PubChem

COMPOUND SUMMARY

Sodium nitrite

PubChem CID	23668193
Structure	 2D Find Similar Structures
Chemical Safety	 Oxidizer, Acute Toxic, Environmental Hazard Laboratory Chemical Safety Summary (LCSS) Datasheet
Molecular Formula	$NO_2.Na$ or $NaNO_2$ or $NNaO_2$
Synonyms	SODIUM NITRITE 7632-00-0 Nitrous acid, sodium salt sodium;nitrite Natrium nitrit More...
Molecular Weight	68.995
Component Compounds	CID 946 (Nitrite) CID 5360545 (Sodium)
Dates	Modify 2021-05-22 Create 2008-02-05

Sodium nitrite appears as a yellowish white crystalline solid. Noncombustible but will accelerate the burning of combustible material. If large quantities are involved in a fire or if the combustible material is finely divided, an explosion may result. If contaminated by **ammonium** compounds, spontaneous decomposition can occur and the resulting heat may ignite surrounding combustible material. Prolonged exposure heat may result in an explosion. Toxic oxides of nitrogen are produced in fires involving this material. Used as a food preservative, and to make other chemicals.

▸ CAMEO Chemicals

Sodium nitrite is an inorganic sodium salt having **nitrite** as the counterion. Used as a food preservative and antidote to **cyanide** poisoning. It has a role as an antimicrobial food preservative, an antihypertensive agent, a food antioxidant, a poison and an antidote to **cyanide** poisoning. It is a **nitrite** salt and an inorganic sodium salt.

▸ ChEBI

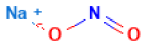
Sodium nitrite solution appears as a clear colorless to yellow solution. Harmful to the environment and somewhat toxic. Used as a preservative, and to make other chemicals.

▸ CAMEO Chemicals

1 Structures

1.1 2D Structure

Chemical Structure Depiction



PubChem

1.2 3D Status

Conformer generation is disallowed since MMFF94s unsupported element, mixture or salt

PubChem

2 Names and Identifiers

2.1 Computed Descriptors

2.1.1 IUPAC Name

sodium;nitrite

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

PubChem

2.1.2 InChI

InChI=1S/HNO2.Na/c2-1-3;/h(H,2,3);/q;+1/p-1

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

PubChem

2.1.3 InChI Key

LPXPTNMVRIOKMN-UHFFFAOYSA-M

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

PubChem

2.1.4 Canonical SMILES

N(=O)[O-].[Na+]

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

PubChem

2.2 Molecular Formula

NO2.Na

CAMEO Chemicals

NaNO2

CAMEO Chemicals; EU Food Improvement Agents; ILO International Chemical Safety Cards (ICSC); Wikipedia

NNaO2

Computed by PubChem 2.1 (PubChem release 2019.06.18)

PubChem

2.3 Other Identifiers

2.3.1 CAS

7632-00-0

CAMEO Chemicals; ChemIDplus; EPA Chemicals under the TSCA; EPA DSSTox; European Chemicals Agency (ECHA); Hazardous Substances Data Bank (HSDB); ILO International Chemical Safety Cards (ICSC); The National Instit

2.3.2 Deprecated CAS

32863-15-3, 56227-20-4, 82497-43-6, 82998-40-1

ChemIDplus

2.3.3 European Community (EC) Number

231-555-9

EU Food Improvement Agents; European Chemicals Agency (ECHA)

2.3.4 ICSC Number

1120

ILO International Chemical Safety Cards (ICSC)

2.3.5 RTECS Number

RA1225000

The National Institute for Occupational Safety and Health (NIOSH)

2.3.6 UN Number

1500

CAMEO Chemicals; DOT Emergency Response Guidebook; ILO International Chemical Safety Cards (ICSC); NJDOH RTK Hazardous Substance List

3287

CAMEO Chemicals

2.3.7 UNII

M0KG633D4F

FDA/SPL Indexing Data

2.3.8 DSSTox Substance ID

DTXSID0020941

EPA DSSTox

2.3.9 Wikipedia

Sodium nitrite

Wikipedia

2.4 Synonyms

2.4.1 MeSH Entry Terms

Nitrite, Sodium
Sodium Nitrite

Medical Subject Headings (MeSH)

2.4.2 Depositor-Supplied Synonyms

SODIUM NITRITE	Nitrous acid, sodium salt (1:1)	Azotyn sodowy	UN1500	DTXSID0020941	CCG-2660(
7632-00-0	CHEMBL93268	Natrium nitrit [German]	EPA Pesticide Chemical Code 076204	INS-250	Sodium ni
Nitrous acid, sodium salt	M0KG633D4F	Nitrito sodico [Spanish]	natrium nitrite	s209	NCGC000
sodium;nitrite	CHEBI:78870	Sodium nitrite, 97+%, ACS reagent	sodium nitrit	HMS3652K08	NCGC000
Natrium nitrit	Sodium nitrite (USP)	Nitrite de sodium [French]	Sodium nitrite, 99%, extra pure, contains an anticaking reagent	Sodium nitrite, analytical standard	NCGC002
Nitrito sodico	DSSTox_CID_941	CCRIS 559	NNaO2	Sodium nitrite, granular, 99.5%	NCGC002
Sodium nitrite solution	Nitrite, sodium	CAS-7632-00-0	Sodium nitrite (TN)	Sodium nitrite, Trace metals grade	Sodium ni
Nitrite de sodium	DSSTox_RID_75879	HSDB 757	Sodium nitrite ACS grade	Tox21_202155	BP-31053
UNII-M0KG633D4F	DSSTox_GSID_20941	Sodium nitrite solution, 40 wt. % in H2O	EC 231-555-9	Tox21_300025	E250
MFCD00011118	Caswell No. 782	NITROUS-15NACID, SODIUM SALT (9CI)	INS NO.250	ANW-36776	Sodium ni
NaNO2	Dusitan sodny [Czech]	EINECS 231-555-9	Sodium nitrite, AR, >=98%	s4074	Sodium ni
Sodium nitrite [USP]	Azotyn sodowy [Polish]	NSC 77391	Sodium nitrite, LR, >=98%	AKOS024427981	Sodium ni

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3 Chemical and Physical Properties

3.1 Computed Properties

Property Name	Property Value	Reference
Molecular Weight	68.995	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Hydrogen Bond Donor Count	0	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	3	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	0	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	68.98267252	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	68.98267252	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	52.5 Å²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	4	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	13.5	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	2	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2019.01.04)

PubChem

3.2 Experimental Properties

3.2.1 Physical Description

Sodium nitrite appears as a yellowish white crystalline solid. Noncombustible but will accelerate the burning of combustible material. If large quantities are involved in a fire or if the combustible material is finely divided, an explosion may result. If contaminated by **ammonium** compounds, spontaneous decomposition can occur and the resulting heat may ignite surrounding combustible material. Prolonged exposure heat may result in an explosion. Toxic oxides of nitrogen are produced in fires involving this material. Used as a food preservative, and to make other chemicals.

CAMEO Chemicals

Sodium nitrite solution appears as a clear colorless to yellow solution. Harmful to the environment and somewhat toxic. Used as a preservative, and to make other chemicals.

CAMEO Chemicals

DryPowder; DryPowder, Liquid; Liquid; OtherSolid; OtherSolid, Liquid; PelletsLargeCrystals; PelletsLargeCrystals, Liquid

EPA Chemicals under the TSCA

White crystalline powder or yellowish lumps

EU Food Improvement Agents

HYGROSCOPIC WHITE-TO-YELLOW SOLID IN VARIOUS FORMS.

ILO International Chemical Safety Cards (ICSC)

3.2.2 Color/Form

White, orthorhombic crystals

Lide, D.R. CRC Handbook of Chemistry and Physics 86TH Edition 2005-2006. CRC Press, Taylor & Francis, Boca Raton, FL 2005, p. 4-87

Hazardous Substances Data Bank (HSDB)

White or slightly yellow granules, rods, or powder

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

Hazardous Substances Data Bank (HSDB)

Slightly yellowish or white crystals, pellets, sticks or powder

Lewis, R.J. Sr.; Hawley's Condensed Chemical Dictionary 14th Edition. John Wiley & Sons, Inc. New York, NY 2001., p. 1019

Hazardous Substances Data Bank (HSDB)

3.2.3 Taste

Slightly salty taste

Lewis, R.J. Sax's Dangerous Properties of Industrial Materials. 10th ed. Volumes 1-3 New York, NY: John Wiley & Sons Inc., 1999., p. V3: 3265

Hazardous Substances Data Bank (HSDB)

3.2.4 Boiling Point

Decomposes at 608° F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

239 °F at 760 mm Hg (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

3.2.5 Melting Point

520 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

30 °F (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

271 °C

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

▸ Hazardous Substances Data Bank (HSDB)

No melting point; decomposes at 280 °C

▸ ILO International Chemical Safety Cards (ICSC)

3.2.6 Solubility

greater than or equal to 100 mg/mL at 66° F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

Sol in water; moderately sol in methanol; sparingly soluble in diethyl ether

Lewis, R.J. Sax's Dangerous Properties of Industrial Materials. 10th ed. Volumes 1-3 New York, NY: John Wiley & Sons Inc., 1999., p. V3: 3265

▸ Hazardous Substances Data Bank (HSDB)

Slightly soluble in ethanol

Lide, D.R. CRC Handbook of Chemistry and Physics 86TH Edition 2005-2006. CRC Press, Taylor & Francis, Boca Raton, FL 2005, p. 4-87

▸ Hazardous Substances Data Bank (HSDB)

Sol in 1.5 parts cold, 0.6 parts boiling water.

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

▸ Hazardous Substances Data Bank (HSDB)

84.8 g/100 g of water at 25 °C

Lide, D.R. CRC Handbook of Chemistry and Physics 86TH Edition 2005-2006. CRC Press, Taylor & Francis, Boca Raton, FL 2005, p. 4-87

▸ Hazardous Substances Data Bank (HSDB)

0.3 G/100 CC ETHER AT 20 °C; 4.4 G/100 CC METHANOL AT 20 °C; 3 G/100 CC ABS ALC AT 20 °C; VERY SOL IN AMMONIA.

Weast, R.C. (ed.) Handbook of Chemistry and Physics. 69th ed. Boca Raton, FL: CRC Press Inc., 1988-1989., p. B-131

▸ Hazardous Substances Data Bank (HSDB)

Solubility in water, g/100ml at 20 °C: 82

▸ ILO International Chemical Safety Cards (ICSC)

3.2.7 Density

2.17 at 68 °F (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

1.32 at 60.8 °F (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

2.17

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

▸ Hazardous Substances Data Bank (HSDB)

2.2 g/cm³

▸ ILO International Chemical Safety Cards (ICSC)

3.2.8 LogP

-3.7

▸ ILO International Chemical Safety Cards (ICSC)

3.2.9 Stability/Shelf Life

Very slowly oxidizes to **nitrate** in air.

Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989., p. 1365

▸ Hazardous Substances Data Bank (HSDB)

Soln of sodium nitrite are unstable & should be prepared directly before use; cannot be dispensed in acidic vehicles

Osol, A. (ed.). Remington's Pharmaceutical Sciences. 16th ed. Easton, Pennsylvania: Mack Publishing Co., 1980., p. 782

▸ Hazardous Substances Data Bank (HSDB)

3.2.10 Autoignition Temperature

1000 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

3.2.11 Decomposition

When heated to decomposition it emits toxic fumes of /**nitrogen oxide** and **sodium oxide**/.

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

▸ Hazardous Substances Data Bank (HSDB)

Decomp above 320 °C; Decomp even by weak acids with evolution of brown fumes of **nitrogen oxide**.

Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989., p. 1365

▸ Hazardous Substances Data Bank (HSDB)

below boiling point

▸ ILO International Chemical Safety Cards (ICSC)

3.2.12 pH

Aq soln is alkaline, pH about 9

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

▸ Hazardous Substances Data Bank (HSDB)

3.2.13 Refractive Index

Refractive index at 598 nm: alpha=1.35, beta=1.65, gamma=1.65

Laue W et al; Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (2005). NY, NY: John Wiley & Sons. Nitrates and Nitrites. Online Posting Date: June 15, 2000.

▸ Hazardous Substances Data Bank (HSDB)

3.2.14 Other Experimental Properties

Hygroscopic. Decomposes above 320 °C.

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

▸ Hazardous Substances Data Bank (HSDB)

4 Spectral Information

4.1 1D NMR Spectra

4.1.1 17O NMR Spectra

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Thumbnail	

SpectraBase

4.2 IR Spectra

4.2.1 FTIR Spectra

Showing 2 of 3 View More

Technique	KBr WAFER
Source of Sample	J. T. Baker Chemical Company
Copyright	Copyright © 1980, 1981-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

SpectraBase

Technique	KBr WAFER
Source of Sample	Mallinckrodt Inc., St. Louis, Missouri
Copyright	Copyright © 1980, 1981-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

SpectraBase

4.2.2 ATR-IR Spectra

Source of Sample	Sigma-Aldrich
Catalog Number	431605
Copyright	Copyright © 2018-2020 Sigma-Aldrich Co. LLC. - Database Compilation Copyright © 2018-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

SpectraBase

4.3 Raman Spectra

Instrument Name	Bio-Rad FTS 175C with Raman accessory
Technique	FT-Raman
Source of Sample	Mallinckrodt Inc., St. Louis, Missouri
Copyright	Copyright © 1980, 1981-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

SpectraBase

Instrument Name	Bio-Rad FTS 175C with Raman accessory
Technique	FT-Raman
Source of Sample	Mallinckrodt Inc., St. Louis, Missouri
Copyright	Copyright © 1980, 1981-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

SpectraBase

5 Related Records

5.1 Related Compounds with Annotation

PubChem

5.2 Component Compounds

CID 946 (Nitrite)

CID 5360545 (Sodium)

PubChem

5.3 Related Compounds

Same Connectivity	4 Records
Mixtures, Components, and Neutralized Forms	2 Records
Similar Compounds	5 Records

PubChem

5.4 Substances

5.4.1 Related Substances

Same	149 Records

PubChem

5.4.2 Substances by Category

PubChem

5.5 Entrez Crosslinks

PubMed	19 Records

Taxonomy	5 Records
OMIM	1 Record
Gene	34 Records

PubChem

5.6 Associated Chemicals

Nitrite;14797-65-0

Hazardous Substances Data Bank (HSDB)

6 Chemical Vendors

PubChem

7 Drug and Medication Information

7.1 WHO Essential Medicines

Drug	Drug Classes	Formulation	Indication
Sodium nitrite	Antidotes and other substances used in poisonings -> Specific	Parenteral - General injections - IV: 30 mg per mL in 10 mL ampoule	Harmful effects of or exposure to noxious substances, chiefly nonmedicinal as to source, not elsewhere classified

WHO Model Lists of Essential Medicines

7.2 FDA Orange Book

FDA Drugs

7.3 Drug Labels for Ingredients

Label Information	Total 13 labels
Drug Ingredient	SODIUM NITRITE
NDC Code(s)	48951-8368-1, 55714-1506-0, 55714-1506-1, 55714-1506-2, 55714-1706-0, 55714-1706-1, 55714-1706-2, 55714-2315-0, 55714-2315-1, 55714-2315-2 ... total 38.
Packagers	Food and Drug Administration; Home Sweet Homeopathics; Hope Pharmaceuticals; King Bio Inc.; Newton Laboratories, Inc.; Uriel Pharmacy Inc.

DailyMed

Label Information	Total 13 labels
Drug Ingredient	SODIUM NITRITE; SODIUM THIOSULFATE
NDC Code(s)	48951-8368-1, 55714-1506-0, 55714-1506-1, 55714-1506-2, 55714-1706-0, 55714-1706-1, 55714-1706-2, 55714-2315-0, 55714-2315-1, 55714-2315-2 ... total 38.
Packagers	Food and Drug Administration; Home Sweet Homeopathics; Hope Pharmaceuticals; King Bio Inc.; Newton Laboratories, Inc.; Uriel Pharmacy Inc.

DailyMed

7.4 Clinical Trials

7.4.1 ClinicalTrials.gov

ClinicalTrials.gov

7.4.2 EU Clinical Trials Register

EU Clinical Trials Register

7.5 EMA Drug Information

Disease/Condition	Treatment of pulmonary arterial hypertension
Active Substance	Sodium nitrite
Status of Orphan Designation	Positive
Decision Date	2012-03-05

European Medicines Agency (EMA)

Disease/Condition	Treatment of aneurysmal subarachnoid haemorrhage
Active Substance	Sodium nitrite
Status of Orphan Designation	Positive
Decision Date	2014-01-16

European Medicines Agency (EMA)

7.6 Therapeutic Uses

Antidotes ...

National Library of Medicine's Medical Subject Headings online file (MeSH, 1999)

Hazardous Substances Data Bank (HSDB)

Has been used as a vasodilator; as a circulatory (blood pressure) depressant and to relieve smooth muscle spasm.

Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989., p. 1365

Hazardous Substances Data Bank (HSDB)

Antidote for cyanide poisoning.

Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989., p. 1365

Hazardous Substances Data Bank (HSDB)

MEDICATION (VET): In cyanide poisoning.

Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989., p. 1365

Hazardous Substances Data Bank (HSDB)

/Cyanide antidote:/ Adults, oxygen therapy should be initiated and amyl nitrite inhaled from the crushable ampules for 30 seconds of every minute until an intravenous route is established. Amyl nitrite then is discontinued and all of the sodium nitrite (300 mg) in the 10 ml ampule is administered intravenously. The 12.5 g of sodium thiosulfate contained in the 50 ml ampule is then administered intravenously. If symptoms persist, a second dose of sodium nitrite (one-half the amount of the first dose) should be given 30 minutes later. Children, oxygen therapy is initiated; 0.33 ml/kg of sodium nitrite solution is administered, followed immediately by 1.65 ml/kg of sodium thiosulfate solution.

