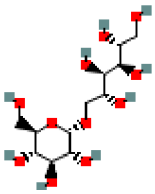
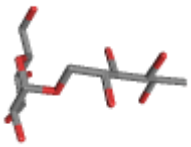
PubChem

COMPOUND SUMMARY

Isomalt

PubChem CID:	88735
Structure:	 2D  3D Find Similar Structures
Molecular Formula:	6-O⁻α-D-Glucopyranosyl-D-sorbitol: $C_{12}H_{24}O_{11}$; 1-O⁻α-D-Glucopyranosyl-D-mannitol dihydrate: $C_{12}H_{24}O_{11}.2H_2O$ or $C_{12}H_{24}O_{11}$
Synonyms:	Isomalt Palatinit 20942-99-8 1-O-alpha-D-Glucopyranosyl-D-mannitol D-Mannitol, 1-O-alpha-D-glucopyranosyl- More...
Molecular Weight:	344.31 g/mol
Dates:	Modify: 2020-08-15 Create: 2005-08-08

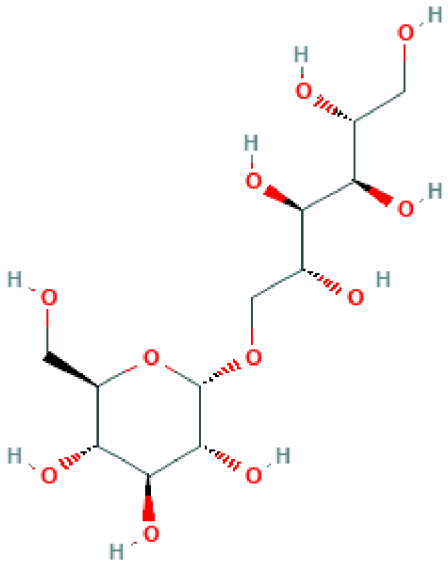
Isomalt is a glycosyl alditol consisting of alpha-D-glucopyranose and D-mannitol residues joined in sequence by a (1->1) glycosidic bond. It has a role as a sweetening agent. It derives from an alpha-D-glucose and a D-mannitol.

▸ ChEBI

1 Structures

1.1 2D Structure

Chemical Structure Depiction



PubChem

1.2 3D Conformer

PubChem

2 Biologic Description

GlyGen URL	https://glygen.org/glycan/G41158BG

▶ GlyGen

3 Names and Identifiers

3.1 Computed Descriptors

3.1.1 IUPAC Name

(2*R*,3*R*,4*R*,5*R*)-6-[(2*S*,3*R*,4*S*,5*S*,6*R*)-3,4,5-trihydroxy-6-(hydroxymethyl)oxan-2-yl]oxyhexane-1,2,3,4,5-pentol

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

PubChem

3.1.2 InChI

InChI=1S/C12H24O11/c13-1-4(15)7(17)8(18)5(16)3-22-12-11(21)10(20)9(19)6(2-14)23-12/h4-21H,1-3H2/t4-,5-,6-,7-,8-,9-,10+,11-,12+/m1/s1

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

PubChem

3.1.3 InChI Key

SERLAGPUMNYUCK-DCUALPFSSA-N

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

PubChem

3.1.4 Canonical SMILES

C(C1C(C(C(C(O1)OCC(C(C(C(CO)O)O)O)O)O)O)O)O

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

PubChem

3.1.5 Isomeric SMILES

C([C@@H]1[C@H]([C@@H]([C@H]([C@H](O1)OC[C@H]([C@H]([C@@H]([C@@H](CO)O)O)O)O)O)O)O)O

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

PubChem

3.2 Molecular Formula

6-O-α-D-Glucopyranosyl-D-sorbitol: C12H24O11; 1-O-α-D-Glucopyranosyl-D-mannitol dihydrate: C12H24O11.2H2O

EU Food Improvement Agents

$C_{12}H_{24}O_{11}$

Computed by PubChem 2.1 (PubChem release 2019.06.18)

PubChem

3.3 Other Identifiers

3.3.1 CAS

20942-99-8

- ChemIDplus; EPA Chemicals under the TSCA; EPA DSSTox; European Chemicals Agency (ECHA)

64519-82-0

- ChemIDplus; European Chemicals Agency (ECHA); Hazardous Substances Data Bank (HSDB)

3.3.2 Deprecated CAS

124569-57-9, 177766-79-9

- ChemIDplus

746666-13-7, 852954-37-1, 874794-40-8, 124569-59-1

- ChemIDplus

3.3.3 European Community (EC) Number

244-122-4

- European Chemicals Agency (ECHA)

613-617-0

- European Chemicals Agency (ECHA)

3.3.4 UNII

G97P6S66E9

- FDA/SPL Indexing Data

3.3.5 DSSTox Substance ID

DTXSID60872321

- EPA DSSTox

3.3.6 Wikipedia

Isomalt

- Wikipedia

3.3.7 GlyTouCan Accession

G41158BG

- GlyTouCan Project

3.4 Synonyms

3.4.1 MeSH Entry Terms

D-Glucitol, 6-O-alpha-D-glucopyranosyl-, mixt. with 1-O-alpha-D-glucopyranosyl-D-mannitol
D-Glucitol, 6-O-alpha-D-glucopyranosyl-, mixture with 1-O-alpha-D-glucopyranosyl-D-mannitol
isomalt
Palatinit

