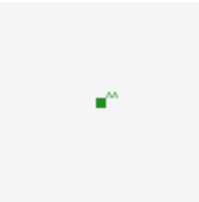
Magnesium Carbonate

PubChem CID	11029
Structure	Find Similar Structures  
Chemical Safety	Laboratory Chemical Safety Summary (LCSS) Datasheet
Molecular Formula	$MgCO_3$ or $CMgO_3$
Synonyms	MAGNESIUM CARBONATE 546-93-0 Magnesite Carbonic acid, magnesium salt 13717-00-5 More...
Molecular Weight	84.31
Parent Compound	 CID 767 (Carbonic Acid)

Component Compounds	 CID 5462224 (Magnesium)  CID 767 (Carbonic Acid)
Dates	• Modify 2022-11-26 • Create 2005-06-24

Magnesium carbonate is a magnesium salt with formula CMgO3. Its hydrated forms, particularly the di-, tri-, and tetrahydrates occur as minerals. It has a role as an antacid and a fertilizer. It is a magnesium salt, a carbonate salt, a one-carbon compound and an organic magnesium salt.

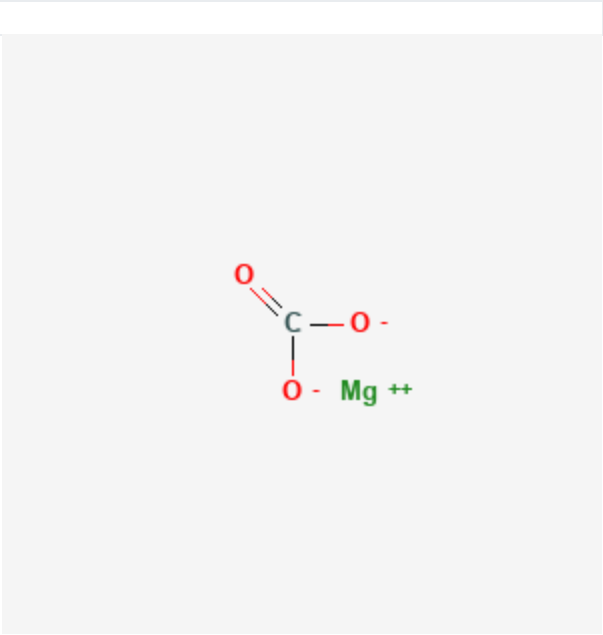
Magnesium carbonate, also known as magnesite, is a common over the counter remedy for heartburn and upset stomach caused by overproduction of acid in the stomach.

1Structures

1.12D Structure

Find Similar Structures

Chemical Structure Depiction



1.23D Conformer

3D Conformer of Parent

2Names and Identifiers

2.1Computed Descriptors

2.1.1IUPAC Name

magnesium;carbonate

Computed by Lexichem TK 2.7.0 (PubChem release 2021.05.07)

2.1.2InChI

InChI=1S/CH2O3.Mg/c2-1(3)4;/h(H2,2,3,4);/q;+2/p-2

Computed by InChI 1.0.6 (PubChem release 2021.05.07)

2.1.3InChIKey

ZLNQQNXFFQJAID-UHFFFAOYSA-L

Computed by InChI 1.0.6 (PubChem release 2021.05.07)

2.1.4Canonical SMILES

C(=O)([O-])[O-].[Mg+2]

Computed by OEChem 2.3.0 (PubChem release 2021.05.07)

2.2Molecular Formula

MgCO3

CMgO3

Computed by PubChem 2.1 (PubChem release 2021.05.07)

2.3Other Identifiers

2.3.1CAS

546-93-0

2.3.2Related CAS

13717-00-5 (magnesite)

7757-69-9 (unspecified magnesium salt)

17968-26-2 (magnesium carbonate salt/solvate)

2.3.3Deprecated CAS

1784-39-0, 183480-27-5, 364320-47-8

2.3.4European Community (EC) Number

208-915-9

2.3.5ICSC Number

0969

2.3.6Wikipedia

Magnesium carbonate

2.3.7Wikidata

Q407931

2.4Synonyms

2.4.1MeSH Entry Terms

anhydrous magnesium carbonate

C.I. 77713

carbonic acid, magnesium salt (1:1), hydrate

CI 77713

E-504

magnesite

magnesite (Mg(CO3))

magnesium carbonate

magnesium carbonate (1:1) hydrate

magnesium carbonate anhydrous

MgCO3.3H2O

nesquehonite

2.4.2Depositor-Supplied Synonyms

MAGNESIUM CARBONATE

546-93-0

Magnesite

Carbonic acid, magnesium salt

13717-00-5

Carbonic acid, magnesium salt (1:1)

Magnesium carbonate anhydrous

magnesium;carbonate

Magnesite dust

Magnesite (Mg(CO3))

Magnesium carbonate basic

Hydromagnesite

Magmaster

Magnesium carbonate (1:1)

7757-69-9

Carbonate magnesium

C.I. 77713

Stan-mag magnesium carbonate

Magnesium carbonate,light

Magnesium carbonate (MgCO3)

DCI light magnesium carbonate

Ins no.504(i)

Anhydrous magnesium carbonate

Ins-504(i)

Magnesium carbonate gold star

Magnesium(II) carbonate (1:1)

CHEBI:31793

E-504(i)

MFCD00064632

NSC-83511

0IHC698356

Giobertite

Kimboshi

Apolda

Destab

Magfy

Magnesium Carbonate, Hydrated

Caswell No. 530

GP 20 (carbonate)

MA 70 (carbonate)

Gold Star (carbonate)

Magnesium carbonate [USAN]

Australian magnesite

HSDB 211

EINECS 208-915-9

NSC 83511

EPA Pesticide Chemical Code 073503

CI 77713

AI3-00768

Magnesiumkarbonat

UNII-0IHC698356

EINECS 231-817-2

Carbonic acid, magnesium salt (1:?)

