201-16157B

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Data Set

Existing Chemical	:	ID: 3710-84-7
CAS No.	:	3710-84-7
EINECS Name	:	N,N-diethylhydroxylamine
EC No.	:	223-055-4
Molecular Formula	:	C4H11NO

Producer related part

Company	:	ATOFINA Chemicals Inc.
Creation date	:	13.12.2005

Substance related part

Company	:	ATOFINA Chemicals Inc.
Creation date	:	13.12.2005
Status	:	
Memo	:	
Printing date	:	31.12.2005
Revision date	:	
Date of last update	:	31.12.2005
Number of pages	:	67
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

Type	:	cooperating company
Name	:	Arkema Inc
Contact person	:	
Date	:	
Street	:	2000 Market St.
Town	:	19103 Philadelphia, PA
Country	:	United States
Phone	:	1-214-419-7000
Telefax	:	
Telex	:	
Cedex	:	
Email	:	
Homepage	:	

18.12.2005

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

1.0.3 IDENTITY OF RECIPIENTS

1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

IUPAC Name	:	
Smiles Code	:	ON(CC)CC
Molecular formula	:	C4 H11 N1 O1
Molecular weight	:	89.14
Petrol class	:	

18.12.2005

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type	:	typical for marketed substance
Substance type	:	organic
Physical status	:	liquid
Purity	:	
Colour	:	
Odour	:	

18.12.2005

1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

1.3 IMPURITIES

1.4 ADDITIVES

1.5 TOTAL QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

1.11 ADDITIONAL REMARKS

1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value : = 10 °C

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
18.12.2005 (2)

2.2 BOILING POINT

Value : = 133 °C at

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
18.12.2005 (2)

2.3 DENSITY

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : = 6.6 hPa at °C

Result : 5 mm Hg
Reliability : (4) not assignable
Flag : Critical study for SIDS endpoint
28.12.2005 (1)

2.5 PARTITION COEFFICIENT

Partition coefficient : octanol-water
Log pow : = .43 at °C
pH value :
Method : other (calculated)
Year :
GLP :
Test substance : as prescribed by 1.1 - 1.4

Source : Atofina Paris La Défense Cedex
Reliability : (2) valid with restrictions
2f : Accepted calculation method
Flag : Critical study for SIDS endpoint
28.12.2005 (38)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in : Water
Value : = 35 vol% at °C
pH value :

concentration	:	at °C
Temperature effects	:	
Examine different pol.	:	
pKa	:	at 25 °C
Description	:	
Stable	:	

Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

28.12.2005 (1)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Type : air
Light source :
Light spectrum : nm
Relative intensity : based on intensity of sunlight
Deg. product :
Method :
Year :
GLP :
Test substance : as prescribed by 1.1 - 1.4

Result : AOP Program (v1.90) Results:

```
==========================
SMILES : ON(CC)CC
CHEM   : Ethanamine, N-ethyl-N-hydroxy-
MOL FOR: C4 H11 N1 O1
MOL WT : 89.14
------------------- SUMMARY (AOP v1.90): HYDROXYL RADICALS ------------
-------
Hydrogen Abstraction       =  17.7070 E-12 cm3/molecule-sec
Reaction with N, S and -OH =  66.0000 E-12 cm3/molecule-sec
Addition to Triple Bonds   =   0.0000 E-12 cm3/molecule-sec
Addition to Olefinic Bonds =   0.0000 E-12 cm3/molecule-sec
Addition to Aromatic Rings =   0.0000 E -12 cm3/molecule-sec
Addition to Fused Rings    =   0.0000 E-12 cm3/molecule-sec

  OVERALL OH Rate Constant =  83.7070 E -12 cm3/molecule-sec
  HALF-LIFE =    0.128 Days (12-hr day; 1.5E6 OH/cm3)
  HALF-LIFE =    1.533 Hrs
------------------- SUMMARY (AOP v1.90): OZONE REACTION-------------------
----

          ******  NO OZONE REACTION ESTIMATION ******
          (ONLY Olefins and Acetylenes are Estimated)

Experimental Database Structure Match:
  Chem Name :  Diethylhydroxylamine
  CAS Number:  003710-84-7
  Exper OH rate constant   :  101  E-12  cm3/molecule-sec
    Exper OH Reference:  ATKINSON,R (1989)
  Exper Ozone rate constant:  ---  cm3/molecule-sec
  Exper NO3 rate constant  :  ---  cm3/molecule-sec
```

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
28.12.2005 (16)

3.1.2 STABILITY IN WATER

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type : fugacity model level III
Media :
Air : .283 % (Fugacity Model Level I)
Water : 44.9 % (Fugacity Model Level I)
Soil : 54.8 % (Fugacity Model Level I)
Biota : .084 % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other: calculated
Year :

Result : Level III Fugacity Model (Full-Output):

```
========================================
Chem Name   : Ethanamine, N-ethyl-N-hydroxy-
Molecular Wt: 89.14
Henry's LC  : 5.87e-008 atm-m3/mole (Henrywin program)
Vapor Press : 3.46 mm Hg  (Mpbpwin program)
Log Kow     : 0.43  (Kowwin program)
Soil Koc    : 1.1  (calc by model)

          Mass Amount    Half-Life    Emissions
           (percent)       (hr)       (kg/hr)
Air        0.283          2.54        1000
Water      44.9           360         1000
Soil       54.8           720         1000
Sediment   0.0842         3.24e+003   0

           Fugacity    Reaction    Advection   Reaction    Advection
            (atm)      (kg/hr)     (kg/hr)    (percent)   (percent)
Air        8.83e-012   878         32.2        29.3        1.07
Water      1.68e-012   981         510         32.7        17
Soil       6.97e-011   599         0           20          0
Sediment   1.53e-012   0.204       0.0191      0.00682     0.000637

Persistence Time: 379 hr
Reaction Time:    462 hr
Advection Time:   2.1e+003 hr
Percent Reacted:  81.9
Percent Advected: 18.1

Half-Lives (hr), (based upon Biowin (Ultimate) and Aopwin):
   Air:      2.542
   Water:    360
   Soil:     720
   Sediment: 3240
     Biowin estimate: 3.002  (weeks       )

Advection Times (hr):
   Air:      100
   Water:    1000
   Sediment: 5e+004
```

Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
18.12.2005 (17)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Type	:	aerobic
Inoculum	:	
Contact time	:	35 day(s)
Degradation	:	= 17 (±) % after 28 day(s)
Result	:	other: Not readily biodegradable
Kinetic of testsubst.	:	7 day(s) < 0 % 14 day(s) = 3 % 23 day(s) = 22 % 28 day(s) = 17 % 35 day(s) = 20 %
Control substance	:	Acetic acid, sodium salt
Kinetic	:	7 day(s) = 98 % 35 day(s) = 99 %
Deg. product	:	not measured
Method	:	ISO 7827 "Evaluation in an aqueous medium of the 'ultimate' aerobic biodegradability of organic compounds - method by anlaysis of dissolved organic carbon (DOC)"
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Source	:	ATOFINA, PARIS -LA-DEFENSE, FRANCE. Atofina Paris La Défense Cedex
Test condition	:	DURATION OF THE TEST: 35 days. ANALYTICAL PARAMETER: The degradation was followed by DOC analysis at frequent intervals over a 28-days period.The degree of biodegradation was calculated by expressing the concentration of DOC removed (corrected for that in the blank inoculum control) as a percentage of initial concentration. SAMPLING: 0, 7, 14, 23, 28, 35 days.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

18.12.2005 (15)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	static
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC0	:	< 90.2
EC50	:	= 110.56 calculated
EC100	:	= 541.2
EC50,24h	:	= 200.62 calculated
Analytical monitoring	:	no data
Method	:	ISO 6341 15 "Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea)"
Year	:	1989
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	RESULTS: DEHA - Effect data (Immobilisation): EC50 (48 hr) = 541.2 mg/l REFERENCE SUBSTANCE - EC50/24h =0.93 mg/l.
Source	:	ATOFINA, PARIS -LA-DEFENSE, FRANCE. Atofina Paris La Défense Cedex
Test condition	:	TEST ORGANISMS - Strain: Daphnia magna. - Source/supplier: Breeding colony was realized in the laboratory, organisms were selected by sieving. - Breeding method: Breeding was realized in ASTM medium. - Age: Less than 24 hours. - Feeding: Algal based feed (Selenastrum capricornutum) in ASTM medium. - Pretreatment: No. STOCK AND TEST SOLUTION AND THEIR PREPARATION - Other procedures: The initial substance solution was prepared at 0.902 g/l. STABILITY OF THE TEST CHEMICAL SOLUTIONS: No data. REFERENCE SUBSTANCE: Potassium dichromate. TEST SYSTEM - Renewal of test solution: No data. - Dissolved oxygen: >2 mg/l. DURATION OF THE TEST: 48 hours. TEST PARAMETER: The percentage of daphnids immobilisation after 24 and 48 hours. SAMPLING: 24, 48 hours.
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

31.12.2005 (3)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

Type : other
Species : Pseudomonas putida (Bacteria)
Exposure period : 16 hour(s)
Unit : mg/l
EC0 : calculated
EC10 : = 9.7 calculated
EC50 : = 37.2
Analytical monitoring : yes
Method : other: ISO TC 147/SC 5/WG 1/N 111
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Result : EC50 = 37.2 mg/l (0.0043% of the solution at 87%)
EC10 = 9.7 mg/l (0.0011% of the solution at 87%)

H = The Growth Inhibition Percentage.

Substance concentration (mg/l)	H %
174	86.3
87	79.5
43.5	54.2
17.4	15.1
8.7	11.3

Source : ATOFINA, PARIS -LA-DEFENSE, FRANCE.
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS
- Source/supplier: Pasteur Institute.
- Method of cultivation: No data.
- Plate composition: No data.
- Pretreatment: No data.

STOCK AND TEST SOLUTION AND THEIR PREPARATION
- Dispersion: The test substance was diluted in ultrapure water and placed in sterile conditions with Bacteria (pseudomonas putida MIGULA).

STABILITY OF THE TEST CHEMICAL SOLUTIONS: No data

REFERENCE SUBSTANCE: 3,5 Dichlorophenol.
EC10 = 5.43 mg/l.

DILUTION WATER
- Source: Ultrapure water.

- pH: was measured at the beginning and the end of test.

	pH	
Concentration	t=0	t=16h
174 mg/l	6.85	6.77
0 mg/l	6.66	6.86

TEST SYSTEM
- Number of replicates per dose: 3.
- Exposure vessel type: Flasks placed in a orbital agitator and incubated at a room temperature.
- Concentrations: 8.7, 17.4, 43.5, 87, 174 mg/l.
- Test temperature: 21+/-1°C.

TEST PARAMETER: Bacterial Inhibition Growth.

MONITORING OF TEST SUBSTANCE CONCENTRATION: The bacterial Growth was measured by Turbidimetry with a Spectrophotiometre Perkin-Elmer lambda 5 (436 nm).

Reliability : (2) valid with restrictions
28.12.2005 (9)

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type : LD50
Value : = 2190 mg/kg bw
Species : rat
Strain : other: WBS/W
Sex : male
Number of animals : 20
Vehicle : other: none
Doses : 1400, 2000, 2800, 4000 mg/kg
Method : other:
Year :
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : The undiluted sample was administrated by stomach tube to male WBS/W rats, 170 +/- g BW. Surviving animals were observed for seven days.

Result :

Oral dose(mg/kg)	No.rats(dead/total)	mortality time for death (hours)
1400	0/5	- - - - -
2000	2/5	- - - >5, >24
2800	4/5	- >3, >5,>24,>24
4000	5/5	>2, 5, 5, >5, >5

LD50 = 2190 mg/kg.

-symptomatology: Muscular incoordination and general depression. Autopsy findings were negative.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
18.12.2005 (31)

Type : LD50
Value : = 2150 mg/kg bw
Species : mouse
Strain : other: OF1
Sex : male
Number of animals : 54
Vehicle : water
Doses : 875, 1000, 1300, 1800, 2400, 3200, 4300, 8750 mg/kg
Method : other
Year :
GLP : no
Test substance : other TS

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Test substance : DEHA - PENNSYLVANIA SALT MANUFACTURING COMPANY.
Reliability : (2) valid with restrictions
31.12.2005 (25)

5.1.2 ACUTE INHALATION TOXICITY

Type : LC50
Value : 3140 ppm
Species : rat
Strain : Sprague-Dawley
Sex : male/female
Number of animals : 60
Vehicle :
Doses : 0, 1410, 2650, 3240, 3560, 4720 ppm
Exposure time : 4 hour(s)
Method : EPA OPP 81-3
Year : 1982
GLP : yes
Test substance : other TS

Method : A series of four-hour whole-body inhalation exposures was performed using Sprague-Dawley derived rats (5/sex/group) to determine the acute inhalation toxicity of diethylhydroxylamine. The test substance was administered into the breathing zone of the animals as vapor. In addition, a group of control animals (5/sex) received house-supply air only while in chamber.

Result : A. Chamber Monitoring and Mortality:
The mean analytical and nominal concentrations of diethylhydroxylamine along with the overall mortality in each test group are summarized below:

Group	Mean Analytical Concentration (ppm)	Nominal Concentration (ppm)	Mortality #dead/#exposed Male	Female
I	1410	1690	0/5	0/5
II	4720	5890	5/5	5/5
III	2650	2780	0/5	0/5
IV-Control	0	0	0/5	0/5
V	3560	4430	1/5	5/5
VI	3240	4840	1/5	5/5

The individual analytical values showed little variation about the mean. For Groups I and III, the nominal and analytical values were approximately the same. For the other three test groups which were run at higher exposure levels, the nominal concentrations were somewhat higher than the analytical values. No reason for these differences between nominal and analytical values was found. No aerosol was found during any exposure.
Chamber relative humidity was generally acceptable in all exposures.

Based on the mean analytical concentration values of diethylhydroxylamine and resultant mortality, the LC50 values and 95% confidence limits were calculated to be:

Sex	LC50 (ppm)	95% Confidence Limits (ppm)
Combined Sexes (males and females)	3140	2770 to 3560

Males	4480	3410 to 5880
Females	2620	2210 to 3100

These values indicated that the test material was more lethal to female rats than to male rats.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : Diethylhydroxylamine (CAS# 3710-84-7) purity 96.5%.

