

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name : Riboflavin Universal

Substance name : riboflavin

CAS-No. : 83-88-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : For the fortification of foods, Food additive, Ingredient for pharmaceutical products

1.3 Details of the supplier of the safety data sheet

Company : DSM Nutritional Products Europe Ltd
PO Box 2676
CH-4002 Basel

Telephone : +41618157777

Telefax : +41618157770

E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

1.4 Emergency telephone number

+41 848 00 11 77 (Carechem 24 International)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.3 Other hazards

Risk of dust explosion.

SECTION 3: Composition/information on ingredients

Synonyms : 7,8-dimethyl-10-(D-ribo-2,3,4,5-tetrahydroxypentyl)isoalloxazine

Brief description of the product : Substance

Molecular formula : C17 H20 N4 O6

3.1 Substances

Hazardous components

Remarks : No hazardous ingredients

Further ingredients

Chemical name	CAS-No. EC-No.	GHS Classification	Concentration [%]
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	Registration number		
riboflavin (Vitamin B2)	83-88-5 201-507-1 01-2120745124-62-		>= 98 - <= 100

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : No hazards which require special first aid measures.
- If inhaled : Move to fresh air.
If symptoms persist, call a physician.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
- In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : No specific symptoms known.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Water
Foam

5.2 Special hazards arising from the substance or mixture

- Specific hazards during fire-fighting : None known.

5.3 Advice for firefighters

- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
- Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Consider dust explosion hazard.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Use personal protective equipment.
Avoid dust formation.

6.2 Environmental precautions

Try to prevent the material from entering drains or water courses.

6.3 Methods and material for containment and cleaning up

Pick up and arrange disposal without creating dust.

6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Advice on safe handling : For personal protection see section 8.
- Advice on protection against fire and explosion : Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed. Take precautionary measures against static discharges.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of work-day.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : To maintain product quality, do not store in heat or direct sunlight.
- Keep container tightly closed and dry.

7.3 Specific end use(s)

- Specific use(s) : Not applicable

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Personal protective equipment

- Eye protection : Safety glasses with side-shields
- Hand protection
- Material : for example nitrile rubber
- Glove thickness : > 0.10 mm
- Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Respiratory protection : No personal respiratory protective equipment normally required.
In case of high dust concentration use a dust mask applicable to local conditions.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	: free flowing powder
Colour	: yellow - yellow-orange
Odour	: odourless
Odour Threshold	: No information available.
pH	: ca. 6 saturated aqueous solution
Melting point/range	: ca. 280 °C with decomposition
Boiling point/boiling range	: not determined
Flash point	: Not applicable
Flammability (solid, gas)	: May form combustible dust concentrations in air.
Vapour pressure	: < 0.001 hPa (25 °C; calculated (citation from literature))
Relative vapour density	: Not applicable
Density	: not determined
Water solubility	: 0.097 g/l (20 °C; OECD Test Guideline 105)
Solubility in other solvents	: Hydrochloric acid 0.1 N: ca.0.18 g/l (37 °C) Ethanol: 0.045 g/l (27.5 °C) Ether: practically insoluble Acetone: practically insoluble
Partition coefficient: n-octanol/water	: log Pow -1.07 (23.8 °C; OECD Test Guideline 107)
Auto-ignition temperature	: No self ignition observed in the Grewer oven at temperatures below melting point.
Thermal decomposition	: Decomposes on heating. Potential for exothermic hazard
Explosive properties	: Not explosive
Oxidizing properties	: No data available

9.2 Other information

Combustibility index for deposited dust	: 3 (23 °C)
	: 3 (100 °C)
Dust explosion class	: St(H)1 (Milled sample, Median value of the tested sample 0.032 mm, Loss on drying 1.5 %; The value was determined in the modified Hartmann tube.)
Minimum ignition energy	: 10 - 30 mJ (Milled sample, Median value of the tested sample 0.032 mm, Loss on drying 1.5 %, EN 13821) The Minimum ignition energy (MIE) of a dust/air mix depends on the particle size the water content and the temperature of the dust. The finer and the dryer the dust the lower the MIE.
	: General remark: The indicated dust explosion characteristics

are only valid for this product and are sensitive to the sample's parameters.