MgCO3

Magnesium Carbonate USP

EC 208-915-9

Magnesium carbonate, USP grade

CHEMBL1200736

DTXSID4049660

Magnesium Carbonate Microparticles

CS-B1764

MAGNESIUM CARBONATE [WHO-DD]

AKOS015903527

DB09481

E504

ANHYDROUS MAGNESIUM CARBONATE [MART.]

FT-0774766

Q407931

Cyclopentanecarboxylic acid, 3-methyl-2-oxo-, methyl ester

53678-75-4

3Chemical and Physical Properties

3.1Computed Properties

Property Name	Property Value	Reference
Molecular Weight	84.31	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Hydrogen Bond Donor Count	0	Computed by Cactvs 3.4.8.18 (PubChem release 2021.05.07)
Hydrogen Bond Acceptor Count	3	Computed by Cactvs 3.4.8.18 (PubChem release 2021.05.07)
Rotatable Bond Count	0	Computed by Cactvs 3.4.8.18 (PubChem release 2021.05.07)
Exact Mass	83.9697855	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	83.9697855	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	63.2 Å²	Computed by Cactvs 3.4.8.18 (PubChem release 2021.05.07)
Heavy Atom Count	5	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	18.8	Computed by Cactvs 3.4.8.18 (PubChem release 2021.05.07)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem

Property Name	Property Value	Reference
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 2021.05.07)

3.2Experimental Properties

3.2.1Physical Description

Odourless, light, white friable masses or as a bulky white powder

WHITE POWDER.

3.2.2Color/Form

Light, bulky, white powder

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

3.2.3Odor

Odorless

NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997., p. 188

3.2.4Boiling Point

Decomposes

NIOSH [L781]

3.2.5Melting Point

Decomposes at 350

NIOSH [L781]

990 °C

Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 81st Edition. CRC Press LLC, Boca Raton: FL 2000, p. 4-70

3.2.6Solubility

0.1g/L

NIOSH [L781]

Practically insoluble both in water or ethanol

White, friable masses or bulky, white powder; at about 700 °C is converted to MgO; sol in about 3,300 parts CO2-free water; more sol in water containing CO2; sol in dilute acids with effervescence; insol in alcohol /Magnesium carbonate hydroxide/

Budavari, S. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. Whitehouse Station, NJ: Merck and Co., Inc., 2001. 1015

0.0106 G/100 CC COLD WATER

Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991., p. 4-76

SOL IN ACID, AQ CARBON DIOXIDE; INSOL IN ACETONE, AMMONIA

Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991., p. 4-76

Insoluble in alcohol; soluble in acids

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

Solubility in water, g/100ml at 20 °C: 0.01 (very poor)

3.2.7Density

3.0

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

Bulk density approximately 4 lb/cu ft

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

Colorless crystals; refractive index: 1.458, 1.473, 1.501; density: 2.83 g/cu-cm /Dihydrate/

Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA15 (1990) 596

White monoclinic crystals; density: 1.73 g/cu cm /Pentahydrate/

Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA15 (1990) 596

Relative density (water = 1): 2.95

3.2.8Stability/Shelf Life

STABLE IN AIR

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

3.2.9Decomposition

When heated to decomposition it emits acrid smoke and irritating fumes /of carbon dioxide/.

Lewis, R.J. Sax's Dangerous Properties of Industrial Materials. 9th ed. Volumes 1-3. New York, NY: Van Nostrand Reinhold, 1996., p. 2077

350 °C

3.2.10Refractive Index

Index of refraction: 1.536 (alpha), 1.741 (beta)

Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 81st Edition. CRC Press LLC, Boca Raton: FL 2000, p. 4-144

3.2.11Other Experimental Properties

HEATED ... MAGNESIUM BICARBONATE LOSES CARBON DIOXIDE & WATER & MAGNESIUM CARBONATE PPT. ... GENERALLY YIELDS LIGHT CARBONATE.

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

Heat of Formation = -1096 kJ/mol

Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA15 596

Colorless to white crystals; density: 1.84 g/cu cm; MP: 165 °C (decomp); soluble in cold water (0.129 wt%) /Trihydrate/

Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA15 (1990) 596

4Spectral Information

4.1IR Spectra

4.1.1FTIR Spectra

Technique	KBr WAFER
Source of Sample	Mallinckrodt Inc., St. Louis, Missouri
Copyright	Copyright © 1980, 1981-2021 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

5Related Records

5.1Related Compounds with Annotation

5.2Parent Compound

CID 767 (Carbonic Acid)

5.3Component Compounds

CID 5462224 (Magnesium)

CID 767 (Carbonic Acid)

5.4Related Compounds

Same Connectivity	2 Records
Same Parent, Connectivity	884 Records
Same Parent, Exact	832 Records
Mixtures, Components, and Neutralized Forms	2 Records

Similar Compounds	4 Records

5.5Substances

5.5.1Related Substances

Same	115 Records

5.5.2Substances by Category

5.6Entrez Crosslinks

PubMed	3 Records

5.7Associated Chemicals

Magnesium Carbonate.H2O;23389-33-5

6Chemical Vendors

7Drug and Medication Information

7.1Drug Indication

Used as an over the counter antacid.

FDA Label

7.2FDA Orange Book

7.3FDA National Drug Code Directory

MAGNESIUM CARBONATE is an active ingredient in 52 products including: 'ACID GONE ANTACID', 'ALUMINUM HYDROXIDE AND MAGNESIUM CARBONATE', and 'BOWEL - DIGESTIVE CARE'.

