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Dangerous and Newer
Environmental Toxins

Objectives of the Presentation

At the end of this presentation the participant should be able to:

- Describe the dangers of pyrethroid pesticides
- Explain the dangers of aflatoxins, ochratoxins, tricothecenes, and fusarium mycotoxins
- Articulate the dangers of titanium implants

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Financial Interest/Compensation: Nothing to disclose

Experimental/Investigational Use: Nothing to disclose

DANGEROUS & NEWER CHEMICALS

AAEM

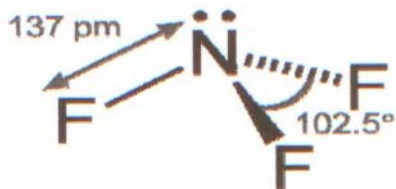
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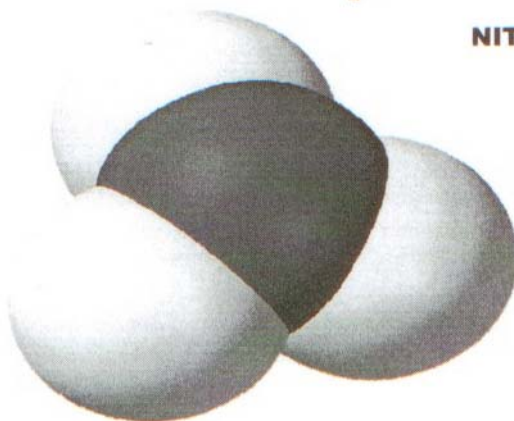
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NITROGEN TRIFLUORIDE



NITROGEN TRIFLUORIDE – NF₃

Nitrogen trifluoride IUPAC name Nitrogen trifluoride Other names Nitrogen fluoride
Trifluorammine, Trifluorammonia

Identifiers CAS number [7783-54-2] Properties Molecular formula NF₃ Molar mass 71.0019 g/mol Appearance colorless gas Density 3.003 kg/m³ (1.013 bar and 15 °C) gas

1540 kg/m³ (1.013 bar at boiling point) liquid Melting point -206.8 °C (66.35 K)

Boiling point -129.1 °C (144.05 K) (1.013 bar)

Solubility in water 0.021 vol/vol (20 °C and 1 bar) Structure Molecular shape trigonal pyramidal Dipole moment 0.234 D Hazards MSDS Air Liquide MSDS EU classification not listed NFPA 704

Flash point non-flammable Except where noted otherwise, data are given for materials in their standard state
(at 25 °C, 100 kPa)

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Nitrogen trifluoride

IDLH Documentation

CAS number: 7783-54-2

NIOSH REL: 10 ppm (29 mg/m³) TWA

1989 OSHA PEL: Same as current PEL

Current OSHA PEL: 10 ppm (29 mg/m³) TWA

1993-1994 ACGIH TLV: 10 ppm (29 mg/m³) TWA

Description of substance: Colorless gas with a moldy odor.

LEL: . *Nonflammable Gas*

Original (SCP) IDLH: 2,000 ppm

Basis for original (SCP) IDLH: *The chosen IDLH is based on the mouse 4-hour LC₅₀ of 2,000 ppm cited by Deichmann and Gerarde [1969]. Deichmann and Gerarde [1969] also stated that nitrogen trifluoride is a pulmonary irritant comparable in toxicity to the oxides of nitrogen.*

SHORT-TERM EXPOSURE GUIDELINES: None developed

ACUTE TOXICITY DATA: **Lethal concentration data:** **Human data:** None relevant for use in determining the revised IDLH.

exposure limits of nitrogen trifluoride. Toxicol Appl Pharmacol 26:1-13.

<http://www.cdc.gov/niosh/idlh/7783542.html>

Revised IDLH: 1,000 ppm Basis for revised IDLH: The revised IDLH for nitrogen trifluoride is 1,000 ppm based on acute inhalation toxicity data in animals [MacEwen and Vernot 1969; Vernot et al. 1973].