Powder volume resistivity	: ca. 1E+13 Ohmm (Product sample, Median value of the tested sample 0.082 mm, Loss on drying 1.5 %) The material can accumulate static charge and can therefore cause electrical ignition.
Minimum ignition temperature of a dust/air mix	: 430 °C (Median value of the tested sample 0.096 mm) determined in the BAM oven
Molecular weight	: 376.37 g/mol
Dissociation constant	: pKa 10.2
Bulk density	: 380 kg/m ³
Further information	: hygroscopic

SECTION 10: Stability and reactivity

10.1 Reactivity

No hazards to be specially mentioned.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Dust may form explosive mixture in air.

10.4 Conditions to avoid

Heat

10.5 Incompatible materials

Bases

Strong acids

Strong oxidizing agents

10.6 Hazardous decomposition products

Nitrogen oxides (NO_x)

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity	: LD50 (Rat): > 2,000 mg/kg
	: LD50 (Mouse): > 2,000 mg/kg
Acute inhalation toxicity	: LC50 (Rat, 4 h): > 5.4 mg/l
Acute dermal toxicity	: LD50 (Rabbit): >= 5,000 mg/kg

Skin irritation	: No skin irritation (Rabbit)
Eye irritation	: No eye irritation (Rabbit) : Dust contact with the eyes can lead to mechanical irritation.
Sensitisation	: positive photoallergenic skin reaction (Guinea pig)
Genotoxicity in vitro	: not mutagenic (Ames test) : not genotoxic (Chromosome aberration test in vitro)
Carcinogenicity	: No indication for carcinogenicity known.
Reproductive toxicity	: This information is not available.
Teratogenicity	: not teratogenic not embryotoxic (Rat)
STOT - single exposure (Acute exposure)	: The substance or mixture is not classified as specific target organ toxicant, single exposure.
STOT - repeated exposure	: NOAEL (Oral, Rat) : 200 mg/kg bw/d Sub-chronic toxicity study (90-day)
Experience with human exposure	: A hypervitaminosis B2 is currently unknown. : Therapeutic dosage 5 - 100 mg/day : RDA (Recommended Daily Allowance) 1.6 mg
Aspiration toxicity	: No aspiration toxicity classification

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	: Oncorhynchus mykiss (rainbow trout) LC0 (96 h) > 500 mg/l (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	: Daphnia magna (Water flea) EC50 (48 h) > 47.4 mg/l (OECD Test Guideline 202) : EC0 (48 h) 43.8 mg/l
Toxicity to algae	: Desmodesmus subspicatus (green algae)

Riboflavin Universal

0470406

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ErC50 (72 h) 21 mg/l
(OECD Test Guideline 201)
: EbC50 (72 h) 9.8 mg/l

: ErC0 (72 h) 7.3 mg/l

Toxicity to bacteria : activated sludge
IC0 (28 d) > 100 mg/l
No inhibition was observed under the biodegradation test conditions.
(OECD Test Guideline 301F)

12.2 Persistence and degradability

Biodegradability : Readily biodegradable.
84 % (28 d)
(OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Partition coefficient: n- : log Pow -1.07 (23.8 °C ; OECD Test Guideline 107)
octanol/water

12.4 Mobility in soil

Distribution among environ- : No data available
mental compartments

12.5 Results of PBT and vPvB assessment

Assessment : The substance does not fulfill the PBT criteria.
: The substance does not fulfill the vPvB criteria.

12.6 Other adverse effects

Additional ecological informa- : Harmful to aquatic organisms.
tion

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Discharge into the environment must be avoided.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Do not dispose of waste into sewer.
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging : Dispose of as unused product.
Do not re-use empty containers.
Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

14.1 UN number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Remarks : Not classified as dangerous in the meaning of transport regulations.

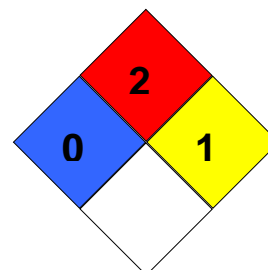
14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

NFPA Classification : Health hazard: 0
Fire Hazard: 2
Reactivity Hazard: 1



15.2 Chemical safety assessment

A Chemical Safety Assessment is not required for this substance.

SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



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to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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