7.4Drug Labels for Ingredients

Label Information	Total 265 labels
Drug Ingredient	MAGNESIUM CARBONATE
NDC Code(s)	0113-0032-63, 0113-6023-63, 0113-7321-71, 0135-0094-41, 0135-0094-42, 0135-0095-41, 0135-0096-26, 0135-0098-26, 0135-0430-03, 0135-0574-01 ... total 448.
Packagers	Acella Pharmaceuticals, LLC; Aeroflex Industria de Aerosol Ltda; Amazon.com Services LLC; American Sales Company; Amerisource Bergen; Apex Energetics Inc.; Apotheca Company; Avion Pharmaceuticals, LLC; BEST CHOICE (VALU MERCHANDISERS COMPANY); BioActive Nutritional, Inc. ... total 123.

7.5Clinical Trials

7.5.1ClinicalTrials.gov

7.5.2EU Clinical Trials Register

7.5.3NIPH Clinical Trials Search of Japan

7.6Therapeutic Uses

THE CARBONATE ... /SALT/ OF MAGNESIUM /IS/ USED AS /ANTACID/, USUALLY IN COMBINATION WITH ALUMINUM HYDROXIDE.

American Medical Association, Council on Drugs. AMA Drug Evaluations Annual 1994. Chicago, IL: American Medical Association, 1994., p. 909

ALTHOUGH 1 G CONTAINS APPROX 20 MEQ ONLY FRACTION MAY BE AVAILABLE FOR NEUTRALIZATION IN VIVO. USUAL ANTACID DOSE OF 500 MG TO 2 G MAY BE INADEQUATE

Gilman, A. G., L. S. Goodman, and A. Gilman. (eds.). Goodman and Gilman's The Pharmacological Basis of Therapeutics. 6th ed. New York: Macmillan Publishing Co., Inc. 1980., p. 993

MEDICATION (VET): WHEN INSOL IN DIGESTIVE TRACT IT IS ANTIDIARRHEAL & COATS MUCOSAE; WHEN SLIGHTLY SOL FORM IS USED IT CAN BE AS LAXATIVE AS MAGNESIUM OXIDE. ... COMMERCIALLY AVAILABLE COSMETIC GRADES EXIST FOR RARE USE AS TOPICAL PROTECTANT, MOISTURE & FAT ABSORBENT.

Rossoff, I.S. Handbook of Veterinary Drugs. New York: Springer Publishing Company, 1974., p. 319

AS AN ANTACID, IT IS RELATIVELY WEAK (1 G NEUTRALIZES APPROX 7 ML OF 0.1 N HCL IN 10 MIN & 17 ML IN 2 HR).

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

For more Therapeutic Uses (Complete) data for MAGNESIUM CARBONATE (8 total), please visit the HSDB record page.

7.7Reported Fatal Dose

3= MODERATELY TOXIC: PROBABLE ORAL LETHAL DOSE (HUMAN) 0.5-5 G/KG; BETWEEN 1 OZ & 1 PINT (OR 1 LB) FOR 70 KG PERSON (150 LB).

Gosselin, R.E., R.P. Smith, H.C. Hodge. Clinical Toxicology of Commercial Products. 5th ed. Baltimore: Williams and Wilkins, 1984., p. II-127

8Food Additives and Ingredients

8.1Food Additive Classes

JECFA Functional Classes

ANTICAKING_AGENT;

8.2Food Additive Definition

EU Food Additive Definition

Magnesium carbonate is a basic hydrated or a monohydrated magnesium carbonate or a mixture of the two.

8.3FDA Substances Added to Food

Substance	MAGNESIUM CARBONATE
Used for (Technical Effect)	PROCESSING AID
Document Number (21 CFR)	177.2600 184.1425

8.4FDA Indirect Additives used in Food Contact Substances

Indirect Additives	MAGNESIUM CARBONATE

	177.2600
Title 21 of the U.S. Code of Federal Regulations (21 CFR)	184.1425

8.5Food Additive Status

FDA Food Additive Status

Magnesium carbonate - B&N, GRAS/FS - 184.1425; Part 163, Cacao Pdts; Part 137, Cereal Flours; Part 133, Cheeses; Part 155, Cnd Peas; Part 135, Frozen Desserts: Part 582 - Animal Feeds

8.6Evaluations of the Joint FAO/WHO Expert Committee on Food Additives - JECFA

Chemical Name	MAGNESIUM CARBONATE
Evaluation Year	1965
ADI	NOT LIMITED
Report	NMRS 40/TRS 339-JECFA 9/16
Tox Monograph	FAS 67.29/NMRS 40A,B,C-JECFA 9/159

9Pharmacology and Biochemistry

9.1Pharmacodynamics

Neutralizes acid in the stomach.

9.2MeSH Pharmacological Classification

Bleaching Agents

Chemicals that are used to oxidize pigments and thus effect whitening. (See all compounds classified as Bleaching Agents.)

Hygroscopic Agents

Materials that readily absorb moisture from their surroundings. (See all compounds classified as Hygroscopic Agents.)

9.3ATC Code

A - Alimentary tract and metabolism

A02 - Drugs for acid related disorders

A02A - Antacids

A02AA - Magnesium compounds

A02AA01 - Magnesium carbonate

A - Alimentary tract and metabolism

A06 - Drugs for constipation

A06A - Drugs for constipation

A06AD - Osmotically acting laxatives

A06AD01 - Magnesium carbonate

9.4Absorption, Distribution and Excretion

Absorption

About 40-60% of magnesium is absorbed following oral administration. Percent absorption decreases as dose increases.

Route of Elimination

Primarily eliminated in urine.