Species	Reference	LC ₅₀ (ppm)	LC _{Lo} (ppm)	Time	Adjusted 0.5-hr LC (CF)	Derived value
Mouse	Deichmann & Gerarde 1969	2,000	---	4 hr	4,000 ppm (2.0)	400 ppm
Dog	MacEwen & Vernot 1969	9,600	---	1 hr	12,000 ppm (1.25)	1,200 ppm
Monkey	MacEwen & Vernot 1969	7,500	---	1 hr	9,375 ppm (1.25)	938 ppm
Rat	Vernot et al. 1973	6,700	---	1 hr	8,375 ppm (1.25)	838 ppm
Mouse	Vernot et al. 1973	7,500	---	1 hr	9,375 ppm (1.25)	938 ppm

<http://www.cdc.gov/niosh/idlh/7783542.html>

NITROGEN TRIFLUORIDE - NF₃

1. USED AS AN ETCHANT IN MICROELECTRONICS
2. ESP. SILICON WAFERS (COMPUTER CHIPS); SILICON NITRIDE, TUNGSTEN SILICATE; CHEMICAL LASERS
3. IN SITU BROKEN DOWN INTO NITROGEN & FLUORINES
4. FLUORINE RADICALS ARE THE ACTIVE CLEANING AGENTS
5. IN 2000, REPLACEMENT FOR PERFLUOROCARBONS SUCH AS HEXAFLUOROETHANE & HEXAFLUORIDE
6. POTENT BUT SLUGGISH OXIDIZER
7. POTENT GREENHOUSE GAS - GLOBAL WARMING POTENTIAL; GWP - 17,200 TIMES GREATER THAN CO₂
8. ATMOSPHERIC LIFETIME - 740 YEARS

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pulmonary irritant.

NITROGEN TRIFLOURIDE - NF₃

9. PRODUCTION - 4000 TONS

10. CLINICAL - a) EYE IRRITANT & OTHER MUCOUS MEMBRANES; b) PULMONARY IRRITANT; c) HEMOLYSIS; d) CONVERTS BLOOD TO METHEMAGLOBIN

11. RESORCINOL - 1-3 DIHYDROXYBENZENE

12. RESORCINOL → PHARMACEUTICALS, DYES, PLASTICIZERS, TEXTILES, ADHESIVES OF WOOD, PLASTICS, RUBBER, SHALE BITUMINOUS, AQUEOUS EFFLUENTS OF COAL CONVERSIONS, RESINS

NITROGEN TRIFLOURIDE - NF₃

13. RESORCINOL → a) BREAKDOWN OF H. S. ____
b) PHLOROGLUCINOL
c) 5 - METHYRESORCINOL (ORCINOL)
d) 3, 4 & 3,5 DHBA
e) ORTHO + META PHTHALIC ACID

14. DAMAGE LIVER - CAUSE THYROIDITIS & HYPOTHYROIDISM

15. 70% OF FLAVENOID H. S.

16. THIOAZOLIDINE
THIOAMIDE - LIKE
THIOUREA } GOITROGENS

17. SOURCE:

*present
in
flavonoid*

NITROGEN TRIFLOURIDE - NF₃

18. ALIPHATIC DISULFIDES (DIMETHYL, DIETHYL) - GOITROGENS

19. SOURCE:

20. BROMINATED FLUORINATED, CHLORINATED COMPOUNDS, PSEUDOHALOGEN EFFECT i. e., PCBr, PBB → THYROIDITIS

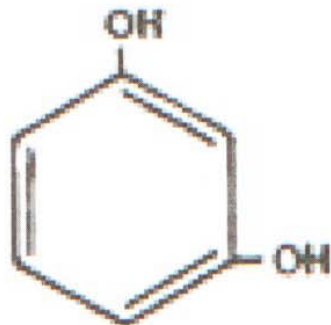
- a) TRANSFER __?__, PRESERVATIVES ?
- b) CLOTHING FIRE PROOFING