Conclusion : A series of groups consisting of five male and five female Sprague-Dawley derived rats was exposed to diethylhydroxylamine vapor for four hours mean analytical levels in the range of 1410 to 4720 parts per million (ppm). Signs attributable to treatment included death, increased incidences of secretory responses, respiratory distress, general signs of poor condition, corneal opacity and loss of body weight. Overall, the time-to-onset and time-to-recovery of these signs were related to exposure concentration. The mortality results indicated the test material was more lethal to female rats than to male rats.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset, Directive 67/548/EEC

31.12.2005 (32)

Type : LC0
Value : > 160 mg/l
Species : mouse
Strain :
Sex :
Number of animals : 5
Vehicle : no data
Doses : 10, 40, 80, 160, 320 mg/l and saturating vapour.
Exposure time : 1 hour(s)
Method : other
Year :
GLP : no data
Test substance : no data

Result : No effects of any kind were observed to occur through concentration of 160 mg/l.
Symptoms of motor depression and muscular incoordination were seen to develop during exposure at 320 mg/l. The animals recovered completely within two hours after exposure.
The concentration of 640 mg/l could not be achieved since a residual quantity of the compound remained unevaporated in the sealed chamber. Mice exposed to this saturated atmosphere showed signs of motor depression and muscular incoordination, followed by complete recovery within 2 hours.
No mortalities ocured at any concentration during the period of exposure nor during the subsequent 7-day observation interval.

Source : Atofina, Paris-La Défense (France)
Atofina Paris La Défense Cedex

Test substance : Various quantity of substance were placed in animal-exposure chambers of 20-liter capacity and the latter immediately sealed. When evaporation and diffusion were complete, 5 mice were introduced to each chamber and the latter resealed. The animals were observed continuously during the one-hour exposure period and one week subsequent to exposure.

Reliability : (4) not assignable
4e: documentation insufficient for assessment.

18.12.2005 (25)

Type	:	LC0
Value	:	
Species	:	rat
Strain	:	
Sex	:	
Number of animals	:	5
Vehicle	:	no data
Doses	:	4 mg/l
Exposure time	:	1 hour(s)
Method	:	other
Year	:	
GLP	:	no data
Test substance	:	no data
Result	:	No effects of any kind were observed.
Source	:	Atofina, Paris-La Défense (France) Atofina Paris La Défense Cedex
Reliability	:	(4) not assignable 4e: documentation insufficient for assessment.

18.12.2005 (24)

Type	:	LC0
Value	:	
Species	:	rat
Strain	:	other: WBS/W
Sex	:	male
Number of animals	:	2
Vehicle	:	
Doses	:	Saturated vapor
Exposure time	:	1 hour(s)
Method	:	other
Year	:	
GLP	:	no
Test substance	:	no data
Method	:	Saturated vapor concentrations were prepared by placing two grams of sample in each of five 20-liter exposure chambers, sealing the latter, and allowing 24 hours for vapor saturation. (Most of the sample remained unevaporated). Each chamber was then opened momentarily to permit the quick insertion of two rats (male WBS/W, 220 g BW). Inhalational exposure was terminated one hour later and the animals were observed for seven days.
Result	:	No effects of any kind were discernable in any of the ten rats during exposure or after exposure. All showed normal gains in body weight during the subsequent observation period.
Source	:	Atofina Paris La Défense Cedex
Reliability	:	(3) invalid

18.12.2005 (35)

5.1.3 ACUTE DERMAL TOXICITY

Type	:	LD50
Value	:	= 1300 mg/kg bw
Species	:	rabbit
Strain	:	other: albino
Sex	:	no data
Number of animals	:	16

Vehicle : no data
Doses : 707, 1000, 1414, 2000 mg/kg
Method : other
Year :
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method : Four albino rabbits were used at each of four dosage levels. Individual doses were applied to the fur-clipped skin of the trunk under a pre-fitted occluding sleeve on each animal. The sleeves were renoved 24 hours later and surviving animals were observed for seven days.

Result :

Skin dose(mg/kg)	No.rabbits(dead/total)	time for deaths (hours)
707	0/4	- - - -
1000	1/4	- - - >26
1414	2/4	- - <20,>26
2000	4/4	<20, <20, <20,>26

LD50 = 1300 mg/kg (995-1690 =95 % confidence limits).

Symptomatology: hypersensitivity, mydriasis, and incoordination prior to toxic incapacitation.

Source : Atofina, Paris-la-Défense, France
Atofina Paris La Défense Cedex
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
28.12.2005 (30)

Type : LD50
Value : 200 - 2000 mg/kg bw
Species : rabbit
Strain : other: albino
Sex : no data
Number of animals : 6
Vehicle : water
Doses : 200 (10% solution), 2000 (undiluted) mg/kg
Method : other
Year :
GLP : no
Test substance : other TS

Method : Three albino rabbits were treated dermally with a single dose of 2000 mg/kg (2.24 ml/kg) and three additional rabbits were treated with a single dose of 200 mg/kg (2.0 ml/kg of a 10% W/V aqueous dilution). Individual doses were applied to the fur-clipped skin of the trunk under a pre-fitted impervious sleeve on each of the animals. After a skin-contact period of 24 hours, the sleeves were removed and the treated sites were gently cleansed with a 2% solution of acetic acid. Surviving animals were then observed for seven days.

Result : 2000 mg/kg (undiluted sample). All of the rabbits died.
200 mg/kg (10% solution). Mild erythema was present over the entire treated areas at the time exposures were terminated; this dissipated completely within another 24 hours. All of the animals remained asymptomatic and gained body weight during the observation period.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA, purity not reported
Reliability : (3) invalid
28.12.2005 (36)

Type : LD50
Value : 200 - 2000 mg/kg bw
Species : rabbit
Strain : other: albino
Sex : no data
Number of animals : 6
Vehicle : water
Doses : 200, 2000 mg/kg
Method : other
Year :
GLP : no
Test substance : no data

Method : Three albino rabbits were treated with 2000 mg/kg (undiluted sample) and three albino rabbits were treated with 200 mg/kg (10% aqueous dilution). Individual doses were applied to the hair-clipped skin of the trunk under a pre-fitted occluding sleeve on each animal. The sleeves were removed 24 hours later and surviving animals were observed for seven days.
Result : 2000 mg/kg (undiluted sample). Each of the three animals died overnight (< 20 hours).
200 mg/kg (10% aqueous dilution). None of the 3 rabbits showed any ill effects and all gained body weight during the subsequent observation period.
Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Reliability : (3) invalid
15.05.2002 (33)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 24 hour(s)
Number of animals : 6
Vehicle :
PDII :
Result : irritating
Classification : irritating
Method : Draize Test
Year :
GLP : no
Test substance : other TS: anhydrous diethylhydroxylamine

Method : One-half ml of the sample was applied to one intact and one abraded skin site under standard gauze patches on each of six albino rabbits. The entire fur-clipped trunk of each animal was then covered with an impervious sleeve for a skin-contact period of 24 hours. Exposures were terminated by removing the dressings and gently cleansing the treated sites with acetone and water. The animals were then examined

daily for eleven days.

Result : INTACT SKIN:
Each of the treated sites was pale gray xhen exposures were terminated. Mild erythema (scores 1 or 2) appeared on the second day and the surface of the skin became abnormally dry. The erythema gradually waned and flake formation of the surface horny layer began. Gross expoliation began about seven days after treatment; this extended well beyond the treated site.

ABRADED SKIN:
Additional effects were superimposed upon the basic skin reaction described above; these were as follows. (1) The initial gray discoloration persisted for many days and its appearance varied with the degree of secondary erythema. (2) The sites also thickened (hypertrophy, not edema) and (3) became moderately indurated about the third or fourth day. (Flexibility was retained and no signs of corrosivity were discernible at any time). Incisions through these lesions on the eleventh day revealed the dermis to be viable and intact.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Reliability : (2) valid with restrictions

Flag : Material Safety Dataset, Directive 67/548/EEC

28.12.2005 (37)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 24 hour(s)
Number of animals : 6
Vehicle :
PDII : 0
Result : not irritating
Classification : not irritating
Method : Draize Test
Year :
GLP : no
Test substance : other TS

Method : One-half ml was applied to one intact and abraded skin site under standard gauze patches on each of six albino rabbits. The entire fur-clipped trunk of each animal was then covered with an impervious sleeve for a skin-contact period of 24 hours.

Result : No signs of irritation were discernible at any of the twelve treated skin sites.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA, purity not reported

Reliability : (2) valid with restrictions

28.12.2005 (27)

Species : rabbit
Concentration : undiluted
Exposure : Occlusive
Exposure time : 4 hour(s)
Number of animals : 6
Vehicle :
PDII :
Result : not irritating

Classification : not irritating
Method : other: 49 CFR 173.240
Year :
GLP : no
Test substance : other TS

Method : As prescribed in 49 CFR 173.240 (six albino rabbits, four hour skin-contact, three days observation).
Result : No signs of skin irritancy were evident in any of the six animals following treatment.
Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Test substance : DEHA, purity not reported
Reliability : (2) valid with restrictions
28.12.2005 (28)

5.2.2 EYE IRRITATION

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure time :
Comment : not rinsed
Number of animals : 6
Vehicle :
Result : slightly irritating
Classification :
Method : Draize Test
Year :
GLP : no
Test substance : other TS

Method : One-tenth ML was placed in the conjunctival sac of one eye of each of six albino rabbits. The resulting irritant reactions were scored periodically until recovery.
Remark : The labelling "irritant for the eyes" of DEHA is based on the intense pain reaction observed after instillation.
Result : Although all instillations evoked intense pain, the irritant reaction was limited to mild conjunctival inflammation without chemosis; most of the treated animals recovered within 24 hours. Neither the cornea nor iris was effected.

Individual conjunctival redness scores were as follows:

Time	Rabbit #1	#1	#3	#4	#5	#6
10 min	>1	>1	>1	>1	>1	>1
1 hr	>1	>1	>1	>1	>1	2
2 hrs	1	1	1	>1	>1	2
3 hrs	1	1	1	>1	<2	2
4 hrs	1	1	1	1	<2	2
24 hrs	0	0	0	0	0	1
48 hrs					1	
72 hrs					0	

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA, purity not reported
Reliability : (2) valid with restrictions
Flag : Material Safety Dataset, Directive 67/548/EEC
28.12.2005 (29)

Species : rabbit
Concentration : undiluted
Dose : .1 ml
Exposure time :
Comment : not rinsed
Number of animals : 6
Vehicle :
Result : slightly irritating
Classification : not irritating
Method : Draize Test
Year :
GLP : no
Test substance : other TS

Method : One-tenth ml was placed in the conjunctival sac of one eye of each of six albino rabbits. The resulting reactions were scored periodically until recovery.

Result : The reaction was confined to moderate conjunctival inflammation which dissipated completely within 72 hours. None of the scores was positive at 24 or 48 hours and neither the cornea nor the iris was effected.

Average scores were as follows:

time	cornea	iris	conjunctival	
			redness	chemosis
10 mins	0	0	>1	1
1 hr	0	0	2	2
2 hrs	0	0	2	>2
3 hrs	0	0	2	>2
4 hrs	0	0	2	2
24 hrs	0	0	1	0
48 hrs	0	0	1	0
72 hrs	0	0	0	0

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Test substance : DEHA, purity not reported
Reliability : (2) valid with restrictions
28.12.2005 (26)

5.3 SENSITIZATION

Type : Buehler Test
Species : guinea pig
Concentration : 1st: Induction 30 % occlusive epicutaneous
2nd: Challenge 30 %occlusive epicutaneous
3rd:
Number of animals : 15
Vehicle : other: distilled water
Result : not sensitizing
Classification : not sensitizing
Method : EPA OPP 81-6

Year : 1982
GLP : yes
Test substance : other TS

Method : After establishing the highest non-irritating dose concentration, a 3 week induction period was initiated during which 10 young adult, male, guinea pigs were treated with the test material applied as a 30% w/w solution in deionized water and 10 were treated with 0.08% Dinitrochlorobenzene (DNCB) in 95% ethyl alcohol (positive controls). During the induction period the animals were dosed on alternate days until a total of nine dose applications was achieved. Seventeen days after the ninth application a challenge dose was applied to a naive site on each guinea pig and approximately 24 and 48 hours later the animals were scored for a sensitization response (erythema and edema).
A naive control group of five animals was maintained under the same environmental conditions and was treated with the test material at challenge only.

Result : All guinea pigs appeared active and healthy throughout the test period. There were no signs of gross toxicity, adverse pharmacologic effects or abnormal behavior. All animals gained weight.

INDUCTION PHASE :
. Test Animals: By the 4th induction many animals exhibited very mild erythema at both 24 and 48 hours post-dose. A slight increase in the severity of irritation was noted at several sites after inductions 8 and 9.
. Positive Control Animals (0.08% DNCB): Varying degrees of erythema were observed throughout induction, increasing in severity toward the end of this period.

CHALLENGE PHASE:
. Test Animals: No irritation was noted after challenge.
. Naive Control Animals: No irritation was noted after challenge.
. Positive Control Animals (0.08% DNCB): Twenty-four and 48 hours after challenge all sites were erythemic, showing a faint to moderate response.
The incidence and severity of irritation (sensitization response) after challenge are described below:

Sensitization Response

	Incidence		Severity	
	24 hrs.	48 hrs.	24 hrs.	48 hrs.
Test Animals	0/10	0/10	0	0
Positive Control Animals	10/10	10/10	1.5	0.85
Naive Animals	0/5	0/5	0	0

Based on these findings Pennatop PF 1866 is considered to be a non contact sensitizer when applied as a 30% w/w solution in deionized water, 3 times a week for 3 weeks.

The positive response to 0.08% DNCB (positive control) validates the test system used in this study.

Source	:	Atofina, Paris-la-défense, France Atofina Paris La Défense Cedex
Test substance	:	DEHA, Pennstop PF 1866, Pennwalt's Wyandotte, MI, Production Facility.
Reliability	:	(1) valid without restriction
Flag	:	Material Safety Dataset, Directive 67/548/EEC

28.12.2005 (34)

5.4 REPEATED DOSE TOXICITY

Type	:	
Species	:	rat
Sex	:	male/female
Strain	:	Sprague-Dawley
Route of admin.	:	inhalation
Exposure period	:	28 days
Frequency of treatm.	:	6 hours per day , 5 days per week
Post exposure period	:	2 weeks
Doses	:	15, 150 and 1506 ppm
Control group	:	yes, concurrent no treatment
NOAEL	:	150 ppm
Method	:	Directive 84/449/EEC, B.8 "Sub-acute toxicity (inhalation)"
Year	:	1992
GLP	:	yes
Test substance	:	other TS

Method : Potential subchronic toxic effects of the test article, Diethylhydroxylamine (DEHA), were evaluated in a 28-day study in rats. The test article was administered via nose-only inhalation to three groups, each comprised of 15 male and 15 female Crl:CDBR rats, for a period of six hours per day, five days per week, for four consecutive weeks (minimum of 20 total exposures). The targeted exposure concentrations were 15, 150 and 1500 ppm. The test atmosphere concentrations were monitored by infrared absorbance and were found to be 15, 150 and 1506 ppm. A concurrent control group of identical design received only filtered air, on a comparable regimen. The animals were observed for clinical signs and effects on body weight, food consumption and clinical pathology parameters. Data from detailed physical examinations, including Functional Observational Battery data (handling and open field observations), were recorded during the pretest period and during weeks 0 through 5. After completion of exposure, 5 rats/sex/group entered an approximate two-week (nonexposure) recovery period, after which they were euthanized; necropsies were performed, and selected organs were weighed. The remaining rats in each group were euthanized immediately following the exposure period and necropsied as described above. A microscopic examination was conducted on selected tissues from all groups.

