

TABLE OF CONTENTS

FOREWORD	1
1. EXECUTIVE SUMMARY	4
2. IDENTITY AND PHYSICAL/CHEMICAL PROPERTIES	5
3. ANALYTICAL METHODS	6
3.1 DMF in workplace air	6
3.2 DMF and metabolites in biological media	7
4. SOURCES OF HUMAN AND ENVIRONMENTAL EXPOSURE	7
4.1 Natural sources	7
4.2 Anthropogenic sources	7
4.3 Uses	8
5. ENVIRONMENTAL TRANSPORT, DISTRIBUTION, AND TRANSFORMATION	8
5.1 Air	8
5.2 Surface water and sediment	8
5.3 Soil and groundwater	9
5.4 Environmental distribution	10
6. ENVIRONMENTAL LEVELS AND HUMAN EXPOSURE	10
6.1 Environmental levels	10
6.1.1 Ambient air	10
6.1.2 Surface water and sediment	11
6.1.3 Soil and groundwater	11
6.2 Human exposure	11
6.2.1 Drinking-water	11
6.2.2 Food	11
6.2.3 Multimedia study	11
6.2.4 Exposure of the general population	11
6.2.5 Occupational exposure	12
7. COMPARATIVE KINETICS AND METABOLISM IN LABORATORY ANIMALS AND HUMANS	12
7.1 Experimental animals	12
7.2 Humans	14
7.2.1 Studies in human volunteers	14
7.2.2 Occupational environment	15
7.2.3 Other relevant data	15
7.3 Interspecies comparisons	15
8. EFFECTS ON LABORATORY MAMMALS AND <i>IN VITRO</i> TEST SYSTEMS	16
8.1 Single exposure	16
8.2 Irritation and sensitization	16
8.3 Short-term exposure	16
8.4 Medium-term exposure	17

8.4.1	Inhalation	17
8.4.2	Oral	22
8.5	Long-term exposure and carcinogenicity	22
8.5.1	Inhalation	22
8.5.2	Oral	23
8.5.3	Injection	23
8.6	Genotoxicity and related end-points	23
8.7	Reproductive toxicity	24
8.7.1	Effects on fertility	24
8.7.2	Developmental toxicity	24
8.8	Neurological effects	25
9.	EFFECTS ON HUMANS	25
9.1	Effects on the liver	25
9.2	Cardiac effects	27
9.3	Cancer	28
9.4	Genotoxicity	29
10.	EFFECTS ON OTHER ORGANISMS IN THE LABORATORY AND FIELD	30
10.1	Aquatic environment	30
10.2	Terrestrial environment	32
11.	EFFECTS EVALUATION	33
11.1	Evaluation of health effects	33
11.1.1	Hazard identification and dose-response assessment	33
11.1.1.1	Effects in humans	33
11.1.1.2	Effects in experimental animals	33
11.1.2	Criteria for setting tolerable concentrations or guidance values	33
11.1.3	Sample risk characterization	34
11.1.4	Uncertainties and degree of confidence in human health risk characterization	35
11.2	Evaluation of environmental effects	35
11.2.1	Terrestrial assessment end-points	35
11.2.2	Sample environmental risk characterization	36
11.2.3	Discussion of uncertainty	36
12.	PREVIOUS EVALUATIONS BY INTERNATIONAL BODIES	37
	REFERENCES	38
	APPENDIX 1 — SOURCE DOCUMENT	47
	APPENDIX 2 — CICAD PEER REVIEW	47
	APPENDIX 3 — CICAD FINAL REVIEW BOARD	48
	APPENDIX 4 — BENCHMARK DOSE CALCULATIONS	49
	INTERNATIONAL CHEMICAL SAFETY CARD	50
	RÉSUMÉ D'ORIENTATION	52
	RESUMEN DE ORIENTACIÓN	54