Volume of Distribution

Vd for magnesium is 0.2-0.4L/kg. About 50% distributes to bone.

Clearance

Maximum magnesium clearance is directly proportional to creatinine clearance.

IN SHEEP TRIAL REAGENT GRADE MATERIAL DEMONSTRATED 72% TRUE ABSORPTION VALUES, WHILE COMMERCIAL MAGNESITE HAD ONLY 14% VALUE DRAMATIZING NEED FOR MORE BIOLOGIC AVAILABILITY STUDIES ON MANY FEED INGREDIENTS.

Rossoff, I.S. Handbook of Veterinary Drugs. New York: Springer Publishing Company, 1974., p. 319

9.5Metabolism/Metabolites

Magnesium does not appear to be metabolized in any way.

9.6Biological Half-Life

Half life of 27.7 hours reported with overdose of 400mEq of magnesium in an adult.

9.7Mechanism of Action

Magnesium carbonate reacts with hydrochloric acid in the stomach to form carbon dioxide and magnesium chloride thus neutralizing excess acid in the stomach.

... Rapidly reacts with hydrochloric acid to form ... carbon dioxide /and magnesium chloride/.

McEvoy, G.K. (ed.). American Hospital Formulary Service- Drug Information 2002. Bethesda, MD: American Society of Health-System Pharmacists, Inc. 2002 (Plus Supplements)., p. 2774

10Use and Manufacturing

10.1Uses

EPA CPDat Chemical and Product Categories

The Chemical and Products Database, a resource for exposure-relevant data on chemicals in consumer products, Scientific Data, volume 5, Article number: 180125 (2018), DOI:10.1038/sdata.2018.125

For magnesium carbonate (USEPA/OPP Pesticide Code: 073503) there are 0 labels match. /SRP: Not registered for current use in the U.S., but approved pesticide uses may change periodically and so federal, state and local authorities must be consulted for currently approved uses./

U.S. Environmental Protection Agency/Office of Pesticide Program's Chemical Ingredients Database on Magnesium Carbonate (546-93-0). Available from, as of October 23, 2002: https://npirspublic.ceris.purdue.edu/ppis/

In foods as a drying agent, color retention agent, anticaking agent and a carrier.

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

ANTACID & CATHARTIC

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

MEDICATION

For more Uses (Complete) data for MAGNESIUM CARBONATE (11 total), please visit the HSDB record page.

Plastics -> Typical concentration range in plastic materials -> 1%

S47 | ECHAPLASTICS | A list from the Plastic Additives Initiative Mapping Exercise by ECHA | DOI:10.5281/zenodo.2658139

10.1.1Use Classification

EPA Safer Chemical Functional Use Classes -> Processing Aids and Additives

Safer Chemical Classes -> Green circle - The chemical has been verified to be of low concern

Food additives

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

ANTICAKING_AGENT; -> JECFA Functional Classes

Plastics -> Polymer Type -> Polyolefin-I; PA

S47 | ECHAPLASTICS | A list from the Plastic Additives Initiative Mapping Exercise by ECHA | DOI:10.5281/zenodo.2658139

Plastics -> Other stabilisers

S47 | ECHAPLASTICS | A list from the Plastic Additives Initiative Mapping Exercise by ECHA | DOI:10.5281/zenodo.2658139

Cosmetics -> Absorbent; Binding; Bulking; Cosmetic colorant; Opacifying

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

10.1.2Household Products

Household & Commercial/Institutional Products

Information on 56 consumer products that contain Magnesium carbonate in the following categories is provided:

• Home Maintenance

• Inside the Home

• Landscaping/Yard

• Personal Care

• Pesticides

• Pet Care

10.2Methods of Manufacturing

MIXING OF SOLUTIONS OF MAGNESIUM SULFATE AND SODIUM CARBONATE, FOLLOWED BY FILTERING AND DRYING

SRI

... FROM DOLOMITE ... BY ... CALCINING IT, SUSPENDING CALCINATED POWDER IN WATER & SATURATING WITH CARBON DIOXIDE ... SOME LIME ... DISSOLVES ... BUT WHEN TEMP, AFTER TREATMENT WITH CARBON DIOXIDE ... RAISED, NEARLY ALL ... LIME PPT ... SOLN ... HEATED ... MAGNESIUM BICARBONATE LOSES CARBON DIOXIDE & WATER & MAGNESIUM CARBONATE PPT. ... GENERALLY YIELDS LIGHT CARBONATE.

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

HEAVY CARBONATE ... PRODUCED BY PRECIPITATING HOT, CONCENTRATED SOLN OF MAGNESIUM CHLORIDE OR SULFATE WITH SOLN OF SODIUM CARBONATE.

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

Reaction of a soluble magnesium salt solution with sodium carbonate or bicarbonate.

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

10.3Formulations/Preparations

GRADES: TECHNICAL, NF; FCC

Lewis, R.J., Sr (Ed.). Hawley's Condensed Chemical Dictionary. 13th ed. New York, NY: John Wiley & Sons, Inc. 1997., p. 690

MEDICINAL MAGNESIUM CARBONATE IS AVAILABLE IN LIGHT & HEAVY FORMS; THE LIGHT, WHICH IS 2 TO 2 1/2 TIMES AS BULKY AS THE HEAVY, IS MOST COMMONLY USED.