Result : 1-2 animals in the control, 15, 150 and 1500 ppm groups were found dead during the study. The deaths did not occur in an exposure-related manner and were not related to exposure to the test article. All other animals survived to the scheduled necropsies. The predominant treatment-related clinical signs were dried yellow dorsal posterior and urogenital matting, lack of grooming, eye closure and hypoactivity in males and females in the 1500 ppm group, and ataxia, paleness in color, walking on tiptoes and hunched posture in the females in this group. The

findings of ataxia, paleness in color, walking on tiptoes, hunched posture, eye closure and hypoactivity were transient in that they occurred only at the post-exposure observation and not prior to exposure or during the Functional

Observational Battery. During the recovery period, no significant findings were noted at any exposure level. The only potential test article-related finding noted during the Functional Observational Battery evaluations (handling and open field observations) was an increase in slightly soiled or very soiled fur in the 1500 ppm group males and females during weeks 0 to 2. During the recovery period, no test article-related findings were noted during the Functional Observational Battery evaluations.

Reductions in mean body weight gain were noted in males and females in the 1500 ppm group during week 0-1 and in males in this group throughout the remainder of the exposure period. Food consumption was reduced in the 1500 ppm group males and females during week 0-1. During the recovery period, body weights and food consumption in these animals were similar to the control group values.

At the week 4 evaluation, the segmented neutrophil count was increased in the 1500 ppm group mates and females, and the lymphocyte count was reduced in the females in this group. Alkaline phosphatase and phosphorous values were increased in the 1500 ppm group males and females at the week 4 evaluation. At the week 4 evaluation, albumin levels were decreased in the 1500 ppm group (both sexes) and the 150 ppm group (females only), and globulin was increased in the 1500 ppm females. These changes corresponded with decreased A/G ratios in the 1500 ppm group (both sexes) and the 150 ppm group females. A slight but statistically significant increase in alanine aminotransferase in the 1500 ppm group females (week 4) may also have been treatment-related. Bile acids were increased in the mates in the 1500 ppm group at the week 4 evaluation. At the week 6 evaluation, the values for all of these parameters were similar to the control group values. (Although bile acids appeared elevated at the week 6 evaluation for 1500 ppm mates, this was due to a low control value and unrelated to the test article.) Other hematology and serum chemistry values and urinalysis parameters were unaffected by exposure to the test article at any exposure level.

No test article-related internal fmdings were noted at the necropsies of animals that died during the study or at the scheduled necropsies. At the week 4 necropsy, thymus gland weights (relative and absolute) were reduced in males and females in the 1500 ppm group. Mean liver weights (absolute and relative) were increased in the 1500 ppm group females at the week 4 necropsy. Organ weights were comparable to the control group values at the week 6 (recovery) necropsy.

At the necropsy of animals that died during the study, no test article-related microscopic observations were noted. At the week 4 necropsy, reversible test article-related microscopic changes consisting primarily of nonsuppurative mucosal inflammation, but also including squamous hyperplasia and necrosis in a limited number of animals, were noted in the nasal passages of male and female rats in

the 150 and 1500 ppm groups; these effects were considered to be local, not systemic. At the recovery necropsy, only one rat of each sex in the 1500 ppm group had minimal nonsuppurative mucosal inflammation in the nasal cavity. Medullary plasmacytosis was noted at an increased incidence in the iliac and popliteal lymph nodes in males in the 1500 ppm group. At the recovery necropsy, no exposure-related microscopic effects were noted in males or females at any dose level.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA, Batch K-03-E. Concentration: 99.1%.

Conclusion : In conclusion, toxicity was exhibited in the 1500 ppm group by clinical signs, inhibition of body weight gain and food consumption, changes in white blood cell differential counts, various serum chemistry changes, reduced thymus gland weights-and increased liver weights. Medullary plasmacytosis was noted in the iliac and popliteal lymph nodes in males in the 1500 ppm group. Systemic effects in the 150 ppm group were limited to slight decreases in albumin and A/G ratio (females only). Based on data collected following a two-week nonexposure (recovery) period, all of these effects were considered to be reversible. Microscopic changes were noted in the nasal passages of male and female rats in the 150 and 1500 ppm groups; these effects were considered to be due to local irritation, not systemic toxicity, and reversible. The hematological, serum chemistry and organ weight (thymus and liver) effects in the 1500 ppm group indicate that the liver and thymus were the target organs, however, no test article related histomorphological changes were seen in these tissues.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset, Directive 67/548/EEC, Critical study for SIDS endpoint

31.12.2005 (12)

Type :

Species : rat

Sex : male/female

Strain : Sprague-Dawley

Route of admin. : inhalation

Exposure period : 5 days

Frequency of treatm. : 6 hours per day

Post exposure period : none

Doses : 15, 150, 450 and 1500 ppm

Control group : yes, concurrent no treatment

NOAEL : 150 ppm

Method : other: range-finding study

Year :

GLP : yes

Test substance : other TS

Method : Possible toxic effects of the test article, Diethylhydroxylamine, were evaluated in this five-day study in rats. For this study, exposure concentrations of 15, 150, 450, and 1500 parts per million (ppm) were selected. The test article was administered via nose-only inhalation, for six hours per day for five consecutive days. The control group received filtered air on a comparable regimen. Each group consisted of five males and five females. The animals were observed twice daily for mortality and moribundity.

Clinical examinations were performed just prior to exposure, during exposure, and approximately one to two hours after exposure. Individual body weights were recorded one week prior to the initiation of dosing (day -7), the day before the initiation of dosing (day -1), and daily during the exposure period through day 5. Individual food consumption was recorded daily, beginning one week prior to test article exposure. Complete necropsies were performed on each rat, and selected organs were weighed.

Result : Test article exposure had no adverse effect on survival in any treated group. An increased incidence of yellow matting on the urogenital and ventral abdominal areas in the 1500 ppm group occurred one hour following exposure on study day 0. This increase was attributed to the test article. Body weight gain and food consumption were slightly inhibited in the 1500 ppm group males and females essentially throughout the study. No macroscopic lesions related to the test article were observed at any exposure level. Mean absolute and relative liver weights were increased in the 450 and 1500 ppm group females, but not the males, in a dose-related manner.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA
Batch 4597. Purity: 99.4%.

Conclusion : Based on the data obtained, exposure levels of 15, 150 and 1500 ppm were selected for a 28-day inhalation toxicity study of Diethylhydroxylamine in rats.

Reliability : (1) valid without restriction
28.12.2005 (13)

5.5 GENETIC TOXICITY 'IN VITRO'

Type : Salmonella typhimurium reverse mutation assay
System of testing : Strains: TA 1535, TA1537, TA 98, TA 100, TA 102
Test concentration : 312.5, 625, 1250, 2500 and 5000 µg/plate
Cycotoxic concentr. : >=5000 µg/plate
Metabolic activation : with and without
Result : negative
Method : OECD Guide-line 471
Year : 1997
GLP : yes
Test substance : other TS

Result : All the dose-levels are expressed as active substance, taking into account the purity of 86.733%.

BACTERIAL TOXICITY
No toxicity was noted towards the three strains used, with and without S9-mix.

GENOTOXIC EFFECTS:
The number of revertants for the vehicle and positive controls was as specified in the acceptance criteria. The study was therefore considered valid.
Since the test substance was freely soluble and non-toxic, the highest dose-level was 5000 µg/plate, according to the criteria specified in the international guidelines.
The selected treatment-levels were 312.5, 625, 1250, 2500 and 5000 µg/plate, for both mutagenicity experiments with

and without S9 mix.
In the TA 1535 strain in the first experiment without S9 mix, a 2-fold increase in the number of revertants was noted at 1250 µg/plate. This increase was not reproducible (not observed in the second experiment performed under the same experimental conditions). In addition the revertant values obtained remained clearly within the vehicle historical range (3-23). Therefore, this slight increase in revertants was not considered as relevant.

PRECIPITATION:
No precipitate was observed in the Petri plates

TEST-SPECIFIC CONFOUNDING FACTORS: none

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : ADMINISTRATION:
- Number of replicates: 3/dose
- Metabolic activation: S9-mix (from Sprague-Dawley rats, treated by Aroclor 1254)
- Vehicle: distilled water
- Negative control: distilled water
- Positive controls:
without S9-mix
. for TA1535 and TA100: sodium azide (1µg/plate)
. for TA98: 2-nitrofluorene (0.5 µg/plate)
. for TA102: mitomycin C (0.5 µg/plate)
. for TA1537: 9-aminoacridine (50µg/plate)
with S9-mix
. for all strains: 2-anthramine (2 µg/plate except 10 µg/plate for TA102)
- Pre-incubation time: 60 minutes
- Pre-incubation temperature: 37°C
- Incubation time: 48 to 72 hours
- Incubation temperature: 37°C

EXAMINATION:
- Bacterial toxicity (performed on TA98, TA100 and TA102 at 0, 10, 100, 500, 1000, 2500 and 5000 µg/plate)
- Number of revertants / plate. Two identical assays were performed.

CRITERIA FOR EVALUATING RESULTS:
- Positivity criteria for cytotoxicity:
no data
- Positivity criteria for genotoxicity:
. number of revertants in the vehicle control is consistent with laboratory historical data
. number of revertants in the positive control is higher than that of vehicle control and is consistent with laboratory historical data
. number of revertants at least twice that of negative control revertants
. reproducibility of the positive response

Test substance : DEHA
Source: Atofina
Batch number: 2905012
Purity: 86.733% in water

Conclusion : DIETHYLHYDROXYLAMINE does not show mutagenic activity in the bacterial reverse mutation test with Salmonella typhimurium.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset, Critical study for SIDS endpoint

28.12.2005 (6)

Type : Chromosomal aberration test
System of testing : Human lymphocytes
Test concentration : 78.125, 156.25, 312.5, 625, 1250, 2500, 3750 and 5000 µg/ml for the first experiment,
312.5, 625, 1250, 2500, 3750 and 5000 µg/ml for the second experiment.
Cycotoxic concentr. : >=2500 µg/ml
Metabolic activation : with and without
Result : positive
Method : OECD Guide-line 473
Year : 1997
GLP : yes
Test substance : other TS

Result : VALIDATION CRITERIA:
The frequencies of cells with structural chromosome aberrations of the vehicle and positive controls were as specified in acceptance criteria. The study was therefore considered valid.

CYTOTOXICITY:
Without S9 mix, a moderate decrease in the mitotic index (up to 53% decrease) was noted after the 3-hour treatment, mainly at dose-levels > 2500 µg/mL.
After the 44-hour treatment, a moderate to strong toxicity was induced at the dose-levels tested (42-100% decrease in the mitotic index).

WithS9 mix, a slight to moderate decrease in the mitotic index (up to 45% decrease) was noted at the 20-hour harvest time.
At the 44-hour harvest time, a marked to strong decrease in the mitotic index was noted at dose-levels > 3750 µg/mL (60-87% decrease).

CHROMOSOMAL ABERRATION ANALYSIS:
Without S9 mix, a significant and reproducible increase in the frequency of cells with structural chromosomal aberrations was noted after the 3-hour treatment at dose-levels > 2500 µg/mL (the frequency of aberrant cells reached 6.5% or 10%, $p < 0.001$, in the first and second experiments respectively). After the 44-hour treatment, a slight and significant increase in the frequency of cells with structural chromosomal aberrations was noted at 312.5 µg/mL (4%, $p < 0.05$).
With S9 mix, in the first experiment, no significant increase in the frequency of cells with structural chromosomal aberrations was noted, whereas in the second experiment, a slight but a statistically significant (5%, $p < 0.01$) increase in the frequency of cells with structural chromosomal aberrations was noted at 3750 µg/mL.
Since this increase was neither reproducible nor noted at higher dose-levels, it was not considered as relevant.
No significant increase in the frequency of cells with structural chromosomal aberrations was noted at the 44-hour harvest time.

PRECIPITATION: no

TEST-SPECIFIC CONFOUNDING FACTORS: none

Source : Atofina, Paris-La Défense, France.

Atofina Paris La Défense Cedex

Test condition : CELL CULTURE:
- Number of donors: 2
- Sex of donor: 1 man + 1 woman
- Age of donor: no data
- Cell cycle length: 12-14 hours
- Number of passages: none
- Method of maintenance of cell cultures: 0.5 mL of heparinised whole blood was added to 5 mL of RPMI 1640 medium containing 20% fetal calf serum, L-glutamine (2 mM), penicillin (100 U/mL), streptomycin (100 l1g/rnL) and phytohaemagglutinin. The cultures were then placed at 37°C for 48 hours.
- Metaphase arrest
  · Spindle poison used: colcemid (10 µg/ml)
  · Duration of exposure: 1.5 h
  · Time before harvest: 1.5 h
- Absence of mycoplasma: no data

ADMINISTRATION:
- Number of replicates: 2
- Metabolic activation: S-9 mix, prepared by rat liver enzyme induction by Aroclor 1254 and addition of Glucose-6-phosphate, NADP, KCl, MgCl2 and sodium phosphate buffer.
- Vehicle: culture medium
- Volume of vehicle added: 5 ml
- Cell density at seeding: no data
- Positive controls: Mitomycin C (3 µg/ml), Cyclophosphamide (25 and 50 µg/ml)
- Negative controls: vehicle
- Pre-incubation time: 48h
- Incubation temperature: 37°C
- Incubation time: 20h and 44h
- Duration of exposure: 3h or 44h

DESCRIPTION OF FOLLOW-UP REPEAT STUDY: no data

EXAMINATION:
- Slide preparation: cells are stained in Giemsa.
- Cytotoxicity test: Cytotoxicity was evaluated using the mitotic index, which indicates whether a item induces mitotic inhibition.
- Number of metaphases analyzed: 200 / dose (only 50 metaphase/culture were analysed when at least 10% cells with structural chromosome aberrations were observed).
- Types of sought aberrations: gaps, chromatid and chromosome breaks and exchanges, and others (multiple aberrations and pulverizations). In addition, the following numerical aberrations were recorded when encountered: polyploidy and endoreduplication.
- Statistical techniques: when necessary, a Chi-square test was used (with p=0.05)

VALIDATION CRITERIA:
Acceptance criteria:
. the frequency of cells with structural aberrations in the vehicle control was consistent with historical data
. the frequency of cells with structural chromosome aberrations in the positive control was significantly higher than that of the control and consistent with historical data.

