



SAFETY DATA SHEET

2x PCR Master mix solution (i-StarTaq)

Date of issue: 2018-06-04

Revision date: 2018-06-04

Version: R0001.0001

1. IDENTIFICATION

A. Product name

- 2x PCR Master mix solution (i-StarTaq)

B. Recommended use and restriction on use

- General use : Laboratory chemicals
 - Restriction on use : Not available

C. Manufacturer / Supplier / Distributor information

o Manufacturer information

- Company name : iNtRON Biotechnology, Inc.
 - Address : #1011 Jungang Induspia V B/D, 137, Sagimakgol-ro, Jungwon-gu, Seongnam, Gyeonggi-do, 13202, Korea
 - Dept. : CRT center
 - Telephone number : +82-31-739-5737
 - Emergency telephone number :
 - Fax number : +82-31-739-5264
 - E-mail address : intronbio@intronbio.com

o Supplier/Distributor information

- Company name : iNtRON Biotechnology, Inc.
 - Address : #1011 Jungang Induspia V B/D, 137, Sagimakgol-ro, Jungwon-gu, Seongnam, Gyeonggi-do, 13202, Korea
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2. HAZARD IDENTIFICATION

A. GHS Classification

- Oxidizing solids : Category2
 - Acute toxicity (oral) : Category5
 - Acute Toxicity (Inhalation: dust / mist) : Category3
 - Skin corrosion/irritation : Category3

B. GHS label elements

o Hazard symbols



o Signal words

- Danger

○ **Hazard statements**

- H272 May intensify fire; oxidizer
- H303 May harmful if swallowed.
- H316 Cause mild skin irritation.
- H331 Toxic if inhaled

○ **Precautionary statements**

1) Prevention

- P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P220 Keep/Store away from clothing//combustible materials.
- P221 Take any precaution to avoid mixing with combustibles, incompatibles material
- P261 Avoid breathing dust/fume.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.

2) Response

- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P311 Call a POISON CENTER or doctor/physician.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P321 Specific treatment
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

○ **NFPA grade (0 ~ 4 level)**

- Health : 3, Flammability : 0, Reactivity : 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Glycerol	Glyceritol ; Glycylalcohol ; Glyrol ; Glycerin ; Glycerine ; 1,2,3-Propanetriol ; 1,2,3-Trihydroxypropane ; Glycol alcohol ; Propane-1,2,3-triol ; Glysarin ; Propanetriol	56-81-5	15
Potassium chloride	Dipotassium dichloride ; Potassium monochloride ;	7447-40-7	5
Ammonium sulfate	Ammonium sulfate (2:1) ; Diammonium sulfate ; Sulfuric acid, diammonium salt ; Mascagnite ; Diazanium sulfate ; Sulphuric acid, ammonium salt (1:2) ;	7783-20-2	1

2-Amino-2-(hydroxymethyl)-1,3-propanediol	1,3-Propanediol, 2-amino-2-(hydroxymethyl)- ; Trometamol ; Tris(hydroxymethyl)methylamine ; Tris buffer ; Trihydroxymethylaminomethane ; Propane-1,3-diol, 2-amino-2-(hydroxymethyl)- ; Aminomethane ; Tromethamine ; 2-Amino-1,3-dihydroxy-2-(hydroxymethyl)propane ; 2-Amino-2-(hydroxymethyl)propane-1,3-diol ; 2-Amino-2-methylol-1,3-propanediol ; Aminotri(hydroxymethyl)methane ; Aminotrimethylolmethane ; Aminotris(hydroxymethyl)methane ; Methanamine, 1,1,1-tris(hydroxymethyl)- ; Tri(hydroxymethyl)methylamine ; Trimethylolaminomethane ; Tris(hydroxymethyl)aminomethane ; Tris(hydroxymethyl)methanamine ; Tris(methylolamino)methane ; [2-Hydroxy-1,1-bis(hydroxymethyl)ethyl]amine ; Tromethane ; Tromethanmin ;	77-86-1	1
Magnesium chloride	Magnesium dichloride ; Magnesium(II) chloride ; Magnogene ; Magnesium chloride solution	7786-30-3	0.1
4-[[4-(Ethylamino)-3-methylphenyl][4-(ethylimino)-3-methyl-2,5-cyclohexadien-1-ylidene]methyl]-1,3-benzenedisulfonic acid monosodium salt	-	2650-17-1	0.01

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Laundering enough contaminated clothing before reuse.