Osol, A. and J.E. Hoover, et al. (eds.). Remington's Pharmaceutical Sciences. 15th ed. Easton, Pennsylvania: Mack Publishing Co., 1975., p. 735

USP, reagent, technical, dense and light powder grades; ceramic grade; FCC grade; USP/NF grade in light and heavy powder

Kuney, J.H., J.M. Mullican (eds.). Chemcyclopedia. Washington, DC: American Chemical Society, 1994., p. 180

Powder containing 90% magnesium carbonate and 10% starch

Kuney, J.H., J.M. Mullican (eds.). Chemcyclopedia. Washington, DC: American Chemical Society, 1994., p. 284

10.4U.S. Production

(1972) 4.6X10+9 G (SHIPPED & USED)

SRI

(1974) 5.4X10+9 G (SHIPPED AND USED)

SRI

10.5U.S. Imports

(1972) 1.26X10+8 G

SRI

(1974) 1.24X10+8 G

SRI

10.6General Manufacturing Information

SRP: Magnesium carbonate hydroxide is a mixture of magnesium hydroxide and magnesium carbonate, commonly used as an antacid. It is not a specific chemical compound.

Acts as desiccant dust for stored-product insects.

Farm Chemicals Handbook 2001. Willoughby, Ohio: Meister 2001., p. C 244

... SOURCE OF OTHER MAGNESIUM COMPOUNDS, BECAUSE OF ITS READY LIBERATION OF CARBON DIOXIDE, FORMING MAGNESIUM OXIDE, WHICH AS NOTED IS USED IN REFRACTORIES. AMONG ITS SEVERAL OTHER USES SIMILAR TO THOSE OF MAGNESIUM OXIDE, IT WAS USED TO MAKE FREE-RUNNING TABLE SALT, NOW REPLACED BY SODIUM SILICOALUMINATE.

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. 1744

Antacids are inorganic salts that dissolve in acid gastric secretions releasing anions that partially neutralize gastric hydrochloric acid. ... Magnesium carbonate contains the equivalent of 40-43.5% magnesium oxide.

McEvoy, G.K. (ed.). American Hospital Formulary Service- Drug Information 2002. Bethesda, MD: American Society of Health-System Pharmacists, Inc. 2002 (Plus Supplements)., p. 27745

11Safety and Hazards

11.1Hazards Identification

11.1.1GHS Classification

GHS Hazard Statements	Not Classified Reported as not meeting GHS hazard criteria by 970 of 1003 companies (only ~ 3.3% companies provided GHS information). For more detailed information, please visit ECHA C&L website.

11.1.2EPA Safer Chemical

Chemical: Magnesium carbonate

Green circle - The chemical has been verified to be of low concern based on experimental and modeled data.

11.1.3Fire Hazards

Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.

11.2Safety and Hazard Properties

11.2.1OSHA Standards

Permissable Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 15 mg/cu m (total dust).

29 CFR 1910.1000; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

Permissable Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 5 mg/cu m (respirable fraction).

29 CFR 1910.1000; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

11.2.2NIOSH Recommendations

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 10 mg/cu m (total particulate).

NIOSH. NIOSH Pocket Guide to Chemical Hazards & Other Databases. U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control & Prevention. DHHS (NIOSH) Publication No. 2001-145 (CD-ROM) August 2001.

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 5 mg/cu m (respirable fraction).

NIOSH. NIOSH Pocket Guide to Chemical Hazards & Other Databases. U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control & Prevention. DHHS (NIOSH) Publication No. 2001-145 (CD-ROM) August 2001.

11.3First Aid Measures

11.3.1Inhalation First Aid

Fresh air, rest.

11.3.2Skin First Aid

Rinse skin with plenty of water or shower.

11.3.3Eye First Aid

Rinse with plenty of water (remove contact lenses if easily possible).

11.3.4Ingestion First Aid

Rinse mouth.

11.4Fire Fighting

In case of fire in the surroundings: all extinguishing agents allowed.

11.5Accidental Release Measures

11.5.1Spillage Disposal

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting.

11.5.2Disposal Methods

SRP: At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices.

11.5.3Preventive 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.

11.6Handling and Storage

11.6.1Safe Storage

Separated from acids.

11.7Exposure Control and Personal Protection

11.7.1Threshold Limit Values (TLV)

Substances whose adopted documentation and TLV's were withdrawn. Substance: Magnesite (74-82-8); Year Withdrawn: 2006; Reason: Insufficient data.

American Conference of Governmental Industrial Hygienists TLVs and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati, OH, 2008, p. 93

11.7.2Inhalation Risk

A nuisance-causing concentration of airborne particles can be reached quickly when dispersed.

11.7.3Effects of Long Term Exposure

Lungs may be affected by repeated or prolongated exposure to dust particles.

11.7.4Allowable Tolerances

Residues of magnesium carbonate are exempted from the requirement of a tolerance when used as an anticaking agent or conditioning agent in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest.

40 CFR 180.1001(c); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

Magnesium carbonate is exempted from the requirement of a tolerance when used as a solid diluent or carrier in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

40 CFR 180.1001(e); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

11.7.5Inhalation Prevention

Avoid inhalation of fine dust and mist. Use local exhaust or breathing protection.

11.7.6Skin Prevention

Protective gloves.

11.7.7Eye Prevention

Wear safety spectacles.

11.7.8Ingestion Prevention

Do not eat, drink, or smoke during work.

11.8Stability and Reactivity

11.8.1Hazardous Reactivities and Incompatibilities

Acids, formaldehyde.

NIOSH. NIOSH Pocket Guide to Chemical Hazards & Other Databases. U.S. Department of Health & Human Services, Public Health Service, Center for Disease Control & Prevention. DHHS (NIOSH) Publication No. 2001-145 (CD-ROM) August 2001.

11.9Regulatory Information

11.9.1FIFRA Requirements

Residues of magnesium carbonate are exempted from the requirement of a tolerance when used as an anticaking agent or conditioning agent in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest.

40 CFR 180.1001(c); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

Magnesium carbonate is exempted from the requirement of a tolerance when used as a solid diluent or carrier in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

40 CFR 180.1001(e); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

11.9.2FDA Requirements

Substance added directly to human food affirmed as generally recognized as safe (GRAS).