American Medical Association, Department of Drugs. Drug Evaluations. 6th ed. Chicago, Ill: American Medical Association, 1986., p. 1646

Hazardous Substances Data Bank (HSDB)

... Sodium nitrite is given to patients poisoned with cyanide to cause formation of methemoglobin, which serves as an alternative binding site for the cyanide ion thereby making it less toxic to the body.

Klaassen, C.D. (ed). Casarett and Doull's Toxicology. The Basic Science of Poisons. 6th ed. New York, NY: McGraw-Hill, 2001., p. 1117

Hazardous Substances Data Bank (HSDB)

... A human case of 2-methyllactonitrile poisoning, mostly by skin absorption. Nausea, vomiting, loss of consciousness, and tonic-clonic convulsions were evident. Treatment with sodium nitrite and sodium thiosulfate was effective.

Bingham, E.; Cohrssen, B.; Powell, C.H.; Patty's Toxicology Volumes 1-9 5th ed. John Wiley & Sons. New York, N.Y. (2001)., p. 4:1418

Hazardous Substances Data Bank (HSDB)

... Nitrite has vasodilating properties, probably through transformation into nitric oxide (NO) or a NO-containing molecule acting as a signal factor for smooth muscle relaxation ... /Nitrite/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

Hazardous Substances Data Bank (HSDB)

/EXPTL THER/ ... /The authors/ hypothesized that **nitrite** would be reduced to NO in ischemic tissue and exert NO-dependent protective effects. Solutions of sodium nitrite were administered in the setting of hepatic and cardiac ischemia-reperfusion (I/R) injury in mice. In hepatic I/R, **nitrite** exerted profound dose-dependent protective effects on cellular necrosis and apoptosis, with highly significant protective effects observed at near-physiological **nitrite** concentrations. In myocardial I/R injury, **nitrite** reduced cardiac infarct size by 67%. Consistent with hypoxia-dependent **nitrite** bioactivation, **nitrite** was reduced to NO, S-nitrosothiols, N-nitros-amines, and **iron**-nitrosylated heme proteins within 1-30 minutes of reperfusion. **Nitrite**-mediated protection of both the liver and the heart was dependent on NO generation and independent of eNOS and heme oxygenase-1 enzyme activities. These results suggest that **nitrite** is a biological storage reserve of NO subserving a critical function in tissue protection from ischemic injury. These studies reveal an unexpected and novel therapy for diseases such as myocardial infarction, organ preservation and transplantation, and shock states.

PMID:15841216
Full text: ***https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1077170***
Duranski MR et al; J Clin Invest 115 (5): 1232-40 (2005)

▸ Hazardous Substances Data Bank (HSDB)

/EXPTL THER/ ...To determine whether infusions of **nitrite** will prevent delayed cerebral vasospasm ... 14 anesthetized cynomolgus monkeys had an autologous blood clot placed around the right middle cerebral artery. ... A 90-mg sodium nitrite iv solution /was/ infused over 24 hr plus a 45-mg sodium nitrite bolus /was given/ daily (n = 3); a 180-mg sodium nitrite iv solution /was/ infused over 24 hours (n = 3); or a control saline solution infusion (n = 8). Each was infused continuously for 14 days. ... In control monkeys, mean (SD) cerebrospinal fluid **nitrite** levels decreased from 3.1 (1.5) umol/L to 0.4 (0.1) umol/L at day 7 and to 0.4 (0.4) umol/L at day 14 (P = .03). All 8 control monkeys developed significant vasospasm of the right middle cerebral artery, which was complicated by stroke and death in 1 animal. Sodium nitrite infusions increased the **nitrite** and methemoglobin levels (< 2.1% of total hemoglobin) in the blood and cerebrospinal fluid without evoking systemic hypotension. Nitrite infusion prevented development of vasospasm (no animals developed significant vasospasm; mean (SD) reduction in right middle cerebral artery area on day 7 after subarachnoid hemorrhage of 8% (9%) in nitrite-treated monkeys vs 47% (5%) in saline-treated controls; P<0.001). There was a negative correlation between the concentration of nitrite in cerebrospinal fluid and the degree of cerebral vasospasm (P< 0.001). Pharmacological effects of nitrite infusion were also associated with the formation of S-nitrosothiol in cerebrospinal fluid. There was no clinical or pathological evidence of nitrite toxicity. /The authors concluded that/ Subacute sodium nitrite infusions prevented delayed cerebral vasospasm in a primate model of subarachnoid hemorrhage.

PMID:15784871
Pluta RM et al; JAMA 293 (12): 1477-84 (2005)

▸ Hazardous Substances Data Bank (HSDB)

/EXPTL THER/ It is hypothesised that exogenous **nitrite** acidified by metabolic products of acidogenic bacteria in the mouth will be converted to products which inhibit growth of the bacteria in question which contribute to dental caries. OBJECTIVES: The aims of this study were (1) to test the activity of both **sodium nitrate** and sodium nitrite at differing concentrations on the ability of Streptococcus mutans to lower the pH of its surroundings and hence (2) to determine whether either **nitrate** or **nitrite** might be bactericidal or bacteriostatic against S. mutans. METHODS: S. mutans NCTC 10449(T) was cultured in a liquid medium to which either **sodium nitrate** or sodium nitrite was added to a final concentration of 0.0, 0.2, 2.0, 20 or 200 mM, of which the first acted as a test substance negative control. After 24 hr, the cultures were streaked onto agar to test for growth and the remaining culture used for pH measurement. The Mann-Whitney U-Test was used for statistical comparison of pH values. RESULTS: **Nitrite** at concentrations of 20 and 200 mM had a highly significant inhibitory effect (p < 0.001) on the ability of S. mutans NCTC 10449(T) to lower pH. Moreover, bacteria that had been subjected to these levels of nitrite were unable to recover on solid medium. Nitrate had no such effect on either the growth of the bacteria or on their ability to lower pH. CONCLUSIONS: It is concluded that nitrite, at final concentrations of either 20 or 200 mM, is both bactericidal and anti-acidogenic with respect to S. mutans, while lower concentrations of nitrite and all concentrations of nitrate are ineffective. Nitrite might be worthy of consideration as a mouth-rinse constituent. 4

PMID:1255411
Radcliffe CE et al; J Dent. 30 (7-8): 325-31. Effects of nitrite and nitrate on the growth and acidogenicity of Streptococcus mutans. Radcliffe CE, Akram NC, Hurrell F, Drucker DB. Oral Microbiology Laboratory, Turner Dental School, University of Manchester, Higher Cambridge Street, Manchester M15 6FH, UK.

▸ Hazardous Substances Data Bank (HSDB)

/MEDICATION: VET/ Methyl acrylonitrile was found to penetrate the rabbit skin readily, causing fatalities in doses of 2 to 4 mL/kg. One of the rabbits was treated with 20 mg/kg of sodium nitrite intravenously and was revived, indicating a typical nitrile effect.

Bingham, E.; Cohrssen, B.; Powell, C.H.; Patty's Toxicology Volumes 1-9 5th ed. John Wiley & Sons. New York, N.Y. (2001)., p. 4:1405

▸ Hazardous Substances Data Bank (HSDB)

7.7 Reported Fatal Dose

General Toxicity Study: oral human, LDLo 71 mg/kg, coma, gastrointestinal effects, and methemoglobinemia; oral child, LDLo 22 mg/kg, vascular effects.

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 27, 2006: ***http://esis.jrc.ec.europa.eu/***

▸ Hazardous Substances Data Bank (HSDB)

The lethal oral dose of **nitrite** for adults has been variously reported to be between 0.7 and 6 g NO2- (approximately 10 to 100 mg NO2-/kg). /**Nitrite**/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: ***http://www.inchem.org/documents/pims/chemical/pimg016.htm***

▸ Hazardous Substances Data Bank (HSDB)

7.8 Maximum Drug Dose

... Sodium nitrite as medication for vasodilation or as antidote in **cyanide** poisoning /admin/ doses of 30 to 300 mg/person, equivalent to 0.5 to 5 mg/kg bw, did not cause toxic effects.

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 30, 2006: ***http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm***

▸ Hazardous Substances Data Bank (HSDB)

8 Food Additives and Ingredients

8.1 Food Additive Classes

JECFA Functional Classes

Food Additives -> COLOUR_RETENTION_AGENT; PRESERVATIVE

Joint FAO/WHO Expert Committee on Food Additives (JECFA)

8.2 FDA Substances Added to Food

Substance	SODIUM NITRITE
Used for (Technical Effect)	PROPELLANT
Document Number (21 CFR)	172.170 172.175 172.177 172.820 172.824 175.105 175.300 176.170 176.180 177.1210 177.2600 178.3570 178.3910 181.33

FDA Center for Food Safety and Applied Nutrition (CFSAN)

8.3 FDA Inventory of Effective Food Contact Substance Notifications - FCN

Food Contact Substance	Sodium nitrite (CAS Reg. No. 7632-00-0).
Manufacturer	Nye Lubricants, Inc.
Effective Date	Nov 8, 2011
Intended Use	As an additive in lubricants with incidental contact with food in compliance with 21 CFR 178.3570.
Limitations/Specifications	The FCS will be used at a level not to exceed 5 percent by weight in repeated-use lubricants that may have incidental contact with all food types under Conditions of Use A through H and J as described in Table 2.
National Environmental Policy Act	Categorical Exclusion 25.32(j)
FDA Decision	Categorical Exclusion Memo
Notification	According to Section 409(h)(1)(C) of the Federal Food, Drug, and Cosmetic Act, food contact substance notifications (FCNs) are effective only for the listed manufacturer and its customers. Other manufacturers must submit their own FCN for the same food contact substance and intended use.

FDA Center for Food Safety and Applied Nutrition (CFSAN)

8.4 Food Additive Status

FDA Food Additive Status

Sodium nitrite - PRES, REG, 100 ppm to < 200 ppm - In loin muscle of smoked chub - 172.177; REG, < 10 ppm (0.001% sodium nitrite) - Alone as color fixative in smoked, cured tuna -172.175; REG, < 20 ppm - In cnd pet food containing meat & fish and their by-prods - 573.700; PS (by USDA) - As a color fixative and preservative, wi or without sodium or potassium nitrate, in the curing of red meat and poultry - 181.34

FDA Center for Food Safety and Applied Nutrition (CFSAN)

8.5 Evaluations of the Joint FAO/WHO Expert Committee on Food Additives - JECFA

Chemical Name	SODIUM NITRITE
Evaluation Year	2002
ADI	0-0.07 mg/kg bw
Comments	Evaluated as nitrite and expressed as nitrite ion; ADI applies to all sources of intake but not to infants below the age of 3 months
Report	FAS 50-JECFA 59/49

Joint FAO/WHO Expert Committee on Food Additives (JECFA)

9 Pharmacology and Biochemistry

9.1 MeSH Pharmacological Classification

Indicators and Reagents

Substances used for the detection, identification, analysis, etc. of chemical, biological, or pathologic processes or conditions. Indicators are substances that change in physical appearance, e.g., color, at or approaching the endpoint of a chemical titration, e.g., on the passage between acidity and alkalinity. Reagents are substances used for the detection or determination of another substance by chemical or microscopical means, especially analysis. Types of reagents are precipitants, solvents, oxidizers, reducers, fluxes, and colorimetric reagents. (From Grant and Hackh's Chemical Dictionary, 5th ed, p301, p499) (See all compounds classified as Indicators and Reagents.)

- Medical Subject Headings (MeSH)

Food Preservatives

Substances capable of inhibiting, retarding or arresting the process of fermentation, acidification or other deterioration of foods. (See all compounds classified as Food Preservatives.)

- Medical Subject Headings (MeSH)

9.2 ATC Code

V - Various

V03 - All other therapeutic products

V03A - All other therapeutic products

V03AB - Antidotes

V03AB08 - Sodium nitrite

- WHO Anatomical Therapeutic Chemical (ATC) Classification

9.3 Absorption, Distribution and Excretion

In mice given 400, 800, or 1200 mg sodium nitrite orally in drinking water 99.1 to 99.5% of the dose was eliminated. The remaining nitrite was transformed into nitrate & recovered from the liver & muscle.

CANTONI C ET AL; ARCH VET ITAL 32 (1-2): 7 (1981)

- Hazardous Substances Data Bank (HSDB)

Nitrate and nitrite given orally are absorbed and transferred to the blood in the upper part of the gastrointestinal tract. Abundant pectin in the food may delay absorption which may then occur lower down in the intestine, with possible increased risk for microbial transformation of nitrate into nitrite. /Nitrate and nitrite/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

- Hazardous Substances Data Bank (HSDB)

Regardless of route of exposure, nitrate and nitrite are rapidly transferred into the blood. Nitrite is gradually oxidized to nitrate which is readily distributed into most body fluids (urine, saliva, gastric juice, sweat, ileostomy fluid). Distribution of nitrate into plasma, erythrocytes, saliva and urine following an oral dose of sodium nitrate has been demonstrated ... /Nitrate and nitrite/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

- Hazardous Substances Data Bank (HSDB)

... Transplacental passage of nitrite occurred in pregnant rats given doses at 2.5-50 mg/kg orally ...

National Research Council. Drinking Water & Health Volume 1. Washington, DC: National Academy Press, 1977., p. 420

- Hazardous Substances Data Bank (HSDB)

For more Absorption, Distribution and Excretion (Complete) data for SODIUM NITRITE (10 total), please visit the HSDB record page.

- Hazardous Substances Data Bank (HSDB)

9.4 Metabolism/Metabolites

... Intestinal bacteria were involved in the reduction of nitrite ... Absorbed nitrite is rapidly oxidized to nitrate in the blood by a mammalian process ... The process of nitrate generation parallels the methemoglobin (MetHb) formation ... Nitrite oxidation to nitrate may also occur in the stomach prior to absorption, as demonstrated in vitro for mice. However, under in vivo conditions, nitrite is probably absorbed from the stomach before large quantities of nitrate are formed. /Nitrite/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

- Hazardous Substances Data Bank (HSDB)

... Nitrite may be further reduced to nitrogen by bacteria under some conditions. In blood, nitrite transforms hemoglobin to methemoglobin and is simultaneously oxidized to nitrate. Normally methemoglobin gradually reverts to hemoglobin through enzymatic reactions. Nitrite has vasodilating properties, probably through transformation into nitric oxide (NO) or a NO-containing molecule acting as a signal factor for smooth muscle relaxation. Nitrite easily transforms into a nitrosating agent in an acidic environment and can react with a variety of compounds, eg ascorbic acid, amines, amides. Nitrosation can also be mediated by bacteria, eg in the stomach. Some reaction products are carcinogenic (eg most nitrosoamines and amides). /Nitrate and nitrite/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

- Hazardous Substances Data Bank (HSDB)

No or very slight increase in blood nitrosamine level was found in human subjects after consumption of nitrate-, nitrite-, and/or amine-rich meals /Nitrate, nitrite, and amine/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

- Hazardous Substances Data Bank (HSDB)

The details of nitrite metabolism became a more complex when it was recognized that conversion of nitrite into nitric oxide can occur under certain physiological conditions such as hypoxia. This represents a reversal of the well-known nitric oxide-to-nitrite/nitrate pathways. As noted earlier, experiments in the 1980s showed that the nitrite ion could react with deoxygenated hemoglobin to release nitric oxide, but these experiments were carried out in vitro and their potential physiological relevance was not apparent. Zweier et al. (1995) reported that, in a perfused heart model for ischaemia, nitrite ion was converted in vivo directly into nitric oxide, which demonstrated that the earlier observations did in fact have biochemical implications. These studies have been followed by several related experiments indicating a renewed interest in the biochemistry of nitrite/nitrate. A model for nitrite/nitrate metabolism has emerged based on extensive and sometimes subtle interactions among ingested and endogenously synthesized nitrate, nitrite, nitric oxide and some related species, and the physiology of the organism.

*IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Geneva: World Health Organization, International Agency for Research on Cancer, 1972-PRESENT. (Multivolume work). Available at: **http://monographs.iarc.fr/ENG/Classification/index.php**, p. V. 94: p. 272(2010)*

▸ Hazardous Substances Data Bank (HSDB)

9.5 Mechanism of Action

There is an active endogenous nitrogen cycle in humans that involves nitrate and nitrite, which are interconvertible in vivo. Nitrosating agents that arise from nitrite under acidic gastric conditions react readily with nitrosatable compounds, especially secondary amines and amides, to generate N-nitroso compounds. These nitrosating conditions are enhanced following ingestion of additional nitrate, nitrite or nitrosatable compounds. Some of the N-nitroso compounds that could be formed in humans under these conditions are known carcinogens.

*IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Geneva: World Health Organization, International Agency for Research on Cancer, 1972-PRESENT. (Multivolume work). Available at: **http://monographs.iarc.fr/ENG/Classification/index.php**, p. V. 94: p. 323 (2010)*

▸ Hazardous Substances Data Bank (HSDB)

To clarify the mechanisms underlying forestomach carcinogenesis in rats by co-treatment with catechol and sodium nitrite (NaNO2), /the authors/ investigated the involvement of oxidative stress resulting from reaction of the two compounds. Since generation of semiquinone radical, hydroxyl radical (*OH), and peroxynitrite (ONOO-) arose through the reaction of catechol with NO, we proposed that superoxide resulting from catechol oxidation reacted with excess NO, consequently yielding *OH via ONOO-. Male F344 rats were co-treated with 0.2% catechol in the diet and 0.8% NaNO2 in the drinking water for 2 weeks. Prior to occurrence of histological evidence indicating epithelial injury and hyperplasia, 8-hydroxydeoxyguanosine levels in forestomach epithelium significantly increased from 12 hr together with appearance of immunohistochemically nitrotyrosine-positive epithelial cells. There were no remarkable changes in rats given each chemical alone. We conclude that oxidative stress due to NO plays an important role in induction of forestomach epithelial damage, cell proliferation, and thus presumably forestomach carcinogenesis.

