

Material Safety Data Sheet



Revision Date 2017. 03. 20

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product name	TOPscript™ One-step RT PCR DryMIX (<i>Dye plus</i>)
Product code	RT421, RT422
Recommended use of the chemical and restrictions on use	
Recommended use	For research use only
Restrictions on use	For research use only
Details of the supplier	
Company name	Enzynomics Inc.
Address	Munji-ro 281-9, Yuseong-gu, Daejeon, 34050, Korea
Emergence contact number	+82-42-719-1023

2. HAZARDS IDENTIFICATION

Classification of Hazards and dangerousness	No relevant classification
Warning article including prevention methods	
Pictorial symbol	No information available
Category	No information available
Hazards and dangerousness	No information available
Prevention methods	
Prevention	No information available
Action	No information available
Store	No information available
Discard	No information available

Other hazards and dangerousness (NFPA) not included in classification

Glycerin

Health	1
Fire	1
Reactivity	0

Dimethyl sulfoxide

Health	1
Fire	1
Reactivity	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Material name	Usual name	CAS No.	Amount (%)
Glycerin	GLYCEROL	56-81-5	1 ~ 50
Dimethyl sulfoxide	SULFINYLBI SMETHANE	67-68-5	< 5

4. FIRST AID MEASURES

Eye contact	Take medical action immediately. Immediately rinse skin and eyes thoroughly with plenty of running water for at least 20 minutes.
Skin contact	Take medical action immediately. Immediately rinse skin and eyes thoroughly with plenty of running water for at least 20 minutes. Remove contaminated clothes and shoes and isolate contaminated area Completely wash clothes and shoes before reuse
Inhalation	Remove to fresh air CPR when there is no breathing Provide Oxygen when breathing is difficult
Ingestion	Take medical action immediately. Do not provide any food for unconscious person
Note to physicians	Take protective action according to the material Do not inject adrenalin

5. FIRE FIGHTING MEASURES

Proper (improper) fire extinguishing agents	Small fire: dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO ₂ (suitable extinguishing agent) Large fires: water spray / mist, regular foam (suitable extinguishing agent) High pressure water (improper extinguishing agent)
Specific hazards from chemical compounds	Can be ignited by heat, spark, flame Container may explode on heating Some can ride, but not easily ignite May cause irritation and poisonous gas in case of fire Inhalation of the substance may be harmful Some fluids may cause dizziness, suffocation-inducing vapors
Protective equipment and precautions for fire fighting	
Glycerin	No information available
Dimethyl sulfoxide	If it is not dangerous move container in fire area In case of tank fire, Cool containers with large amounts of water even after extended In case of tank fire, if there is a high sound level in the pressure relief device or if the Stand away from tank covered with flames

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Micro particles can ignite fire or explosion therefore remove all the sources of fire.

Stop leak if it is not dangerous

Give attention to materials and conditions that should be avoid

Do not enter the space without proper respirator or respirator until proper air (oxygen concentration 18 ~ 23.5%) is available.

Prevent entry into waterways, sewers, basements, and confined spaces.

Environmental precautions

In case of small leakage, flush contaminated area with large amount of water

Containment and cleaning up

In case of small leakage, absorb with sand and non-combustible material and place in container.

In case of large leakage, make a ditch away from liquid spills

Put spills into a clean, dry container with clean shovel, loosely closed, then transfer container from leak area

In case of powder leakage, cover with plastic sheet to prevent spread and keep dry

7. HANDLING AND STORAGE

Precautions for safe handling

Note the substances and conditions to avoid

Wash thoroughly after handling

Note the high temperature

In case of material leakage, reduce the oxygen concentration in the air and cause suffocation in an enclosed space, so be careful not to spill

Check the oxygen concentration before entering the place because there is a risk of loss of consciousness or death due to oxygen deficiency at high concentration in the air

Keep this temperature below 20°C because this material evaporates slowly and reaches hazardous concentrations.

Do not spray because it will evaporate faster if sprayed

Conditions for safe storage

Keep it tightly closed

Store in a cool, dry place

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure standard of chemical compound, biological exposure standard

Domestic regulations

Glycerin

TWA - 10 mg/m³

Dimethyl sulfoxide

No information available

ACGIH regulation

Glycerin

TWA - 10 mg/m³

Dimethyl sulfoxide

No information available

Biological release regulation

Glycerin

No information applicable

Dimethyl sulfoxide

No information available

Proper engineering management

Keep air levels below the exposure guidelines

Individual protection equipment

Respiratory protection

Glycerin

No information available

Use respiratory protection equipment certified by Korea occupational safety and health agency in a release of gas/liquid according to their chemical physical properties.