21 CFR 184.1425; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

Magnesium carbonate used as a general purpose food additive in animal drugs, feeds, and related products is generally recognized as safe when used in accordance with good manufacturing or feeding practice.

21 CFR 582.1425; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of October 22, 2002: https://www.ecfr.gov

The Approved Drug Products with Therapeutic Equivalence Evaluations List identifies currently marketed prescription drug products, incl magnesium carbonate, approved on the basis of safety and effectiveness by FDA under sections 505 of the Federal Food, Drug, and Cosmetic Act.

DHHS/FDA; Electronic Orange Book-Approved Drug Products with Therapeutic Equivalence Evaluations. Available from, as of April 16, 2003: https://www.fda.gov/cder/ob/

Antacid products for over-the-counter (OTC) human use. Magnesium carbonate /is included in/ this list of specific active ingredients.

21 CFR 331.11; U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of April 16, 2003: https://www.ecfr.gov

12Toxicity

12.1Toxicological Information

12.1.1Toxicity Summary

During overdose, magnesium impairs neuromuscular transmission resulting in weakness and hypoflexia.

12.1.2Exposure Routes

The substance can be absorbed into the body by inhalation.

12.1.3Inhalation Symptoms

Cough.

12.1.4Interactions

This study investigated the in vitro adsorption of halofantrine (Hf) by some antacids. Magnesium carbonate showed the highest adsorptive effect, the extent of adsorption being up to 83%. Only 4% of Hf adsorbed by the antacid could be eluted with 0.1 M HCl while no detectable elution occurred with water. Other antacids investigated were magnesium trisilicate and aluminium hydroxide and these had Hf-adsorption capacities of 23 and 43%, respectively. The effect of magnesium carbonate on the bioavailability of Hf was evaluated in seven healthy volunteers. The subjects were administered with 500 mg oral dose of Hf-HCl or the same dose of the drug in combination with 1 g of magnesium carbonate, in a crossover fashion. Blood samples were collected at predetermined time intervals and were analysed for Hf and its major metabolite, desbutylhalofantrine (Hfm), using high-performance liquid chromatography method. The results showed that magnesium carbonate significantly prolonged ($P<0.05$) the time to reach maximum plasma concentration (Tmax) of Hf. Also the maximum plasma concentrations (Cmax) of Hf and Hfm were significantly reduced ($P<0.05$). Furthermore, there was a reduction in the area under the curve (AUC) values of Hf and this was as high as 56% (range 1-56%). Results of this study suggest that it may not be advisable to concomitantly administer Hf with an antacid like magnesium carbonate.

PMID:9885302
Aideloje SO, et al; Eur J Pharm Biopharm 46 (3): 299-303 (1998)

The use of calcium carbonate ($CaCO_3$) to bind phosphorus (P) in chronic hemodialysis patients has been a popular tactic in the past decade. Nonetheless, problems with hypercalcemia decrease its usefulness, particularly in patients treated with calcitriol. A P binder not containing calcium (Ca) would be of value in these circumstances. In short-term studies, ...magnesium carbonate ($MgCO_3$) was well-tolerated and controlled P and Mg levels when given in conjunction with a dialysate Mg of 0.6 mg/dl. ...A prospective, randomized, crossover study /was performed/ to evaluate if the chronic use of $MgCO_3$ would allow a reduction in the dose of $CaCO_3$ and yet achieve acceptable levels of Ca, P, and Mg. We also assessed whether the lower dose of $CaCO_3$ would facilitate the use of larger doses of calcitriol. The two phases were $MgCO_3$ plus half the usual dose of $CaCO_3$ and $CaCO_3$ alone given in the usual dose. It was found that $MgCO_3$ (dose, 465 +/- 52 mg/day elemental Mg) allowed a decrease in the amount of elemental Ca ingested from 2.9 +/- 0.4 to 1.2 +/- 0.2 g/day ($P<0.0001$). The Ca, P, Mg levels were the same in the two phases. The maximum dose of iv calcitriol without causing hypercalcemia was 1.5 +/- 0.3 ug/treatment during the $MgCO_3$ phase and 0.8 +/- ug/treatment during the Ca phase ($P<0.02$). If these studies are confirmed, the use of $MgCO_3$ and a dialysate Mg of 0.6 mg/dl may be considered in selected patients who develop hypercalcemia during treatment with iv calcitriol and $CaCO_3$.

PMID:8770963
Delmez JA, et al; Kidney Int 49 (1): 163-167 (1996)

Effect of magnesium on iron and magnesium metabolism in rats was investigated. 96 male Wistar rats were divided into four groups received 2.5; 5.0 and 10.0 mg magnesium daily per kg of body weight--dissolved in 2%--solution of arabic gum (tests groups) or clear 2%--solution of arabic gum (test group) for 4 weeks and the next 4 weeks without supplements. Iron concentrations increased in the brain and kidney of the experimental rats, but decreased in the spleen, intestine and liver (2 and 4 weeks only) also in the heart and femur (only 8 wk). Percentage of iron retention decreased during the whole experiment. Magnesium concentrations increased in the spleen, liver and intestine of rats. It was shown that at 8 weeks of experiment the magnesium level of heart and femur decreased (only groups received 2.5 mg and 5.0 mg Mg/kg bw/24 hr), but in group received 10.0 mg Mg/kg bw/24 hr increased for all experiment. The apparent retention of magnesium increased in start of the experiment. This results show that oral magnesium supplementation disturbs metabolism of these elements, especially balance of iron.