Evaluation criteria:
A reproducible and statistically significant increase in the frequency of cells with structural chromosome aberrations for at least one of the dose-levels and one of the two harvest times was considered as a positive result. Reference to historical data was also taken into account in the evaluation of the findings.

Test substance : DEHA
Source: Atofina
Purity: 86.73% in water

Conclusion : DIETHYLHYDROXYLAMINE (batch No. 2905012) induced chromosome aberrations in cultured human lymphocytes, without metabolic activation (S9 mix).

Reliability : (1) valid without restriction

Flag : Material Safety Dataset

31.12.2005 (5)

Type : Mammalian cell gene mutation assay

System of testing : L5178Y MOUSE LYMPHOMA CELLS

Test concentration : without S9: 156.25, 312.5, 625, 1250, 2500 and 5000 µg/mL
with S9: 625, 1250, 2500, 3750 and 5000 µg/mL

Cycotoxic concentr. : >=1250 µg/mL

Metabolic activation : with and without

Result : positive

Method : OECD Guide-line 476

Year : 1997

GLP : yes

Test substance : other TS

Result : VALIDITY CRITERIA:
The cloning efficiencies CEo and CE2 and the mutation frequencies of the vehicle and positive controls were as specified in acceptance criteria. The study was therefore considered valid.

PRELIMINARY TEST:
Except for some slight decreases in the cloning efficiency immediately after treatment (CEo) or in the relative survival (RS), no noteworthy toxicity was induced at the dose-levels tested, both with and without S9 mix.

CYTOTOXICITY:
Without S9 mix, a slight to moderate toxicity was induced as shown by 31-61 % decrease in the CEo, 28-60% decrease in the relative total growth (RTG) as well as 35-70% decrease in the RS.
With S9 mix, a slight to moderate toxicity was induced, mainly at the highest dose-level tested, as shown by: up to 60% decrease in the CEo and the RS as well as 44-48% decrease in the RTG.

MUTAGENICITY:
Without S9 mix, in both experiments, a noteworthy and dose-related increase in the mutation frequency (up to 3.4 fold the vehicle control value), accompanied with an increase in the number of small colonies, was noted at dose-levels > 1250 µg/mL.
With S9 mix, on the basis of the positive criteria specified in the study plan, no positive response could be attributed to the test item. However it should be noted that an increase in the number of small colonies was generally observed in both experiments.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : CELL CULTURES:
- Source: Biovalley (77601, Marne-la-Vallée, France)
- Culture type: suspension
- Number of passages: 1
- Method of maintenance of cell cultures: Before treatment, the cells were seeded in 50 mL of RPMI 1640 medium containing 10% horse serum, L-Glutamine (2 mM), penicillin (100 U/mL), streptomycin (100 µg/mL) and sodium pyruvate (200 µg/mL). The cells were then incubated at 37°C in a humidified atmosphere of 5% CO2/95% air. After incubation, cells were counted and culture medium was removed. Cells were suspended in adequate volume of RPMI 1640 medium containing 10% inactivated horse serum.
- Cell density: 500.000 cells/ml
- Deficiences/Proficiences: TK
- Absence of mycoplasma: no data

ADMINISTRATION:
- Number of replicates: 2
- Metabolic activation: S9-mix obtained from the liver of rats treated with Aroclor 1254
- Vehicle: culture medium
- Volume of vehicle added: 50 ml
- Positive control:
. without metabolic activation: methylmethanesulfonate (MMS, at a final concentration of 25 µg/ml)
. with metabolic activation: cyclophosphamide (CPA, at a final concentration of 3 µg/ml).
- Pre-incubation time: (If applicable)
- Incubation temperature: 37°C
- Duration of exposure: 3h
- Selective agent: TFT (4 µg/ml)
- Duration of expression period: 11-12 days

EXAMINATION:
- Cytotoxicity: 1.6 cells/well (one 96-well plate/culture = two plates/dose-level, except for the vehicle control where two 96-well plates/culture were used = total of four plates) to determine cytotoxicity using cloning efficiency after treatment (CEo). After at least 7 days of incubation at 37°C, the clones were counted. RCEo (survival relative to vehicle control after treatment) was then calculated.
CEo = -ln (empty wells/total wells) / number of cells per well
RCEo = CEo treated / CEo vehicle control x 100
- Cell viability: 1.6 cells/well (one 96-well plate/culture = two plates/dose-level, except for the vehicle control where two 96-well plates/culture were used = total of four plates) to define the number of viable cells (CE2 = Cloning Efficiency at the end of the expression period). After at least 7 days of incubation at 37°C, the clones were counted. RCEo (viability relative to vehicle control after treatment) was then calculated.
- Mutations assessment: 2000 cells/well (one 96-well plate/culture = two plates/dose-level, except for the vehicle control where two 96-well plates/culture were used = total of four plates) to select the TFT-resistant mutant cells (for determination of CEmutant) After 11-12 days of incubation at 37°C in the presence of 4 µg TFT/ml of culture medium, the clones were counted, differentiating small and

large colonies.
The relative mutant frequency is calculated as MF = CEmutant / CE2 x 10E6

NUMBER OF INDEPENDENT EXPERIMENTS: 2

PRELIMINARY TEST:
To assess cytotoxicity, cells were exposed to 0, 10, 100, 500, 1000, 2500 and 5000 µg/ml, with and without S9-mix. CEo and RCEo were determined.

CRITERIA FOR EVALUATING RESULTS:
Difference between small and large colonies was based on the following criterion:
. size of small colonies: <25% of the diameter of the well
. size of large colonies: >25% of the diameter of the well
For scoring of colonies in mutant plates, the following parameters were considered:
. well with mutant colony (small or large)
. well without mutant colony.
When small and large colonies were present in the same well, two mutant colonies were counted (one small + one large).
Acceptance criteria:
- the cloning efficiency of the vehicle controls were between 0.6 and 1.4 for CEo and between 0.7 and 1.3 for CE2.
- the mutation frequency of the vehicle control was between 60 and 250 x 10E6
- the mutation frequency of positive control was higher than that of the vehicle control and consistent with historical data.
Evaluation criteria: a reproducible two-fold increase in the mutant frequency when compared to the vehicle control, at any dose-level and/or evidence of a dose relationship were considered as positive results.

Test substance : DEHA
Source: Atofina
Purity: 86.73% in water

Conclusion : DIETHYLHYDROXYLAMINE induced mutagenic activity in the mouse lymphoma assay, without S9 mix.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset

31.12.2005 (7)

Type : Salmonella typhimurium reverse mutation assay
System of testing : TA 100
Test concentration : 0.0974-1948 µmol/plate (8 concentrations tested)
Cycotoxic concentr. : >= 97.4 µmol/plate
Metabolic activation : with and without
Result : positive
Method : other
Year :
GLP : no
Test substance : other TS: 97% purity

Remark : Positive at bacteriotoxic concentrations.

Result : In the concentration range 0.0974-9.74 µmolDEHA/plate, the substance has neither a bactericidal nor a mutagenic effect.
At higher concentrations, the number of revertant colonies increased with increasing dose. In the same concentration range, decreasing survival was also observed.
At concentration exceeding 1948 µmol/plate, the toxic effect of DEHA prevented the growth of reverted cells to visible

colonies (See Attached Document).
The addition of S9-mix to the incubation system was without influence on the number of revertants, indicating that no metabolic activation was involved.

Quantitatively identical results were obtained from both purified and air oxidised samples of DEHA, indicating the absence of impurity effects.

Source : Atofina, Paris-La Défense, France.
Atofina Paris La Défense Cedex

Test condition : ADMINISTRATION:
- Number of replicates: 6
- Metabolic activation: S9-mix (from Sprague -Dawley rats, treated by Aroclor 1254)
- Vehicle: DMSO only at the lower concentration (< 487 µmol/plate)
- Negative control:
- Positive controls: 2 -aminofluorène
- Pre-incubation time: no data
- Pre-incubation temperature: no data
- Incubation time: no data
- Incubation temperature: no data

EXAMINATION:
- Bacterial toxicity
- Number of revertants / plate. Three identical assays were performed.

CRITERIA FOR EVALUATING RESULTS: no data

Test substance : DEHA
Source: EGA-Chemie (Steinheim, Germany)
Batch number: no data
Purity: 97%
Other: DEHA was tested in both original and purified form.
The purification consisted of a double vacuum distillation (4 Torr). Three cuts were taken in the first distillation (32±1°, 34±1° and 36±1°) and the middle, sharply boiling cut of each of these from the second distillation used for the tests described here.
Original DEHA after two weeks air oxidation was also assayed.

Conclusion : These results suggest that DEHA has a mutagenic effect in the toxic range of the compound.

Reliability : (3) invalid
Significant methodological deficiences:
- Only one strain is used and many information are missing.
- The range of concentration used (9-173372 µg/plate) is far in exces of the maximal concentration of 5000 µg/plate recommended by the OECD guideline.

16.01.2003 (23)

Type : Salmonella typhimurium reverse mutation assay
System of testing : Stains: TA1535, TA1537, TA1538, TA98 and TA100
Test concentration : 10, 100 and 1000 µg/plate
Cycotoxic concentr. :
Metabolic activation : with and without
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : At 1000 µg/plate (the highest dose), none of the revertant

ratio (treated/control) were over 2.0 with and without metabolic activation, even if 1.9 was obtained in TA1538 with metabolic activation.

Source : Atofina, Paris-La Défense, France
Atofina Paris La Défense Cedex

Test condition : TEST CONDITIONS:
- Number of replicates: no data
- Metabolic activation: S9-mix (from rats, treated by phenobarbital)
- Vehicle: distilled water
- Negative control: yes
- Positive controls: no
- Pre-incubation time: no data
- Pre-incubation temperature: no data
- Incubation time: 48 hours
- Incubation temperature: 37°C

EXAMINATION:
- Number of revertants / plate.

CRITERIA FOR EVALUATING RESULTS:
- Positivity criteria for genotoxicity:
. number of revertants at least twice that of negative control revertants

Test substance : DEHA
Source: Pennwalt Corporation
Batch number: no data
Purity: no data

Conclusion : Under the conditions used here, no mutagenic activity was observed.

Reliability : (3) invalid
Significant methodological deficiences:
- No positive control, no cytotoxicity study, no indication about the number of replicates, no validation criteria.
- The purity of the test sample is not reported. In the same publication the author reported the use of impure DEHA containing autooxidation products.

28.12.2005 (22)

Type : other: Bacterial mutagenicity test of urine from exposed rats
System of testing : Salmonella typhimurium TA1535
Test concentration : see Test Conditions
Cycotoxic concentr. : not studied
Metabolic activation : with
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : The urine samples collected on the day before treatment and on the 5 days of treatment demonstrated no increase in mutagenic activity greater than two times the spontaneous rate.

The secondary micronucleus test yielded very low values (0.1 to 0.3 micronuclei per 1000 polychromatic erythrocytes).

Source : Atofina, Paris-La Défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Species: mouse
- Strain: B6D2F1

- Source: no data
- Sex: female
- Age: no data
- Weight at study initiation: approximately 20 g
- Number of animals per dose: 10

ADMINISTRATION:
A control urine sample was collected at 0-4°C for 6 h and stored at -200C. In the following 5 consecutive days the mice were treated orally by gavage with 200 mg/kg unpurified diethylhydroxylamine diluted in distilled water such that each animal received 0.01 ml/g body wt. Urine samples were collected for 6 hr after treatment during which time the mice were not fed (except with water).

IN VITRO PROCESS
- Preparation of plates: 200 µl of sterile urine sample are mixed with molten agar containing approximately 2. 10E7 S. typhimuria and 200 units beta-glucuronidase.
- Number of replicates: no data
- Pre-incubation time: no
- Pre-incubation temperature: no
- Incubation time: 48 hours
- Incubation temperature: 37°C

EXAMINATION:
- Bacterial toxicity: not valued
- Number of revertants / plate. A Rt/Rc ratio is defined as being the ratio between the number of revertants per test plate (Rt) and the number of revertants per control plate (Rc)

CRITERIA FOR EVALUATING RESULTS:
no data

OTHER: 5 of the mice were examined for increased micronuclei values (no further methodological data)

Test substance : DEHA
Source: no data
Batch number: no data
Purity: unpurified

Conclusion : Under the experimental conditions used here, no mutagenic activity was observed with DEHA.

Reliability : (3) invalid
Documentation insufficient for assessment:
- Since unpurified substance is used and no chemical analysis was performed, it is difficult to assess the actual dose of DEHA administered to animals.

28.12.2005 (22)

Type : other: Bacterial mutagenicity test of urine from exposed rats
System of testing : Salmonella typhimurium TA 1535
Test concentration : See Test Conditions
Cycotoxic concentr. : Not studied
Metabolic activation : with
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : None of the samples produced more than a two-fold increase over the spontaneous rate.

Source : Atofina, Paris-La Défense, France.
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Species: rat
- Strain: Sprague-Dawley
- Source: no data
- Sex: no data
- Age: no data
- Weight at study initiation: 250 g
- Number of animals per dose: 1

ADMINISTRATION:
Two rats were pretreated with either Phenobarbital (0.1%, for 7 days in their drinking water) or Aroclor 1254 (500 mg/kg, intraperitoneally, 5 daysprior to treatment). Two rats were not pretreated as a control group.
After pre-treatment, one rat in each group received DEHA in corn oil at 400 mg/kg by gavage.
Urine samples were collected for 24h.

IN VITRO PROCESS
- Preparation of plates: 200 µl of sterile urine sample are mixed with molten agar containing approximately 2. 10E7 S. typhimuria and 200 units beta-glucuronidase
- Number of replicates: no data
- Pre-incubation time: no
- Pre-incubation temperature: no
- Incubation time: 48 hours
- Incubation temperature: 37°C

EXAMINATION:
- Bacterial toxicity: not valued
- Number of revertants / plate. A Rt/Rc ratio is defined as being the ratio between the number of revertants per test plate (Rt) and the number of revertants per control plate (Rc)

CRITERIA FOR EVALUATING RESULTS:
no data

Test substance : DEHA
Source: no data
Batch number: no data
Purity: unpurified

Reliability : (3) invalid
Documentation insufficient for assessment:
- Since unpurified substance is used and no chemical analysis was performed, it is difficult to assess the actual dose of DEHA administered to animals.