PMID:16530157
Ishii Y et al; Arch Biochem Biophys 447 (2): 127-35 (2006)

▸ Hazardous Substances Data Bank (HSDB)

... The major concern of possible long-term effects of exposure to nitrate and nitrite is associated with formation of nitroso compounds, many of which are carcinogenic. This formation may take place wherever nitrite and nitrosable compounds are present, but it is favored by acidic conditions or the presence of some bacteria. The gastrointestinal tract and especially the stomach is regarded as the main formation site, but nitrosation reactions can also take place in an infected urinary bladder ... /Nitrate and nitrite poisoning/

*IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: **http://www.inchem.org/documents/pims/chemical/pimg016.htm***

▸ Hazardous Substances Data Bank (HSDB)

The two basic actions of sodium nitrite in vivo are relaxation of smooth muscle, especially of small blood vessels, and in toxic doses the conversion of hemoglobin to methemoglobin.

Gosselin, R.E., R.P. Smith, H.C. Hodge. Clinical Toxicology of Commercial Products. 5th ed. Baltimore: Williams and Wilkins, 1984., p. III-314

▸ Hazardous Substances Data Bank (HSDB)

... Nitrites ... can react with amines or amides and form N-nitroso cmpd (containing the group =N-N=O). N-nitroso cmpd are carcinogenic in a wide range of animal species, most are mutagenic in test systems and some have been teratogenic in animals. It is highly probable that N-nitroso cmpd also may be carcinogenic in man. ... /Nitrite/

*European Chemicals Bureau; IUCLID Dataset, Potassium nitrate (7757-79-1) (2000 CD-ROM edition). Available from, as of October 26, 2006: **http://esis.jrc.ec.europa.eu/***

▸ Hazardous Substances Data Bank (HSDB)

Nitrite is involved in the oxidation of hemoglobin (Hb), normally present in blood, to methemoglobin (MetHb). The ferrous iron Fe2+ of the heme group is oxidized to ferric iron Fe3+ and oxygen and nitrite bind more firmly to this oxidized haem. During the process of MetHb formation, nitrate is eventually generated from nitrite. Thus, blood oxygen transport to the tissues and organs is inhibited. The rate of formation of MetHb varies considerably between animal species ... At low levels of nitrite exposure, MetHb formation is reversible. The rate of MetHb reduction, which is catalyzed by the enzyme system NADPH-MetHb reductase, also varied among species, with a high correlation between formation and reduction rates of MetHb. At high nitrite exposure, the reductase system becomes saturated and can no longer cope with MetHb formation. Such saturation results in increased MetHb concentration in the blood leading to ischemia in tissues, cyanosis, irreversible damage to the tissues and ultimately to mortality ... Young infants (aged < 3 months) are extremely susceptible to nitrite-induced MetHb formation because of the presence of fetal Hb. Fetal Hb can comprise initially 60 to 80% of the total Hb, decreasing to 20 to 30% within 3 months. Fetal Hb seems to be more easily converted to MetHb... /Nitrite/

*WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: **http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm***

▸ Hazardous Substances Data Bank (HSDB)

Nitrite may form nitroso compounds by reaction with a nitrosatable compound. Many different amino compounds including secondary and tertiary amines, secondary and tertiary amides, N-substituted ureas, guanidines, indoles (mainly tryptophan-bound in proteins) and urethanes, can act as nitrosatable compounds. In the case of amines, amides and ureas, the formed nitroso compounds are N-nitrosamines, N-nitrosoamides and N-nitrosoureas. The most common nitroso compounds are those derived from secondary amines. The rate of formation is often pH dependent and proportional to the concentration of unprotonated amine (inversely related to the basicity of the amine) and to the concentration of N2O3, and hence to the square of the NO2 concentration. An optimum pH in the range of 2.5 to 3.3 is commonly observed for N-nitrosamine formation ... Nitrosation occurs especially rapidly with weakly basic secondary amines (eg morpholine, piperazine, N-methylaniline), N-alkylureas, N-alkylcarbamates and aminopyrine. Nitrosation occurs relatively slowly with strongly basic amines, such as dimethylamine, and simple N-alkylamides. Nitrosation of tertiary amines, yielding dialkylnitrosamines and nitrosation of guanidines, yielding nitrosocyanamides and nitrosoureas occur relatively slowly. Catalysis of N-nitrosamine formation by nucleophilic anions at pH 2 to 5 has been widely observed. The catalytic order is SCN > I > Br > Cl > phosphate or carboxylate. Acceleration by SCN- and I- have attracted much attention because of their in vivo relevance: salivary SCN- levels are relatively high in smokers and I- is present in gastric secretion. Nitrosation of amides and related compounds is not catalyzed by nucleophilic anions. ... . /Nitrite/

*WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: **http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm***

▸ Hazardous Substances Data Bank (HSDB)

... Nitrite may exhibit mutagenic activity by three mechanisms: (i) nitrite may deaminate DNA-bases in single strand vital DNA. Spontaneous deaminations, however, are frequent and DNA-repair systems correcting these lesions are present in bacteria and probably mammalian cells as well, (ii) formation of intra- or interstrand crosslinks between purine residues may occur resulting in distortion of the helix in the case of double-stranded DNA. An induction of this type of lesions may be enhanced by the presence of molecules proximate to DNA, like polyamines, glycols, alcohols and phenols ... and (iii) nitrite may react with nitrosatable agents to form N-nitroso compounds and thus indirectly exhibit mutagenic (and carcinogenic) activity. /Nitrite/

*WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 30, 2006: **http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm***

▸ Hazardous Substances Data Bank (HSDB)

10 Use and Manufacturing

10.1 Use Classification

Food additives

- EU Food Improvement Agents

Human drugs -> Rare disease (orphan)

- European Medicines Agency (EMA)

Human Drugs -> FDA Approved Drug Products with Therapeutic Equivalence Evaluations (Orange Book) -> Active Ingredients

- FDA Drugs

Food Additives -> COLOUR_RETENTION_AGENT; PRESERVATIVE -> JECFA Functional Classes

- Joint FAO/WHO Expert Committee on Food Additives (JECFA)

Cosmetics -> Anticorrosive

S13 | EUCOSMETICS | Combined Inventory of Ingredients Employed in Cosmetic Products (2000) and Revised Inventory (2006) | DOI:10.5281/zenodo.2624118

- NORMAN Suspect List Exchange

10.2 Uses

EPA CPDat Chemical and Product Categories

- EPA Chemical and Products Database (CPDat)

The active ingredient is no longer contained in any registered products ... "cancelled."

United States Environmental Protection Agency/ Prevention, Pesticides and Toxic Substances; Status of Pesticides in Registration, Reregistration, and Special Review. (1998) EPA 738-R-98-002, p. 318

- Hazardous Substances Data Bank (HSDB)

Component of heat-transfer salts; chem in metal treatment & finishing operations; component of detinning solution & multipurpose greases; agent for recovery of tin from scrap.

SRI

- Hazardous Substances Data Bank (HSDB)

Serves as an anti-corrosion inhibitor for multipurpose greases.

Porkorny L et al; Kirk-Othmer Encyclopedia of Chemical Technology. (2005). NY, NY: John Wiley & Sons; Sodium Nitrate and Nitrite. Online Posting Date: January 27, 2006.

- Hazardous Substances Data Bank (HSDB)

Large amounts of sodium nitrite are consumed in the chemical and pharmaceutical industries for the production of nitroso and isonitroso compounds, diazotization reactions (especially for dyes), and the synthesis of pharmaceuticals (e.g., caffeine) and agricultural pesticides (e.g., pyramin).

Ullmann's Encyclopedia of Industrial Chemistry. 6th ed.Vol 1: Federal Republic of Germany: Wiley-VCH Verlag GmbH & Co. 2003 to Present, p. V22 699 (2003)

- Hazardous Substances Data Bank (HSDB)

Manuf of diazo dyes, nitroso compds, and in many other processes of manuf of organic chemicals; dyeing and printing textile fabrics; bleaching flax silk, and linen; photography.

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

- Hazardous Substances Data Bank (HSDB)

Therap Cat (Vet): In cyanide poisoning; as a circulatory (blood pressure) depressant and to relieve smooth muscle spasm.

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

- Hazardous Substances Data Bank (HSDB)

Therap Cat: Vasodilator

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

Hazardous Substances Data Bank (HSDB)

Fertilizer /minor use/

Kirk-Othmer Encyclopedia of Chemical Technology. 3rd ed., Volumes 1-26. New York, NY: John Wiley and Sons, 1978-1984., p. V10: 56

Hazardous Substances Data Bank (HSDB)

Diazotization (by reaction with **hydrochloric acid** to form **nitrous acid**), rubber accelerators, color fixative and preservative in cured meats, meat products, fish; pharmaceuticals, photographic and analytical reagent, dye manufacture.

Lewis, R.J. Sr.; Hawley's Condensed Chemical Dictionary 14th Edition. John Wiley & Sons, Inc. New York, NY 2001., p. 1019

Hazardous Substances Data Bank (HSDB)

... synthesis of ... agricultural pesticides

Laue W et al; Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (2005). NY, NY: John Wiley & Sons; Nitrates and Nitrites. Online Posting Date: Jun 15, 2000.

Hazardous Substances Data Bank (HSDB)

MEDICATION

Hazardous Substances Data Bank (HSDB)

MEDICATION (VET)

Hazardous Substances Data Bank (HSDB)

Has been found effective ... as preservative for fish when incorporated in **ice** at a level of 0.1-0.5%.

Furia, T.E. (ed.). CRC Handbook of Food Additives. 2nd ed. Cleveland: The Chemical Rubber Co., 1972., p. 155

Hazardous Substances Data Bank (HSDB)

10.2.1 Industry Uses

Corrosion inhibitors and anti-scaling agents
Dyes
Intermediates
Lubricants and lubricant additives
Oxidizing/reducing agents
Plating agents and surface treating agents
Processing aids, not otherwise listed
Processing aids, specific to petroleum production
chemical distribution
water treatment

https://www.epa.gov/chemical-data-reporting

EPA Chemicals under the TSCA

10.2.2 Consumer Uses

Agricultural products (non-pesticidal)
Building/construction materials not covered elsewhere
Cleaning and furnishing care products
Fuels and related products
Lubricants and greases
Metal products not covered elsewhere
Paints and coatings
Photographic supplies, film, and photo chemicals
Plastic and rubber products not covered elsewhere
Water treatment products
used in products which are used as cleaners in plating processes, examples of final uses are automotive and machinery.

https://www.epa.gov/chemical-data-reporting

EPA Chemicals under the TSCA

10.3 Methods of Manufacturing

By heating **sodium nitrate** until it fuses ... adding sufficient metallic lead to completely reduce **nitrate** to **nitrite**. ... mixt is lixiviated with **water**, filtered, partially evaporated, & allowed to crystallize.

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 779

Hazardous Substances Data Bank (HSDB)

Synthesized by a number of chemical reactions involving the reduction of **sodium nitrate** by exposure to heat, light, and ionizing radiation, addition of lead metal to fused sodium nitrate at 400-450 °C, reaction of the **nitrate** in the presence of sodium ferrate and **nitric oxide** at about 400 °C, contacting molten **sodium nitrate** with **hydrogen**, and electrolyte reduction of **sodium nitrate** in a cell having a cation-exchange membrane, **rhodium**-plated **titanium** anode, and lead cathode.

Porkorny L et al; Kirk-Othmer Encyclopedia of Chemical Technology. (2005). NY, NY: John Wiley & Sons; Sodium Nitrate and Nitrite. Online Posting Date: January 27, 2006.

Hazardous Substances Data Bank (HSDB)

Reaction of nitrogen oxides with **sodium carbonate** or **sodium hydroxide** solution.

Laue W et al; Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (2005). NY, NY: John Wiley & Sons. Online Posting Date: June 15, 2000.

Hazardous Substances Data Bank (HSDB)

Large-scale production of sodium nitrite is now based on the reaction of nitrogen oxides with sodium carbonate or sodium hydroxide solution.

Ullmann's Encyclopedia of Industrial Chemistry. 6th ed.Vol 1: Federal Republic of Germany: Wiley-VCH Verlag GmbH & Co. 2003 to Present, p. V22 698 (2003)

Hazardous Substances Data Bank (HSDB)

10.4 Formulations/Preparations

Grade: Reagent; Technical; USP; FCC.

Lewis, R.J. Sr.; Hawley's Condensed Chemical Dictionary 14th Edition. John Wiley & Sons, Inc. New York, NY 2001., p. 1019

Hazardous Substances Data Bank (HSDB)

Sodium nitrite is sold as the salt and in solution. The finely crystalline, slightly yellowish salt is marketed in untreated form and also after treatment with aryl alkyl sulfonates. The salt contains ca. 99.0 % sodium nitrite, 0.6 % sodium nitrate, < 0.1 % sodium chloride and sodium sulfate, and < 0.1 % water.

Ullmann's Encyclopedia of Industrial Chemistry. 6th ed.Vol 1: Federal Republic of Germany: Wiley-VCH Verlag GmbH & Co. 2003 to Present, p. V22 699 (2003)

Hazardous Substances Data Bank (HSDB)

10.5 U.S. Production

Aggregated Product Volume (EPA CDR 2016)

10,000,000 - 50,000,000 lb

https://www.epa.gov/chemical-data-reporting

EPA Chemicals under the TSCA

(1977) AT LEAST 5.0X10+9 G

SRI

Hazardous Substances Data Bank (HSDB)

Production volumes for non-confidential chemicals reported under the Inventory Update Rule: Reported range in 1986 >500,000 lb - 1 million lb; reported range in 1990 and 1994 10,000-500,000 lb; no reports in 1998; reported range in 2002 10,000-500,000 lb.

Year	Production Range (pounds)
1986	>500 thousand-1 million
1990	>10 thousand-500 thousand
1994	>10 thousand-500 thousand
1998	No Reports
2002	>10 thousand-500 thousand

US EPA; Non-confidential Production Volume Information Submitted by Companies for Chemicals Under the 1986-2002 Inventory Update Rule (IUR). Nitrous acid, sodium salt (7632-00-0). Available from, as of November 8, 2006: http://www.epa.gov/oppt/iur/tools/data/2002-vol.html

Hazardous Substances Data Bank (HSDB)

10.6 U.S. Imports

(1978) 3.94X10+9 G

SRI

Hazardous Substances Data Bank (HSDB)

(1982) 4.68X10+9 G

SRI

Hazardous Substances Data Bank (HSDB)

(1984) 8.14X10+9 g

BUREAU OF THE CENSUS. U.S. IMPORTS FOR CONSUMPTION AND GENERAL IMPORTS 1984 p.1-351

Hazardous Substances Data Bank (HSDB)

10.7 U.S. Exports

(1984) 4.03X10+11 g /Sodium compounds, NSPF/

BUREAU OF THE CENSUS. U.S. EXPORTS, SCHEDULE E, 1984 p.2-93

Hazardous Substances Data Bank (HSDB)

10.8 General Manufacturing Information

Industry Processing Sectors

All other basic inorganic chemical manufacturing	Utilities
All other basic organic chemical manufacturing	Water treatment
All other chemical product and preparation manufacturing	Wholesale and retail trade
Fabricated metal product manufacturing	resale of chemicals

Food, beverage, and tobacco product manufacturing
Miscellaneous manufacturing
Nonmetallic mineral product manufacturing (includes clay, glass, cement, concrete, lime, gypsum, and other nonmetallic mineral product manufacturing.
Oil and gas drilling, extraction, and support activities
Paint and coating manufacturing
Petroleum lubricating oil and grease manufacturing
Petroleum refineries
Plastic material and resin manufacturing
Synthetic dye and pigment manufacturing
sales and services to the marine industry

EPA Chemicals under the TSCA

EPA TSCA Commercial Activity Status

Nitrous acid, sodium salt (1:1): ACTIVE
https://www.epa.gov/tsca-inventory

EPA Chemicals under the TSCA

EPA TSCA Regulatory Flag

S - indicates a substance that is identified in a final Significant New Use Rule.
https://www.epa.gov/tsca-inventory

EPA Chemicals under the TSCA

Incompatibilities: acetanilide, antipyrine, chlorates, hypophosphites, iodides, mercury salts, permanganates, sulfites, tannic acid, vegetable astringent decoctions, infusions or tinctures.
O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition, Whitehouse Station, NJ: Merck and Co., Inc., 2001., p. 1544

Hazardous Substances Data Bank (HSDB)

Addition of sodium nitrite to meat that accounts for 7% of the entire US food supply is generally believed to have reduced the risk of botulism in humans to almost zero. Nitrite retards the growth of botulinum spores, which are prevalent in food.
Booth, N.H., L.E. McDonald (eds.). Veterinary Pharmacology and Therapeutics. 5th ed. Ames, Iowa: Iowa State University Press, 1982., p. 1100

Hazardous Substances Data Bank (HSDB)

Nitrosodiethanolamine (NDELA) ... combines with sodium nitrite used as a corrosion inhibitor.
Bingham, E.; Cohrssen, B.; Powell, C.H.; Patty's Toxicology Volumes 1-9 5th ed. John Wiley & Sons. New York, N.Y. (2001)., p. 4:635

Hazardous Substances Data Bank (HSDB)

11 Identification

11.1 Analytic Laboratory Methods

Hydrazine method, applicable in presence or absence of nitrates or chlorides, is used to determine nitrites in drug tablets by titration with iodine. /Nitrites/

Association of Official Analytic Chemists. Official Methods of Analysis of the AOAC. 14th ed. Arlington, VA: Association of Official Analytic Chemists, Inc., 1984., p. 681/36.105

Hazardous Substances Data Bank (HSDB)

Colorimetric method for determination of ... nitrite in cured meat. /Nitrite/

Furia, T.E. (ed.). CRC Handbook of Food Additives. 2nd ed. Cleveland: The Chemical Rubber Co., 1972., p. 155

Hazardous Substances Data Bank (HSDB)

Modified Jones Reductor used to determine nitrate & nitrite in cheeses containing greater than or equal to 1 ppm nitrite. /Nitrates & nitrites/

Association of Official Analytic Chemists. Official Methods of Analysis of the AOAC. 14th ed. Arlington, VA: Association of Official Analytic Chemists, Inc., 1984., p. 310/16.278-2832

Hazardous Substances Data Bank (HSDB)

Titration with sodium thiosulfate used to determine nitrites (including sodium nitrite) in dry cure mix or curing pickle preservatives. I

Association of Official Analytic Chemists. Official Methods of Analysis of the AOAC. 14th ed. Arlington, VA: Association of Official Analytic Chemists, Inc., 1984., p. 385/20.090-092

Hazardous Substances Data Bank (HSDB)

For more Analytic Laboratory Methods (Complete) data for SODIUM NITRITE (8 total), please visit the HSDB record page.