MeSH

3.4.2 Depositor-Supplied Synonyms

Isomalt	1-O-beta-D-glucopyranosyl-D-mannitol
Palatinit	HSDB 7969
20942-99-8	6-O-alpha-D-Glucopyranosyl-D-glucitol mixed with 1-O-alpha-D-glucopyranosyl-D-mannitc
1-O-alpha-D-Glucopyranosyl-D-mannitol	DSSTox_CID_753
D-Mannitol, 1-O-alpha-D-glucopyranosyl-	D-Mannitol, 1-O-.alpha.-D-glucopyranosyl-
UNII-G97P6S66E9	DSSTox_RID_75770
64519-82-0	DSSTox_GSID_20753
G97P6S66E9	SCHEMBL154031
CCRIS 3698	CHEMBL3187473
Isomaltidex	DTXSID60872321
GalenIQ 980	CHEBI:150326
a-D-Glcp-1,1-D-Mannitol	D-Glucitol, 6-O-alpha-D-glucopyranosyl-, mixed with 1-O-alpha-D-glucopyranosyl-D-manni
1-o-d-glucopyranosyl-d-mannitol	D-Glucitol, 6-O-alpha-D-glucopyranosyl-, mixt. with 1-O-alpha-D-glucopyranosyl-D-mannit

PubChem

4 Chemical and Physical Properties

4.1 Computed Properties

Property Name	Property Value	Reference
Molecular Weight	344.31 g/mol	Computed by PubChem 2.1 (PubChem release 2019.06.18)
XLogP3-AA	-5.2	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	9	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	11	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	8	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	344.131862 g/mol	Computed by PubChem 2.1 (PubChem release 2019.06.18)
Monoisotopic Mass	344.131862 g/mol	Computed by PubChem 2.1 (PubChem release 2019.06.18)
Topological Polar Surface Area	201 Å^2	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	23	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	343	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	9	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	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2019.01.04)

PubChem

4.2 Experimental Properties

4.2.1 Physical Description

Odourless, white, slightly hygroscopic, crystalline mass.

EU Food Improvement Agents

4.2.2 Taste

Pure sweet taste (sweetening power =0.45 relative to sucrose in about a 10% solution)

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

Hazardous Substances Data Bank (HSDB)

4.2.3 Solubility

Soluble in water, very slightly soluble in ethanol.

EU Food Improvement Agents

In water, 1X10+6 mg/L /miscible/ at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2010. Available from, as of Jul 28, 2011: ***http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm***

▶ Hazardous Substances Data Bank (HSDB)

4.2.4 Vapor Pressure

3.16X10-17 mm Hg at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2010. Available from, as of Jul 28, 2011: ***http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm***

▶ Hazardous Substances Data Bank (HSDB)

4.2.5 LogP

log Kow = -5.88 (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2010. Available from, as of Jul 28, 2011: ***http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm***

▶ Hazardous Substances Data Bank (HSDB)

4.2.6 Stability/Shelf Life

Isomalt has very good thermal and chemical stability. When it is melted, no changes in the molecular structure are observed.

Rowe, R.C., Sheskey, P.J., Quinn, M.E.; (Eds.), Handbook of Pharmaceutical Excipients 6th edition Pharmaceutical Press, London, England 2009, p. 344

▶ Hazardous Substances Data Bank (HSDB)

4.2.7 Optical Rotation

Specific rotation: +89.8 deg to +92.2 deg

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

▶ Hazardous Substances Data Bank (HSDB)

4.2.8 Decomposition

/Isomalt/ exhibits considerable resistance to acids and microbial influences. ... Isomalt does not undrego browning reactions; it has no reducing groups, and therefore it does not react with other ingredients in a formulation.

Rowe, R.C., Sheskey, P.J., Quinn, M.E.; (Eds.), Handbook of Pharmaceutical Excipients 6th edition Pharmaceutical Press, London, England 2009, p. 344

▶ Hazardous Substances Data Bank (HSDB)

4.2.9 Viscosity

In the melt, has a lower viscosity, higher specific heat capacity, and higher boiling-point elevation than sucrose

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

▶ Hazardous Substances Data Bank (HSDB)

4.2.10 Other Experimental Properties

Water content <7% ... has a lower viscosity, higher specific heat capacity, and higher boiling-point elevation than sucrose ... The components are hydrolyzed to give 1 mol each of glucose and sorbitol or mannitol

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

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

Enthalpy of Solution: 14.6 kJ/mol

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

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

Henry's Law constant = 4.2X10-21 atm-cu m/mol at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2010. Available from, as of Jul 28, 2011: ***http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm***

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

Hydroxyl radical reaction rate constant = 1.14X10-11 cu cm/molec-sec at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2010. Available from, as of Jul 28, 2011: ***http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm***

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

5 Related Records

5.1 Related Compounds with Annotation

PubChem

5.2 Related Compounds

Same Connectivity	73 Records
Same Parent, Connectivity	79 Records
Same Parent, Exact	2 Records
Mixtures, Components, and Neutralized Forms	5 Records
Similar Compounds	6,019 Records
Similar Conformers	21 Records

PubChem

5.3 Substances

5.3.1 Related Substances

All	93 Records
Same	48 Records
Mixture	45 Records

PubChem

5.3.2 Substances by Category

PubChem

5.4 Entrez Crosslinks

PubMed	34 Records

PubChem

6 Chemical Vendors

- PubChem

7 Drug and Medication Information

7.1 Therapeutic Uses

Disaccharides; Sugar Alcohols; Sweetening Agents; Cariogenic Agents

National Library of Medicine's Medical Subject Headings online file (MeSH, 2009)

▶ Hazardous Substances Data Bank (HSDB)

By means of programmed feeding experiments on rats, the caries-producing properties of a new sugar substitute Palatinit were compared with those of other carbohydrates. The cariogenicity of Palatinit was significantly lower than that of **sucrose** and **lactose** and roughly comparable to that of **L-sorbose**. Reference strains of Streptococcus mutans are unable to produce extra-cellular polysaccharide or notable amounts of acid from Palatinit. The use of this substance as sugar substitute can be recommended for caries prophylaxis on the basis of these experiments.

PMID:274266

Karle EJ, Gehring E; Dtsch Zahnarztl Z 33 (3): 189-91 (1978)

▶ Hazardous Substances Data Bank (HSDB)

7.2 Drug Idiosyncrasies

Measurement of expired air **carbon monoxide** expired is an essential examination to be conducted in smokers during consultation. However, this can be the source of errors, such as that identified in the case report we present here. A 65 year-old man, wishing to stop smoking, consumed a large quantity of polyol-rich sweets and exhibited increased expired air **carbon monoxide** levels, intestinal gases and increased volume of his liver. All these signs regressed when he stopped taking the sweets. The production of intestinal gases related to polyol and isomalt contained in some products may be the cause of error in the measurement of expired air **carbon monoxide**.