28.12.2005 (22)

Type : other: Bacterial mutagenicity test of urine from exposed rats and humans
System of testing : Salmonella typhimurium TA1538, TA 1535, TA1537, TA 98, TA 100
Test concentration : see Test Conditions.
Cycotoxic concentr. : not reported
Metabolic activation : with and without
Result : negative
Method : other
Year :
GLP : no
Test substance : other TS: Pennwalt Corp., purity unknown

Result : Group A:
Two samples (n°8 and 14) exhibited a high Rt/Rc ratio when tested with TA1535. They were tested again, using sample volumes of 100, 200 and 400 µl, with and without beta-glucuronidase. A dose-response effect was observed but beta-glucuronidase had no influence (cf Attached Document). Those two samples were then pooled and extracted at pH 9.0 with isobutanol-chloroform. No mutagenic activity was found in the organic phase. In contrast, most of the mutagenic activity was recovered in the basic aqueous phase.
The other nine samples and all of the control samples were less than two times the spontaneous control values and where therefore considered no-mutagenic.

Groups B, C and D:
None of the samples tested demonstrated an increase in mutagenic activity greater than two-fold.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Species: Rat
- Strain: Long-Evans hooded
- Source: Charles River Breeding Laboratories Inc., Wilmington, Massachusetts
- Sex: male
- Age: 7 to 8.5 weeks
- Weight at study initiation: no data
- Number of animals per dose: 10 or 11

ADMINISTRATION:
- Treated groups (level and duration of exposure): 3 animal groups (A, B and C) and 1 human group (D)
All rats were exposed to an atmosphere containing 10 ppm DEHA, 10 ppm nitroethane and saturated vapor of diethylamine hydrogen sulfite for 8 hours a day.
A: 11 rats exposed for a total of 1575 to 1640 hours, 11 unexposed rats.
B: 10 rats exposed for a total of 1935 to 2019 hours, 10 unexposed rats.
C: 10 rats exposed for a total of 2430 to 2510 hours, 10 unexposed rats.
D: 1 laboratory technician was accidentally exposed for 4 hours to a 2-ppm DEHA atmosphere as he was distilling DEHA (with a concentration peak at 50 ppm).
- Exposure chamber: Two stainless steel exposure chambers with a volume of 1250 liters each. One houses the control animal and receives only room filtered air while the second receives exposed animals and receives DEHA, nitroethane and diethylamine hydrogen sulfide.
- Vehicle: room filtered air
- Negative control: vehicle
- Positive controls: no
- Collected samples: urine samples
A: urine samples were collected for 24h since the beginning of exposure
B: urine samples were collected for 16h at the end of exposure
C: two urine samples per rat were collected: the first during the exposure period of 6.5-8h, the second during the 14.5-16.5 hours following exposure. This last sample was divided into two parts: one half of this sample was returned

to the exposure chamber and kept in contact with the gases during exposure for an additional 5-8.5 hours period.
D: urine samples were collected at 2, 18 and 24 hours after the exposure.

IN VITRO PROCESS
- Preparation of plates: 200 µl of sterile urine sample are mixed with molten agar containing approximately 2. 10E7 S. typhimuria and 200 units beta-glucuronidase (exception with D: 200 and 400 µl of urine sample are tested with and without beta-glucuronidase)
- Strains: B, C and D assay were only performed in TA1535 strain.
- Number of replicates: 1
- Pre-incubation time: no
- Pre-incubation temperature: no
- Incubation time: 48 hours
- Incubation temperature: 37°C

EXAMINATION:
- Bacterial toxicity: not valued
- Number of revertants / plate. A Rt/Rc ratio is defined as being the ratio between the number of revertants per test plate (Rt) and the number of revertants per control plate (Rc)

CRITERIA FOR EVALUATING RESULTS:
no data

Test substance : Source: Pennwalt Corporation
Batch number: No data
Purity: Anhydrous DEHA was distilled and the fraction evaporated at 118-131°C was collected and used. In this way, the yellow oxidation products were removed and the DEHA was clear.

Other: DEHA was administered simultenaously with nitroethane and diethylamine hydrogen sulfite. All those substances are supposed to not react with each other.

Conclusion : A chronic exposure of male rats to a 10 ppm DEHA atmosphere does not produce any mutagenic metabolites in urine (even if two samples were positive) in the Ames test.
A technician, accidentally exposed to 2 ppm did not produced any mutagenic urinary metabolites either.

Reliability : (3) invalid
Unsuitable test system:
Multiple chemical exposure

28.12.2005 (22)

Type : Unscheduled DNA synthesis
System of testing : Human lymphocytes
Test concentration : 0, 0.4, 0.8, 2 and 4%
Cycotoxic concentr. : 2 and 4%
Metabolic activation : without
Result : positive
Method : other
Year :
GLP : no data
Test substance : other TS

Result : At concentrations 4000 and 8000 ppm the cells were still viable as determined by trypan blue dye exclusion method. At these concentrations a significant increase in DNA synthesis was detected as described by liquid scintillation studies.

At the highest concentration cell death was evident with falling off of DNA incorporation.

Source : Atofina, Paris-La Défense, France.
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Species: human health donor
- Sex: no data
- Body weight: no data
- Cell obtaining technique: White cells separated from heparinized blood (preservative-free heparin, 10 U/ml blood) over a Ficoll- Paque gradient (Pharmacia) were washed in saline, counted in a hemocytometer, and incubated in freshly prepared culture medium consisting of Eagle's minimum essential medium supplemented with 1% fetal calf serum and 2 mM glutamine. Hydroxyurea was added at a final concentration of 10 mM to suppress normal, replicative DNA synthesis
- Mycoplasma checking: no data
- Labelling substance: tritium-labelled thymidine

ADMINISTRATION:
- Cell support: no data
- Cell density: 1.5.10E6 cell/ml
- Pre-incubation time: 2 hours (thereafter, cells are washed to discard unattached dead cells)
- Vehicle: saline
- Volume of vehicle added: no data
- Positive control: no
- Negative control: saline
- Number of replicates: 3
- Incubation (= exposure) time: 4 hours
- Incubation temperature: no data

POST EXPOSURE PROCESSING:
Cells are collected on glass fiber filters, extensively rinsed with distilled water and air-dried.
Filters are then placed in vials and counted in a toluene-PPO-POPOP mixture in a liquid scintillation counter.

EXAMINATION:
Cytotoxicity: Cell viability was determined 30 min before harvesting of cells using the trypan blue method.

Repair DNA damages test: the amount of tritiated thymidine incorporation was expressed in counts per minute.

CRITERIA FOR EVALUATING RESULTS:
no data

Test substance : DEHA
Source: no data
Batch number: no data
Purity: unpurified

Reliability : (3) invalid
Significant methodological deficiences:
- Validation criteria are absent and the number of examined cells per dose is not reported.
- The purity of the test sample is not reported. In the same publication the author reported the use of impure DEHA containing autooxidation products.

28.12.2005 (22)

5.6 GENETIC TOXICITY 'IN VIVO'

Type	:	Micronucleus assay
Species	:	mouse
Sex	:	male/female
Strain	:	ICR
Route of admin.	:	gavage
Exposure period	:	single administration
Doses	:	0, 375, 750 and 1500 mg/kg
Result	:	negative
Method	:	OECD Guide-line 474 "Genetic Toxicology: Micronucleus Test"
Year	:	1997
GLP	:	yes
Test substance	:	other TS

Result :

MORTALITY:
Mortality occurred within a day after dose administration as follows:
1/5 males at 1500 mg/kg
5/5 males and females at 3000 and 5000 mg/kg

CLINICAL SIGNS:
Lethargy at 1500 mg/kg. One female exhibited tremors at 1500 mg/kg

NUMBER OF MICRONUCLEATED ERYTHROCYTES PER ANIMALS:
The number of micronucleated polychromatic erythrocytes was not statistically increased relative to their respective vehicle control in either males of females, regardless of dose level or bone marrow collection time (cf. Attached Document)

PROPORTION OF IMMATURE ERYTHROCYTES AMONG TOTAL ERYTHROCYTES
(PCE/NCE RATIO): no data

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition :

TEST ORGANISMS:
- Source: Harlan Sprague-Dawley Inc., Frederick, MD
- Age: 6 to 8 weeks
- Body weight at study initiation: 24.0 to 32.8 g (males) and 24.6 to 30.6 g (females)
- Number of animals per dose: 5 males + 5 females
- Other: an additional group of 5 males and 5 females was designated as replacement animals in the event of mortality prior to the scheduled sacrifice and was dosed with the test article high-dose level.

ADMINISTRATION:
- Vehicle: distilled water
- Duration of test: 24, 48 or 72hours
- Administration volume: 20 ml/kg
- Frequency of treatment: single administration
- Positive control: cyclophosphamide 40 mg/kg
- Negative control: distilled water

EXAMINATIONS:
- Clinical observations (after dose administration and daily thereafter)
- Tissue examined: bone marrow
- Actual dose (mg/kg body weight): not determined

- Slide preparation:
At the scheduled sacrifice times, five mice per sex per treatment were sacrificed by CO2 asphyxiation. Immediately following sacrifice, the femurs were exposed, cut just above the knee, and the bone marrow was aspirated into a syringe containing fetal bovine serum. The bone marrow cells were transferred to a capped centrifuge tube containing approximately 1 ml fetal bovine serum. The bone marrow cells were pelleted by centrifugation at approximately 100 g for five minutes and the supernatant was drawn off, leaving a small amount of serum with the remaining cell pellet. The cells were resuspended by aspiration with a capillary pipet and a small drop of bone marrow suspension was spread onto a clean glass slide. Two to four slides were prepared from each animal. The slides were fixed in methanol, stained with May-Gruenwald-Giemsa and permanently mounted.
- Number of cells analyzed per animal: 1000

STATISTICAL TECHNIQUES:
Statistical significance is determined with Kastenbaum-Bowman tables, which is based on the binomial distribution.

VALIDATION CRITERIA:
The mean incidence of micronucleated polychromatic erythrocytes must not exceed 5/1000 polychromatic erythrocytes (0.5%) in the negative (vehicle) control.
The incidence of micronucleated polychromatic erythrocytes in the positive control group must be significantly increased relative to the negative control (p=<0.05, Kastenbaum-Bowman tables)

Test substance : DEHA
Source: Elf Atochem
Purity: 98%.

Conclusion : The negative (vehicle) and positive controls fulfilled the requirements for determination of a valid test.
Diethylhydroxylamine did not induce a significant increase in the incidence of micronucleated polychromatic erythrocytes in bone marrow and was concluded to be negative in the micronucleus test using male and female ICR mice.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset, Directive 67/548/EEC

31.12.2005 (10)

Type : Unscheduled DNA synthesis
Species : rat
Sex : male
Strain : Wistar
Route of admin. : gavage
Exposure period : single administration
Doses : 2000 and 800 mg/kg
Result : negative
Method : OECD Guide-line 486
Year : 1997
GLP : yes
Test substance : other TS

Method : Diethylhydroxylamine was tested for its ability to induce unscheduled DNA synthesis (UDS) in the livers of orally dosed male rats using an in vivo/in vitro procedure.

Information provided by the sponsor indicated that the LD50

value for Diethylhydroxylamine was greater than 2000 mg/kg (the maximum recommended dose for the UDS assay). Accordingly, a confirmatory range-finder study was performed at 2000 mg/kg. Additionally, both male and female animals were tested in the range-finder study to determine any substantial inter-sex differences in toxicity.

In the range-finder study, groups of three male and three female out bred Han Wistar (Crl:WI (Glx/BRL/Han) BR) rats were dosed once with up to 2000 mg/kg Diethylhydroxylamine. During a 2 day post-dose observation period male animals dosed at 2000 mg/kg showed clinical signs of eye closure, piloerection, lethargy and weight loss. Female animals dosed at 2000 mg/kg showed clinical signs of eye closure, piloerection, lethargy, abnormal gait and being cold to the touch. However, due to the severity of these signs the female animals were killed in extremis. Therefore, a further three female animals were dosed at 1400 mg/kg and acceptable clinical signs including piloerection, lethargy, abnormal gait, being cold to th e touch and weight loss were observed. Accordingly, as no substantial inter-sex differences in toxicity were observed, male animals only were tested in the main study at a maximum dose of 2000 mg/kg. A lower dose level of 800 mg/kg (40% of the maximum dose) was also selected.

In the main study groups of four male rats were treated once with the vehicle (purified water), Diethylhydroxylamine (at 800 mg/kg or 2000 mg/kg) or the required positive control, by oral gavage, at a dose volume of 10 mL/kg. The positive controls used were 75 mg/kg 2-acetamidofluorene (2?AAF) suspended in corn oil (12-14 hour experiment) and 10 mg/kg dimethylnitrosamine (DMN) dissolved in purified water (2-4 hour experiment).

Result : Clinical signs observed in the main study included piloerection and lethargy (2-4 hour experiment, 2000 mg/kg dose group). In the 12-14 hour experiment slight weight loss was observed (2000 mg/kg dose group).

Approximately 2-4 hours (Experiment 1) or 12-14 hours (Experiment 2) after dosing, animals were sacrificed and their livers perfused with collagenase to provide a primary culture of hepatocytes. Cultures were made from three animals in each dose group and were treated with [3H] thymidine. Six slides from each animal were prepared with fixed hepatocytes and of these, three were dipped in photographic emulsion to prepare autoradiograms. Slides were examined microscopically after development of the emulsion and staining, and the net grain count (NNG), the number of grains present in the nucleus minus the mean number of grains in three equivalent areas of cytoplasm, was determined for each of two of the three slides, each animal and dose group.

Negative (vehicle) control animals gave a group mean NNG value of less than 0.2 with only 0 to 1% cells in repair. Group mean NNG values were increased by 2-AAF and DMN treatment to 2.9 or more with more than 20% cells found to be in repair. It may be noted that the Experiment 1 vehicle control NNG value was slightly higher than normal (0.2), however this value is within the negative historical control range and therefore acceptable. Additionally, although the

positive control response for DMN was lower than normal (falling outside of historical range), the response was considered to be clearly indicative of UDS. Accordingly, in this study the vehicle control NNG value was consistent with both published and historical control data, and the system was shown to be sensitive to two known DNA damaging agents requiring metabolism for their action. The assay was therefore accepted as valid.

Treatment with 800 or 2000 mg/kg Diethylhydroxylamine did not produce a group mean NNG value greater than zero nor were any cells found in repair at either dose.

Source : Atofina, Paris-la-Défense, France
Atofina Paris La Défense Cedex

Test substance : DEHA
Origin: Atofina
Purity: 86.605 % in water

Conclusion : When treated once via oral gavage with Diethylhydroxylamine at doses up to 2000 mg/kg male Han Wistar rats showed no induction of UDS in hepatocytes isolated ex vivo approximately 2-4 or 12-14 hours after dosing. It is concluded that Diethylhydroxylamine had no genotoxic activity detectable in this test system under the experimental conditions employed.