Hazardous Substances Data Bank (HSDB)

11.2 Clinical Laboratory Methods

Sample collection: Arterial blood sampling reveals a characteristic chocolate-brown color. Methemoglobin concentrations can be quantified by spectrophotometry and should be measured immediately. Biochemical analysis: Total hemoglobin, blood count. Serum electrolytes, especially potassium. Acid-base balance. Arterial blood gases. Urine analysis. Toxicological analysis: The most relevant investigation is methemoglobin concentration which correlates well with symptoms and should be monitored according to the clinical condition. /Nitrate and nitrite poisoning/

*IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 25, 2006: **http://www.inchem.org/documents/pims/chemical/pimg016.htm***

Hazardous Substances Data Bank (HSDB)

12 Safety and Hazards

12.1 Hazards Identification

12.1.1 GHS Classification

Showing 1 of 5 View More

Pictogram(s)	 Oxidizer, Acute Toxic, Environmental Hazard
Signal	Danger
GHS Hazard Statements	H272: May intensify fire; oxidizer [**Danger** Oxidizing liquids; Oxidizing solids] H301: Toxic if swallowed [**Danger** Acute toxicity, oral] H400: Very toxic to aquatic life [**Warning** Hazardous to the aquatic environment, acute hazard]
Precautionary Statement Codes	P210, P220, P221, P264, P270, P273, P280, P301+P310, P321, P330, P370+P378, P391, P405, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)

▸ EU REGULATION (EC) No 1272/2008

12.1.2 Hazard Classes and Categories

Showing 2 of 5 View More

Ox. Sol. 3

Acute Tox. 3 *

Aquatic Acute 1

▸ EU REGULATION (EC) No 1272/2008

Ox. Sol. 3 (98.49%)

Acute Tox. 3 (99.66%)

Eye Irrit. 2 (26.86%)

Aquatic Acute 1 (99.68%)

▸ European Chemicals Agency (ECHA)

12.1.3 Health Hazards

Ingestion (or inhalation of excessive amounts of dust) causes rapid drop in blood pressure, persistent and throbbing headache, vertigo, palpitations, and visual disturbances; skin becomes flushed and sweaty, later cold and cyanotic; other symptoms include nausea, vomiting, diarrhea (sometimes), fainting, methemoglobinemia. Contact with eyes causes irritation. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

Ingestion (or inhalation of large amounts) causes poisoning which may produce cyanosis, marked fall in blood pressure, leading to collapse, coma, and possibly death. Irritating to skin, eyes, and respiratory tract. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

12.1.4 Fire Hazards

Special Hazards of Combustion Products: Toxic oxides of nitrogen may form in fires. Behavior in Fire: May increase intensity of fire if in contact with combustible material. May melt and flow at elevated temperatures. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

Special Hazards of Combustion Products: Toxic oxides of nitrogen may form in fires. Behavior in Fire: May increase intensity of fire if water evaporates. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

Not combustible but enhances combustion of other substances. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.

▸ ILO International Chemical Safety Cards (ICSC)

12.1.5 Fire Potential

Not combustible but enhances combustion of other substances ... /Sodium nitrite/ is a strong oxidant and reacts with combustible and reducing materials causing fire and explosion hazard.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

▸ Hazardous Substances Data Bank (HSDB)

MODERATE; A strong oxicizint agent. In contact with organic matter will ignite by friction.

Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984., p. 2442

Hazardous Substances Data Bank (HSDB)

12.1.6 Skin, Eye, and Respiratory Irritations

... /Sodium nitrite/ is irritating to the eyes.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.2 Safety and Hazard Properties

12.2.1 Explosive Limits and Potential

Explodes when heated to over 1,000 °C ...

Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984., p. 2442

Hazardous Substances Data Bank (HSDB)

Shock may explode them ... /Nitrites/

Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984., p. 2442

Hazardous Substances Data Bank (HSDB)

May explode on heating above 530 °C ... /Sodium nitrite/ is a strong oxidant and reacts with combustible and reducing materials causing fire and explosion hazard.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.3 First Aid Measures

12.3.1 First Aid

EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with **water** or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop. SKIN: IMMEDIATELY flood affected skin with **water** while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and **water**. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment. INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing. INGESTION: If the victim is conscious and not convulsing, give 1 or 2 glasses of **water** to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Generally, the induction of vomiting is NOT recommended outside of a physician's care due to the risk of aspirating the chemical into the victim's lungs. However, if the victim is conscious and not convulsing and if medical help is not readily available, consider the risk of inducing vomiting because of the high toxicity of the chemical ingested. Ipecac syrup or salt **water** may be used in such an emergency. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

CAMEO Chemicals

Get medical attention. INHALATION: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give **oxygen**. INGESTION: Give patient 2 to 4 glasses of **water** and induce vomiting. EYES or SKIN: Flush with **water**, holding lids open occasionally if necessary. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

CAMEO Chemicals

12.3.2 Inhalation First Aid

Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.

ILO International Chemical Safety Cards (ICSC)

12.3.3 Skin First Aid

First rinse with plenty of **water** for at least 15 minutes, then remove contaminated clothes and rinse again.

ILO International Chemical Safety Cards (ICSC)

12.3.4 Eye First Aid

First rinse with plenty of **water** for several minutes (remove contact lenses if easily possible), then refer for medical attention.

ILO International Chemical Safety Cards (ICSC)

12.3.5 Ingestion First Aid

Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Give one or two glasses of **water** to drink. Refer for medical attention .

ILO International Chemical Safety Cards (ICSC)

12.4 Fire Fighting

Excerpt from ERG Guide 140 [Oxidizers]: SMALL FIRE: Use water. Do not use dry chemicals or foams. CO2 or Halon® may provide limited control. LARGE FIRE: Flood fire area with water from a distance. Do not move cargo or vehicle if cargo has been exposed to heat. Move containers from fire area if you can do it without risk. FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

Excerpt from ERG Guide 151 [Substances - Toxic (Non-combustible)]: SMALL FIRE: Dry chemical, CO2 or water spray. LARGE FIRE: Water spray, fog or regular foam. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. Use water spray or fog; do not use straight streams. FIRE INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

In case of fire in the surroundings, use appropriate extinguishing media.

ILO International Chemical Safety Cards (ICSC)

12.4.1 Fire Fighting Procedures

If material on fire or involved in fire: Flood with water. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible.

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 828

Hazardous Substances Data Bank (HSDB)

12.4.2 Firefighting Hazards

Evaporation at 20 °C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.5 Accidental Release Measures

12.5.1 Isolation and Evacuation

Excerpt from ERG Guide 140 [Oxidizers]: As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids. LARGE SPILL: Consider initial downwind evacuation for at least 100 meters (330 feet). FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

Excerpt from ERG Guide 151 [Substances - Toxic (Non-combustible)]: As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids. SPILL: Increase, in the downwind direction, as necessary, the isolation distance shown above. FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

12.5.2 Spillage Disposal

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

ILO International Chemical Safety Cards (ICSC)

12.5.3 Cleanup Methods

Environmental considerations: water spill: Add soda ash (NaCO3). Add calcium hypochlorite (Ca(ClO)2). Adjust pH to neutral (pH=7).

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 828

Hazardous Substances Data Bank (HSDB)

Environmental considerations: land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. /SRP: If time permits, pits, ponds, lagoons, soak holes, or holding areas should be sealed with an impermeable flexible membrane liner./ Cover solids with a plastic sheet to prevent dissolving in rain or fire fighting water.

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 828

Hazardous Substances Data Bank (HSDB)

Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: P3 filter respirator for toxic particles).

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.5.4 Disposal Methods

SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational exposure or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal, aquatic, and plant life; and conformance with environmental and public health regulations.

Hazardous Substances Data Bank (HSDB)

12.5.5 Preventive Measures

SRP: The scientific literature for the use of contact lenses in industry is conflicting. The benefit or detrimental effects of wearing contact lenses depend not only upon the substance, but also on factors including the form of the substance, characteristics and duration of the exposure, the uses of other eye protection equipment, and the hygiene of the lenses. However, there may be individual substances whose irritating or corrosive properties are such that the wearing of contact lenses would be harmful to the eye. In those specific cases, contact lenses should not be worn. In any event, the usual eye protection equipment should be worn even when contact lenses are in place.

Hazardous Substances Data Bank (HSDB)

Personnel protection: Avoid breathing dusts. ... Do not handle broken packages unless wearing appropriate personal protective equipment. Wash away any material which may have contacted the body with copious amounts of water or soap and water. Wear positive pressure self-contained breathing apparatus when fighting fires involving this material.

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 828

Hazardous Substances Data Bank (HSDB)

If material not on fire and not involved in fire: Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers.

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 828

Hazardous Substances Data Bank (HSDB)

NO contact with combustible substances ... PREVENT DISPERSION OF DUST ... Local exhaust or breathing protection ... Do not eat, drink, or smoke during work. Wash hands before eating ... Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. Depending on the degree of exposure, periodic medical examination is indicated.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

Approximately 14 million households in the United States use private wells to supply their drinking water (Bureau of the Census 1993). In agricultural areas, nitrogen-based fertilizers are a major source of contamination for shallow groundwater aquifers that provide drinking water. A recent United States Geological Survey study showed that >8,200 wells nationwide were contaminated with nitrate levels above the U.S. Environmental Protection Agency (EPA) drinking water standard of 10 parts per million (ppm). ... Because of the risks for potential adverse health effects, persons who use drinking water that contains nitrate levels >10 milligrams per liter (mg/L) should have alternative sources of water or appropriate treatment of existing supplies. Information regarding testing of well water can be obtained from city or county health departments. Other sources of nitrate contamination are organic animal wastes and contamination from septic sewer systems, especially in wells <100 feet deep. During spring melt or drought conditions, both domestic wells and public water systems using surface water can show increased nitrate levels. /Nitrate/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. 32p. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

12.6 Handling and Storage

12.6.1 Nonfire Spill Response

Excerpt from ERG Guide 140 [Oxidizers]: Keep combustibles (wood, paper, oil, etc.) away from spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Do not get water inside containers. SMALL DRY SPILL: With clean shovel, place material into clean, dry container and cover loosely; move containers from spill area. SMALL LIQUID SPILL: Use a non-combustible material like vermiculite or sand to soak up the product and place into a container for later disposal. LARGE SPILL: Dike far ahead of liquid spill for later disposal. Following product recovery, flush area with water. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

Excerpt from ERG Guide 151 [Substances - Toxic (Non-combustible)]: Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Cover with plastic sheet to prevent spreading. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS. (ERG, 2016)

*U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. **https://www.phmsa.dot.gov/hazmat/outreach-training/erg** (accessed April 26, 2016).*

CAMEO Chemicals

12.6.2 Safe Storage

Separated from combustible substances, reducing agents and acids. Dry. Well closed.

ILO International Chemical Safety Cards (ICSC)

12.6.3 Storage Conditions

Separated from combustible and reducing substances, acids. Dry. Well closed.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

It must be stored and shipped separately from oxidizable substances, ammonium salts, **urea**, food, and animal feeds.

Ullmann's Encyclopedia of Industrial Chemistry. 6th ed.Vol 1: Federal Republic of Germany: Wiley-VCH Verlag GmbH & Co. 2003 to Present, p. V22 699 (203)

Hazardous Substances Data Bank (HSDB)

12.7 Exposure Control and Personal Protection

12.7.1 Inhalation Risk

Evaporation at 20 °C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

ILO International Chemical Safety Cards (ICSC)

12.7.2 Effects of Short Term Exposure

The substance is irritating to the eyes. The substance may cause effects on the cardiovascular system and blood. This may result in lower blood pressure and the formation of methaemoglobin. Exposure could cause death. The effects may be delayed. Medical observation is indicated.

ILO International Chemical Safety Cards (ICSC)

12.7.3 Allowable Tolerances

Sodium nitrite (not more than 3% of pesticide formulation) is exempted from the requirement of a tolerance when used as a stabilizer or inhibitor in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

*40 CFR 180.920; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: **http://www.ecfr.gov***

Hazardous Substances Data Bank (HSDB)

12.7.4 Personal Protective Equipment (PPE)

Dust mask; goggles or face shield; protective gloves (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

CAMEO Chemicals

Wear impervious protective clothing and goggles. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

CAMEO Chemicals

Protective gloves. Safety spectacles ... Extra personal protection: P3 filter respirator for toxic particles

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.7.5 Fire Prevention

NO contact with combustible substances.

ILO International Chemical Safety Cards (ICSC)

12.7.6 Exposure Prevention

PREVENT DISPERSION OF DUST!

ILO International Chemical Safety Cards (ICSC)

12.7.7 Inhalation Prevention

Use local exhaust or breathing protection.

ILO International Chemical Safety Cards (ICSC)

12.7.8 Skin Prevention

Protective gloves.

ILO International Chemical Safety Cards (ICSC)

12.7.9 Eye Prevention

Wear safety spectacles.

ILO International Chemical Safety Cards (ICSC)

12.7.10 Ingestion Prevention

Do not eat, drink, or smoke during work. Wash hands before eating.

ILO International Chemical Safety Cards (ICSC)

12.8 Stability and Reactivity

12.8.1 Air and Water Reactions

Soluble in water.

CAMEO Chemicals

Very soluble in water.

CAMEO Chemicals

12.8.2 Reactive Group

Nitrate and Nitrite Compounds, Inorganic

CAMEO Chemicals

Nitrate and Nitrite Compounds, Inorganic

Water and Aqueous Solutions

CAMEO Chemicals

12.8.3 Reactivity Alerts

Strong Oxidizing Agent

CAMEO Chemicals

12.8.1 CSL Reaction Information

CSL No	CSL00045
Reactants/Reagents	SODIUM NITRITE; 2-AMINO-5-BROMO-4-METHYL-3-NITROPYRIDINE
Reaction Class	Diazotisation
Function Group	HeteroAryl Amine
GHS Category	Corrosive,Explosive,Harmful
Reaction Scale	M (up to 100g)
Warning Message	Uncontrollable, slow 'foaming' of reaction contents during addition of sodium nitrite
Source Reference	User-Reported
CSL Status	Approved
Modified Date	6/26/2018

Pistoia Alliance Chemical Safety Library

CSL No	CSL00128
Reactants/Reagents	ETHANOL; 1,3-DIAMINOGUANIDINE HYDROCHLORIDE; SODIUM NITRITE
GHS Category	Explosive
Warning Message	We recently had an unanticipated explosion resulting in the injury of two chemists. The workers were repeating a recently published preparation of 1,5-diamino-1H-tetrazole by the aqueous diazotization of diaminoguanidine hydrochloride using a single equivalent of nitrous acid (Inorg. Chem. 2005, 44, 4237). After neutralization (pH 8) and evaporation, the desired product is extracted from the inorganic salts with hot ethanol. The ethanol is then evaporated and the resulting solid recrystallized from water. The preparation states that the product is pure after the ethanol extraction. Unfortunately, we have found that the ethanol extracts not only the desired product but also a very sensitive side product, 5-azidotetrazole. This side product is produced by either double diazotization of diaminoguanidine or possibly by diazotization of the desired product through the intermediate 1H-tetrazolo[1,5-d]tetrazole. If this procedure is repeated, it is imperative that the ethanol extract not be taken to dryness
Source Reference	C&EN
CSL Status	Approved
DOI Link	http://pubs.acs.org/cen/safety/20050725.html
Additional Info	Unanticipated explosion due to formation of the side product 5-azidotetrazole
Modified Date	6/29/2018

Pistoia Alliance Chemical Safety Library

12.8.4 Reactivity Profile

SODIUM NITRITE is an oxidizing agent. Mixtures with phosphorus, tin(II) chloride or other reducing agents may react explosively [Bretherick 1979 p. 108-109]. If contaminated by ammonium compounds, spontaneous decomposition can occur and resulting heat may ignite surrounding combustible material. Reacts with acids to form toxic nitrogen dioxide gas. Mixing with liquid ammonia forms dipotassium nitrite, which is very reactive and easily explosive [Mellor 2, Supp. 3:1566 1963]. Melting together wilh an ammonium salt leads to a violent explosion [Von Schwartz 1918

p. 299]. A mixture with **potassium cyanide** may cause an explosion. Noncombustible but accelerates the burning of all combustible material. If large quantities are involved in fire or if the combustible material is finely divided, an explosion may result. When a little **ammonium sulfate** is added to fused potassium nitrite, a vigorous reaction occurs attended by flame [Mellor 2:702. 1946-47].