Use proper filter or half-circled respiratory protection cartridge equipment if the concentration of release material is lower than 100mg/m³

Use proper filter or loose-fitting respiratory protection cartridge equipment such as hood/helmet shape motor operated equipment or continuous flow protection mask if the concentration of release material is lower than 250mg/m³

Use proper filter or full face cartridge or motor operated half-circled equipment or half circled continuous flow air supply respiratory protection equipment if the concentration of release material is lower than 500mg/m³

Use proper filter or full faced respiratory protection cartridge equipment or hood/helmet type, pressurized mask if the concentration of release material is lower than 10000mg/m³

Use proper filter or auto air supply (SCBA) equipment or pressurized auto air supply (SCBA) respiratory protection equipment if the concentration of release material is lower than 100000mg/m³

Dimethyl sulfoxide

Use respiratory protection equipment certified by Korea occupational safety and health agency in a release of gas/liquid according to their chemical physical

Use chemical protection glasses and safety glasses

Install eyewash and emergency shower near work area

Eye protection

Hand protection

Wear suitable chemical resistant gloves

Body protection

Wear suitable chemical resistant clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

Glycerin	
Appearance	
State	Liquid
Color	Dark color to yellow color
Odor	Dull
Odor threshold	No information available
pH	Neutral
Melting point/freezing point	20 °C
Early boiling point and range	171 °C
Flashing point	160 °C ((c.c.))
Evaporation rate	No information available
Evaporation rate (solid/liquid)	Liquid
Maximum / minimum evaporation or explosion range	19 / 2.7 %
Steam pressure	0.0025 mmHg (at 50 °C)
Solubility	water solubility :1000 g/L at 25 °C solvent solubility: alcohol, ethyl acetate, ether insolubility, benzene, chloroform, carbon tetrachloride, carbon disulfide, oil ether, oil
Vapor density	3.1 ((air=1))
Specific gravity	1.2613 ((water=1))
n-octanol/ distribution coefficient	No information available
Self-ignition temperature	370 °C
Disassemble temperature	290 °C
Viscosity	954 cP (at 25 C)
Molecular weight	92.09

Dimethyl sulfoxide**Appearance**

State	Liquid
Color	No color
Odor	Slight smell of sulfur odor or smell of garlic clams
Odor threshold	No information available
pH	No information available
Melting point/freezing point	18 °C
Early boiling point and range	189 °C
Flashing point	95 °C
Evaporation rate	No information available
Evaporation rate (solid/liquid)	No information available
Maximum / minimum evaporation or explosion range	2.6 / 42.0 %
Steam pressure	0.609 mmHg
Solubility	25.3 g/100 ml
Vapor density	2.71 ((air=1))
Specific gravity	1.1 ((water=1))
n-octanol/ distribution coefficient	-1.35
Self-ignition temperature	215 °C
Disassemble temperature	No information available
Viscosity	1.1 cP (at 27 C)
Molecular weight	78.14

10. STABILITY AND REACTIVITY**Chemical stability and possibility of hazardous reactions**

Glycerin	No information available
Dimethyl sulfoxide	Stable at normal temperature and pressure Container may explode on heating May cause irritation and poisonous gas in case of fire

Situation to avoid

Glycerin	No information available
Dimethyl sulfoxide	Store for form Heat source, spark, flame, etc.

Materials to avoid

Glycerin	No information available
Dimethyl sulfoxide	No information available

Harmful material produce by degradation

Glycerin	No information available
Dimethyl sulfoxide	No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Glycerin	irritation, difficult to breath, area, vomit, diarrhea, headache, dizziness, dyssomnia, kidney problem, paralyzed Can absorb body by suction Can be absorbed by suction and extinguisher Through skin, digestive system, can absorb body by inhalation of aerosol Able to absorb body by suction of steam Can be absorbed by inhalation, skin and digestive system
Dimethyl sulfoxide	Can absorb body by suction Can be absorbed by suction and extinguisher Through skin, digestive system, can absorb body by inhalation of aerosol Able to absorb body by suction of steam Can be absorbed by inhalation, skin and digestive system