PMID:12402755

Lagrue G et al; Presse Med 31 (32): 1502-3 (2002)

▶ Hazardous Substances Data Bank (HSDB)

8 Food Additives and Ingredients

8.1 Food Additive Classes

JECFA Functional Classes

Food Additives -> ANTICAKING_AGENT; BULKING_AGENT; GLAZING_AGENT; SWEETENER

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

8.2 Food Additive Definition

EU Food Additive Definition

Manufactured by enzymatic conversion of **sucrose** with nonviable cells ofProtaminobacter rubrumfollowed by catalytic hydrogenation

- EU Food Improvement Agents

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

Chemical Name	HYDROGENATED ISOMALTULOSE
Evaluation Year	1985
ADI	NOT SPECIFIED
Report	TRS 733-JECFA 29/34

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

9 Pharmacology and Biochemistry

9.1 MeSH Pharmacological Classification

Cariogenic Agents

Substances that promote DENTAL CARIES. (See **all compounds classified as Cariogenic Agents**.)

▶ MeSH

9.2 Absorption, Distribution and Excretion

The in vivo metabolism of isomalt in the large intestine was simulated in an in vitro fermentation study to investigate its degradation using chyme from pigs as a basic substrate additionally inoculated with feces. In the first week, the fermentation of isomalt (3.65%) by non-adapted microflora was investigated. In the second week, isomalt fermentation by adapted microflora taken from pigs fed a basic diet supplemented with isomalt was studied. In the third week, both /non-adapted and adapted/ flora were studied in fermentation experiments with a high concentration of isomalt (7.30%). Isomalt was degraded to **lactic acid**, volatile fatty acids, and gases (CO2, CH4, and **hydrogen**). ...

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

Fistulated and normal pigs were fed 10% **sucrose** between meals, 5 or 10% isomalt between meals, or 10% isomalt with meals. The passage and absorption rate of these substances were determined at the terminal ileum (10 pigs per treatment) or over the whole distance of the digestive tract (4 pigs per treatment). Ten percent **sucrose** was completely digested and absorbed in the small intestine. In the 3 isomalt treatments, 61-64% of the ingested compound passed the terminal ileum in the form of intact isomalt plus free **sorbitol**, free **mannitol**, and free **glucose**. None of these sugars were excreted in the feces, indicating that isomalt and its constituents passing the terminal ileum are completely broken down in the large intestine.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

Renal clearance studies were conducted in adult female rats (250 g b.w.) infused with 1.8 g isomalt, alpha-O-D-glucopyranosyl-1,6-D-sorbitol, or alpha-O-D-glucopyranosyl-1,6-D-mannitol over a period of 3 hours. Maximum plasma concentrations of 25 mM were obtained. These compounds were readily cleared and urinary concentrations of up to 100 mg/mL were recorded, which compares with a maximum urinary concentration of 0.6 mg/mL in rats receiving 5 g isomalt per day orally. After the infusion of either isomalt or alpha-O-D-glucopyranosyl-1,6-D-sorbitol, free **sorbitol** was not detected in blood or urine, and blood **glucose** concentrations were unchanged, demonstrating the metabolic inertness of these disaccharide alcohols. From the infusion and excretion rates and the plasma concentrations that were observed, the authors concluded that alpha-O-D-glucopyranosyl-1,6-D-sorbitol is distributed in extracellular **water**, but does not reach the intracellular compartments.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

When isomalt was fed to rats for several weeks it was observed that fecal excretion declined steadily, while the cecum enlarged. The authors concluded that this resulted from adaptation and metabolism by the gut microflora. Similarly, during a 17-day feeding period in which 6 female rats received 3.5 g isomalt daily, the fecal content fell from 25% of the dose at the beginning to 1% at the end.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

For more Absorption, Distribution and Excretion (Complete) data for Isomalt (9 total), please visit the **HSDB record page**.

Hazardous Substances Data Bank (HSDB)

9.3 Metabolism/Metabolites

Rat intestinal maltase was shown to be active against isomalt, alpha-O-D-glucopyranosyl-1,6-D-sorbitol, and alpha-O-D-glucopyranosyl-1,6-D-mannitol, but the rates of hydrolysis were slow. The ratio of the rates of hydrolysis of **sucrose**, **isomaltulose**, and isomalt by rat intestinal alpha-glucosidases was 100:30:12. Similarly, **sucrose** was hydrolysed about 20 times faster than alpha-O-D-glucopyranosyl-1,6-D-sorbitol or alpha-O-D-glucopyranosyl-1,6-D-mannitol by disaccharidases from the small intestine of the pig, and the relative rates of hydrolysis of **maltose**, **sucrose**, **isomaltulose** and isomalt by human intestinal alpha-glucosidases were 100:25:11:2.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

Hazardous Substances Data Bank (HSDB)

The fate of isomalt in the gastrointestinal tract of female rats that had been adapted to the compound was investigated by increasing its dietary concentration from 10% to 34.5% over a period of 3-4 weeks. After administration of 1.7 g isomalt in 5 g feed, the contents of the stomach, small intestine, cecum, and large intestine were examined at intervals up to 6 hr. From the content of alpha-O-D-glucopyranosyl-1,6-D-sorbitol, alpha-O-D-glucopyranosyl-1,6-D-mannitol, **sorbitol**, **mannitol**, and **sucrose** found in these organs, the authors concluded that alpha-O-D-glucopyranosyl-1,6-D-sorbitol and alpha-O-D-glucopyranosyl-1,6-D-mannitol were only partially hydrolyzed by the carbohydrases in the small intestine, while a substantial proportion of these compounds reached the cecum where further hydrolysis of glycosidic bonds occurred. Fermentation of the liberated hexitols occurred in the cecum, which was enlarged, and only small amounts of alpha-O-D-glucopyranosyl-1,6-D-sorbitol, alpha-O-D-glucopyranosyl-1,6-D-mannitol, and hexitols reached the large intestine.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

