heights, IL 60005 • Phone: 847-228-6850 • FAX: 847-228-1856.

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THE PROFILE HAS UNDERGONE THE FOLLOWING ATSDR INTERNAL REVIEWS:

1. Health Effects Review. The Health Effects Review Committee examines the health effects chapter of each profile for consistency and accuracy in interpreting health effects and classifying end points.
2. Minimal Risk Level Review. The Minimal Risk Level Workgroup considers issues relevant to substance-specific minimal risk levels (MRLs), reviews the health effects database of each profile, and makes recommendations for derivation of MRLs.
3. Data Needs Review. The Research Implementation Branch reviews data needs sections to assure consistency across profiles and adherence to instructions in the Guidance.

PEER REVIEW

A peer review panel was assembled for ethion. The panel consisted of the following members:

1. Dr. Robert Coppock, DABT, DABVT, P.O. Box 2031, Vegreville, Alberta T9C 1T2, Canada;
2. Dr. Frederick Oehme, Comparative Toxicology Laboratories, Kansas State University, Manhattan, Kansas, 66506; and
3. Dr. James Withey, 49 Wilton Crescent, Ottawa, Ontario K1S 2T6, Canada.

These experts collectively have knowledge of ethion's physical and chemical properties, toxicokinetics, key health end points, mechanisms of action, human and animal exposure, and quantification of risk to humans. All reviewers were selected in conformity with the conditions for peer review specified in Section 104(I)(13) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended.

Scientists from the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the peer reviewers' comments and determined which comments will be included in the profile. A listing of the peer reviewers' comments not incorporated in the profile, with a brief explanation of the rationale for their exclusion, exists as part of the administrative record for this compound. A list of databases reviewed and a list of unpublished documents cited are also included in the administrative record.

The citation of the peer review panel should not be understood to imply its approval of the profile's final content. The responsibility for the content of this profile lies with the ATSDR.

CONTENTS

FOREWORD	v
QUICK REFERENCE FOR HEALTH CARE PROVIDERS	vii
CONTRIBUTORS	ix
PEER REVIEW	xi
LIST OF FIGURES	xvii
LIST OF TABLES	xix
1. PUBLIC HEALTH STATEMENT	1
1.1 WHAT IS ETHION?	1
1.2 WHAT HAPPENS TO ETHION WHEN IT ENTERS THE ENVIRONMENT?	2
1.3 HOW MIGHT I BE EXPOSED TO ETHION?	3
1.4 HOW CAN ETHION ENTER AND LEAVE MY BODY?	4
1.5 HOW CAN ETHION AFFECT MY HEALTH?	4
1.6 HOW CAN ETHION AFFECT CHILDREN?	6
1.7 HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO ETHION?	7
1.8 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO ETHION?	9
1.9 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?	9
1.10 WHERE CAN I GET MORE INFORMATION?	10
2. HEALTH EFFECTS	13
2.1 INTRODUCTION	13
2.2 DISCUSSION OF HEALTH EFFECTS BY ROUTE OF EXPOSURE	13
2.2.1 Inhalation Exposure	15
2.2.1.1 Death	15
2.2.1.2 Systemic Effects	15
2.2.1.3 Immunological and Lymphoreticular Effects	15
2.2.1.4 Neurological Effects	15
2.2.1.5 Reproductive Effects	15
2.2.1.6 Developmental Effects	15
2.2.1.7 Genotoxic Effects	15
2.2.1.8 Cancer	15
2.2.2 Oral Exposure	16
2.2.2.1 Death	16
2.2.2.2 Systemic Effects	17
2.2.2.3 Immunological and Lymphoreticular Effects	36
2.2.2.4 Neurological Effects	36
2.2.2.5 Reproductive Effects	40
2.2.2.6 Developmental Effects	40
2.2.2.7 Genotoxic Effects	41
2.2.2.8 Cancer	41