Health maleficence information

Acute poison

Oral

Glycerin	LD50 27200 mg/kg Rat (rat/LD50/12600mg/kg(IUCLID))
Dimethyl sulfoxide	LD50 > 20000 mg/kg (mouse)

Ingestion

Glycerin	LD50 > 10000 mg/kg Rat
Dimethyl sulfoxide	LD50 20000 ~ 40000 mg/kg Rabbit

Inhalation

Glycerin	No information available
Dimethyl sulfoxide	No information available

Skin corrosion or irritant agent

Glycerin	No irritation on skin
Dimethyl sulfoxide	Very weak or erythematous on rabbit test Temporary erythema, burning, smeared, itching in the body

Serious eye damage or irritation

Glycerin	No irritation on eyes
Dimethyl sulfoxide	Repeated drip infusion into rabbit eyes will only cause temporary tears, but will not show any change in iris, cornea, lens, retina, conjunctiva, or eyelids

Respiratory organ hypersensitiveness

Glycerin	No information available
Dimethyl sulfoxide	No information available

Skin hypersensitiveness

Glycerin	No information available
Dimethyl sulfoxide	No information available

Carcinogenic

Occupational safety and health acts

Glycerin	No information available
Dimethyl sulfoxide	No information available

Employment announcement

Glycerin	No information available
Dimethyl sulfoxide	No information available

IARC

Glycerin	No information available
Dimethyl sulfoxide	No information available

OSHA

Glycerin	No information available
Dimethyl sulfoxide	No information available

ACGIH	
Glycerin	No information available
Dimethyl sulfoxide	No information available
NTP	
Glycerin	No information available
Dimethyl sulfoxide	No information available
EU CLP	
Glycerin	No information available
Dimethyl sulfoxide	No information available
Germ cell mutagenicity	
Glycerin	Many color mammal red blood cell/negative
Dimethyl sulfoxide	In vitro Salmonella typhimurium Ames test, with or without metabolic activation in CHO cell Negative in In vivo Micronucleus Assay
Reproduction toxicity test	
Glycerin	No information available
Dimethyl sulfoxide	No effect on estrus cycle and semen factors (survival and morphology)
Special target poison (1 time exposer)	
Glycerin	No information available
Dimethyl sulfoxide	No information available
Special target poison (long exposer)	
Glycerin	rat(inhale):1-4mg/l epiglottis epithelium
Dimethyl sulfoxide	13 weeks inhalation Repeated toxicity No systemic toxicity when administered
Absorption injurious	
Glycerin	No information available
Dimethyl sulfoxide	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish

Glycerin LC50 5000 mg/l 24 hr Carassius auratus

Dimethyl sulfoxide LC50 32300 mg/l 96 hr Lepomis cyanellus

Crustacean

Glycerin EC50 > 10000 mg/l 24 hr Daphnia magna (Daphnia magna EC50(24HR) 10000mg/L(US EPA ECOTOX); Daphnia magna EC50(24HR) >10000 mg/L (EU IUCLID))

Dimethyl sulfoxide EC50 24600 mg/l 48 hr Daphnia magna

Algae

Glycerin (LC50(96hr) 77712.039 mg/L)

Dimethyl sulfoxide EC50 12350 ~ 25500 mg/l 96 hr Skeletonema costatum

Residual fungicide and resolvability

Residual fungicide

Glycerin No information available

Dimethyl sulfoxide log Kow -1.35

Resolvability

Glycerin No information available

Dimethyl sulfoxide No information available

Life enrichment

Enrichment

Glycerin No expected life enrichment

Dimethyl sulfoxide BCF < 0.4

Biodegradability

Glycerin	63 (%) 14 day Fast biodegradability (OECD SIDS), 93% biodegradability in 30 days (OECD TG 301D) (IUCLID))
Dimethyl sulfoxide	3.1 (%) 28 day

Soil

Glycerin	No information available
Dimethyl sulfoxide	No information available

Other harmful influences

Glycerin	Environmental summary : No information on toxicity on aquatic organisms
Dimethyl sulfoxide	No information available

13. DISPOSAL CONSIDERATIONS**Waste treatment method**

Glycerin	No information available
Dimethyl sulfoxide	If specified in the Waste Management Act, consider the precautions specified in the regulations.