Hazardous Substances Data Bank (HSDB)

9.4 Mechanism of Action

/Investigators/ compared the effect of a variety of sugar alcohols on **calcium** absorption from the rat small and large intestine in vitro. An Using chamber technique was used to determine the net transport of Ca across the epithelium isolated from the jejunum, ileum, cecum, and colon of rats. The concentration of Ca in the serosal and mucosal **Tris** buffer solution was 1.25 mM and 10 mM, respectively. The Ca concentration in the serosal medium was determined after incubation for 30 min and the net Ca absorption was evaluated. The addition of 0.1-200 mM **erythritol**, **xylitol**, **sorbitol**, **maltitol**, palatinit, or **lactitol** to the mucosal medium affected net Ca absorption in the intestinal preparations. Differences in Ca transport were observed between portions of the intestine, but not between sugar alcohols tested. /The authors/ concluded that sugar alcohols directly affect the epithelial tissue and promote Ca absorption from the small and large intestine in vitro.

PMID:12064809
Mineo H et al; Dig Dis Sci 47 (6): 1326-33 (2002)

Hazardous Substances Data Bank (HSDB)

Isomalt is a non-cariogenic sweetener, which is widely used in sugar-free candy and chewing gum. Little is known about the effects of Isomalt on de- and remineralization. Binding between **calcium** and Isomalt has been reported, which could affect the mineral balance. The objective of this study was to examine the effects of Isomalt on de- and remineralization of bovine enamel lesions, both in vitro and in situ. In in vitro study, subsurface enamel lesions were subjected to 3-weeks pH-cycling. Treatments were 5-min rinses with 10% Isomalt solutions daily and 10% Isomalt additions to re- or demineralizing solutions. Standard pH-cycling conditions were used with a 0.2 ppm **fluoride** background during the remineralization phase. In in situ study, subsurface lesions were exposed 2 months in vivo and brushed three times daily with 10% Isomalt containing toothpaste. Treatment effects were assessed by chemical analysis of the solutions (in vitro) and transversal microradiography (in vitro and in situ). In in vitro study, while 5-min rinses with 10% Isomalt gave slightly increased remineralization, continuous presence of 10% Isomalt (in re- or demineralizing solutions) inhibited both de- and/or remineralization. This lead to significantly smaller overall mineral loss when Isomalt was added during demineralization. In in situ study, remineralization enhancement during short Isomalt treatments was confirmed. Isomalt had a positive effect on the de/remineralization balance when given under conditions relevant to practical use.

PMID:18157558
Takatsuka T et al; Clin Oral Investig 12 (2): 173-7 (2008)

Hazardous Substances Data Bank (HSDB)

... Reports from authoritative bodies and reviews indicates that the decrease in pH in plaque as a consequence of metabolic acid production by saccharolytic bacteria when exposed to fermentable carbohydrates (i.e. sugars and starches) may promote demineralization and prevent remineralization of the hydroxyapatite crystals. Tooth hydroxyapatite crystals are very resistant to dissolution at neutral pH, but their solubility drastically increases as pH drops. Typically, the critical pH for dental enamel is around 5.5. ... Demineralization of tooth tissues can also occur as a result of consumption of dietary acids in foods or beverages, and that frequent consumption can lead to dental erosion. **Xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** and **polydextrose** are slowly metabolized by bacteria in the mouth. The rate and amount of acid production from these food constituents is significantly less than that from **sucrose**. ... **Xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** and **polydextrose** do not promote dental caries because they do not lower plaque pH to the level associated with enamel demineralization. ... A cause and effect relationship has been established between the consumption of sugar-containing foods/drinks at an exposure frequency of four times daily or more and an increased tooth demineralization, and that the consumption of foods/drinks containing **xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** or **polydextrose**, instead of sugar in sugar-containing foods/drinks, may maintain tooth mineralization by decreasing tooth demineralization compared with sugar-containing foods, provided that such foods/drinks do not lead to dental erosion.

*European Food Safety Authority (EFSA); EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA): Scientific Opinion on the substantiation of health claims related to the sugar replacers xylitol, sorbitol, mannitol, maltitol, lactitol, isomalt, erythritol, D-tagatose, isomaltulose, sucralose and polydextrose and maintenance of tooth mineralisation by decreasing tooth demineralisation and reduction of post-prandial glycaemic responses (April 2011). Available from, as of July 28, 2011: **http://www.efsa.europa.eu/en/publications.htm***

Hazardous Substances Data Bank (HSDB)

The food constituents **xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** or **polydextrose** resulted in reduced post-prandial blood **glucose** (or insulinemic) responses compared with sugars on a weight by weight basis owing to their reduced/delayed digestion/absorption and/or to a decrease in the amount of available carbohydrates, and that the consumption of foods/drinks in which **xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** or **polydextrose** replaced sugars induced lower post-prandial glycemic and insulinemic responses than sugar-containing foods/drinks. ... A cause and effect relationship has been established between the consumption of foods/drinks containing **xylitol**, **sorbitol**, **mannitol**, **maltitol**, **lactitol**, isomalt, **erythritol**, **D-tagatose**, **isomaltulose**, **sucralose** or **polydextrose** instead of sugar and reduction in post-prandial blood **glucose** responses (without disproportionally increasing post-prandial insulinemic responses) as compared to sugar-containing foods/drinks.