▸ **CAMEO Chemicals**

SODIUM NITRITE SOLUTION is an oxidizing agent. Reacts with reducing agents to generate heat and products that may be gaseous (causing pressurization inside closed containers). The products may themselves be capable of further reactions (such as combustion). Dissolution in **water** reduces but does not nullify the oxidizing power of nitrites. Reacts with acids to form toxic **nitrogen dioxide** gas. Mixtures with **phosphorus**, **tin(II) chloride** or other reducing agents may react explosively [Bretherick 1979 p. 108-109]. When a mixture with **sodium thiosulfate** was heated to dryness, a violent explosion occurred [Mellor 10:501 1946-47]. May react with organic amines to give carcinogens (nitrosamines).

▸ **CAMEO Chemicals**

12.8.5 Hazardous Reactivities and Incompatibilities

... /They/ can react vigorously with reducing materials. /Nitrites/

Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984., p. 2442

▸ **Hazardous Substances Data Bank (HSDB)**

Accidental mixing of /**sodium nitrate**, sodium nitrite and **sodium sulfide**/ caused a violent explosion.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1337

▸ **Hazardous Substances Data Bank (HSDB)**

Interaction, without addition of acid, produces tetrazolyguanidine ('**tetrazene**'), a primary explosive of equal sensitivity to **mercury(II) azide**, but more readily initiated.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1334

▸ **Hazardous Substances Data Bank (HSDB)**

Heating a mixture of an ammonium salt with a **nitrite** salt causes a violent explosion on melting, owing to formation and decomposition of ammonium nitrite. Salts of other nitrogenous bases behave similarly. Mixtures of **ammonium chloride** and sodium nitrite are used as commercial explosives. Accidental contact of traces of **ammonium nitrate** with sodium nitrite residues caused wooden decking on a truck to ignite.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1335

▸ **Hazardous Substances Data Bank (HSDB)**

Wooden staging, which had become impregnated over a number of years with sodium nitrite, became accidentally ignited and burned as fiercely as if impregnated with **potassium chlorate**. Although the effect of impregnating cellulosic material with **sodium nitrate** is well known, that due to sodium nitrite was unexpected.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1337

▸ **Hazardous Substances Data Bank (HSDB)**

Empty paper sacks, some of which had contained **sulfur** or inorganic salts but mostly sodium nitrite, were dumped (with general rubbish) into a skip located inside by windows in direct sunlight. The fire which resulted was probably caused by exothermic interaction of the sodium nitrite with **sulfur** and damp paper, with further self heating aided by the generally insulating nature of the mound of paper sacks in the draught-free skip warmed by sunlight.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1336

▸ **Hazardous Substances Data Bank (HSDB)**

Sodium nitrite soln is used to inhibit 'popcorn' polymerization of **butadiene** in processing plants. If concn **nitrite** soln (5%) are used, a black sludge is produced, which when dry, will ignite and burn when heated to 150 °C, even in absence of air. The sludge produced from used of **nitrite** soln to scavenge **oxygen** in **butadiene** distillation systems contained 80% of organic polymer and a **nitrate**:**nitrite** ratio of 2:1. Use of dilute **nitrite** soln (0.5%) or pH above 8 prevents sludge formation.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1335

▸ **Hazardous Substances Data Bank (HSDB)**

Unusual conditions in the main fractionation column separating product **butadiene** from by-product **butenyne** (**vinylacetylene**, thought to be safe at below 50 mol% concn) caused the concn of the latter to approach 60% in part of the column as fractionation proceeded. Explosive decomposition, possibly initiated by an overheated instable organic material derived from sodium nitrite, destroyed the column and adjacent plant ...

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 422

▸ **Hazardous Substances Data Bank (HSDB)**

A rotary drum had been used previously to dry metal components which had been heat-treated in /**sodium**/ **nitrate**-/**sodium**/ **nitrite** molten salt baths, washed, then tumble dried with ground maize husks to absorb adhering **water**. When the drum was taken out of service, it was not cleaned out. After some 10 mo it was recommissioned, but while being heated up to operating temp, an explosion occurred which ejected flame jets for several meters. This was attributed to presence of considerable contamination of the maize husks by metal **nitrate**-**nitrite** residues, and ignition on heating of such material was confirmed experimentally.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1339

▸ **Hazardous Substances Data Bank (HSDB)**

Interaction of nitrites when heated with metal amidosulfates (sulfamates) may become explosively violent owing to liberation of **nitrogen** and steam. Mixtures with **ammonium sulfamate** form ammonium nitrite which decomposes violently around 80 °C.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1335

▸ **Hazardous Substances Data Bank (HSDB)**

Mixtures of sodium nitrite and various cyanides explode on heating, including **potassium cyanide**, **potassium hexacyanoferrate(III)**, sodium pentacyanonitrosylferrate(II), potassium hexacyanoferrate(II), or **mercury(II) cyanide**. Such mixtures have been proposed as explosives, initiable by heat or a detonator.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1335

▸ **Hazardous Substances Data Bank (HSDB)**

Lithium reacts with sodium nitrite to form lithium sodium hydronitrite, a cmpd which decomposes violently around 100 to 130 °C.

Fire Protection Guide to Hazardous Materials. 13 ed. Quincy, MA: National Fire Protection Association, 2002., p. 491-109

Hazardous Substances Data Bank (HSDB)

Violent explosion occurs if cyanide salt is melted with nitrite salt. The melt explodes if cyanide plus ... nitrite is heated to 450 °C.

Fire Protection Guide to Hazardous Materials. 13 ed. Quincy, MA: National Fire Protection Association, 2002., p. 491-68

Hazardous Substances Data Bank (HSDB)

A mixture /of sodium nitrite and phenol/ exploded violently on heating in a test tube.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1336

Hazardous Substances Data Bank (HSDB)

Mixtures of sodium nitrite and phthalic acid or phthalic anhydride explode violently on heating. A nitrite ester may have been produced.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1336

Hazardous Substances Data Bank (HSDB)

A mixture /of sodium nitrite and potassium thiocyanate/ explodes on heating. Preparation of a molten salt bath from 0.45 kg of potassium thiocyanate (reducant) and 1.35 kg of sodium nitrite (oxidant) led to a violent explosion on melting, which caused severe structural damage to the lab ... Used of sand baths, rather than salt baths for lab heating purposes is to be preferred. The relative lack of descriptive chemistry in modern curricula is cited as the major contributory factor to the general ignorance which led to the explosion.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1336

Hazardous Substances Data Bank (HSDB)

Large-scale addition of solid sodium disulfite to an unstirred and too-concentrated soln of sodium nitrite caused a vigorous exothermic reaction.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1337

Hazardous Substances Data Bank (HSDB)

There is no interaction between /sodium nitrite and sodium thiosulfate/ soln, but evaporation of the mixture gave a residue which explodes on heating. The mixed solids behave similarly.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1337

Hazardous Substances Data Bank (HSDB)

Addition of solid sodium nitrite to the molten amide caused immediate gas evolution, followed by a violent explosion.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1336

Hazardous Substances Data Bank (HSDB)

Fusion of urea (2 mol) with sodium nitrite (or potassium nitrite, 1 mol of either) to give high yields of the cyanate must be carried out exactly as described to avoid the risk of explosion.

Bretherick, L. Handbook of Reactive Chemical Hazards. 4th ed. Boston, MA: Butterworth-Heinemann Ltd., 1990, p. 1337

Hazardous Substances Data Bank (HSDB)

Sodium nitrite at 460 °F in contact with the fiber drums in which it is shipped undergoes a vigorous decomposition reaction producing a propellant-type burning until the carton is consumed.

Fire Protection Guide to Hazardous Materials. 13 ed. Quincy, MA: National Fire Protection Association, 2002., p. 491-182

Hazardous Substances Data Bank (HSDB)

Soln of potassium and sodium nitrite in liq ammonia form disodium nitrite, which is very reactive and easily explosive.

Fire Protection Guide to Hazardous Materials. 13 ed. Quincy, MA: National Fire Protection Association, 2002., p. 491-157

Hazardous Substances Data Bank (HSDB)

... /Sodium nitrate/ decomposes on contact with acids producing toxic fumes (nitrogen oxides) ... The solution in water is a weak base. Reacts with aluminium, ammonium compounds, amines.

*IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: **http://www.inchem.org/documents/icsc/icsc/eics1120.htm***

Hazardous Substances Data Bank (HSDB)

12.9 Transport Information

12.9.1 DOT Emergency Guidelines

/GUIDE 140: OXIDIZERS/ Fire or Explosion: These substances will accelerate burning when involved in a fire. Some may decompose explosively when heated or involved in a fire. May explode from heat or contamination. Some will react explosively with hydrocarbons (fuels). May ignite combustibles (wood, paper, oil, clothing, etc.). Containers may explode when heated. Runoff may create fire or explosion hazard.

U.S. Department of Transportation. 2012 Emergency Response Guidebook. Washington, D.C. 2012

Hazardous Substances Data Bank (HSDB)

/GUIDE 140: OXIDIZERS/ Health: Inhalation, ingestion or contact (skin, eyes) with vapors or substance may cause severe injury, burns or death. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution.

U.S. Department of Transportation. 2012 Emergency Response Guidebook. Washington, D.C. 2012

Hazardous Substances Data Bank (HSDB)

/GUIDE 140: OXIDIZERS/ Public Safety: CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

U.S. Department of Transportation. 2012 Emergency Response Guidebook. Washington, D.C. 2012

Hazardous Substances Data Bank (HSDB)

/GUIDE 140: OXIDIZERS/ Protective Clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighters' protective clothing will only provide limited protection.

U.S. Department of Transportation. 2012 Emergency Response Guidebook. Washington, D.C. 2012

Hazardous Substances Data Bank (HSDB)

For more DOT Emergency Guidelines (Complete) data for SODIUM NITRITE (8 total), please visit the HSDB record page.

Hazardous Substances Data Bank (HSDB)

12.9.2 DOT ID and Guide

1500 141

DOT Emergency Response Guidebook

12.9.3 Shipping Name/ Number DOT/UN/NA/IMO

UN 1500; Sodium nitrite

Hazardous Substances Data Bank (HSDB)

IMO 5.1; Sodium nitrite

Hazardous Substances Data Bank (HSDB)

12.9.4 Standard Transportation Number

49 187 47; Sodium nitrite

Hazardous Substances Data Bank (HSDB)

12.9.5 Shipment Methods and Regulations

No person may /transport,/ offer or accept a hazardous material for transportation in commerce unless that person is registered in conformance ... and the hazardous material is properly classed, described, packaged, marked, labeled, and in condition for shipment as required or authorized by ... /the hazardous materials regulations (49 CFR 171-177)./

49 CFR 171.2; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of February 15, 2006: http://www.ecfr.gov

Hazardous Substances Data Bank (HSDB)

The International Air Transport Association (IATA) Dangerous Goods Regulations are published by the IATA Dangerous Goods Board pursuant to IATA Resolutions 618 and 619 and constitute a manual of industry carrier regulations to be followed by all IATA Member airlines when transporting hazardous materials.

International Air Transport Association. Dangerous Goods Regulations. 47th Edition. Montreal, Quebec Canada. 2006., p. 255

Hazardous Substances Data Bank (HSDB)

The International Maritime Dangerous Goods Code lays down basic principles for transporting hazardous chemicals. Detailed recommendations for individual substances and a number of recommendations for good practice are included in the classes dealing with such substances. A general index of technical names has also been compiled. This index should always be consulted when attempting to locate the appropriate procedures to be used when shipping any substance or article.

International Maritime Organization. International Maritime Dangerous Goods Code. London, UK. 2004., p. 71

Hazardous Substances Data Bank (HSDB)

12.9.6 DOT Label

Oxidizer Poison

CAMEO Chemicals

Poison

CAMEO Chemicals

12.9.7 EC Classification

Symbol: O, T, N; R: 8-25-50; S: (1/2)-45-61

ILO International Chemical Safety Cards (ICSC)

12.9.8 UN Classification

UN Hazard Class: 5.1; UN Subsidiary Risks: 6.1; UN Pack Group: III

ILO International Chemical Safety Cards (ICSC)

12.10 Regulatory Information

12.10.1 Federal Drinking Water Standards

EPA 1,000 ug/L /Nitrite/

USEPA/Office of Water; Federal-State Toxicology and Risk Analysis Committee (FSTRAC). Summary of State and Federal Drinking Water Standards and Guidelines (11/93) To Present

Hazardous Substances Data Bank (HSDB)

12.10.2 Federal Drinking Water Guidelines

EPA 1,000 ug/L /Nitrite/

USEPA/Office of Water; Federal-State Toxicology and Risk Analysis Committee (FSTRAC). Summary of State and Federal Drinking Water Standards and Guidelines (11/93) To Present

Hazardous Substances Data Bank (HSDB)

12.10.3 State Drinking Water Guidelines

(ME) MAINE 1000 ug/L /Nitrite/

USEPA/Office of Water; Federal-State Toxicology and Risk Analysis Committee (FSTRAC). Summary of State and Federal Drinking Water Standards and Guidelines (11/93) To Present

Hazardous Substances Data Bank (HSDB)

12.10.4 Clean Water Act Requirements

Sodium nitrite is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

40 CFR 116.4; //ecfr69//

Hazardous Substances Data Bank (HSDB)

12.10.5 CERCLA Reportable Quantities

Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

*40 CFR 302.4; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: **http://www.ecfr.gov***

Hazardous Substances Data Bank (HSDB)

12.10.6 FIFRA Requirements

Sodium nitrite (not more than 3% of pesticide formulation) is exempted from the requirement of a tolerance when used as a stabilizer or inhibitor in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

*40 CFR 180.920; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: **http://www.ecfr.gov***

Hazardous Substances Data Bank (HSDB)

As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their future use. Under this pesticide reregistration program, EPA examines health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether they are eligible for reregistration. In addition, all pesticides must meet the new safety standard of the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA '88 were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern and List D pesticides of less concern. Sodium nitrite is found on List D. Case No: 4052; Pesticide type: rodenticide, antimicrobial; Case Status: RED Approved 9/91; OPP has made a decision that some/all uses of the pesticide are eligible for reregistration, as reflected in a Reregistration Eligibility Decision (RED) document.; Active ingredient (AI): sodium nitrite; AI Status: The active ingredient is no longer contained in any registered products ... "cancelled.".

United States Environmental Protection Agency/ Prevention, Pesticides and Toxic Substances; Status of Pesticides in Registration, Reregistration, and Special Review. (1998) EPA 738-R-98-002, p. 318

Hazardous Substances Data Bank (HSDB)

12.10.7 FDA Requirements

The food additive sodium nitrite may be safely used in or on specified foods in accordance with the following prescribed conditions: (a) It is used or intended for use as follows: (1) As a color fixative in smoked cured tunafish products so that the level of sodium nitrite does not exceed 10 parts per million (0.001 percent) in the finished product. (2) As a preservative and color fixative, with or without sodium nitrate, in smoked, cured sablefish, smoked, cured salmon, and smoked, cured shad so that the level of sodium nitrite does not exceed 200 parts per million and the level of sodium nitrate does not exceed 500 parts per million in the finished product. (3) As a preservative and color fixative, with sodium nitrate, in meat-curing preparations for the home curing of meat and meat products (including poultry and wild game), with directions for use which limit the amount of sodium nitrite to not more than 200 parts per million in the finished meat product, and the amount of sodium nitrate to not more than 500 parts per million in the finished meat product.

*21 CFR 172.175; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: **http://www.ecfr.gov***

Hazardous Substances Data Bank (HSDB)

The food additive sodium nitrite may be safely used in combination with salt (NaCl) to aid in inhibiting the outgrowth and toxin formation from Clostridium botulinum type E in the commercial processing of smoked chub in accordance with the following prescribed conditions: (a) All fish in smoking establishments shall be clean and wholesome and shall be expeditiously processed, packed, and stored under adequate sanitary conditions in accordance with good manufacturing practice. (b) The brining procedure is controlled in such a manner that the water phase portion of the edible portion of the finished smoked product has a salt (NaCl) content of not less than 3.5 percent, as measured in the loin muscle, and the sodium nitrite content of the edible portion of the finished smoked product is not less than 100 parts per million and not greater than 200 parts per million, as measured in the loin muscle. (c) Smoked chub shall be heated by a controlled heat process which provides a monitoring system positioned in as many strategic locations in the smokehouse as necessary to assure a continuous temperature throughout each fish of at least 160 °F for a minimum of 30 minutes. (d) The finished product shall be cooled to a temperature of 50 °F or below within 3 hours after smoking and further cooled to a temperature of 38 °F or below within 12 hours after smoking. A temperature of 38 °F or below shall be maintained during all subsequent storage and distribution. All shipping containers, retail packages, and shipping records shall indicate with appropriate notice the perishable nature of the product and specify that the product shall be held under refrigeration (38 °F or below) until consumed.

21 CFR 172.177; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: http://www.ecfr.gov

Hazardous Substances Data Bank (HSDB)

Sodium nitrite is an indirect food additive for use only as a component of adhesives.

21 CFR 175.105; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: http://www.ecfr.gov

Hazardous Substances Data Bank (HSDB)

Sodium nitrite and potassium nitrite are subject to prior sanctions issued by the U.S. Department of Agriculture for use as color fixatives and preservative agents, with or without sodium or potassium nitrate, in the curing of red meat and poultry products.