Reliability : (1) valid without restriction

Flag : Material Safety Dataset, Directive 67/548/EEC

31.12.2005 (4)

Type : Dominant lethal assay
Species : rat
Sex : male
Strain : Sprague-Dawley
Route of admin. : i.p.
Exposure period : single administration
Doses : 0, 1.8, 18 and 180 mg/kg
Result : ambiguous
Method : other
Year :
GLP : no data
Test substance : other TS

Result : Number of corpora lutea per pregnant female:
At weeks 3 and 4, the positive control had significantly lower values than the other controls and treated groups.

Number of preimplantation losses per pregnant female:
The 180 mg/kg group had significantly higher values than the negative control in some instances.

Number of dead implantations:
At weeks 2 through 6, the positive control had significantly higher values than the other controls and treated groups. The 180 mg/kg treated group had significantly higher values than the historic and negative controls at weeks 4 and 6.

Proportion of pregnant female with one or more dead implants:
At weeks 2 trough 6, the positive control had significantly higher values than the other controls and treated groups.
The 180 mg/kg treated group displayed no significant differences from the historic and negative controls.

Dead implant / total implants:
At weeks 2 trough 6, the positive control had significantly higher values than the other controls and treated groups.
The 180 mg/kg dose group (weeks 3, 4 and 6) and the 18 mg/kg dose group (week 6) had significantly higher values than the historic and negative controls.

Number of live implants (data not shown):
At weeks 2 trough 5, the positive control had significantly lower values than the other controls and treated groups.
In isolated instances, each treated group had a significantly different value from the historic or negative control.

Source : Atofina, Paris-La Défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Source: Charles River farm
- Age: 8-10 weeks
- Body weight at study initiation: 225-260 g (males) and 185-215 g (females)
- Number of animals per dose: 10 males

ADMINISTRATION:
- Vehicle: corn oil
- Duration of test: 8 weeks
- Administration volume: 2 ml/kg
- Frequency of treatment: single administration
- Positive control: Triethylenemelamine (0.5 mg/kg, intraperitoneally)
- Negative control: corn oil (2 ml/kg)

MATING:
Male rats were treated on Monday and mated with two females on next Monday (through Friday).
On Friday, females were removed from the cage and the male was allowed to rest for two days.
On subsequent Monday, the male was mated to two new females and the process was repeated until each male had been mated for 8 weeks with two new females per week.

EXAMINATIONS:
Fourteen days from the midweek mating, the females were sacrificed by CO2 asphyxiation and the abdominal cavity was exposed. The membrane was removed from each ovary and corpora lutea for each ovary were counted and recorded separately. In addition, both uterine horns were examined and fetal deaths and total implantations were determined and recorded separately for each horn.
Fertility index: number of pregnant females/number of mated females
Total implantations
Total corpora lutea
Peimplantation losses: number of corpora lutea - number of implantations
Dead implants
Proportions of females with one ore more dead implants
Proportions of females with two ore more dead implants
Dead implant/total implants
Live implant/pregnant females

STATISTICAL TECHNIQUES:
Chi-square test or t test, on a case by case basis

VALID ATION CRITERIA:
Negative control males must show a total of 8-15 (±20%) implantations
Females mated to TEM-treated males must exhibit severe fetal damage.
There must be significantly fewer implantations and there must be significantly more females with two or more dead implants. This damage must be seen between Weeks 2 and 7 of the spermatogenic cycle.

Test substance : Source: Pennwalt Corporation
Batch number: no data
Purity: no data

DEHA was a yelow liquid indicating that it contained its autooxidation products which have been identified as the corresponding nitrone C2H5N(O)=CHCH3 and an oil of high free radical character, premumably high molecular weight nitroxide radicals.

Conclusion : Under the conditions of this dominant lethal assay, the test compound, DEHA, appeared to exhibit minimal activity in two of the parameters measured: the proportion of pregnant females with one or more implants and the number of dead implantations per pregnant female.
These effects were observed at week 6 and only at the highest dose level employed (180 mg/kg).
No statistically dose-response was observed.

Reliability : (3) invalid
The test substance was not pure and contained autooxidation products.

28.12.2005 (22)

Type : Micronucleus assay
Species : rat
Sex : male/female
Strain : Long-Evans
Route of admin. : inhalation
Exposure period :
Doses : 9 ± 1 ppm
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : The control group and treated group had similar percentages of micronuclei although the group of 10 treated males was slightly higher than the three other groups due to an increase in percentage micronuclei in 3 of the 10 animals.

Source : Atofina, Paris-La Défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Source: Charles River Breeding Laboratories Inc., Wilmington, Massachusetts
- Age: 7 to 8.5 weeks
- Body weight at study initiation: no data
- Number of animals per dose: 3 males + 9 females
- Other: 9 control and 9 exposed females were mated, three each to one male (control male with control females and exposed male with exposed females). Mating lasted for 14 days.

ADMINISTRATION:

- Vehicle: room filtered air
- Duration of test: not precised
- Positive control: no
- Negative control: room filtered air
- Other: Ten male rats born to the exposed animals were themselves exposed for 452-522h, while five female rats born to the exposed animals were themselves exposed for 613-683 h.

EXAMINATIONS:
- Clinical observations: no
- Tissue examined: bone marrow
- Actual dose (mg/kg body weight): not determined
- Slide preparation:
The rats were sacrificed within 48 hr after exposure was terminated and one femur from each was removed for testing. The bone marrow was directly flushed into fetal calf serum and slides were prepared and stained with Wright and Giemsa stains.
- Number of cells analyzed per animal: 1000

STATISTICAL TECHNIQUES:
no data

VALIDATION CRITERIA:
no data

Test substance : Source: Pennwalt Corporation
Batch number: No data
Purity: Anhydrous DEHA was distilled and the fraction evaporated at 118-131°C was collected and used. In this way, the yellow oxidation products were removed and the DEHA was clear.

Other: DEHA was administered simultenaously with nitroethane and diethylamine hydrogen sulfite. All those substances are supposed to not react with each other.

Reliability : (3) invalid
Documentation insufficient for assessment.
Scarce data about exposure and validation criteria.

28.12.2005 (22)

Type : Dominant lethal assay
Species : rat
Sex : male
Strain : Long-Evans
Route of admin. : inhalation
Exposure period : 8, 7 or 12 hrs/day, 3, 5 or 6 days/week for DEHA and nitroethane
24 hrs/day, 7 days/week for diethylamine hydrogen sulfite
Total exposure between 1541 and 1673 hours over a period of several months
Doses : 9 ± 1 ppm DEHA, 10 ± 1 ppm nitroethane and diethylamine hydrogen sulfite at saturated vapor concentration
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : See Attached Document.

The fertility rates was quite low: 59% in the treated group and 39% in the control versus a normal of about 80%.

The percentage of induced lethals and the number of dead implants per pregnant females were lower in the treatd group than in the control.

Source : Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Source: Charles River Breeding Laboratories Inc., Wilmington, Massachusetts
- Age: no data
- Body weight at study initiation: no data
- Number of animals per dose: 20 males

ADMINISTRATION:
- Vehicle: room filtered air
- Duration of test: no precise data ("several months")
- Administration volume: inhaled vapours
- Frequency of treatment: no data
- Positive control: no
- Negative control: room filtered air

MATING:
80 unexposed females were mated two to a male (20 control and 20 exposed males). The males were removed from the exposure chambers for the time required to mate (approximately 1 day).
Matings occured outside the exposure chambers in a separate room.

EXAMINATIONS:
Fertility index: number of pregnant females/number of mated females
Induced lethals
Dead implants/pregnant female

STATISTICAL TECHNIQUES:
No data

VALIDATION CRITERIA:
No data

Test substance : Source: Pennwalt Corporation
Batch number: No data
Purity: Anhydrous DEHA was distilled and the fraction evaporated at 118-131°C was collected and used. In this way, the yellow oxidation products were removed and the DEHA was clear.

Other: DEHA was administered simultenaously with nitroethane and diethylamine hydrogen sulfite. All those substances are supposed to not react with each other.

Conclusion : With the limited number of pregnant females observed, it appears that thre was no increase caused by the combined exposure.

Reliability : (3) invalid
Unsuitable test system due to multiple chemical exposure. Since exposed animals display a better fertility than that of control, control group can be suspected to be unreliable. Furthermore, no historical control data are available, thus it is impossible to conclude considering scarce data presented here.

31.12.2005 (22)

Type : Drosophila SLRL test

Species : Drosophila melanogaster

Sex	:	male
Strain	:	other: Oregon-R wild
Route of admin.	:	other: inhalation and oral feed
Exposure period	:	24 hours
Doses	:	Inhalation: exposure to vapor from 0, 0.05, 0.5, 5.0% DEHA solution in water Oral feeding: 0.0, 0.002, 0.2 and 2% DEHA solution in water
Result	:	ambiguous
Method	:	other
Year	:	
GLP	:	no
Test substance	:	other TS: Pennwalt Corp., purity unknown
Method	:	Oregon-R wild type adult males (treated or not) were mated individually with 3 to 5 virgin Basc females for three days (Brood 1). Males were then transfered to a fresh vial with 3 to 5 virgin Basc females for a second 3-day period (Brood 2). The procedure was repeated two more times to make up Broods 3 and 4. Principally sperm were sampled in brood1, spermatids in brood 2, spermatocytes in brood 3 and spermatogonia in brood 4. Individual F1 +/Basc females were permitted to mate with their brothers and F2 offspring examined for the absence of wild-type (non-Basc) males. Where wild-type males were observed, the culture was scored as non-lethal. If no wild-type males and 10 or more Basc males appeared, the culture was scored as lethal, since the probability that the wild-type males fall to appear by chance alone is less than 0.001. Where no wild-type males but fewer than 10 Basc males were found, several F2 +/Basc females were mated with Basc males and F3 scored in like manner. The flies were treated in two ways: exposing them to the vapour of DEHA or by feeding.
Result	:	In the inhalation studies, only exposure to the highest concentration gave evidence of significant mortality. Some 30% of the flies died at termination of the 24h treatment. Combined results from two inhalation experiments are shown in attached document. The mean values for all broods were higher at each concentration but not significantly so. No evidence of a dose-response correlation was observed. In the feeding studies, mortality was virtually at control level for all concentrations except 2.0% DEHA where some 90% of the flies failed to survive the 24-hr feeding period. Combined results from two experiments at 0.0, 0.2, and 2.0%, and from one experiment at 0.02% are shown in attached document too. Mean mutation frequencies were significantly higher than controls at all doses ($p < 0.05$), and preferential sensitivity of spermatids (Brood 2) is suggested. However, no evidence of a dose-effect correlation was found.
Source	:	Atofina, Paris-La Défense, France Atofina Paris La Défense Cedex
Conclusion	:	Thus in both the inhalation and feeding experiments, an

effect (in the former not significant, in the latter significant) was observed at the lowest concentration used, but no significant change at progressively higher doses. Clearly, experiments testing concentrations at concentrations between 0.0% and the lowest experimental concentration are required to determine if mutation frequencies rise progressively in this interval and then plateau. At any rate, as an overall judgment on the basis of the data thus far obtained, DEHA may be classified as a weak mutagen in Drosophila.

Reliability : (3) invalid
Documentation insifficient for assessment:
- scarce data on the methode used
- no data on DEHA purity
Significant methodological deficiences:
- no analytical control of DEHA concentration in exposure chambers.

31.12.2005 (22)

Type : other: histidine alkylation in hemoglobin and urine
Species : rat
Sex : female
Strain : Sprague-Dawley
Route of admin. : i.p.
Exposure period : single administration
Doses : 0, 150, 300 and 450 mg/kg
Result : negative
Method : other
Year :
GLP : no data
Test substance : other TS

Result : As seen in attached document, there is no difference between the amount of unreacted histidine of the tested animals and that of control group. Also, there was no increase in the percentage of alkylated histidine in the urine of the treated rats.

Source : Atofina, Paris-La Défense, France.
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Source: no data
- Age: no data
- Body weight at study initiation: 220-280 g
- Number of animals per dose: 3 females

ADMINISTRATION:
- Vehicle: no data
- Duration of test: 24h
- Administration volume: no data
- Frequency of treatment: single administration
- Positive control: no
- Negative control: yes

SAMPLES PROCESSING:
Urinary samples:
Urine was collected at 4°C for 24h after treatment.
Aliquots of 0.5 ml or urine were prepared by pipetting into 12 x 75-mm tubes and made alkaline (pH - 10.5-11) with NaOH and dried under a stream of air, The volume was reconstituted to 0.5 m1 with distilled water and the proteins were precipitated by the addition of 2 ml of sulfosa1icylic acid in 0.3 N lithium citrate, adjusted to pH

2.2 with LiOH, and centrifuged at 7000 rpm for 10 min. The clear supernatant (150 µl) was injected into the Model 121M Beckman amino acid analyzer which employed the physiological lithium citrate buffer system.

Blood samples:
Animal were sacrificed 24h after treatment and individual blood samples were collected by heart puncture.
Red blood cells (RBC) were washed in 3-4 volumes of saline per volume of RBC for 2 minutes and allowed to incubate for an additional 10 min to shrink after which the saline was removed by centrifugation. The procedure was repeated two to three times until the supernatant was clear. The cel1s were then lysed with 1 vol of water and 0.5 vol carbon tetrachloride and shaken at 320 rpm for 10 min and centrifuged at 7000g for 10 min. The suspension was left at room temperature for 10 min and again centrifuged at 7000g for 10 min. The supernatant was then filtered through two Whatman No.1 filters. The heme was removed by adding 1 m1 of the hemolysate dropwise with constant stirring to 15 ml of 1.5% HCl in acetone, at 0°C, until the supernatant was clear, and finally dried under vacuum. After drying, 0.1-0.2 mg Hb was hydrolyzed in an excess of 6 N HCl at 110°C for 24 hr. The hydrolysate was dried under vacuum over NaOH to neutralize any remaining HCl. The residue was dissolved in 250-350 ml of buffer and injected into the Model 119 Beckman amino acid analyzer.

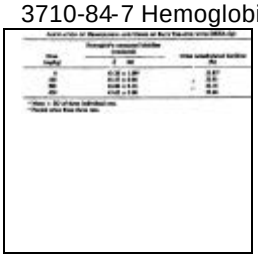
EXAMINATIONS:
The blood samples are reported as the mean of the percentage unreacted histidine in tho hemoglobin of the three rats in each group. The pooled urine samples are reported as the percentage nonalkylated histidine in the urine.

STATISTICAL TECHNIQUES:
no data

VALIDATION CRITERIA:
To standardize the hemoglobin analysis, each sample was brought to the same concentration, 38 histidine residue weight equivalents per milliliter, corresponding to 28 residue weight equivalents of proline in human tetramer hemoglobin molecules. Since proline is not susceptible to substitution reaction, any deviation from the experimental mean volume of proline in the control can be considered as impurity. Percentage of impurity was calculated as follows:
% impurity = 100 - (Actual molecules of proline/28 x100)
The sample was considered unsuitable for analysis if the impurity was greater than 7%.