*European Food Safety Authority (EFSA); EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA): Scientific Opinion on the substantiation of health claims related to the sugar replacers xylitol, sorbitol, mannitol, maltitol, lactitol, isomalt, erythritol, D-tagatose, isomaltulose, sucralose and polydextrose and maintenance of tooth mineralisation by decreasing tooth demineralisation and reduction of post-prandial glycaemic responses (April 2011). Available from, as of July 28, 2011: **http://www.efsa.europa.eu/en/publications.htm***

Hazardous Substances Data Bank (HSDB)

10 Use and Manufacturing

10.1 Use Classification

Food additives

- EU Food Improvement Agents

Food Additives -> ANTICAKING_AGENT; BULKING_AGENT; GLAZING_AGENT; SWEETENER -> JECFA Functional Classes

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

Cosmetics -> Humectant

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

Isomalt is a noncariogenic excipient used in a variety fo pharmaceutical preparations including tablets or capsules, coatings, sachets, suspensions, and in effervescent tablets. It can also be used in direct compression and wet granulation. In buccal applications such as chewable tablets it is commonly used because of its negligible negative heat of solution, mild sweetness and 'mouth feel'. It is also used widely in lozenges, sugar-free chewing gum, and hard-boiled candies, and as a sweetening agent in confectionery for diabetics.

Rowe, R.C., Sheskey, P.J., Quinn, M.E.; (Eds.), Handbook of Pharmaceutical Excipients 6th edition Pharmaceutical Press, London, England 2009, p. 343

- Hazardous Substances Data Bank (HSDB)

Sugar substitute for most applications in confectionery

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (1999-2011). New York, NY: John Wiley & Sons; Sugar alcohols. Online Posting Date: 30 May 2011

- Hazardous Substances Data Bank (HSDB)

Applications in the nonfood sector (e.g., surfactant synthesis and resin production) are known.

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). NY, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

- Hazardous Substances Data Bank (HSDB)

10.3 Methods of Manufacturing

On catalytic hydrogenation /of **isomaltulose**/, isomalt is obtained as an approximately equimolar mixture of both isomers. Industrially hydrogenation is carried out as a fixed-bed process in the presence of **nickel** catalysts. After hydrogenation and complete deionization, isomalt is obtained as an agglomerate of the two isomalt components by using a specially developed drying process. The agglomerates consist of discrete crystallites of GPM /**1-O-alpha-D-glucopyranosyl-D-mannitol**/ dihydrate, anhydrous GPM, and 1,6-GPS /**6-O-alpha-D-glucopyranosyl-D-sorbitol**/ with a primary crystal-size distribution of < 1 um. In processing, agglomerates about 0.2-2 mm in size behave like homogeneous crystallites. The isomalt components have a high tendency to crystallize (low solubility at low temperature). An isomalt variant which is enriched in 1,6-GPS could be obtained by enhanced crystallization techniques. Isomalt is commercially available either as crystalline product or as a concentrated liquid solution.

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (2010). NY, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

- Hazardous Substances Data Bank (HSDB)

10.4 U.S. Production

Current overall production is estimated at 100,000 t/a.

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2011). NY, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

Hazardous Substances Data Bank (HSDB)

10.5 General Manufacturing Information

EPA TSCA Commercial Activity Status

D-Mannitol, 1-O-.alpha.-D-glucopyranosyl-: ACTIVE

https://www.epa.gov/tsca-inventory

EPA Chemicals under the TSCA

EPA TSCA Regulatory Flag

PMN - indicates a commenced PMN (Pre-Manufacture Notices) substance.

https://www.epa.gov/tsca-inventory

EPA Chemicals under the TSCA

Table of percent relative sweetness and caloric values:

Sweetener/Name of Compound	% Relative Sweetness vs. Sucrose (normal sugar)	Impact on Blood Sugar and Insulin Secretion	Calorie Value (kcal/g)	Derived From
Mannitol	50 - 70	Low	1.6	Fructose
Sorbitol	50 - 70	Low	2.6	Glucose
Sorbitol Syrup	25 - 50 (depending on sorbitol content)	Low	3	Corn, Wheat or Potato Starch
Xylitol	100	Low	3	D-xylose
Maltitol	90	Low	3	High Maltose Corn Syrup
Maltitol Syrup	25 - 50 (depending on maltitol content)	Low	3	Corn, Wheat or Potato Starch
Lactitol	30 - 40	Low	2	Lactose
Isomalt	45 - 65	Low	2	Sucrose
Erythritol	60 - 80	Low	0.2	Glucose
Polydextrose	0	Low	1	Dextrose (Glucose), Sorbitol & Citric or Phosphoric Acid

Health Canada. Sugar Alcohols (Polyols) and Polydextrose Used as Sweeteners in Foods. Available from, as of September 28, 2011: http://www.hc-sc.gc.ca/fn-an/securit/addit/sweeten-edulcor/polyols_polydextose_factsheet-polyols_polydextose_fiche-eng.php

Hazardous Substances Data Bank (HSDB)

A mixture of diasteromers 6-O-apha-D-glucopyranosul-D-sorbitol and 1-O-alpha-D-glucopyranosyl-D-mannitol

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (2008). New York, NY: John Wiley & Sons; Sugar alcohols. Online Posting Date: 30 May 2011

Hazardous Substances Data Bank (HSDB)

... Sweetening power = 0.45 relative to sucrose in about 10% solution.

Schiweck H et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (2010). NY, NY: John Wiley & Sons; Sugar Alcohols. Online Posting Date: May 30, 2011

Hazardous Substances Data Bank (HSDB)

11 Safety and Hazards

11.1 Fire Fighting

11.1.1 Fire Fighting Procedures

Water spray, dry chemical, carbon dioxide or foam as appropriate for surrounding fire and materials.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

Hazardous Substances Data Bank (HSDB)

This material is assumed to be combustible. As with all dry powders it is advisable to ground mechanical equipment in contact with dry material to dissipate the potential buildup of static electricity.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

Hazardous Substances Data Bank (HSDB)

11.2 Accidental Release Measures

11.2.1 Cleanup Methods

Wear approved respiratory protection, chemically compatible gloves and protective clothing. Wipe up spillage or collect spillage using a high efficiency vacuum cleaner. Avoid breathing dust. Place spillage in appropriately labeled container for disposal. Wash spill site.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

Hazardous Substances Data Bank (HSDB)

11.2.2 Disposal Methods

SRP: 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.