21 CFR 181.34; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: http://www.ecfr.gov

Hazardous Substances Data Bank (HSDB)

Sodium nitrite is a food additive permitted in feed and drinking water of animals.

21 CFR 573.700; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of August 30, 2006: http://www.ecfr.gov

Hazardous Substances Data Bank (HSDB)

12.11 Other Safety Information

12.11.1 Toxic Combustion Products

Gives off irritating or toxic fumes (or gases) in a fire.

IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: http://www.inchem.org/documents/icsc/icsc/eics1120.htm

Hazardous Substances Data Bank (HSDB)

12.11.2 History and Incidents

Some 115 people in northwest China suffered food poisoning -- with 4 in critical condition -- after eating mutton-and-bun soup, the official Xinhua News Agency reported Monday. The victims, customers at a canteen in Qianxian, a county in Shaanxi province, were rushed to a hospital on Sunday and the shop was shut down, Xinhua said. A preliminary investigation showed that the soup, a local delicacy, contained too much nitrite, which can be used as a food preservative, the news agency said. It was not immediately clear why nitrite was used in the soup or whether it was added intentionally. The canteen owner has been detained by police, Xinhua said. Some food poisoning cases in China have been blamed on cooks who put poisons or toxic cleaning materials in food, mistaking them for salt or other ingredients.

International Society for Infectious Diseases. A ProMED-mail post (April 19, 2004): Soure: Yahoo News, Asia/China/ AP (edited). Available from, as of January 18, 2007: http://www.promedmail.org

Hazardous Substances Data Bank (HSDB)

On September 25, 1944, 11 elderly men were admitted to a New Your hospital exhibiting blueness over large parts of their bodies. All were derelicts in relatively poor health. At first, the condition was attributed to cyanosis from carbon monoxide poisoning. However, the symptoms weren't quite right to be gas poisoning. The results of a blood analysis indicated the presence of methemoglobin. When it was determined that all had eaten oatmeal at the same cafeteria, an investigation to identify the source of the poisoning was begun. Carbon monoxide poisoning was quickly ruled out because the 11 men had not been in the cafeteria at the same time. Interviews with the cook indicated that he had added a "handful" of salt from an open gallon can standing on the stove. This can had been filled from a larger can; beside this larger can was an identical one that the proprietor identified as saltpetre (sodium nitrate). The cook acknowledged that it was possible that he had absent-mindedly refilled the salt can on the stove from the one that contained saltpetre. The recipe for the oatmeal was duplicated and an analysis back in the laboratory indicated that the "saltpetre" was actually sodium nitrite and that the levels in the oatmeal were considerably higher than the portions that were permitted in finished meat treated with sodium nitrite. However, the estimated dose was about 2 ½ grains of sodium nitrite, whereas the toxic dose was estimated to be 3 grains. In addition, about 125 servings of oatmeal had been prepared, but only 11 men became ill. Further investigation revealed that one of 17 salt shakers had also been filled with sodium nitrite. It was suspected, but could not be confirmed, that the 11 persons who became ill added "salt" to their oatmeal from the contaminated shaker. /Abstracted from article/

Roueche B; Eleven Blue Men. The Medical Detectives. p. 1-10. Times Books, NY (1980) as abstracted for a course taught at Illinois State. Course handout Available from, as of January 18, 2007: http://lilt.ilstu.edu/pefranc/ROUECHE.00.html

Hazardous Substances Data Bank (HSDB)

An accidental food poisoning outbreak occurred resulting in the death of 14 of the 22 affected persons. Chemical analysis of food materials revealed the presence of sodium nitrite and potassium arsenate. Analysis of urine, gastric contents, liver and kidney, collected at the time of autopsy, confirmed the presence of these chemical substances in high concentrations. Epidemiological data indicated that the food poisoning occurred due to the accidental use of sodium nitrite and potassium arsenate instead of table salt in the preparation of tamarind (Tamarindus indica) soup.

PMID:7897751
Gautami S et al; J Toxicol Clin Toxicol 33 (2): 131-3 (1995)

Hazardous Substances Data Bank (HSDB)

12.11.3 Special Reports

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition).[Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/]

Hazardous Substances Data Bank (HSDB)

NAS/NRC; Nitrates, An Environmental Assessment 723 pp. (1978)

Hazardous Substances Data Bank (HSDB)

IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Geneva: World Health Organization, International Agency for Research on Cancer, Vol 94: Ingested Nitrate and Nitrite and Cyanobacterial Peptide Toxins (2010)[IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Geneva: World Health Organization, International Agency for Research on Cancer, 1972-PRESENT. (Multivolume work). Available at: http://monographs.iarc.fr/ENG/Classification/index.php, p. V94 (2010)]

Hazardous Substances Data Bank (HSDB)

13 Toxicity

13.1 Toxicological Information

13.1.1 NIOSH Toxicity Data

▸ The National Institute for Occupational Safety and Health (NIOSH)

13.1.2 Evidence for Carcinogenicity

There is limited evidence in humans for the carcinogenicity of **nitrite** in food. **Nitrite** in food is associated with an increased incidence of stomach cancer. ...There is sufficient evidence in experimental animals for the carcinogenicity of **nitrite** in combination with amines or amides. There is limited evidence in experimental animals for the carcinogenicity of **nitrite** per se. Overall evaluation: Ingested **nitrate** or **nitrite** under conditions that result in endogenous nitrosation is probably carcinogenic to humans (Group 2A).

*IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Geneva: World Health Organization, International Agency for Research on Cancer, 1972-PRESENT. (Multivolume work). Available at: **http://monographs.iarc.fr/ENG/Classification/index.php**, p. V94: p. 323 (2010)*

▸ Hazardous Substances Data Bank (HSDB)

13.1.3 Exposure Routes

The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

▸ ILO International Chemical Safety Cards (ICSC)

13.1.4 Inhalation Symptoms

Blue lips, fingernails and skin. Confusion. Convulsions. Dizziness. Headache. Nausea. Unconsciousness.

▸ ILO International Chemical Safety Cards (ICSC)

13.1.5 Eye Symptoms

Redness. Pain.

▸ ILO International Chemical Safety Cards (ICSC)

13.1.6 Ingestion Symptoms

Increased heart rate. See Inhalation.

▸ ILO International Chemical Safety Cards (ICSC)

13.1.7 Acute Effects

ChemIDplus

13.1.8 Interactions

The effects of acidified sodium nitrite, a releaser of nitric oxide, combined with human superoxide dismutase were investigated in a 6 hr model of myocardial ischemia (MI) with repertusion in open-chest, anesthetized cats. Acidified sodium nitrite + human superoxide dismutase together exert significant protection on the myocardium subjected to ischemia and repertusion injury. Sodium nitrite may act synergisticaly with human superoxide dismutase to prolong the action of nitric oxide scavenging free radicals that inactivate nitric oxide.

Johnson G et al; Am Heart J 119 (3): 530-7 (1990)

Hazardous Substances Data Bank (HSDB)

Chronic sodium nitrite (SN) treatment potentiated spontaneous and 1,2-dimethylhydrazine (DMH)-induced carcinogenesis. Mice injected with SN alone showed a higher incidence of leukemia and lung cancer than in controls. Combined treatment with DMH and SN induced most of benign and malignant tumors (hepatic hemangioendothelioma, hepatocarcinoma, renal adenoma, etc.). The difference in the numbers of DMH- and SN-induced tumor bearers was not significant until a concentration of 500 mg/L was reached (64.7%). The level of multiple tumor incidence increased when SN 50 and 500 mg/L was used. Unlike DMH alone, cumulative incidence of DMH-specific tumors and leukemia after combined treatment was higher. An evaluation of cumulative incidence and relative risk established an indirect but positive correlation between SN dose, on the one hand, and spontaneous and induced carcinogenesis, on the other. The strongest carcinogenic effect was reported when DMH was used in combination with SN 500 mg/L. /The authors concluded that their/ data confirmed the carcinogenic hazard of chronic exposure to SN which increased when in combination with that to a specific carcinogenic substance.

PMID:15755063
Il'nitski AP et al; Vopr Onkol 50 (6): 683-8 (2004)

Hazardous Substances Data Bank (HSDB)

Combined effects of sodium nitrite (NaNO2) and 2-amino-3-methylimidazo(4,5-f)quinoline (IQ) on liver, colon and Zymbal's gland carcinogenesis were assessed using a rat two-stage carcinogenesis model, with a focus on involvement of oxidative stress. Male 6-week-old F344 rats were given a single intraperitoneal injection of 200 mg/kg of diethylnitrosamine and 4 subcutaneous injections of 40 mg/kg of 1,2-dimethylhydrazine for initiation. Then, they were administered 0 or 300 ppm IQ in the diet or 0, 0.1 or 0.2% NaNO2 in their drinking water for 27 weeks. The treatment with NaNO2+IQ significantly enhanced colon and Zymbal's gland carcinogenesis and tended to enhance hepatocarcinogenesis. The incidence of lung tumors in the IQ-treated groups was significantly increased as compared with the initiation alone group. In a second experiment, male rats were given IQ or NaNO2 under the same conditions as before for 1 week, and at sacrifice, their liver and colon tissue or mucosa were collected for analysis of 8-hydroxydeoxyguanosine (8-OHdG), thiobarbituric acid reactive substances (TBARS), acrolein-modified protein and the bromodeoxyuridine-labeling index (BrdU-LI) (in the colon). In the colon, 8-OHdG, acrolein-modified protein levels and BrdU-LI were significantly increased by the combined treatment. These results indicate that the treatment with NaNO2 enhances IQ-induced colon and Zymbal's gland carcinogenesis in rats and that oxidative DNA damage and lipid peroxidation may partly be involved, especially in the colon. In addition, this experiment showed that IQ can act as a potent lung carcinogen in rats.

PMID:16353153
Kitamura Y et al; Int J Cancer 118 (10): 2399-404 (2006)

Hazardous Substances Data Bank (HSDB)

... Short-term effects of combined treatment with anti-oxidants, sodium ascorbate (NaAsA) and sodium nitrite (NaNO2) on forestomach cell proliferation were examined in F344 male rats. Groups of 5 animals aged 6 weeks were treated for 4 weeks with 0.8% catechol, 0.8% hydroquinone, 1% tert-butyl-hydroquinone (TBHQ), 2% gallic acid or 2% pyrogallor alone or in combination with 0.3% NaNO2 in the drinking water and/or 1% NaAsA in the diet. The thicknesses of forestomach mucosa in rats treated with anti-oxidants and NaNO2 in combination were greater than those with antioxidant alone and additional NaAsA treatment further enhanced the thickening of mucosa. It was noteworthy that values for mucosae of animals treated with NaNO2 and NaAsA without anti-oxidant were similar to those for anti-oxidants.

PMID:8262668
Yoshida Y et al; Int J Cancer 56 (1): 124-8 (1994)

Hazardous Substances Data Bank (HSDB)

For more Interactions (Complete) data for SODIUM NITRITE (40 total), please visit the HSDB record page.

Hazardous Substances Data Bank (HSDB)

13.1.9 Antidote and Emergency Treatment

Maintain an open airway and assist ventilation if necessary. Administer supplemental oxygen. Treat hypotension with supine positioning, intravenous crystalloid fluids, and a low dose -pressor if needed. Monitor vital signs and ECG for 4 to 6 hours. Symptomatic methemoglobinemia may be treated with methylene blue. ... Administer activated charcoal. Gastric emptying is not necessary for small ingestions if activated charcoal can be given promptly . Hemodialysis and hemoperfusion are not effective. Severe methemoglobinemia in infants not responsive to methylene blue therapy may require exchange transfusion. /Nitrates and Nitrites/

Olson, K.R. (Ed.); Poisoning & Drug Overdose. 4th ed. Lange Medical Books/McGraw-Hill. New York, N.Y. 2004., p. 279

Hazardous Substances Data Bank (HSDB)

Decontamination: Remove victim from exposure and administer supplemental oxygen if available. Remove contaminated clothing and wash with copious soap and water. Irrigate exposed eyes with water or saline. /Nitrates and NItrites/

Olson, K.R. (Ed.); Poisoning & Drug Overdose. 4th ed. Lange Medical Books/McGraw-Hill. New York, N.Y. 2004., p. 280

Hazardous Substances Data Bank (HSDB)

Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for shock and treat if necessary ... . Anticipate seizures and treat as necessary ... . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with 0.9% saline (NS) during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 d of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal ... . /Nitrates, nitrites, and related compounds/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 286-7

Hazardous Substances Data Bank (HSDB)

Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious or is in severe respiratory distress. Monitor cardiac rhythm and treat arrhythmias if necessary. Start IV administration of D5W /SRP: "To keep open", minimal flow rate/. Use 0.9% saline (NS) or lactated Ringer's (LR) if signs of hypovolemia are present. For hypotension with signs of hypovolemia, administer fluid cautiously. If unresponsive to these measures, vasopressors may be helpful. Watch for signs of fluid overload ... . Treat seizures with diazepam or lorazepam ... . Administer 1% solution methylene blue if patient is symptomatic with severe hypoxia, cyanosis, and cardiac compromise not responding to oxygen. ... . Use proparacaine hydrochloride to assist eye irrigation ... . /Nitrates, nitrites, and related compounds/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 287

Hazardous Substances Data Bank (HSDB)

Monitor vital signs, blood pressure, respiration and onset of cyanosis. Administer oxygen if there are clinical signs of methemoglobinemia. Methylene blue is the specific antidote indicated in case of methemoglobinemia. /Nitrate and nitrite poisoning/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

Hazardous Substances Data Bank (HSDB)

... The treatment of methemoglobinemia caused by nitrates and nitrites is not specific: suppression of the oxidizing agents, oxygenation, prescription of reducing agents. /Nitrates and nitrites/

European Chemicals Bureau; IUCLID Dataset, Potassium nitrate (7757-79-1) (2000 CD-ROM edition). Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

Methylene blue has a protective effect against nitrite-induced MetHb formation and may therefore be used as an antidote in nitrite intoxications ... Patient recovered well due to therapy with methylene blue combined with oxygen and/or ascorbic acid and in severe cases, exchange transfusion. /Nitrite/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

Hazardous Substances Data Bank (HSDB)

... Relevant laboratory analyses are: arterial blood gases, acid base balance, nitrates could be measured in urine. The levels are usually below 150 mg NO3-/day). /Nitrate and nitrite poisoning/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

Hazardous Substances Data Bank (HSDB)

Sample collection: Arterial blood sampling reveals a characteristic chocolate-brown color. Methemoglobin concentrations can be quantified by spectrophotometry and should be measured immediately. Biochemical analysis: Total hemoglobin, blood count. Serum electrolytes, especially potassium. Acid-base balance. Arterial blood gases. Urine analysis. Toxicological analysis: The most relevant investigation is methemoglobin concentration which correlates well with symptoms and should be monitored according to the clinical condition. /Nitrate and nitrite poisoning/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 25, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm

Hazardous Substances Data Bank (HSDB)

13.1.10 Medical Surveillance

Clinical Evaluation: History. Evaluation of a patient with suspected nitrate/nitrite exposure includes a complete medical history and physical examination. Clues to potential exposure are often obtained by reviewing the following items with the patient or family: location of home (urban, suburban, or rural); drinking water source and supply (if well water: depth, location, type of well construction, and frequency of microbiologic and nitrate testing); surrounding activities (agricultural or industrial) and proximity to drinking-water source; type of sewer system (municipal or septic) and proximity to drinking water source; recent flooding; occupations, avocations, and hobbies of family members; nutritional status (for infants: type of formula, feeding regimen, and source of dilution water); family history, including recent use of medications by infant and mother; and history of recent gastroenteritis with vomiting or diarrhea. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 12. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Physical examination should include special attention to the color of the skin and mucous membranes. If there is a history of gastroenteritis (especially in infants), evaluate the patient for the possible presence of dehydration (poor skin turgor, sunken fontanelle, dry mucous membranes). All cyanotic patients should be assessed for possible cardiac and lung disease (cardiac murmurs, gallops, arrhythmias; rales, rhonchi, wheezes, dullness or hyperresonance in the chest). A central chocolate-brown or slate-gray cyanosis that does not respond to administration of 100% oxygen is indicative of methemoglobinemia. Cyanosis due to cardiorespiratory compromise most often improves with administration of 100% oxygen. In young infants, look for labored breathing, respiratory exhaustion, hypotension, below-average weight gain, and failure to meet developmental markers. Gastroenteritis can increase the rates of production and absorption of nitrites in young infants and aggravate methemoglobinemia. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 12. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Signs and Symptoms Signs and symptoms of methemoglobinemia can be directly correlated with the percentage of total hemoglobin in the oxidized form... The lips and mucous membranes of patients with nitrate/nitrite toxicity usually have more of a brownish than a bluish cast. Dyspnea, especially on exertion, is common. Varying degrees of central nervous system depression might be present. The cardiac and pulmonary examinations are usually normal, but systolic flow murmurs might be detected. Cardiac arrhythmias and hypotension can occur in patients with severe poisoning, although death from methemoglobinemia alone is uncommon, except in infants. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 13. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Laboratory Evaluation Most commonly, a drop of the patient's blood is placed on a piece of filter paper next to a drop of blood from person who does not have methemoglobinemia; when dry, the blood with methemoglobin will turn a deep chocolate-brown or slate-gray color. A tube of methemoglobin containing blood will not turn red when shaken in air or when oxygen is bubbled through it, whereas blood that is dark because of normal deoxyhemoglobin will turn red. Screening Tests: Examination of blood color. Determination of the calculated versus measured arterial saturation gap. Hemoglobin and hematocrit. Serum-free hemoglobin (for hemolysis detection). Serum haptoglobin (for hemolysis detection). Heinz bodies on peripheral blood smear. Urinalysis. Specialized Tests: Determination of methemoglobin level. Tests for causes of congenital methemoglobinemia. Hemoglobin electrophoresis. Activity of NADH-dependent methemoglobin reductase. Tests for Causes of Failure of Methylene Blue Therapy (see Treatment and Management section): Activity of glucose-6-phosphate dehydrogenase (G-6-PD). Activity of NADPH-dependent methemoglobin reductase. Sulfhemoglobin blood level (not readily available for clinical use). /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 13-14. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Direct Biologic Indicators. Although 80% to 90% of the body's excretion of nitrate is through urine and saliva, biologic nitrate or nitrite levels are generally not useful for diagnostic purposes. However, urinary and salivary nitrate concentrations can be important indicators of exposure requiring remedial action. The correlation between blood nitrite and methemoglobin is not usually linear at lower nitrite concentrations because a certain minimum amount of nitrite must enter the bloodstream before a measurable increase in methemoglobin concentration can be detected. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 14. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Indirect Biologic Indicators. The methemoglobin level in blood is the most useful screening, as well as diagnostic, test for nitrate toxicity. Methemoglobin can be measured in whole blood using a visible spectrophotometer (or co-oximeter) at 635 nanometers. To express the methemoglobin level as a percentage, total hemoglobin content of the blood sample also must be determined. Oximeters used to measure methemoglobin levels can falsely report sulfhemoglobin as methemoglobin. Although sulfhemoglobinemia is seldom severe enough to be life-threatening, its presence

can explain some methylene blue treatment (see Treatment and Management section) failures. For the evaluation of suspected congenital methemoglobinemia, hemoglobin electrophoresis is helpful. In patients with methemoglobinemia, the partial pressure of oxygen (PO2) is usually normal despite the presence of an abnormal hemoglobin that cannot bind or transport oxygen. The percent O2 saturation calculated by some blood-gas instruments from the PO2, or calculated manually with a nomogram, will be normal. However, the percent O2 saturation actually measured with a co-oximeter will be decreased, resulting in a calculated versus measured arterial "percent O2 saturation gap." This finding is not specific for methemoglobinemia, however, because carboxyhemoglobinemia and sulfhemoglobinemia produce the same findings. Percent O2 saturation determined with a pulse oximeter might be unreliable in patients with methemoglobinemia, especially after administration of methylene blue (see Treatment and Management section). Arterial blood gases should be used to monitor oxygenation in such patients. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 14-15. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