2.2.3	Dermal Exposure	42
2.2.3.1	Death	42
2.2.3.2	Systemic Effects	42
2.2.3.3	Immunological and Lymphoreticular Effects	42
2.2.3.4	Neurological Effects	44
2.2.3.5	Reproductive Effects	44
2.2.3.6	Developmental Effects	44
2.2.3.7	Genotoxic Effects	44
2.2.3.8	Cancer	44
2.3	TOXICOKINETICS	44
2.3.1	Absorption	46
2.3.1.1	Inhalation Exposure	46
2.3.1.2	Oral Exposure	46
2.3.1.3	Dermal Exposure	46
2.3.2	Distribution	47
2.3.2.1	Inhalation Exposure	47
2.3.2.2	Oral Exposure	47
2.3.2.3	Dermal Exposure	48
2.3.2.4	Other Routes of Exposure	48
2.3.3	Metabolism	49
2.3.4	Elimination and Excretion	50
2.3.4.1	Inhalation Exposure	50
2.3.4.2	Oral Exposure	50
2.3.4.3	Dermal Exposure	50
2.3.4.4	Other Routes of Exposure	51
2.3.5	Physiologically based Pharmacokinetic (PBPK)/Pharmacodynamic (PD) Models	51
2.4	MECHANISMS OF ACTION	52
2.4.1	Pharmacokinetic Mechanisms	52
2.4.2	Mechanisms of Toxicity	54
2.4.3	Animal-to-Human Extrapolations	55
2.5	RELEVANCE TO PUBLIC HEALTH	55
2.6	ENDOCRINE DISRUPTION	70
2.7	CHILDREN'S SUSCEPTIBILITY	70
2.8	BIOMARKERS OF EXPOSURE AND EFFECT	74
2.8.1	Biomarkers Used to Identify or Quantify Exposure to Ethion	75
2.8.2	Biomarkers Used to Characterize Effects Caused by Ethion	76
2.9	INTERACTIONS WITH OTHER CHEMICALS	77
2.10	POPULATIONS THAT ARE UNUSUALLY SUSCEPTIBLE	78
2.11	METHODS FOR REDUCING TOXIC EFFECTS	78
2.11.1	Reducing Peak Absorption Following Exposure	79
2.11.2	Reducing Body Burden	79
2.11.3	Interfering with the Mechanism of Action for Toxic Effects	79
2.12	ADEQUACY OF THE DATABASE	80
2.12.1	Existing Information on Health Effects of Ethion	80
2.12.2	Identification of Data Needs	82
2.12.3	Ongoing Studies	86
3.	CHEMICAL AND PHYSICAL INFORMATION	87
3.1	CHEMICAL IDENTITY	87
3.2	PHYSICAL AND CHEMICAL PROPERTIES	87

4. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL	91
4.1 PRODUCTION	91
4.2 IMPORT/EXPORT	91
4.3 USE	92
4.4 DISPOSAL	93
5. POTENTIAL FOR HUMAN EXPOSURE	95
5.1 OVERVIEW	95
5.2 RELEASES TO THE ENVIRONMENT	99
5.2.1 Air	99
5.2.2 Water	100
5.2.3 Soil	101
5.3 ENVIRONMENTAL FATE	102
5.3.1 Transport and Partitioning	102
5.3.2 Transformation and Degradation	104
5.3.2.1 Air	104
5.3.2.2 Water	106
5.3.2.3 Soil Transformation and Degradation	108
5.4 LEVELS MONITORED OR ESTIMATED IN THE ENVIRONMENT	109
5.4.1 Air	111
5.4.2 Water	111
5.4.3 Sediment and Soil	112
5.4.4 Other Environmental Media	114
5.5 GENERAL POPULATION AND OCCUPATIONAL EXPOSURE	119
5.6 EXPOSURES OF CHILDREN	123
5.7 POPULATIONS WITH POTENTIALLY HIGH EXPOSURES	128
5.8 ADEQUACY OF THE DATABASE	128
5.8.1 Identification of Data Needs	129
5.8.3 Ongoing Studies	133
6. ANALYTICAL METHODS	135
6.1 BIOLOGICAL SAMPLES	135
6.2 ENVIRONMENTAL SAMPLES	137
6.3 ADEQUACY OF THE DATABASE	143
6.3.1 Identification of Data Needs	143
6.3.2 Ongoing Studies	144
7. REGULATIONS AND ADVISORIES	145
8. REFERENCES	151
9. GLOSSARY	169
APPENDICES	
A. ATSDR MINIMAL RISK LEVELS AND WORKSHEETS	A-1
B. USER'S GUIDE	B-1
C. ACRONYMS, ABBREVIATIONS, AND SYMBOLS	C-1

LIST OF FIGURES

2-1	Levels of Significant Exposure to Ethion — Oral	29
2-2	Proposed Mammalian Pathways of Ethion Biotransformation	45
2-3	Conceptual Representation of a Physiologically Based Pharmacokinetic (PBPK) Model for a Hypothetical Chemical Substance	53
2-4	Existing Information on Health Effects of Ethion	81
5-1	Frequency of NPL Sites with Ethion Contamination	98
5-2	Transformation of Ethion	105

LIST OF TABLES

2-1	Levels of Significant Exposure to Ethion — Oral	18
2-2	Levels of Significant Exposure to Ethion — Dermal	43
2-3	Genotoxicity of Ethion <i>In Vitro</i>	70
3-1	Chemical Identity of Ethion	88
3-2	Physical and Chemical Properties of Ethion	89
5-1	Percentage of Ethion Remaining in Various Types of Tropical Soils over Time	110
5-2	Ethion Intakes from Foods for Infants, Children, and Adults in the U.S. Population (in mg/kg/day)	120
6-1	Analytical Methods for Determining Ethion and Metabolites in Biological Samples	136
6-2	Analytical Methods for Determining Ethion in Environmental Samples	138
7-1	Regulations and Guidelines Applicable to Ethion	148