Hazardous Substances Data Bank (HSDB)

11.2.3 Preventive Measures

As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

Hazardous Substances Data Bank (HSDB)

As a general rule, when handling USP Reference Standards avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Wash thoroughly after handling.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

Hazardous Substances Data Bank (HSDB)

/Wear/ chemically compatible gloves /and/ safety glasses or goggles. Protect exposed skin.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

▶ Hazardous Substances Data Bank (HSDB)

11.3 Handling and Storage

11.3.1 Storage Conditions

Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity. Store in a refrigerator.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

▶ Hazardous Substances Data Bank (HSDB)

If stored under normail ambient conditions, isomalt is chemically stable for many years. When it is stored in an unopened container at 20 °C and 60% relative humidity, a re-evaluation after 3 yaers is recommended.

Rowe, R.C., Sheskey, P.J., Quinn, M.E.; (Eds.), Handbook of Pharmaceutical Excipients 6th edition Pharmaceutical Press, London, England 2009, p. 344

▶ Hazardous Substances Data Bank (HSDB)

11.4 Exposure Control and Personal Protection

11.4.1 Personal Protective Equipment (PPE)

Engineering controls such as exhaust ventilation are recommended.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

▶ Hazardous Substances Data Bank (HSDB)

Use a NIOSH approved respirator, if it is determined to be necessary by an industrial hygiene survey involving air monitoring. In the event that a respirator is not required, an approved dust mask should be used.

United States Pharmacopeial Convention, Inc (USP); MSDS Database Online; Material Safety Data Sheet: Isomalt; Catalog Number: 1349626; (Revision Date: January 24, 2005)

▶ Hazardous Substances Data Bank (HSDB)

11.5 Regulatory Information

11.5.1 FDA Requirements

Food labeling. Health claims: dietary noncariogenic carbohydrate sweeteners and dental caries. ... Eligible noncariogenic carbohydrate sweeteners are the sugar alcohols **xylitol**, **sorbitol**, **mannitol**, **maltitol**, isomalt, **lactitol**, hydrogenated **starch** hydrolysates, hydrogenated glucose syrups, and **erythritol**, or a combination of these.

*21 CFR 101.80 (USFDA); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of July 11, 2011: **http://www.ecfr.gov***

▶ Hazardous Substances Data Bank (HSDB)

12 Toxicity

12.1 Toxicological Information

12.1.1 Interactions

Dental caries and periodontal disease are wide-spread oral illnesses whose etiology is intimately associated with the consumption of carbohydrate sweeteners....Human clinical trials and several animal experiments have shown promising clinical results obtained by replacing **sucrose** with certain sugar alcohols (polyols). Among the sugar alcohols, the best results so far have been obtained with **xylitol**, which is chemically a **pentitol** containing five **carbon** atoms. Chewing gums containing **xylitol** have been shown to be strong instruments against caries in caries-active age-groups and in high-risk subjects. More research is needed to assess the ability of mixtures of **xylitol** with **sorbitol**, palatinit, **maltitol**, other sugar alcohols, and intense sweeteners to prevent oral plaque diseases. Although thorough clinical trials on the relationship between carbohydrate sweeteners and periodontal diseases have not been performed, the available data indicate that dietary polyols may have a restricted dampening effect on periodontal and gingival inflammations.

Makinen KK, Isokangas P; Prog Food Nutr Sci 12 (1): 73-109 (1988)

▶ Hazardous Substances Data Bank (HSDB)

12.1.2 Antidote and Emergency Treatment

/SRP:/ Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing **water**. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Higher alcohols (>3 carbons) 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. 233

▶ Hazardous Substances Data Bank (HSDB)

/SRP:/ 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 ... . Monitor for pulmonary edema and treat if necessary ... . Anticipate seizures and treat if 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 ml of **water** for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated **charcoal** ... . /Higher alcohols (>3 carbons) 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. 232-3

▶ Hazardous Substances Data Bank (HSDB)

/SRP:/ Advanced Treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, has severe pulmonary edema, or is in severe respiratory distress. Positive-pressure ventilation techniques, with a bag-valve-mask device, may be beneficial. Consider drug therapy for pulmonary edema ... . Monitor cardiac rhythm and treat arrhythmias as 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. Consider vasopressors if patient is hypotensive with a normal fluid volume. Watch for signs of fluid overload ... . Monitor for signs of hypoglycemia (decreased LOC, tachycardia, pallor, dilated pupils, diaphoresis, and/or **dextrose** strip or glucometer readings below 50 mg) and administer 50% **dextrose** if necessary ... . Treat seizures with **diazepam** or **lorazepam** ... . Use **proparacaine hydrochloride** to assist eye irrigation ... . /Higher alcohols (>3 carbons) 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. 233

▶ Hazardous Substances Data Bank (HSDB)

12.1.3 Human Toxicity Excerpts

/HUMAN EXPOSURE STUDIES/ The polyol isomalt (Palatinit) is a well established sugar replacer. The impact of regular isomalt consumption on metabolism and parameters of gut function in nineteen healthy volunteers was examined in a randomised, double-blind, cross-over trial with two 4-week test periods. Volunteers received 30 g isomalt or 30 g **sucrose** daily as part of a controlled diet. In addition to clinical standard diagnostics, biomarkers and parameters currently discussed as risk factors for CHD, diabetes or obesity were analysed. Urine and stool Ca and **phosphate** excretions were measured. In addition, mean transit time, defecation frequency, stool consistency and weight were determined. Consumption of test products was affirmed by the urinary excretion of **mannitol**. Blood lipids were comparable in both phases, especially in volunteers with hyperlipidaemia, apart from lower apo A-1 (P=0.03) for all subjects. Remnant-like particles, oxidised LDL, NEFA, **fructosamine** and leptin were comparable and not influenced by isomalt. Ca and **phosphate** homeostasis was not affected. Stool frequency was moderately increased in the isomalt phase (P=0.006) without changes in stool consistency and stool **water**. This suggests that isomalt is well tolerated and that consumption of isomalt does not impair metabolic function or induce hypercalciuria. ...