PMID:11286091
Skrajnowska D, Oledzka R; Rocz Panstw Zakl Hig 51 (4): 403-15 (2000)

12.1.5Antidote and Emergency Treatment

Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious or in severe respiratory distress. Positive pressure ventilation techniques with a bag valve mask device may be beneficial. Monitor cardiac rhythm and treat arrhythmias if necessary ... . Start an IV with D5W /SRP: "To keep open", minimal flow rate/. Use lactated Ringer's if signs of hypovolemia are present. Watch for signs of fluid overload. Consider drug therapy for pulmonary edema ... . For hypotension with signs of hypovolemia, administer fluid cautiously. Consider vasopressors for hypotension with a normal fluid volume. Watch for signs of fluid overload ... . Use proparacaine hydrochloride to assist eye irrigation ... . /Magnesium and Related Compounds/

Bronstein, A.C., P.L. Currance; Emergency Care for Hazardous Materials Exposure. 2nd ed. St. Louis, MO. Mosby Lifeline. 1994., p. 363

Basic treatment: Establish a patent airway. 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 pulmonary edema and treat if necessary ... . Monitor for shock and treat if necessary ... . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool ... . /Magnesium and Related Compounds/

Bronstein, A.C., P.L. Currance; Emergency Care for Hazardous Materials Exposure. 2nd ed. St. Louis, MO. Mosby Lifeline. 1994., p. 362-3

12.1.6Non-Human Toxicity Excerpts

/LABORATORY ANIMALS: Acute Exposure/ The effects of magnesium carbonate (MgCarb) on carcinogenesis and natural killer (NK) cell modulation by nickel subsulfide (Ni_3S_2) were studied. Male Fischer F344/NCr rats, 50-90 g body wt, 20 rats/group, received single im injections into both thigh muscles of 2.5 mg Ni_3S_2 alone or combined with different proportions of MgCarb; the Mg/Ni molar ratio ranged from 0.25 to 4.0. Control rats received im injections of normal saline or magnesium acetate (MgAcet), or sc MgCarb at a site distant from Ni_3S_2. The animals were observed over 79 weeks for the development of tumors. The NK cell activity was determined over the first 3 weeks of the experiment in separate groups of rats treated as above, with the use of the 51Cr/YAC-1 release assay for blood and spleen cells and the peroxidase localization of Ox-8-immunoreactive lymphocytes at the injection site. Im administration of MgCarb mixed with Ni_3S_2 up to the Mg/Ni molar ratio of 1.0 inhibited the carcinogenicity of Ni_3S_2 in a dose-related manner; final incidence of sarcomas decreased from 100 to 55% and the appearance of first tumors was delayed from 25 to 39 weeks. Higher doses of MgCarb did not exert further effect. Distant sc injection of MgCarb or local im

application of MgAcet did not change the carcinogenic potency of im Ni3S2. MgCarb or saline alone did not produce any tumors. Im Ni3S2 had no significant influence on the activity of NK cells in blood and spleen, while im MgCarb alone did not affect the NK activity in blood but doubled it transiently in the spleen 24 hr after injection. In the injected muscle, Ox-8-positive cells became abundant around MgCarb but could not be found close to Ni3S2. This inhibitory effect of Ni3S2 was partially reversed by MgCarb. Also, numerous multinucleated giant cells infiltrated the sites of injection of MgCarb alone and MgCarb + Ni3S2 but not Ni3S2 alone. The results indicate a dose-dependent and strictly local character of the inhibition by MgCarb of Ni3S2 carcinogenesis, as well as a possible involvement of NK and phagocytic cells in this inhibition.

PMID:3594718
Kasprzak KS, et al; Carcinogenesis 8 (7): 1005-1011 (1987)

/LABORATORY ANIMALS: Acute Exposure/ Two reagent and two feed grade magnesium oxides and reagent grade magnesium carbonate, sodium bicarbonate, and calcium carbonate were evaluated to ascertain their ability to neutralize acid in the rumen. Rumen fluid pH was increased in vitro, compared to the control, by antacid compounds, and their increased ranked: calcium carbonate

PMID:6286737
Schaefer DM, et al; J Dairy Sci 65 (5): 732-739 (1982)

/LABORATORY ANIMALS: Chronic Exposure or Carcinogenicity/ Animal experiments with magnesium carbonate dust produce a slight fibrosis. After prolonged exposure to high concentrations, pulmonary deposition and retention of magnesium carbonate occurred.

American Conference of Governmental Industrial Hygienists. Documentation of Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 2001. Cincinnati, OH. 2001., p. 1

12.1.7Protein Binding

30% of magnesium is bound to proteins.

12.2Ecological Information

12.2.1Natural Pollution Sources

MAGNESIUM CARBONATE OCCURS NATURALLY AS MAGNESITE, AND HAS 3 NATURALLY OCCURING HYDRATES; BARRINGTONITE, NESQUEHONITE, AND LANSFORDITE.

Kirk-Othmer Encyclopedia of Chemical Technology. 3rd ed., Volumes 1-26. New York, NY: John Wiley and Sons, 1978-1984., p. V14 619

Magnesium is approx 2% of the earth's crust, eighth in elemental abundance, and widely distributed in the environment as a variety of compounds(1,2). Its concn is 1.8% and 1.6% in igneous and sedimentary rocks, respectively(2). In igneous rocks, magnesium is typically a constituent of the dark-colored ferromagnesium minerals (e.g., olivine, pyroxenes, amphiboles, and dark-colored micas), along with other less common minerals(2). In metamorphic rocks, magnesium minerals such as chlorite, montmorillonite, and serpentine occur(2). Sedimentary rocks of magnesium include carbonates (e.g., magnesite and hydromagnesite), hydroxides (e.g., brucite), and mixtures of magnesium and calcium carbonate (e.g., dolimite)(2). Magnesium is also found in silicate minerals (e.g., olivine, serpentine, and asbestos)(1). Rocks and minerals contain a higher percentage of magnesium than do soils as a result of the loss of magnesium due to weathering(1). Magnesium chloride, with makes up 17% of sea salt(1) is released to the atmosphere as sea spray(SRC).