C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.
- Take the doctor's examination.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- Not available

C. Special protective actions for firefighters

- Keep unauthorized personnel out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Notify your local firestation and inform the location of the fire and characteristics hazard.
- Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.
- Keep containers cool with water spray.
- Fine powder may cause ignition.
- Move people from the area.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Ventilate closed spaces before entering.
- Move container to safe area from the leak area.
- Remove all sources of ignition.
- Handling the damaged containers or spilled material after wearing protective equipment.
- Avoid dust formation.
- Moist with water to prevent dust scattering.

B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.
- Dust spills : Cover dust spills with plastic sheet or waterproof cloth to minimize spreading and avoid contact with water.
- Small liquid state spills: Appropriate container for disposal of spilled material collected.
- For disposal of spilled material in appropriate containers collected and clear surface.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Do not handle until all safety precautions have been read and understood.
- Operators should wear antistatic footwear and clothing.
- Minimize occurrence of dust and accumulation.

B. Conditions for safe storage, including any incompatibilities

- Check regularly for leaks.
- Do not use damaged containers.
- Do not apply direct heat.
- Save applicable laws and regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

- o ACGIH TLV

- [Glycerol] : TWA, 10 mg/m³
- **OSHA PEL**
 - [Glycerol]: 15 mg/m³ (Total dust), 5 mg/m³ (Respirable fraction)

B. Engineering controls

- A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

C. Individual protection measures, such as personal protective equipment

- **Respiratory protection**
 - Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
 - Respiratory protection is ranked in order from minimum to maximum.
 - Consider warning properties before use.
 - Dust, mist, fume-purifying respiratory protection
 - Any air-purifying respirator with a corpuscle filter of high efficiency
 - Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)
 - Self-contained breathing apparatus with a corpuscle filter of high efficiency
 - For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- **Eye protection**
 - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
 - Provide an emergency eye wash station and quick drench shower in the immediate work area.
- **Hand protection**
 - Wear appropriate chemical resistant glove.
- **Skin protection**
 - Wear appropriate chemical resistant protective clothing.
- **Others**
 - Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

[Xylene Cyanol FF]

A. Appearance	
- Appearance	Solide
- Color	Blue to gray
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	295 °C
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	-/-
K. Vapour pressure	Not available
L. Solubility	1g/100ml
M. Vapour density	Not available
N. Specific gravity(Relative density)	Not available
O. Partition coefficient of n-octanol/water	3.57
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	538.62

[Glycerol]

A. Appearance	
- Appearance	Liquid (Diamond)
- Color	Colorless

B. Odor	light smell
C. Odor threshold	Not available
D. pH	(Neutral)
E. Melting point/Freezing point	18.1°C
F. Initial Boiling Point/Boiling Ranges	290°C
G. Flash point	177°C (ca. 101.3kPa)
H. Evaporation rate	Not available
I. Flammability(solid, gas)	lower limit: 3, upper limit:19 (Flash point 199)
J. Upper/Lower Flammability or explosive limits	19/27%
K. Vapour pressure	0.000168mmHg (at 25 deg C)
L. Solubility	1000000mg/l (25°C)
M. Vapour density	3.1 ((Air=1))
N. Specific gravity(Relative density)	1.2613 g/cu cm(at 20 deg C)
O. Partition coefficient of n-octanol/water	-1.76
P. Autoignition temperature	405°C (ca. 101.3kPa)
Q. Decomposition temperature	290°C
R. Viscosity	954°C (at 25 C)
S. Molecular weight	92.09

[Potassium chloride]

A. Appearance	
- Appearance	Solid (Powder, crystal)
- Color	Colorless
B. Odor	Odorless
C. Odor threshold	Not available
D. pH	7
E. Melting point/Freezing point	770~773°C
F. Initial Boiling Point/Boiling Ranges	1407°C
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	-/-
K. Vapour pressure	(5.73hPa at 906°C)
L. Solubility	342000mg/l (at 20°C)
M. Vapour density	Not available
N. Specific gravity(Relative density)	1.98
O. Partition coefficient of n-octanol/water	-0.46
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	74.55