Treatment and Management In cases of mild nitrate toxicity (blood methemoglobin levels <20%), asymptomatic patients do not require treatment other than avoiding ingestion or inhalation of substances that cause methemoglobinemia. In symptomatic patients with moderate or severe toxicity and hypoxia or dyspnea, 100% oxygen should be administered immediately to saturate fully all remaining normal hemoglobin. Specific therapy for methemoglobinemia consists of intravenous administration of methylene blue at a dose of 1 to 2 milligrams/kilograms (mg/kg) body weight (0.1 to 0.2 milliliters [mL]/kg body weight of a 1% solution in saline) over a 5- to 10-minute period. Within 15 minutes of methylene blue administration, cyanosis will usually begin obviously to improve. If no response to the initial injection occurs within 15 minutes in seriously ill patients, or within 30 to 60 minutes in moderately ill patients, a second methylene blue dose of 0.1 mL/kg body weight can be given. Caution is advised because methylene blue can slightly worsen methemoglobinemia when given in excessive amounts. In general, the total dose administered during the first 2 to 3 hours should not be >0.5 to 0.7 mL/kg of body weight. Methylene blue should not be administered to a patient with known G-6-PD deficiency because severe hemolytic anemia can develop. For severe, life-threatening methemoglobinemia, especially when the patient responds poorly to methylene blue therapy or when the patient has G-6-PD deficiency, treatment options include exchange transfusion and hyperbaric oxygen therapy. During treatment in the hyperbaric chamber, sufficient oxygen can be dissolved directly in the blood to support life; reversible binding to hemoglobin is not required. Blood transfusion might be required if massive hemolysis develops. In persons with severe hemolysis, maintaining a brisk urine flow and alkalinizing the urine by administration of sodium bicarbonate might help protect against renal injury from erythrocyte breakdown products. Patients with severe poisoning who are experiencing seizures or cardiac arrhythmias might require anticonvulsant or antiarrhythmic therapy. If a local anesthetic is suspected of being the etiologic agent for the methemoglobinemia, however, lidocaine probably should be avoided. /Nitrates and Nitrites/

ATSDR; Case Studies in Environmental Medicine. NITRATE/NITRITE TOXICITY. p 15-16. Course: SS3054. Revision Date: January 2001 Original Date: October 1991 Expiration Date: January 2007.

Hazardous Substances Data Bank (HSDB)

13.1.11 Human Toxicity Excerpts

/HUMAN EXPOSURE STUDIES/ Human volunteers given sodium nitrite intravenously produced a maximum methemoglobin level of 7% after a dose of 2.7 mg NO2-/kg and 30% after a dose of 8 mg/kg ... The first symptoms of oral nitrite poisoning develop within 15 to 45 minutes.[IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: http://www.inchem.org/documents/pims/chemical/pimg016.htm]

Hazardous Substances Data Bank (HSDB)

/HUMAN EXPOSURE STUDIES/ Symptoms of nitrite poisoning and MetHb formation after ingestion ranged from 0.4 to > 200 mg/kg bw, expressed as nitrite ion ... MetHb formation in different cases varied from 7.7 up to 79% ... /It was deduced that/ cyanosis occurred at MetHb concentration above 10%, and other symptoms at > 20% ... /Nitrite/[WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 30, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm]

Hazardous Substances Data Bank (HSDB)

/HUMAN EXPOSURE STUDIES/ The effect of sodium nitrite on subpopulations (young and old) of isolated neonatal and adult red blood cells was studied. MetHb formation increased with NaNO2 concentration in all subpopulations. Red blood cells treated with NaNO2 were less fragile. Changes in protein composition occurred after NaNO2 treatment. The membrane-bound Hb increased with increasing NaNO2 concentration. When compared with adult red blood cells, neonatal red blood cells seemed more susceptible to MetHb formation, to decrease in fragility, and to oxidative denaturation of spectrins and band-3-proteins. Increased susceptibility of neonatal cells to oxidative injury and MetHb formation may contribute to their shorter life-span when compared to adult cells. This susceptibility may also be related to lower MetHb reductase activity in neonatal cells.[WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 27, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm]

Hazardous Substances Data Bank (HSDB)

/SIGNS AND SYMPTOMS/ Signs and symptoms of nitrite poisoning include intense cyanosis, nausea, vertigo, vomiting, collapse, spasms of abdominal pain, tachycardia, tachypnea, coma, convulsions and death. Injection and inflammation of gastric and intestinal mucosa are described at autopsy. /Inorganic nitrite salts/[Gosselin, R.E., R.P. Smith, H.C. Hodge. Clinical Toxicology of Commercial Products. 5th ed. Baltimore: Williams and Wilkins, 1984., p. II-315]

Hazardous Substances Data Bank (HSDB)

For more Human Toxicity Excerpts (Complete) data for SODIUM NITRITE (30 total), please visit the HSDB record page.

Hazardous Substances Data Bank (HSDB)

13.1.12 Non-Human Toxicity Excerpts

/LABORATORY ANIMALS: Acute Exposure/ Single dose of 30 mg/kg of sodium nitrite iv caused methemoglobinemia in dogs. /From table/

Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982., p. 2416

Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Acute Exposure/ Testing of sodium nitrite on rabbit corneas by application of 0.08 molar soln after removal of corneal epithelium, or by injection into stroma, has caused no local injury.

Grant, W.M. Toxicology of the Eye. 3rd ed. Springfield, IL: Charles C. Thomas Publisher, 1986., p. 840

Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Acute Exposure/ Sodium nitrite /is/ not irritating /to/ rabbit skin ...

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Acute Exposure/ Sodium nitrite /is/ moderately irritating /to/ rabbit eyes ... Irrigation of the treated eye 30 to 60 seconds after application ... had little effect on the overall effects, which were primarily of conjunctival irritation.

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

For more Non-Human Toxicity Excerpts (Complete) data for SODIUM NITRITE (60 total), please visit the HSDB record page.

Hazardous Substances Data Bank (HSDB)

13.1.13 Non-Human Toxicity Values

Showing 5 of 6 View More

LD50 Rabbit oral 186 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

Hazardous Substances Data Bank (HSDB)

LD50 Mouse ip 158 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

Hazardous Substances Data Bank (HSDB)

LD50 Mouse oral 175 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

Hazardous Substances Data Bank (HSDB)

LD50 Rat iv 65 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

Hazardous Substances Data Bank (HSDB)

LD50 Rat oral 85 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 3266

Hazardous Substances Data Bank (HSDB)

13.1.14 Ecotoxicity Values

Showing 5 of 121 View More

LC50; Species: Cyprinus carpio (common carp, wt 2-78 g); Conditions: freshwater; static; Concentration: 35 nmol/L at pH 6.9-7.4 for 24 hr /total/

Williams EM, Eddy FB; Aquat.Toxicol. 13 (1): 29-42 (1988) Available from, as of September 13, 2006

Hazardous Substances Data Bank (HSDB)

LC50; Species: Cyprinus carpio (common carp, size 56 mm fork length); Conditions: freshwater; flow-through; Concentration: 15600 ug/L (95% confidence limit: 13300 to 17900 ug/L) for 10 days /total/

Solbe JFD et al; J Fish Biol 27 (Suppl. A): 197-207 (1985) Available from, as of September 13, 2006

Hazardous Substances Data Bank (HSDB)

LC50; Species: Daphnia magna (Water flea); Conditions: freshwater; static; Concentration: 8300 ug/L for 96 hr /total/

Ewell WS et al; Environ Toxicol Chem 5 (9): 831-840 (1986) Available from, as of September 13, 2006

Hazardous Substances Data Bank (HSDB)

LC50; Species: Daphnia magna (Water flea); Conditions: freshwater; static; Concentration: 43600 ug/L for 24 hr /total/

Bringmann G, Kuhn R; Z.Wasser-Abwasser-Forsch 10 (5): 161-166(ENG TRANSL)(OECDG Data File)(GER)(ENG ABS) (1977) Available from, as of September 13, 2006

Hazardous Substances Data Bank (HSDB)

LC50; Species: Gambusia affinis (Western mosquitofish, female); Conditions: freshwater; static; Concentration: 1500 ug/L for 96 hr /total/

Wallen IE et al; Sewage Ind Wastes 29 (6): 695-711 (1957) Available from, as of September 13, 2006

Hazardous Substances Data Bank (HSDB)

13.1.15 Ecotoxicity Excerpts

/AQUATIC SPECIES/ Rainbow trout (Salmo gairdneri) appears to be the most sensitive fish species to nitrite toxicity, with a 96 hr LC50 ranging from 0.56 to 1.78 mg NO2-/L for low chloride water and 11.5 to 17.4 mg NO2-/L for high chloride water, at pH between 7.5 and 8.6 in hard water. /Nitrite/

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

/AQUATIC SPECIES/ Salmo gairdneri /exposed/ to 0.1 mg NO2-/L for ... /7wk/ in freshwater caused no lethality, growth reduction, gill histological changes or hematological dyscrasions ... Although 0.05 mg NO2-/L causes significant incr in methemoglobin levels, the change was slight and not of biological significance. /Nitrite (NO2) /

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 26, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

/AQUATIC SPECIES/ ... /Sodium nitrite/ is toxic to aquatic organisms.

IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from, as of October 23, 2006: http://www.inchem.org/documents/icsc/icsc/eics1120.htm

Hazardous Substances Data Bank (HSDB)

13.1.16 Ongoing Test Status

The following link will take the user to the National Toxicology Program (NTP) Test Agent Search Results page, which tabulates all of the "Standard Toxicology & Carcinogenesis Studies", "Developmental Studies", and "Genetic Toxicity Studies" performed with this chemical. Clicking on the "Testing Status" link will take the user to the status (i.e., in review, in progress, in preparation, on test, completed, etc.) and results of all the studies that the NTP has done on this chemical. [http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm?fuseaction=ntpsearch.searchresults&searchterm=7632-00-0]

Available from: ***http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm?fuseaction=ntpsearch.searchresults&searchterm=7632-00-0***

Hazardous Substances Data Bank (HSDB)

13.1.17 National Toxicology Program Studies

Sodium nitrite administered via drinking **water**, was tested for its effects on fertility & reproduction in Swiss CD-1 mice according to the continuous breeding protocol. Based on results of dose-finding studies, 0.06, 0.12, & 0.24% weight/volume sodium nitrite concns were chosen to investigate effects on fertility & reproduction. Male & female mice were continuously exposed for a 7 day precohabitation & a 98 day cohabitation period (Task 2). Sodium nitrite treatment had no effect on fertility or any of the reproductive parameters. The **water** consumption in the 0.24% group was consistently lower but this had no effect on F0 body weights. Since the response was negative in Task 2, the cross-over mating trial (Task 3) to determine the sex affected by chemical treatment was not conducted. The F1 pups from control & 0.24% groups were weaned for second generation studies. Live male & female pup weights were significantly lower on postnatal days 7, 14, & 21 in the 0.24% group. At sexual maturity, fertility was not affected in the F1 mice nor were body weights decreased in either sex. At necropsy, absolute cauda epididymis weight was lower in the treated group by 9%. Based on the results of the present study, it is concluded that sodium nitrite is not a reproductive toxicant in Swiss CD-1 mice at the levels tested.

Department of Health & Human Services/National Institute of Environmental Health Sciences, National Toxicology Program; Reproductive Toxicity of Sodium Nitrite (CAS No. 7632-00-0) in CD-1 Swiss Mice, NTP Study No. RACB88071 (December 1990) Available from, as of August 8, 2002: ***http://ntp.niehs.nih.gov/index.cfm?objectid=0847F35A-0850-D1E7-B02ED4DDD150F990***

Hazardous Substances Data Bank (HSDB)

14-WEEK STUDY IN RATS Groups of 10 male and 10 female rats were exposed to 0, 375, 750, 1,500, 3,000, or 5,000 ppm sodium nitrite (equivalent to average daily doses of approximately 30, 55, 115, 200, or 310 mg sodium nitrite/kg body weight to males and 40, 80, 130, 225, or 345 mg/kg to females) in drinking **water** for 14 weeks. Clinical pathology study groups of 15 male and 15 female rats were exposed to the same concentrations for 70 or 71 days. One female exposed to 3,000 ppm died before the end of the study. Body weights of males exposed to 3,000 or 5,000 ppm and females exposed to 5,000 ppm were significantly less than those of the controls. **Water** consumption by 5,000 ppm males and 3,000 and 5,000 ppm females was less than that by the controls at weeks 2 and 14. Clinical findings related to sodium nitrite exposure included brown discoloration in the eyes and cyanosis of the mouth, tongue, ears, and feet of males exposed to 3,000 or 5,000 ppm and of females exposed to 1,500 ppm or greater. Reticulocyte counts were increased in males and females exposed to 3,000 or 5,000 ppm. The erythron was decreased on day 19 but increased by week 14 in males and females exposed to 5,000 ppm. Methemoglobin concentrations were elevated in almost all exposed groups throughout the 14 week study; a no-observed-adverse-effect level was not achieved. The relative kidney and spleen weights of males and females exposed to 3,000 or 5,000 ppm were significantly greater than those of the controls. Sperm motility in 1,500 and 5,000 ppm males was significantly decreased. Increased erythropoietic activity in the bone marrow of exposed males and females was observed. The incidences of squamous cell hyperplasia of the forestomach in 5,000 ppm males and females were significantly increased. 14-WEEK STUDY IN MICE Groups of 10 male and 10 female B6C3F1 mice were exposed to 0, 375, 750, 1,500, 3,000, or 5,000 ppm sodium nitrite (equivalent to average daily doses of approximately 90, 190, 345, 750, or 990 mg/kg to males and 120, 240, 445, 840, or 1,230 mg/kg to females) in drinking **water** for 14 weeks. Body weights of males exposed to 5,000 ppm were significantly less than those of the controls. **Water** consumption by males exposed to 1,500 ppm or greater was slightly less than that by the controls at week 13. Relative spleen weights of 3,000 and 5,000 ppm males and absolute and relative heart, kidney, liver, and spleen weights of females exposed to 3,000 or 5,000 ppm were greater than those of the control groups. Sperm motility was decreased in 5,000 ppm males, and the estrous cycles of 1,500 and 5,000 ppm females were significantly longer than in the controls. There were increased incidences of squamous cell hyperplasia of the forestomach in 5,000 ppm males and females, extramedullary hematopoiesis of the spleen in 3,000 and 5,000 ppm males and 1,500 ppm or greater females, and degeneration of the testis in 3,000 and 5,000 ppm males. 2-YEAR STUDY IN RATS Groups of 50 male and 50 female rats were exposed to 0, 750, 1,500, or 3,000 ppm sodium nitrite (equivalent to average daily doses of approximately 35, 70, or 130 mg/kg to males and 40, 80, or 150 mg/kg to females) in drinking **water** for 2 years. For toxicokinetic studies of plasma **nitrite** and blood methemoglobin, 10 male and 10 female special study rats were exposed to the same concentrations for 12 months. Survival of exposed groups was similar to that of the controls. Mean body weights of males and females exposed to 3,000 ppm were less than those of the controls throughout the study. **Water** consumption by males and females exposed to 3,000 ppm was less than that by the controls throughout the study, and that by the other exposed groups was generally less after week 14. The incidences of hyperplasia of the forestomach epithelium in males and females exposed to 3,000 ppm were significantly greater than those in the control groups. The incidence of fibroadenoma of the mam mary gland was significantly increased in females exposed to 1,500 ppm, and the incidences of multiple fibroadenoma were increased in 750 ppm and 1,500 ppm females; however, these neoplasms occur with a high background incidence, and no increase was seen in the 3,000 ppm group. The incidences of mononuclear cell leukemia were significantly decreased in males and females exposed to 1,500 or 3,000 ppm. 2-YEAR STUDY IN MICE Groups of 50 male and 50 female B6C3F1 mice were exposed to 0, 750, 1,500, or 3,000 ppm sodium nitrite (equivalent to average daily doses of approximately 60, 120, or 220 mg/kg to males and 45, 90, or 165 mg/kg to females) in drinking **water** for 2 years. Survival of exposed groups was similar to that of the controls; mean body weights of 3,000 ppm females were less than those of the controls throughout the study. Exposed groups generally consumed less **water** than the control groups. The incidences of squamous cell papilloma or carci noma (combined) in the forestomach of female mice occurred with a positive trend. The incidence of hyperplasia of the glandular stomach epithelium was significantly greater in 3,000 ppm males than in the controls. ... CONCLUSIONS Under the conditions of this 2-year drinking **water** study, there was no evidence of carcinogenic activity of sodium nitrite in male or female F344/N rats exposed to 750, 1,500, or 3,000 ppm. There was no evidence of carcinogenic activity of sodium nitrite in male B6C3F1 mice exposed to 750, 1,500, or 3,000 ppm. There was equivocal evidence of carcinogenic activity of sodium nitrite in female B6C3F1 mice based on the positive trend in the incidences of squamous cell papilloma or carcinoma (combined) of the forestomach. Exposure to sodium nitrite in drinking **water** resulted in increased incidences of epithelial hyperplasia in theforestomach of male and female rats and in the glandular stomach of male mice. Decreased incidences of mononuclear cell leukemia occurred in male and female rats.