(1) Aikawa JK; pp. 1025-1034 in Metals and Their Compounds in the Environment. Merian E, ed. Weinheim, Germany: VCH (1991) (2) Bodek I et al, eds; Environmental Inorganic Chemistry. Elmsford, NY: Pergamon Press pp. 6.5-1 to 6.5-10 (1988)

12.2.2Artificial Pollution Sources

The production and use of magnesium compounds as refractories, as chemical intermediates, and in construction materials(1,2) result in their release to the environment through various waste streams(SRC). The production and use of magnesium compounds in environmental applications and in agriculture(1,2) results in their direct release to the environment(SRC). About 69% of the magnesium compounds used in the United States were used for refractories (e.g., olivine)(1). The remaining 31% of magnesium compounds were used in agriculture as fertilizer or animal feed (e.g, magnesium oxide, magnesium sulfate), as chemical intermediates (e.g., magnesium chloride, magnesium hydroxide, magnesium carbonate, magnesium oxide) , construction materials (e.g., magnesium oxide), environmental (e.g., magnesium oxide, magnesium hydroxide), and industrial applications (e.g., magnesium oxide)(1,2). Other uses include road dust and ice control (e.g., magnesium chloride), pulp and paper applications (e.g.,magnesium sulfate), pharmaceuticals (e.g., magnesium sulfate, magnesium carbonate, magnesium oxide), and cosmetics (e.g., magnesium carbonate)(1,2).

(1) Kramer DA; USGS Minerals Yearbook for Magnesium Compounds (2001). Available from https://minerals.usgs.gov/minerals/pubs/commodity/magnesium/401302.pdf as of Oct 21, 2002. (2) Kramer DA; USGS Mineral Commodity Summary for Magnesium Compounds (2002). Available from https://minerals.usgs.gov/minerals/pubs/commodity/magnesium/401302.pdf as of Oct 21, 2002.

12.2.3Environmental Fate

AQUATIC FATE: Natural water systems acquire magnesium through weathering reactions, which involve the interaction of water and atmosphere with the earth's crust and subsequent leaching of magnesium compounds into water. The Mg2+ ion is the predominant form of dissolved magnesium. However, some magnesium complexes do form. The magnesium sulfate ion pair complex ($MgSO_4$) is the most significant complex present, representing 2.6% and 11% of the total magnesium content in fresh and sea water, respectively. The concentrations of bicarbonate and carbonate complexes are significant but considerably less than sulfate complexes. Incorporation of magnesium compounds into sediment is an important removal process. For example, a small amount of magnesium is ion exchanged for calcium on clay minerals in ocean sediment. Also small amounts of magnesium carbonate (about 6% of the magnesium supplied by rivers) are deposited with calcite ($CaCO_3$) in seawater. There is significant uptake of magnesium (about 24% of the river input of magnesium) by sediment in which sulfate reduction is taking place(1). The avg Kd value for magnesium sorption on Po River sediments is 1.3 cu m/kg, which suggests that magnesium ions are weakly sorbed on sediments(2). High-temperature alteration of basalts at hydrothermal vents apparently constitute the most important sink for magnesium in seawater(1).

(1) Bodek I et al, eds; Environmental Inorganic Chemistry. Elmsford, NY: Pergamon Press pp. 6.5-1 to 6.5-10 (1988) (2) Pettine M et al; Sci Tot Environ 145: 243-265 (1994)

13Literature

13.1NLM Curated PubMed Citations

13.2Springer Nature References

13.3Depositor Provided PubMed Citations

13.4General References

1. de Baaij JH: The art of magnesium transport. Magnes Res. 2015 Jul-Sep;28(3):85-91. doi: 10.1684/mrh.2015.0388. [PMID:26446763]
2. Jahnen-Dechent W, Ketteler M: Magnesium basics. Clin Kidney J. 2012 Feb;5(Suppl 1):i3-i14. doi: 10.1093/ndtplus/sfr163. [PMID:26069819]
3. Nikolaev MV, Magazanik LG, Tikhonov DB: Influence of external magnesium ions on the NMDA receptor channel block by different types of organic cations. Neuropharmacology. 2012 Apr;62(5-6):2078-85. doi: 10.1016/j.neuropharm.2011.12.029. Epub 2012 Jan 12. [PMID:22261381]
4. CDC NIOSH: MgCO3
5. Toxnet

13.5Chemical Co-Occurrences in Literature

13.6Chemical-Gene Co-Occurrences in Literature

13.7Chemical-Disease Co-Occurrences in Literature

14Patents

14.1Depositor-Supplied Patent Identifiers

Link to all deposited patent identifiers

14.2WIPO PATENTSCOPE

Patents are available for this chemical structure:

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

15Interactions and Pathways

15.1Chemical-Target Interactions

15.2Drug-Drug Interactions

16Classification

16.1MeSH Tree

16.2ChEBI Ontology

16.3KEGG: Animal Drugs

16.4WHO ATC Classification System

16.5EPA Safer Choice

16.6ChemIDplus

16.7CAMEO Chemicals

16.8UN GHS Classification

16.9EPA CPDat Classification

16.10NORMAN Suspect List Exchange Classification

16.11EPA DSSTox Classification

16.12Consumer Product Information Database Classification

16.13FDA Drug Type and Pharmacologic Classification

16.14EPA Substance Registry Services Tree

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