PMID:16197583
Gostner A et al; Br J Nutr 94 (4): 575-81 (2005)

Hazardous Substances Data Bank (HSDB)

/HUMAN EXPOSURE STUDIES/ Isomalt, placebo, **sorbitol**, or **sucrose** (20 g dissolved in 200 mL **water** in the case of the placebo or 2 tablets of **Natreen** dissolved in the same amount of **water**) was administered to 24 type I diabetics at 6 a.m., 10 a.m., 2 p.m., and 6 p.m. Each test substance was administered 6 times at each of these 4 periods. Average and maximum serum insulin levels and average and maximum blood sugar levels were significantly higher after **sucrose** ingestion than after ingestion of the other test substances. There were no significant differences between **sorbitol** and isomalt. Side effects reported after isomalt ingestion included vomiting in one patient, but diarrhea was not reported with any of the test substances.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

Hazardous Substances Data Bank (HSDB)

/HUMAN EXPOSURE STUDIES/ During a double-blind test, 12 volunteers ingested **sorbitol**, and 12 others isomalt, in 10, 20, or 40 g doses administered in 1-2 week intervals. The internal neurological and cardiovascular examinations, as well as hematology and blood chemistry analyses, revealed no modifications in initial data or values which could be related to the intake of either of the 2 sugar substitutes. The intestinal symptoms (meteorism, flatulence, and diarrhea) increased as the administered dose-strength increased. After 10 g of either substance, light abdominal pains were registered; after 20 g, these symptoms became stronger, and flatulence and diarrhea occurred; the 10 patients having indicated no symptoms were equally divided between the 2 test groups. From a clinical viewpoint, intestinal symptoms were significantly higher in those volunteers given 40 g isomalt or **sorbitol**, which represents the normal consumption level of a sugar substitute, than in the other groups. The differences in response to isomalt and **sorbitol** were not significant.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

Hazardous Substances Data Bank (HSDB)

/HUMAN EXPOSURE STUDIES/ In a double-blind cross-over study, 200 healthy adult volunteers of both sexes received 50 g chocolate containing either 20 g isomalt or 20 g **sucrose** at 8 o'clock in the morning after a standard breakfast at intervals of 1 week. After isomalt ingestion, 16 of the volunteers (8%) reacted with diarrhea, whereas none experienced diarrhea after **sucrose** ingestion. The incidence of diarrhea was 10.8% in female volunteers versus only 4.5% in male volunteers. The subjects had been informed of the possible gastrointestinal symptoms in advance, so it is possible that the expectations of the female volunteers and also their subjective evaluation of the resulting symptoms were different than those of the male volunteers. A higher frequency of defecation and increased flatulence were reported after isomalt ingestion compared with the ingestion of **sucrose**.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

Hazardous Substances Data Bank (HSDB)

For more Human Toxicity Excerpts (Complete) data for Isomalt (34 total), please visit the **HSDB record page**.

▶ Hazardous Substances Data Bank (HSDB)

12.1.4 Non-Human Toxicity Excerpts

/LABORATORY ANIMALS: Acute Exposure/ In other dietary studies, 10% isomalt caused transient diarrhea that disappeared after adaptation; the feeding of isomalt was associated with cecal enlargement.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Acute Exposure/ Fistulated and normal pigs were fed 10% **sucrose** between meals, 5 or 10% isomalt between meals, or 10% isomalt with meals. The passage and absorption rate of these substances were determined at the terminal ileum (10 pigs per treatment) or over the whole distance of the digestive tract (4 pigs per treatment). ... No influence of isomalt on the consistency of the feces was observed. An increased flow of ileum chyme occurred in the period of 1-4 hours after administration of isomalt, which is probably related to the osmotic activity of non-absorbed isomalt and its constituents. Consequently, the ileal digestibility of the proteins of the basal diet was slightly negatively affected. The fecal digestibility of energy-containing compounds in the isomalt treatments was significantly lower than in **sucrose** treatment. This can be explained by the increased excretion of bacterial mass resulting from the more intensive fermentation in the large intestine in the isomalt-fed groups. The results of the determination of metabolisable energy of the diets indicate that the metabolisable energy value of isomalt is lower than that of **sucrose**.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Acute Exposure/ Groups of 12 ileum re-entrant fistulated pigs and 12 normal pigs (Dutch Landrace x large white) were fed 80% basal ration plus a combination of 10% isomalt and 10% **sucrose**, 20% isomalt, or 20% **sucrose**. After exposure to isomalt for 5 and 8 days, no isomalt could be detected in the feces. ... In pigs fed 10%, and especially 20%, isomalt, the flow of the chyme along the small intestine was considerably accelerated during the first 3-4 hours after feeding, and the amount of chyme appearing at the terminal ileum was greatly increased compared with the animals fed 20% **sucrose**. This accelerated and increased flow of the chime along the small intestine was ascribed by the authors as most likely due to the osmotic properties of the non-absorbed isomalt and its constituents. Fecal digestibility of proteins and "**nitrogen**-free extract" in the 10%, and especially the 20%, isomalt diets was depressed compared with the 20% **sucrose** diet. As a result, energy digestibility with the isomalt diets was also depressed. The authors concluded that the lowered faecal digestibility of the isomalt diets is most likely due to the increased excretion of bacterial mass resulting from the more intensive fermentation in the large intestine in the isomalt-fed groups.

*WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: **http://www.inchem.org/pages/jecfa.html***

▶ Hazardous Substances Data Bank (HSDB)

/LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Groups of 4 male and 4 female beagle dogs, 40-51 weeks of age, received isomalt at dietary concentrations of 0, 5, 10, or 20% for 13 weeks. No differences between control and test groups were observed in general behavior or appearance; food intake and body weights were normal. Diarrhea was observed in animals receiving 20% isomalt and, occasionally, in the 10%-dose group; normal feces were produced by animals given 5% isomalt. Measurement of body temperatures, pulse rates, and reflexes and ophthalmoscopic investigations after 4, 7, and 13 weeks of treatment showed no treatment-related changes; hematological and clinical chemical parameters were normal at these times. Plasma **urea** concentrations were lower in the treated animals, sometimes significantly so, but still within the range considered physiologically normal. Urinalysis did not show treatment-related differences. At autopsy, no compound-dependent abnormalities were observed and organ weights were unaffected (the gastrointestinal tract components were not weighed). Histopathological examination did not detect any tissue changes related to the test material. Concentrations of intestinal tissue alpha-glucosidases (maltase, sucrase, and glucoamylase) were unchanged by treatment. The authors concluded that concentrations of up to 20% isomalt in the diet did not produce any toxic injury. Allowing for the occasional ill-formed feces in the 10%-dose group, the no-effect level was conservatively placed at 5% of the diet, equal to 1.67 g/kg b.w./day for 13 weeks.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

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

For more Non-Human Toxicity Excerpts (Complete) data for Isomalt (20 total), please visit the **HSDB record page**.

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

12.1.5 Non-Human Toxicity Values

LD50 Rat i.p. > 2,500 mg/kg b.w.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

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

LD50 Rat i.v. > 2,500 mg/kg b.w.

WHO/FAO: Expert Committee on Food Additives. Summary of Toxicological Data of Certain Food Additives Series 20: Isomalt (64519-82-0) (1985). Available from, as of July 19, 2011: ***http://www.inchem.org/pages/jecfa.html***

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

13 Literature

13.1 NLM Curated PubMed Citations

PubChem

13.2 Springer Nature References

Springer Nature

13.3 Depositor Provided PubMed Citations

PubChem

13.4 Chemical Co-Occurrences in Literature

PubChem

13.5 Chemical-Gene Co-Occurrences in Literature

PubChem

13.6 Chemical-Disease Co-Occurrences in Literature

PubChem

14 Patents

14.1 Depositor-Supplied Patent Identifiers

PubChem

Link to all deposited patent identifiers

PubChem

14.2 WIPO PATENTSCOPE

Patents are available for this chemical structure:

https://patentscope.wipo.int/search/en/result.jsf?inchikey=SERLAGPUMNYUCK-DCUALPFSSA-N

PATENTSCOPE (WIPO)

15 Biomolecular Interactions and Pathways

15.1 Chemical-Gene Interactions

15.1.1 GGDB Chemical-Gene Interactions

ACGG-DB: ***https://acgg.asia/acggdb.html***
GlycoGene Database (GGDB): ***https://acgg.asia/db/ggdb***

▸ GlyCosmos Glycoscience Portal

16 Biological Test Results

16.1 BioAssay Results

PubChem

17 Classification

17.1 Ontologies

17.1.1 MeSH Tree

MeSH

17.1.2 ChEBI Ontology

ChEBI

17.1.3 WIPO IPC

WIPO

17.1.4 ChemIDplus

ChemIDplus

17.1.5 NORMAN Suspect List Exchange Classification

NORMAN Suspect List Exchange

18 Information Sources

FILTER BY SOURCE ALL SOURCES

1. ## ChEBI

Isomalt
http://www.ebi.ac.uk/chebi/searchId.do?chebiId=CHEBI:150326

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

2. ## ChemIDplus

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https://www.nlm.nih.gov/copyright.html

1-o-alpha-D-Glucopyranosyl-D-mannitol
https://chem.nlm.nih.gov/chemidplus/sid/0020942998

Palatinit
https://chem.nlm.nih.gov/chemidplus/sid/0064519820

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

3. ## EPA Chemicals under the TSCA

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

D-Mannitol, 1-O-.alpha.-D-glucopyranosyl-
https://www.epa.gov/chemicals-under-tsca

4. ## EPA DSSTox

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

1-O-alpha-D-Glucopyranosyl-D-mannitol
https://comptox.epa.gov/dashboard/DTXSID60872321

5. ## European Chemicals Agency (ECHA)

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https://echa.europa.eu/web/guest/legal-notice

1-O-α-D-glucopyranosyl-D-mannitol
https://echa.europa.eu/substance-information/-/substanceinfo/100.040.096

D-arabino-Hexitol, 6-O-α-D-glucopyranosyl-, (2.xi.)
https://echa.europa.eu/substance-information/-/substanceinfo/100.122.870

6. ## Hazardous Substances Data Bank (HSDB)

Isomalt
https://pubchem.ncbi.nlm.nih.gov/source/hsdb/7969

7. ## EU Food Improvement Agents

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

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

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https://www.who.int/about/who-we-are/publishing-policies/copyright

HYDROGENATED ISOMALTULOSE
https://apps.who.int/food-additives-contaminants-jecfa-database/chemical.aspx?chemID=720

9. ## NORMAN Suspect List Exchange

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

10. ## FDA/SPL Indexing Data

G97P6S66E9
https://www.fda.gov/ForIndustry/DataStandards/SubstanceRegistrationSystem-UniqueIngredientIdentifierUNII/

11. ## GlyCosmos Glycoscience Portal

https://glytoucan.org/Structures/Glycans/G41158BG

12. ## GlyGen

G41158BG
https://glygen.org/glycan/G41158BG

13. ## GlyTouCan Project

https://pubchem.ncbi.nlm.nih.gov/substance/252281021

14. ## Springer Nature

https://pubchem.ncbi.nlm.nih.gov/substance/341156769

15. ## Wikipedia

Isomalt
https://en.wikipedia.org/wiki/Isomalt

16. ## PubChem

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

17. ## MeSH

Palatinit
https://www.ncbi.nlm.nih.gov/mesh/67016640

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

Cariogenic Agents
https://www.ncbi.nlm.nih.gov/mesh/68002326

18. ## WIPO

International Patent Classification
http://www.wipo.int/classifications/ipc/

19. ## PATENTSCOPE (WIPO)

SID 389011737
https://pubchem.ncbi.nlm.nih.gov/substance/389011737