Test substance : Source: no data
Batch number: no data
Purity: unpurified

Attached document : 3710-84-7 Hemoglobin alkylation (Legator).bmp



Reliability : (4) not assignable

4b: Secondary literature

31.12.2005 (22)

5.7 CARCINOGENICITY

Species	:	rat
Sex	:	male/female
Strain	:	Long-Evans
Route of admin.	:	inhalation
Exposure period	:	2 years
Frequency of treatm.	:	12 hours/day, 6 days/week for 3 months then 7 hours/day, 5 days/week (cf. Attached Document)
Post exposure period	:	none
Doses	:	9-27 ppm DEHA and the vapor of diethylamine hydrogen sulfite. Rats were also continuously exposed to 9 ± 2 ppm of nitroethane (cf. Attached Document).
Result	:	
Control group	:	other: concurrent vehicle and unexposed to vehicle
Method	:	other
Year	:	
GLP	:	no data
Test substance	:	other TS
Source	:	Atofina, Paris-la-défense, France Atofina Paris La Défense Cedex
Test condition	:	TEST ORGANISMS: - Source: Charles River Laboratories, Inc. - Age: 7-8.5 weeks - Weight at study initiation: no data - No. of animals per dose: cf. Attached Document (Experimental conditions) ADMINISTRATION: - Type of exposure: whole body - Vehicle: air at room temperature - Concentration in vehicle: cf. Attached Document (Experimental conditions) CLINICAL OBSERVATIONS AND FREQUENCY - Body weight: recorded after sacrifice and removal of blood - Food consumption: no - Water consumption: no - Clinical signs: no - Mortality: - Macroscopic examination: - Ophthalmoscopic examination: no - Haematology: Red blood cell count, total and differential white blood cell counts, red blood cell indices, and morphology. - Clinical chemistry: total protein. globulin, albumin, serum glutamic oxalacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), serum calcium, serum phosphorus, blood urea nitrogen, creatinine and blood glucose. After the 6-month sacrifice. tests were also made for total bilirubin and cholesterol. - Urinalysis: no ORGANS EXAMINED AT NECROPSY (MACROSCOPIC AND MICROSCOPIC): brain, pituitary, eye, middle ear, nasal cavity, thyroid,

parathyroid, thymus, larynx, trachea, esophagus, heart, lung, lymph nodes, salivary gland, adrenal gland, pancreas, liver, spleen, stomach, small and large intestine, kidney, urinary bladder, ureter, bone, bone marrow, muscle, skin, and for males, testes. prostate. and seminal vesicle. and for females, ovary, uterus, fallopian tubes, and mammary gland.

OTHER EXAMINATIONS: no

ANALYTICAL DEVICE:
Air samples from the centre of each test chamber through a Teflon tube and allowed to expand into an evacuated 12-liter bulb. Analysis was performed on a Beckman Model IR-10, using the band associated with the C-H stretch and centered at 2995 cm-1.

STATISTICAL TEST: no data

Test substance : -Source: Pennwalt Corporation
-Batch number: no data
-Purity: anhydrous DEHA was distilled and the fraction evaporated at 118-131°C was collected and used.
-Other: The three test reagents (DEHA, nitroethane and diethylamine hydrogen sulfite) do not react with each other in the gas phase.

Attached document : 3710-84-7 Carcino (Heicklen) Mortality and carcino.bmp

Conclusion : There are no significant variation among the groups. In summary therefore, the long-term study on rats indicates no significant effects at levels of 10-20 ppm DEHA, 10 ppm nitroethane and the vapor pressure of diethylamine hydrogen sulfite.

Reliability : (3) invalid
Problems met with exposure concentrations control make the interpretation of results somewhat difficult.

31.12.2005 (19)

Species : mouse
Sex : male/female
Strain : Swiss
Route of admin. : inhalation
Exposure period : 2 years
Frequency of treatm. : 6-8 hours per days, 5 days per week
Post exposure period : none
Doses : 10.3 ppm DEHA, 10.1 ppm nitroethane, and vapors of diethylamine hydrogen sulfite
Result :
Control group : yes, concurrent vehicle
Method : other
Year :
GLP : no data
Test substance : other TS: anhydrous DEHA

Remark : Swiss strain mice were subjected to inhalation of 10.3 ppm DEHA, 10.1 ppm nitroethane, and vapors of diethylamine hydrogen sulfite for >2 year. Histopathological evaluation of all organs indicated only a few significant findings. The incidence of all tumors, as well as subcutaneous tumors (principally fibrosarcomas), increased in exposed males with marginal significance. The incidence of any tumors in exposed females decreased with marked statistical significance.

Source : Atofina, Paris-la-défense, France

Atofina Paris La Défense Cedex
Reliability : (3) invalid
28.12.2005 (18)

5.8.1 TOXICITY TO FERTILITY

Type : other: Three generation study
Species : mouse
Sex : male/female
Strain : Swiss
Route of admin. : inhalation
Exposure period : 3 generations
Frequency of treatm. : 6-8 hours/days, 5 days/week
Premating exposure period
Male : 6-8 weeks
Female : 6-8 weeks
Duration of test :
No. of generation studies : 3
Doses : 7.8 ppm DEHA and 11.5 ppm nitroethane
Control group : yes, concurrent vehicle
Method : other
Year :
GLP : no data
Test substance : other TS: anhydrous DEHA

Remark : Three generations of mice were exposed starting prior to conception, to 7.8 ppm DEHA and 11.5 ppm nitroethane for 8.25 h/day, excluding weekends. Continuous exposure to the vapor of diethylamine hydrogen sulfite for 24 h/day, including weekends was also conducted. Two litters from each mated pair of mice were produced in generations 2 and 3, the offspring in generation 2B used to produce generations 3A and 3B. The average number of pups/litter was smaller in the test group than in the control group in each generation, though the differences were within the mean deviations. The number of pups that were stillborn or died soon after birth was 2.86% in the control group compared to 1.73% in the test group. Microscopic postmortem examns. of generations 2B and 3B showed a small number of lesions and no difference between control and test animals.
Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex
Reliability : (3) invalid
16.05.2002 (20)

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

Species : rat
Sex : female
Strain : other: CD (SD) BR
Route of admin. : gavage
Exposure period : from GD6 to GD15
Frequency of treatm. : Daily
Duration of test : sacrifice on GD20
Doses : 87.4, 393 and 568 mg/kg
Control group : yes, concurrent vehicle
NOAEL maternal tox. : = 87.4 mg/kg bw

other: NOAEL	:	>= 568 mg/kg bw
developmental toxicity		
Method	:	OECD Guide-line 414 "Teratogenici ty"
Year	:	1981
GLP	:	yes
Test substance	:	other TS
Result	:	MATERNAL BODY WEIGHT During gestation days 6-9, a reduced mean body weight gain occurred in the 393 mg/kg/day group and a mean body weight loss occurred in the 568 mg/kg/day group; the differences from the control group were statistically significant. During gestation days 9-12, mean body weight gains in the 393 and 568 mg/kg/day groups were comparable to the control group values. During the remainder of the treatment period (gestation days 12-16), mean body weight gains were reduced (statistically significant) in the 393 mg/kg/day group and were similar to the control group in the 568 mg/kg/day group. However, the decrease in body weight gain in the 393 mg/kg/day group during this interval was not considered to be related to treatment because a corresponding decrease was not noted in the 568 mg/kg/day group. Mean body weight gains in the 393 and 568 mg/kg/day groups were comparable to the control values during the post-treatment period (gestation days 16-20). Mean body weights in these groups were reduced (statistically significant) beginning on gestation day 7 (393 mg/kg/day) or 8 (568 mg/kg/day) and continuing through gestation day 16. Mean net body weights and net body weight gains in these groups were slightly decreased relative to the control group values. FOOD CONSUMPTION Food consumption, evaluated as g/animal/day and g/kg/day, was reduced in the 393 and 568 mg/kg/day groups throughout the entire treatment period (gestation days 6-9, 9-12 and 12-16); the differences from the control group were statistically significant. During the post-treatment period (gestation days 16-20), food consumption in these groups was comparable to the control group. Food consumption in the 87.4 mg/kg/day group was unaffected by treatment with the test article. CLINICAL EXAMINATIONS DURING PREGNANCY Treatment-related clinical findings noted in the 393 and 568 mg/kg/day groups included hair loss on various body surfaces, tan matting around the mouth and/or salivation. These findings were observed at the time of dosing and/or one hour following dosing. MATERNAL MORTALITY All maternal animals survived to the scheduled necropsy on gestation day 20. ORGAN WEIGHT Mean gravid uterine weights in the 393 and 568 mg/kg/day groups were similar to the control group value. Body weight data in the 87.4 mg/kg/day group was unaffected by test article administration. HISTOPATHOLOGY At the scheduled necropsy on gestation day 20, no test article-related internal findings were observed at any dose

level.

EXAMINATION OF FETUSES AND UTERINE CONTENT
Intrauterine growth and survival were unaffected by test article administration at any dose level.
Parameters evaluated included postimplantation loss, live litter size, mean fetal body weights, fetal sex ratios and the mean numbers of corpora lutea and implantation sites.
Fetuses (litters) available for morphological evaluation numbered 354(24), 326(22), 353(23) and 356(24) in the control, 87.4, 393 and 568 mg/kg/day groups, respectively.
Malformations were observed in 2(2), 1(1), 2(2) and 3(3) fetuses (litters) in these same respective dose groups and were considered to be spontaneous in origin. No developmental variants were noted in fetuses in the treated groups that were considered to be related to treatment with the test article.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Number of animals per group: 25

ADMINISTR ATION:
- Vehicle: deionized water
- Concentration in vehicle: 17.48, 78.7 and 113.6 mg/ml
- Total volume applied: 5 ml/kg

MATING PROCEDURES:
Females were placed in a suspended wire -mesh cage with a resident untreated male.
Positive evidence of mating wasconfirmed by the presence of a copulatory plug or the presence of sperm in vaginal smear, checked daily. The day on which evidence of mating was identified was termed day 0 of gestation.

PARAMETERS ASSESSED DURING STUDY:
- Maternal body weight: recorded on days 0, 6 to 16 (daily) and 20.
- Food consumption: recorded on days 0, 6 to 16 (daily) and 20.
- Clinical observations: twice daily from day 0 through day 20
- Maternal mortality: twice daily from day 0 through day 20
- Examination of uterine content: laparohysterectomy on day 20, early and late resorption, total implantations, number of corpora lutea
- Examination of fetuses: number of fetuses, sex ratio, external malformations, post-implantation loss/litter (= number of dead fetuses + resorption per group / number of gravid females per group), summation per group (= post-implantation loss per litter / number of viable fetuses per litter)

ORGANS EXAMINED AT NECROPSY (MACROSCOPIC AND MICROSCOPIC):
- Organ weights: gravid uteri
- Histopathology: Thoracic, abdominal and pelvic cavities

Fetal viscera and skeleton were examined

OTHER EXAMINATIONS: none

STATISTICAL TEST:
- One-way ANOVA with Dunnett's test applied to corpora lutea, total implantations, viable fetuses, fetal body weights, maternal body weig hts, gravid uterine weights and food consumption.
- Kruskall-Wallis test with Mann-Whitney U test for applied to litter proportions of intrauterine data (considering the litter rather than the fetus).

Test substance : DEHA
Source: Elf Atochem
Batch number: A14HD1
Concentration: 87.4%.

Conclusion : In conclusion, maternal toxicity was expressed by inhibition of body weight gain and food consumption at dose levels of 393 and 568 mg/kg/day. No maternal toxicity was evident at a dose level of 87.4 mg/kg/day. No developmental toxicity was apparent at any dose level. Based on the results of this study, the NOAEL (no observable adverse effect level) for maternal toxicity was considered to be 87.4 mg/kg/day, and the NOAEL for developmental toxicity was considered to be 568 mg/kg/day.

Reliability : (1) valid without restriction

Flag : Critical study for SIDS endpoint

31.12.2005 (11)

Species : rat
Sex : female
Strain : other: CD (SD) BR
Route of admin. : gavage
Exposure period : from GD6 to GD15
Frequency of treatm. : daily
Duration of test : sacrifice on GD20
Doses : 100, 250, 500, 750 and 1000 mg/kg
Control group : yes, concurrent vehicle
NOAEL maternal tox. : = 250 mg/kg bw
Method : other: range-finding study
Year :
GLP : yes
Test substance : other TS

Result : Five females in the 1000 mg/kg/day group died between gestation days 10 and 14. The remaining three females in this group were euthanized and discarded (without necropsy) on gestation day 16 or 17, at the request of the sponsor.
All other animals survived to the scheduled necropsy on gestation day 20
No test article-related internal findings were noted at any dose level.
Clinical observations related to treatment with the test article included salivation, animals rubbing their muzzles on the cage floor, tan matting/material around the mouth and neck and drooping eyelids at dose levels of 500, 750 and/or 1000 mg/kg/day at the time of dosing or one hour following dosing.
Mean body weight losses and reduced food consumption were observed in the 500, 750 and 1000 mg/kg/day groups during gestation days 6-9.
Food consumption remained reduced in the 750 mg/kg/day group during gestation days 9-12 and 12-16.
A slighltly reduced mean fetal body weight was observed in the 750 mg/kg/day group.
Intrauterine growth and survival were unaffected by test

article administration at any other dose level evaluated.
The only external malformations observed were anuria in in one control group fetus and microphtalmia and craniorachischisis in one 500mg/kg/day group fetus. No external developmental variations were observed in fetuses at any dose level.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Number of animals: 8

ADMINISTRATION:
- Type of exposure: (Specify, if entry from picklist is not specific enough, e.g. whole body, nose/head only)
- Vehicle: deionized water
- Concentration in vehicle: no data
- Total volume applied: 5 ml/kg

MATING PROCEDURES:
Females were placed in a suspended wire-mesh cage with a resident untreated male.
Positive evidence of mating was confirmed by the presence of a copulatory plug or the presence of sperm in vaginal smear, checked daily. The day on which evidence of mating was identified was termed day 0 of gestation.

PARAMETERS ASSESSED DURING STUDY:
- Maternal body weight:
- Food consumption:
- Clinical observations:
- Maternal mortality:
- Examination of uterine content: laparohysterectomy on day 20, early and late resorption, total implantations, number of corpora lutea
- Examination of fetuses: number of fetuses, sex ratio, external malformations

ORGANS EXAMINED AT NECROPSY (MACROSCOPIC AND MICROSCOPIC):
- Organ weights: gravid uteri
- Histopathology: Thoracic, abdominal and pelvic cavities

OTHER EXAMINATIONS: none

STATISTICAL TEST:
- One-way ANOVA with Dunnett's test applied to corpora lutea, total implantations, viable fetuses, fetal body weights, maternal body weights, gravid uterine weights and food consumption.
- Kruskall-Wallis test with Mann-Whitney U test for applied to litter proportions of intrauterine data (considering the litter rather than the fetus).