21. 2,4-D.N.P. (DINITROPHENOL) - INSECTICIDE, FUNGACIDE, DYES, WOOD PRESERVATIVE, BY PRODUCT OF OZONIZATION OF PARATHION

22. BENOMYL - SYSTEMIC FUNGACIDE - AFFECTS TESTICULAR SIZE & WEIGHT IN OFFSPRING

9

READ 10/10



RESORCINOL

10

RESORCINOL

PHENOLIC – CARBOXYLIC DIHYDROBENZOIC ACIDS

ALIPHATIC DISULFIDES – DIMETHYL, DIETHYL

11

BROMINATED, FLUORINATED,
CHLORINATED COMPOUNDS

➔ PSEUDO HALOGEN EFFECT

12

RESORCINOL

- a) **PRODUCTION OF PHARMACEUTICALS,
PLASTICIZERS, TEXTILES, RESINS, ADHESIVES OF
WOOD, PLASTICS, RUBBER**

- b) **BREAKDOWN OF HYDROGEN SULFIDE -
PHLOROGLUCINOL**

- c) **PYROGALLOL, 5 - METHYL RESORCINOL
(ARCINOL), ORTHO - [O] + META - [m],
PHTHALIC ACID FROM SHAKE BITUMEN,
AQUEOUS EFFLUENT FROM COAL
CONVERSIONS**

13

NATURALLY OCCURRING BIOFLAVENOIDS

***MILLET, SORGHUM, BEANS
AND GROUND NUTS***

HESPERDIN

CATECHIN

PHYTORETIN

***INHIBITION OF THYROID
PEROXIDATION***

14

MILLET

NATURALLY OCURRING BIOFLAVENOIDS

CONTAINS CYANIDE

15

THIOZOLIDINE

THIOAMIDO - LIKE

THIOUREA

GOITRIN

16

2, 4, D. N. P.

**INSECTICIDE, HERBICIDE, FUNGACIDE,
DYES, WOOD PRESERVATIVES,
BY PRODUCT OF OZONIZATION OF
PARATHION**

17

PHTHALATES

***PLASTIC CONTAINERS, OCCURS
NATURALLY IN SHALE, CRUDE OIL,
PLANTS & FUNGAL METABOLITES***

- a) BREAKDOWN PRODUCTS FROM
BACTERIA METABOLITES HAVE
ANTITHYROID ACTIVITY**
- b) ALSO CAUSES ENDOMETRIOSIS**

18

OBESITY - HORMONE CONTAMINATED FOOD

- a) **ETHINYL ESTROGEN - CONTAMINATED FOODS**
- b) **BISPHENOL - CRYPTORCHISM, HYPOSPADIAS, UNDESCENDED TESTICLES IN OFFSPRING**
- c) **DDT**
- d) **KEPONE**
- e) **MIREX**
- f) **OTHER CHLORINATED PESTICIDES**

19

hard plastic
containers
contaminated

ORGANOPHOSPHATE INSECTICIDES

- a) **INTERFERE WITH CHOLINESTERASE ENZYMES**
- b) **SOME REVERSIBLE**
- c) **LONG - TERM EFFECTS - REF. DR. M. ABOU - DONIA**

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3-4 yrs →
brain
damage

BENOMYL

SYSTEMIC FUNGACIDE →

↓ TESTICULAR SIZE & WEIGHT

∴ ↓ SPERM COUNTS

21

**DO: CHOLINESTERASE IN BLOOD
& URINE FOR ORGANOPHOSPHATE**

INSECTICIDE EXPOSURE

NO MATTER HOW LONG

FROM EXPOSURE

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SUMMARY

- 1) **THERE ARE NUMEROUS NEW CHEMICALS, i. e.,
NITROGEN TRIFLUORIDE, THAT CAUSE
DYSHOMEOSTASIS.**
- 2) **MANY OLDER CHEMICALS HAVE NEWLY FOUND
DYSFUNCTION.**
- 3) **THE CLINICIAN SHOULD BE AWARE.**