Disposal considerations

Glycerin	If specified in the Waste Management Act, consider the precautions specified in the regulations.
Dimethyl sulfoxide	If specified in the Waste Management Act, consider the precautions specified in the regulations.

14. TRANSPORT INFORMATION**IATA****Propriety shipping name**

Glycerin	No dangerous good in sense of these transport regulations
Dimethyl sulfoxide	No dangerous good in sense of these transport regulations

Hazard class

Glycerin	No information available
Dimethyl sulfoxide	No information available

Subsidiary class

Glycerin	No information available
Dimethyl sulfoxide	No information available

Packing group

Glycerin	No information available
Dimethyl sulfoxide	No information available

UN-No

Glycerin	No information available
Dimethyl sulfoxide	No information available

Environmental hazards

Glycerin	No information available
Dimethyl sulfoxide	No information available

15. REGULATORY INFORMATION**Regulations of occupational safety and health act**

Glycerin	No information available
Glycerin	Exposure standard materials
Dimethyl sulfoxide	No information available

Regulations of toxic chemicals regulation act

Glycerin	No information available
Dimethyl sulfoxide	No information available

Regulations of safety control of dangerous substances act

Glycerin	4th class The third kind Petroleum(Receptivity) 4000 L
Dimethyl sulfoxide	4th class The third kind Petroleum(Receptivity) 4000 L

Regulations of waste control act

Glycerin	Designated waste
Dimethyl sulfoxide	Designated waste

Regulations of other domestic and international act**Domestic act****Persistent organic pollutants control act**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

Foreign act**American supervision information**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

CERCLA

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

EPCRA 302

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

EPCRA 304

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

EPCRA 313

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**American supervision information
(Rotterdam agreement material)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**American supervision information
(Stockholm agreement material)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**American supervision information
(Montreal protocol material)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**EU Classification information
(Confirmed classification results)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**EU Classification information
(Danger expression)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

**EU Classification information
(Safety expression)**

Glycerin	No information applicable
Dimethyl sulfoxide	No information applicable

16. OTHER INFORMATION

Source of material

Glycerin

IUCLID (oral)
SIDS (oral)
SIDS (skin corrosive or irritant)
SIDS (severe eye damage or irritation)
NLM (Germ Cell Mutagenesis)
IUCLID (specific target organ toxicity (repeated exposure))
OECD SIDS (fish)
EU IUCLID (Crustaceans)
OECD SIDS (Crustaceans)
US EPA ECOTOX (Crustaceans)
ECOSAR (agar)
OECD SIDS (Enrichment)
IUCLDE (biodegradable)
OECD SIDS (biodegradable)
OECD TG 301C (biodegradable)
OECD TG 301D (biodegradable)

Dimethyl sulfoxide

Corporate Solution From Thomson Micromedex (<http://csi.micromedex.com>) (Color)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Melting point / Freezing point)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Initial boiling point and boiling range)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Flash Point)
International Chemical Safety Cards (ICSC) (<http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm>) (upper or lower limit of the print or explosion range)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Vapor Pressure)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Solubility)
International Chemical Safety Cards (ICSC) (<http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm>) (vapor density)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (weight)
ICSC (n-octanol / water partition coefficient)
National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Autoignition Temperature)
The Merck Index 13th Ed. (Molecular Weight)
International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)(epigram)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Percutaneous)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Skin corrosive or irritant)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Severe eye damage or irritation)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Germ cell mutagenicity)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Reproductive toxicity)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(Specific target organ toxicity (repeated exposure))
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(fish)
OECD Screening Information Data Set(<http://cs3-hq.oecd.org/scripts/hpv/>)(crustacean)
International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)(agar)
ICSC(Persistence)
IUCLID(Enrichment)
Chemical Risk Information Platform (CHRIP)(<http://www.safe.nite.go.jp/english/db.html>)(Biodegradable)
The Chemical Database, The Department of Chemistry at the University of Akron(<http://ull.chemistry.uakron.edu/erd>)

The above information was acquired by diligent search and/or investigation and the recommendations are based on prudent application of professional judgment. The information shall not be taken as being all inclusive and is to be used only as a guide. All materials and mixtures may present unknown hazards and should be used with caution. Since Enzynomics, Inc. cannot control the actual methods, volumes, or conditions of use, the company shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein.

Questions about the information found on this MSDS should be directed to info@enzynomics.com.

End of Material Safety Data Sheet