Test substance : DEHA
Source: Elf Atochem
Concentration: 87.4%.

Conclusion : Maternal toxicity was expressed by mortalities at a dose level of 1000 mg/kg/day and changes in the clinical condition of animals and inhibition of body weight gain and food consumption at dose levels of 500, 750 and 1000 mg/kg/day. No maternal toxicity was observed at a dose level of 100 and 250 mg/kg/day. No developmental toxicity was observed at dose levels of 100, 250, 500 and 750 mg/kg/day.

Reliability : (1) valid without restriction
31.12.2005 (14)

Species : mouse
Sex : female
Strain : Swiss
Route of admin. : inhalation
Exposure period : from GD6 to GD17
Frequency of treatm. : 8.25 +/- 2.25 hours/day
Duration of test : sacrifice on GD18
Doses : 8.9 ± 2.0 ppm
Control group : yes, concurrent vehicle
Method : other
Year :
GLP : no data
Test substance : other TS: anhydrous diethylhydroxylamine

Result : Based on the observations of the uterine contents recorded on Day 18 of gestation, the test material did not produce any effect.

MATERNAL FINDINGS:
Examination of the internal organs of the females revea1ed a cystic left ovary in one mouse. This was not judged to be compound-related.

FETAL FINDINGS:
Examination of the offspring at delivery revealed a number of subcutaneous hematomas, primarily of the dorsal thorax and the extremities, in 20 pups out of 11 group C litters and in 8 pups out of group E litters. In addition, two fetuses were recorded as being small (0.64 and 0.55 g), one fetus had an internal hemorrhage, and one fetus had a right lip separation which was attributed to a possible mechanical injury. Exencepha1y was found in one fetus which also had a subcutaneous hematoma on the tail and was described as pale.
This fetus was found to have open ed eyes and a protruding tongue. No other fetal abnormalities were observed.
However, because of the distribution of these observations, they were not judged to be the result of a compound effect.

Fetal specimen stained with Alizarin red S and cleared for examination of skeletal abnormalities exhibited changes frequently observed in 18-ady-old mouse fetuses of this strain. No dose-related variation in the frequency of these commonly encountered changes was observed.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Test condition : TEST ORGANISMS:
- Source: Charles River Laboratory
- Age: 56 days
- Weight at study initiation: no data
- Number of animals: 50 females

ADMINISTRATION:
- Type of exposure: whole body
- Treatment: animal are also exposed to nitroethane (14.3 ± 2.0 ppm) and diethylamine hydrogen sulfite (saturating vapours)
- Vehicle: filtered room air

MATING PROCEDURES:

Females were mated two to a male.

PARAMETERS ASSESSED DURING STUDY:
- Body weight gain: no
- Food consumption: no
- Clinical observations during pregnancy: no
- Examination of uterine content: resorption sites, implantation sites
- Examination of fetuses: number of viable fetuses, number of dead fetuses, fetal morphology, soft tissues (head, thoracic and visceral organs examined by a modified Wilson's sectioning technique), skeletal examination.

ORGANS EXAMINED AT NECROPSY (MACROSCOPIC AND MICROSCOPIC):
- Female internal organs: ovaries, uteri, placentae
- Histopathology: no

OTHER EXAMINATIONS: no

Test substance : - Source: Pennwalt Corp.
- Batch number: no data
- Purity: Anhydrous DEHA was distilled and the fraction evaporated at 118-131° was collected and used.
- Other: DEHA, nitroethane and diethylamine hydrogen sulfite were simultaneously administered. They are supposed to no react with each other.

Conclusion : Exposure of pregnant female mice to air concentrations of DEHA produced no effects on the dams. There was no evidence of compound-induced malformations, variation in sex ratio, embryotoxicity or inhibition of fetal growth and development.

Reliability : (2) valid with restrictions
2c: Comparable to guideline study with acceptable restrictions.

28.12.2005 (8)

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

Endpoint	:	other: carcinogenicity
Study descr. in chapter	:	
Reference	:	
Type	:	other: initiation/promotion study
Species	:	mouse
Sex	:	male/female
Strain	:	CD-1
Route of admin.	:	drinking water
No. of animals	:	160
Vehicle	:	water
Exposure period	:	
Frequency of treatm.	:	ad libitum
Doses	:	3, 30 or 300 mg/kg
Control group	:	yes, concurrent vehicle
Observation period	:	
Result	:	
Method	:	other
Year	:	

GLP : no data
Test substance : no data

Remark : The anticarcinogenic potential of diethylhydroxylamine (3710847) (DEHA) on tumors induced by benzo(a)pyrene was studied in mice. Mice were given 0, 3, 30 or 300 mg/kg DEHA per day in the drinking water from 57 to 112 days of age. In this study, DEHA was oxidized rapidly to give the nitrone, the 300 mg/kg/d solutions were reduced to 192 mg/kg/d by the end of a 3-day period. Essentially all the DEHA was removed from the lower dose solutions, so the animals on the 3 and 30 mg solutions primarily received the nitrone. For the 4 weeks between 70 and 98 days of age animals received eight 1 mg doses of benzo(a)pyrene by gavage at 4 day intervals. Animals were weighed regularly and were killed for necropsy at 211 days of age. Lesions were selected for histopathological examination. Gross lesions were observed only in the lungs and the squamous portions of the stomach. Of the 19 lung tumors evaluated, 18 were type 2 adenomas while one was a Clara cell adenoma. The 16 stomach tumors examined histopathologically were classified as papillomas. Treatment with DEHA produced no significant effect on lung tumor incidence in either sex. A significant increase in stomach tumors was observed in females given DEHA. The authors conclude that, contrary to expectations, DEHA did not reduce the tumor incidence. In female mice, DEHA may act as a promoter or cocarcinogen for benzo(a)pyrene. DEHA is presumably metabolized differently in male and female mice.

Source : Atofina, Paris-la-défense, France
Atofina Paris La Défense Cedex

Reliability : (2) valid with restrictions
16.05.2002 (21)

5.10 EXPOSURE EXPERIENCE

5.11 ADDITIONAL REMARKS

6.1 ANALYTICAL METHODS

6.2 DETECTION AND IDENTIFICATION

7.1 FUNCTION

7.2 EFFECTS ON ORGANISMS TO BE CONTROLLED

7.3 ORGANISMS TO BE PROTECTED

7.4 USER

7.5 RESISTANCE

8.1 METHODS HANDLING AND STORING

8.2 FIRE GUIDANCE

8.3 EMERGENCY MEASURES

8.4 POSSIB. OF RENDERING SUBST. HARMLESS

8.5 WASTE MANAGEMENT

8.6 SIDE-EFFECTS DETECTION

8.7 SUBSTANCE REGISTERED AS DANGEROUS FOR GROUND WATER

8.8 REACTIVITY TOWARDS CONTAINER MATERIAL

(1) Arkema technical bulletin. 2004. Amines: Global supplier of amines and amine technology.

(2) Atkinson 1989 as cited in the experimental database of EPIWIN 3.12.

(3) ATOCHEM.DIETHYLHYDROXYLAMINE, INHIBITION DE LA MOBILITE DE D APHNIA MAGNA.CENTRE D'APPLICATION DE LEVALLOIS, N° D'ENREGISTREMENT CAL: 2986/92, LE 5/6/92.

(4) Atofina (2003) Diethylhydroxylamine: Measurement of unscheduled DNA synthesis in rat liver using an in vivo/in vitro procedure. Covance Report Number 514/97-D6173.

(5) Atofina. DIETHYLHYDOXYLAMINE. In vitro mammalian chromosome aberration test in cultured human lymphocytes. CIT Study No:22208 MLH. 25 March 2002.

(6) Atofina. DIETHYLHYDROXYLAMINE. Bacterial reverse mutation test. CIT Study No:22207 MMO.8 November 2001

(7) Atofina. DIETHYLHYDROXYLAMINE.In vitro mammalian cell gene mutation test in L5178Y TK mouse l ymphoma cells.CIT.Study No:22209 MLY.19 December 2001.

(8) Beliles, R.P., Makris, S.L., Ferguson, F., Putman, C., Sapanski, W., Kelly, N., Partymiller, K., Heicklen, J. (1978) Teratology study in mice subjected to inhalation of diethylhydroxylamine, nitroethane, and diethylamine hydrogen sulfite, Environ. Res., 17/2,165-76.

(9) Diéthylhydroxylamine. Détermination d'un effet inhibiteur sur la multiplication cellulaire bactérienne (Pseudomonas Putida), selon l'avant projet de norme ISO TC 147/SC 5/WG 1/N 111. Centre d'application de Levallois, N.réf: 41110/JCB, Le 09/09/92.

(10) Elf Atochem North America. DIETHYLHYDROXYLAMINE. MICRONUCLEUS CYTOGENETIC ASSAY IN MICE. Microbiological Associates. Study No. G94AZ90.122. 29 March 1995.

(11) Elf Atochem North America. DIETHYLHYDROXYLAMINE. A DEVELOPMENTAL TOXICITY STUDY IN RATS. WIL Research Laboratories. Study No. WIL-160083. 12 November 1997.

(12) Elf Atochem North America. DIETHYLHYDROXYLAMINE. A 28-DAY INHALATION TOXICITY STUDY OF DIETHYLHYDROXYLAMINE IN RATS. WIL Research Laboratories. Study No. WIL-160035. 22 January 1996.

(13) Elf Atochem North America. DIETHYLHYDROXYLAMINE. A 5-DAY INHALATION TOXICITY DOSE RANGE-FINDING STUDY OF DIETHYLHYDROXYLAMINE IN RATS. WIL Research Laboratories. Study No. WIL-160034. 22 January 1996.

(14) Elf Atochem North America. DIETHYLHYDROXYLAMINE. A DOSE R ANGE-FINDING DEVELOPMENTAL TOXICITY STUDY IN RATS. WIL Research Laboratories. Study No. WIL-160077. 11 August 1997.

(15) ELF ATOCHEM S.A.BIODEGRADABILITE DE LA DIETHYLHYDROXYAMINE, SELON LA NORME ISO 7827.CENTRE D'APPLICATION DE LEVALLOIS, N.REF: 41100/JCB, LE 7/09/1992.

(16) EPIWIN 3.12.

(17) EPIWIN v 3.12.

(18) Heicklen, Julian; Lundgard, Richard; Partymiller, Kenneth; Ferguson, Fred; Putman, Cecelia; Sapanski, Walter; Tankard, Joanne; Billups, Leonard (1982) Chronic inhalation study of mice subjected to diethylhydroxylamine, nitroethane, and diethylamine hydrogen sulfite, Environ. Res., 27(2), 277-89.

(19) Heicklen, Julian; Meagher, James F.; Weaver, James; Kelly, Nelson; Partymiller, Kenneth; Latt, Richard; Ferguson, Fred; Putman, Cecelia; Sapanski, Walter; Billups, Leonard (1981) Toxicological testing of rats subjected to inhalation of diethylhydroxylamine, nitroethane, and diethylamine hydrogen sulfite, Environ. Res., 26(2), 258-73.

(20) Heicklen, Julian; Partymiller, Kenneth; Kelly, Nelson; Sapanski, Walter; Putman, Cecelia; Billups, Leonard H. (1979) Three-generation reproduction study in mice subjected to inhalation of diethylhydroxylamine, nitroethane, and diethylamine hydrogen sulfite, Environ. Res., 20(2), 450-4.

(21) Heicklen,J., Wilson, T., Miller, G.D., Massaro, E.J. (1984) The Effect Of Diethylhydroxylamine On The Incidence Of Tumors Induced By Benzo(a)pyrene In The Mouse, Drug and Chemical Toxicology, 7/4, 315-327.

(22) Legator, Marvin; Kouri, Richard E.; Parmar, Amar S.; Zimmering, Stanley; Putman, Cecelia; Latt, Richard; Heicklen, Julian; Meagher, James F.; Weaver, James; Kelly, Nelson (1979) Mutagenic testing of diethylhydroxylamine, nitroethane, and diethylamine hydrogen sulfite, Environ. Res., 20(1), 99-124.

(23) Münzner, R.; Filby, W. G. (1979) Evaluation of the mutagenic effect of N,N-diethylhydroxylamine in Salmonella typhimurium TA 100, Chemosphere, 8(10), 809-13.

(24) Pennsalt Chemicals. RC 1866. ACUTE ORAL TOXICITY.

(25) Pennsalt Chemicals. RC 1866. ACUTE ORAL TOXICITY. Pharmacology Research. Study No. 57880. 1 April 1957.

(26) Pennwalt Corporation. DIETHYLHYDROXYL AMINE #2049. EYE IRRITANCY IN RABBITS. Pharmacology Research. 25 November 1975.

(27) Pennwalt Corporation. DIETHYLHYDROXYLAMINE #2049. SKIN IRRITANCY IN RABBITS. Pharmacology Research. 25 November 1975.

(28) Pennwalt Corporation. DIETHYLHYDROXYLAMINE #2697. Dot skin corrosivity in rabbits. Pharmacology Research. 17 January 1977.

(29) Pennwalt Corporation. DIETHYLHYDROXYLAMINE #2697. EYE IRRITANCY IN RABBITS. Pharmacology Research. 17 January 1977.

(30) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. Acute dermal toxicity in rabbits. Pharmacology Research. Study No. 2697. 15 January 1980.

(31) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. ACUTE ORAL TOXICITY IN RATS. Pharmacology Research. Study No. 2697. 17 January 1977.

(32) Pennwalt corporation. DIETHYLHYDROXYLAMINE. AN ACUTE INHALATION TOXICITY STUDY OF DIETHYLHYDROXYLAMINE IN THE RAT. Bio/dynamics, New Jersey. Study No. 84-7768. 21 February 1986.

(33) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. DERMAL TOXICITY IN RABBITS. Pharmacology Research. Study No. 2697. 17 January 1977.

(34) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. EPA Guinea Pig Sensitization Test (Buehler). Product Safety Labs, New Jersey. Study No. T-9454. 22 November 1989.

(35) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. One hour saturated vapor toxicity in rats. Pharmacology Research. Study No. 2697. 17 January 1977.

(36) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. Pharmacology Research. Study No. 2049. 19 September 1979.

(37) Pennwalt Corporation. DIETHYLHYDROXYLAMINE. Skin irritancy in rabbits. Pharmacology Research. Study No. 2697. 15 January 1980.

(38) Syracuse Research Corporation (SRC).

10.1 END POINT SUMMARY

10.2 HAZARD SUMMARY

10.3 RISK ASSESSMENT