Toxicology & Carcinogenesis Studies of Sodium Nitrite in F344/N Rats and B6C3F1 Mice p.8 Technical Report Series No. 495 (2001) NIH Publication No. 01-3954 U.S. Department of Health and Human Services, National Toxicology Program, National Institute of Environmental Health Sciences, Research Triangle Park, NC 27709

Hazardous Substances Data Bank (HSDB)

13.1.18 Populations at Special Risk

Acute **nitrate** toxicity is almost always seen in infants rather than adults when it results from ingestion of well waters & vegetables high in nitrates. ... /it was/ deduced that infants were prone to upset stomachs & achlorhydria. As result, stomach pH increased in alkalinity allowing **nitrate**-reducing organisms to enter & to reduce nitrates to nitrites. A gastric pH above 4 supports **nitrate**-reducing organisms. ... immature enzyme systems may also be of importance. ... fetal hemoglobin (hemoglobin F) is oxidized by **nitrite** to methemoglobin at rate twice as rapid as adult hemoglobin (hemoglobin A). Furthermore, enzymatic capacity of erythrocytes of newborn infants to reduce methemoglobin to hemoglobin appears less than that of adults. Difference is probably due to developmental deficiency in activity of DPNH-methemoglobin reductase (**diphosphopyridine nucleotide**). As opposed to adults, several clinical, physiologic & metabolic factors predispose infants to development of methemoglobinemia & acute **nitrate** poisoning. /**Nitrite**/

National Research Council. Drinking Water & Health Volume 1. Washington, DC: National Academy Press, 1977., p. 420

Hazardous Substances Data Bank (HSDB)

Neonates are at special risk for high **nitrate** and **nitrite** levels as their enzyme system for regeneration of hemoglobin is not fully developed ... Most clinical case data refers to neonates developing methemoglobinemia after drinking **water** or **water**-based formulations with high **nitrate** or **nitrite** content ... Cases of methemoglobinemia have also been reported due to feeding babies vegetable preparations where **nitrate** has been converted to **nitrite** through bacterial action. /**Nitrate** and **nitrite** poisoning/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from, as of October 24, 2006: ***http://www.inchem.org/documents/pims/chemical/pimg016.htm***

Hazardous Substances Data Bank (HSDB)

The lowest acute oral lethal dose of nitrite reported for man varied from 27 to 255 mg/kg, in which the lowest figures applied for children and elderly people. Nitrite is also more toxic to young infants (3 mo) than adults giving rise to relatively higher methemoglobin levels in the blood ... Individuals with stomach lesions or disorders ... /and/ persons on cimetidine and other antacid medication present special risk groups in which a correlation between nitrate or nitrite intake and incidence of gastric cancer cannot be excluded. /Nitrate and nitrite/

European Chemicals Bureau; IUCLID Dataset, Sodium nitrite (7632-00-0) (2000 CD-ROM edition). Available from, as of October 27, 2006: http://esis.jrc.ec.europa.eu/

Hazardous Substances Data Bank (HSDB)

Aside from infants under 3 months of age, several other categories of individuals with altered physiological status or with hereditary or acquired disease may also be predisposed to the development of nitrite- or nitrate-induced methemoglobinemia. These include pregnant women ... individuals with glucose-6-phosphate dehydrogenase deficiency ... adults with reduced gastric acidity (including those being treated for peptic ulcer or individuals with chronic gastritis or pernicious anemia), a rare group with a hereditary lack of NADH or methemoglobin reductase activity in their red blood cells ... and probably the elderly ... Individuals with hereditary structural abnormalities in hemoglobin, referred to as hemoglobin Ms, are probably also at increased risk from dietary nitrate or nitrite. /Nitrate and nitrite/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 30, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

Hazardous Substances Data Bank (HSDB)

Atrophic gastritis is a relevant factor in determining the gastric nitrite level, because nitrate administered to subjects with this type of gastritis results in a ten times higher nitrite concentration than that found in subjects with a normal mucosa. A given nitrate dose may be harmless to normal subjects, but harmful to a patient with atrophic gastritis, especially in the presence of precursors of N-nitrosamines or nitrosamides in the diet. /Nitrate and nitrite/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 31, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

Hazardous Substances Data Bank (HSDB)

... Iron deficient patients with gastric lesions and patients with pernicious anemia (PA) are predisposed to stomach cancer and also have a high reduction rate of nitrate to nitrite. The reduction rates in PA patients were nearly 50-fold higher than of matched controls, as was the number of bacteria. /Nitrate and nitrite/

WHO; WHO Food Additives Series 35 (844): Nitrite. Available from, as of October 31, 2006: http://www.inchem.org/documents/jecfa/jecmono/v35je13.htm

Hazardous Substances Data Bank (HSDB)

13.2 Ecological Information

13.2.1 ICSC Environmental Data

The substance is toxic to aquatic organisms.

ILO International Chemical Safety Cards (ICSC)

13.2.2 Natural Pollution Sources

Sodium nitite is present in brines(1).

(1) Porkorny L et al; Kirk-Othmer Encyclopedia of Chemical Technology. (2005). NY, NY: John Wiley & Sons; Sodium Nitrate and Nitrite. Online Posting Date: January 27, 2006.

Hazardous Substances Data Bank (HSDB)

13.2.3 Environmental Fate

The major environmental releases of inorganic sources of nitrates are due to the use of fertilizers. Most nitrogenous materials in natural waters tend to be converted to nitrate, so all sources of combined nitrogen, particularly organic nitrogen and ammonia, should be considered as potential nitrate sources. Primary sources of organic nitrates include human sewage and livestock manure, especially from feedlots. Because it does not volatilize, nitrate/nitrite is likely to remain in water until consumed by plants or other organisms. Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. Symptoms include blueness of the skin. /Nitrate; nitrite/

US EPA; National Primary Drinking Water Regulations. Technical Factsheet on: NITRATE/NITRITE. Available at http://www.epa.gov/safewater/dwh/t-ioc/nitrates.html as of Sept 24, 2007.

Hazardous Substances Data Bank (HSDB)

13.2.4 Probable Routes of Human Exposure

... /Sodium nitrite/ can be absorbed into the body by inhalation of its aerosol and by ingestion.

IPCS, CEC; International Chemical Safety Card on Sodium nitrite. (October 2000). Available from http://www.inchem.org/documents/icsc/icsc/eics1120.htm as of October 23, 2006.

Hazardous Substances Data Bank (HSDB)

Oral intake of nitrate and nitrite in food and drinking water is the major route of entry /Nitrate and nitrite poisoning/

IPCS; Poisons Information Monograph G016: Nitrates and nitrites. (September 1996). Available from: http://www.inchem.org/documents/pims/chemical/pimg016.htm as of October 24, 2006.

Hazardous Substances Data Bank (HSDB)

14 Associated Disorders and Diseases

- Comparative Toxicogenomics Database (CTD)

15 Literature

15.1 NLM Curated PubMed Citations

PubChem

15.2 Springer Nature References

Springer Nature

15.3 Thieme References

Thieme Chemistry

15.4 Wiley References

Wiley

15.5 Depositor Provided PubMed Citations

PubChem

15.6 Chemical Co-Occurrences in Literature

PubChem

15.7 Chemical-Gene Co-Occurrences in Literature

PubChem

15.8 Chemical-Disease Co-Occurrences in Literature

PubChem

16 Patents

16.1 Depositor-Supplied Patent Identifiers

PubChem

Link to all deposited patent identifiers

PubChem

16.2 WIPO PATENTSCOPE

Patents are available for this chemical structure:

https://patentscope.wipo.int/search/en/result.jsf?inchikey=LPXPTNMVRIOKMN-UHFFFAOYSA-M

PATENTSCOPE (WIPO)

16.3 FDA Orange Book Patents

Patent	8568793
Expiration	Dec 24, 2031
Applicant	HOPE PHARMS
Drug Application	N201444 (Prescription Drug: NITHIODOTE. Ingredients: SODIUM NITRITE | SODIUM THIOSULFATE)

FDA Drugs

Patent	9345724
Expiration	Mar 29, 2031
Applicant	HOPE PHARMS
Drug Application	N201444 (Prescription Drug: NITHIODOTE. Ingredients: SODIUM NITRITE | SODIUM THIOSULFATE)

FDA Drugs

Patent	9585912
Expiration	Mar 29, 2031
Applicant	HOPE PHARMS
Drug Application	N201444 (Prescription Drug: NITHIODOTE. Ingredients: SODIUM NITRITE | SODIUM THIOSULFATE)

FDA Drugs

17 Biomolecular Interactions and Pathways

17.1 Drug-Gene Interactions

▸ Drug Gene Interaction database (DGIdb)

17.2 Chemical-Gene Interactions

17.2.1 CTD Chemical-Gene Interactions

▸ Comparative Toxicogenomics Database (CTD)

18 Biological Test Results

18.1 BioAssay Results

PubChem

19 Classification

19.1 Ontologies

19.1.1 MeSH Tree

Medical Subject Headings (MeSH)

19.1.2 ChEBI Ontology

ChEBI

19.1.3 KEGG: ATC

KEGG

19.1.4 WHO ATC Classification System

WHO Anatomical Therapeutic Chemical (ATC) Classification

19.1.5 ChemIDplus

ChemIDplus

19.1.6 CAMEO Chemicals

CAMEO Chemicals

19.1.7 ChEMBL Target Tree

ChEMBL

19.1.8 UN GHS Classification

UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

19.1.9 EPA CPDat Classification

EPA Chemical and Products Database (CPDat)

19.1.10 NORMAN Suspect List Exchange Classification

NORMAN Suspect List Exchange

19.1.11 EPA DSSTox Classification

- EPA DSSTox

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   https://cameochemicals.noaa.gov/chemical/4511

   SODIUM NITRITE SOLUTION
   https://cameochemicals.noaa.gov/chemical/12642

   CAMEO Chemical Reactivity Classification
   https://cameochemicals.noaa.gov/browse/react

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   Sodium nitrite [USP]
   https://chem.nlm.nih.gov/chemidplus/sid/0007632000

   ChemIDplus Chemical Information Classification
   https://chem.nlm.nih.gov/chemidplus/

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   https://www.epa.gov/chemicals-under-tsca

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   Sodium nitrite
   https://comptox.epa.gov/dashboard/DTXSID0020941

   CompTox Chemicals Dashboard Chemical Lists
   https://comptox.epa.gov/dashboard/chemical_lists/

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   https://echa.europa.eu/substance-information/-/substanceinfo/100.028.687

   Sodium nitrite
   https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/62648

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   https://pubchem.ncbi.nlm.nih.gov/source/hsdb/757

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   Nitrous acid, sodium salt
   https://www.cdc.gov/niosh-rtecs/RA12B128.html

9. **EU Food Improvement Agents**

   SODIUM NITRITE
   https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32012R0231

10. **Wikipedia**

    sodium nitrite
    https://en.wikipedia.org/wiki/Sodium_nitrite

11. **DOT Emergency Response Guidebook**

    sodium nitrite
    https://www.phmsa.dot.gov/hazmat/erg/emergency-response-guidebook-erg

12. **NJDOH RTK Hazardous Substance List**

    sodium nitrite
    http://nj.gov/health/eoh/rtkweb/documents/fs/2258.pdf

13. **ChEBI**

Sodium nitrite
http://www.ebi.ac.uk/chebi/searchId.do?chebiId=CHEBI:78870

ChEBI Ontology
http://www.ebi.ac.uk/chebi/userManualForward.do#ChEBI%20Ontology

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17. ## Drug Gene Interaction database (DGIdb)

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> http://www.dgidb.org/downloads

https://www.dgidb.org/drugs/SODIUM NITRITE

18. ## EPA Chemical and Products Database (CPDat)

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> https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources

sodium nitrite
https://comptox.epa.gov/dashboard/DTXSID0020941#exposure

EPA CPDat Classification
https://www.epa.gov/chemical-research/chemical-and-products-database-cpdat

19. ## EU Clinical Trials Register
https://www.clinicaltrialsregister.eu/

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https://www.ema.europa.eu/en/medicines/human/orphan-designations/eu312967

Sodium nitrite (EU/3/13/1224)
https://www.ema.europa.eu/en/medicines/human/orphan-designations/eu3131224

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https://www.fda.gov/Drugs/InformationOnDrugs/ucm129662.htm

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https://apps.who.int/food-additives-contaminants-jecfa-database/chemical.aspx?chemID=4792

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NORMAN Suspect List Exchange Classification
https://www.norman-network.com/nds/SLE/

24. ## EU REGULATION (EC) No 1272/2008

sodium nitrite
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008R1272

25. ## Hazardous Chemical Information System (HCIS), Safe Work Australia

sodium nitrite
http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=4181

26. ## NITE-CMC

Sodium nitrite - FY2011
https://www.nite.go.jp/chem/english/ghs/11-mhlw-2027e.html

Sodium nitrite - FY2006
https://www.nite.go.jp/chem/english/ghs/06-imcg-1099e.html

27. ## FDA Center for Food Safety and Applied Nutrition (CFSAN)

Sodium nitrite
https://www.fda.gov/food/food-additives-petitions/food-additive-status-list

FCN Number 1113
https://www.cfsanappsexternal.fda.gov/scripts/fdcc/index.cfm?set=FCN&id=1113

SODIUM NITRITE
https://www.cfsanappsexternal.fda.gov/scripts/fdcc/index.cfm?set=FoodSubstances&id=SODIUMNITRITE

28. ## FDA/SPL Indexing Data

M0KG633D4F
https://www.fda.gov/ForIndustry/DataStandards/SubstanceRegistrationSystem-UniqueIngredientIdentifierUNII/

29. ## Pistoia Alliance Chemical Safety Library

SODIUM NITRITE; 2-AMINO-5-BROMO-4-METHYL-3-NITROPYRIDINE
http://www.pistoiaalliance.org/projects/chemical-safety-library/

30. ## SpectraBase

SODIUM NITRITE
https://spectrabase.com/spectrum/DwZyTMnuLG1

SODIUM NITRITE
https://spectrabase.com/spectrum/5VVaToskVRt

SODIUM NITRITE
https://spectrabase.com/spectrum/DGDp9QxNLKU

SODIUM NITRITE
https://spectrabase.com/spectrum/Bx7unr5ZX4Z

SODIUM NITRITE
https://spectrabase.com/spectrum/AKk33fys7d4

SODIUMNITRITE
https://spectrabase.com/spectrum/1pRJcyXJngm

Sodium nitrite
https://spectrabase.com/spectrum/ERIOx3Sdd5f

31. ## Springer Nature

32. ## Thieme Chemistry

33. ## WHO Anatomical Therapeutic Chemical (ATC) Classification

https://www.whocc.no/atc/

ATC Code
https://www.whocc.no/atc_ddd_index/

34. ## WHO Model Lists of Essential Medicines

Sodium nitrite
https://list.essentialmeds.org/medicines/44

35. ## Wiley

https://pubchem.ncbi.nlm.nih.gov/substance/?source=wiley&sourceid=115082

36. ## Medical Subject Headings (MeSH)

Sodium Nitrite
https://www.ncbi.nlm.nih.gov/mesh/68012977

MeSH Tree
http://www.nlm.nih.gov/mesh/meshhome.html

Indicators and Reagents
https://www.ncbi.nlm.nih.gov/mesh/68007202

Food Preservatives
https://www.ncbi.nlm.nih.gov/mesh/68005520

37. ## PubChem

https://pubchem.ncbi.nlm.nih.gov

38. ## KEGG

Anatomical Therapeutic Chemical (ATC) classification
http://www.genome.jp/kegg-bin/get_htext?br08303.keg

39. ## UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

GHS Classification Tree
http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

40. ## ChEMBL

Target Tree
https://www.ebi.ac.uk/chembl/target/browser

41. ## PATENTSCOPE (WIPO)

SID 403029935

https://pubchem.ncbi.nlm.nih.gov/substance/403029935