[Tris]

A. Appearance	
- Appearance	Solid
- Color	white
B. Odor	unique smell
C. Odor threshold	Not available
D. pH	10.4
E. Melting point/Freezing point	171~172
F. Initial Boiling Point/Boiling Ranges	219~220
G. Flash point	170
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	-/-
K. Vapour pressure	0.000002mmHg (at 25)
L. Solubility	550mg/l
M. Vapour density	Not available

N. Specific gravity(Relative density)	1.328
O. Partition coefficient of n-octanol/water	-1.56(estimation)
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	121.14

[Magnesium sulfate]

A. Appearance	
- Appearance	Solid, crystal
- Color	Colorless to gray
B. Odor	odorless
C. Odor threshold	Not available
D. pH	5.5
E. Melting point/Freezing point	>280 °C
F. Initial Boiling Point/Boiling Ranges	7656 °C
G. Flash point	non flammability
H. Evaporation rate	Not available
I. Flammability(solid, gas)	non flammability
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	0Pa
L. Solubility	767 °C
M. Vapour density	>1(air=1)
N. Specific gravity(Relative density)	1.77
O. Partition coefficient of n-octanol/water	0.48
P. Autoignition temperature	Not available
Q. Decomposition temperature	>280 °C
R. Viscosity	Not available
S. Molecular weight	132.14

10. STABILITY AND REACTIVITY

A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with heat, sparks, flame or other ignition sources.
- Keep away from heat source.

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

- (Respiratory tracts)
 - Not available
- (Oral)
 - May harmful if swallowed.
- (Eye-Skin)
 - Cause mild skin irritation.

B. Delayed and immediate effects and also chronic effects from short and long term exposure

- **Acute toxicity**
 - * **Oral**
 - Product (ATEmix) : 2000mg/kg < ATEmix <= 5000mg/kg
 - [Glycerol] : LD50 = 12600 mg/kg Rat (ChemIDplus)
 - [Potassium chloride] : LD50 2600 mg/kg Rat (HSDB)
 - [Ammonium sulfate] : LD50 >2000 mg/kg Rat (OECD Guideline 423)
 - [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : LD50 = 5900 mg/kg rabbit (Thomson Micromedex)
 - [Magnesium chloride] : LD50 = 2800 mg/kg Rat
 - * **Dermal**
 - Product (ATEmix) : >5000mg/kg
 - [Glycerol] : LD50 > 10000 mg/kg Rat (ChemIDplus)
 - [Ammonium sulfate] : LD50 >2000 mg/kg Rat (OECD Guideline 434)
 - * **Inhalation**
 - Product (ATEmix) : Not available
 - [Glycerol] : LC50 >2.75 mg/ℓ 4 hr Rat (ECHA)
 - [Ammonium sulfate] : Dust LC50 0.64 mg/ℓ 4 hr Guinea pig
- **Skin corrosion/irritation**
 - Cause mild skin irritation.
- **Serious eye damage/irritation**
 - Not available
- **Respiratory sensitization**
 - Not available
- **Skin sensitization**
 - Not available
- **Carcinogenicity**
 - * **IARC**
 - Not available
 - * **OSHA**
 - Not available
 - * **ACGIH**
 - Not available
 - * **NTP**
 - Not available
 - * **EU CLP**
 - Not available
- **Germ cell mutagenicity**
 - Not available
- **Reproductive toxicity**
 - Not available
- **STOT-single exposure**
 - Not available
- **STOT-repeated exposure**
 - Not available
- **Aspiration hazard**
 - Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

- **Fish**
 - [Glycerol] : LC50 >11 mg/ℓ 96 hr Cyprinodon variegatus (ECHA)
 - [Potassium chloride] : LC50 880 mg/ℓ 96 hr Pimephales promelas (OECD SIDS)
 - [Ammonium sulfate] : LC50 53 mg/ℓ 96 hr Oncorhynchus mykiss
 - [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : LC50 = 955.892 mg/ℓ 96 hr (Estimate)
 - [Magnesium chloride] : LC50 2120 mg/ℓ 96 hr Pimephales promelas (ECOTOX)
- **Crustaceans**
 - [Glycerol] : LC50 1955 mg/ℓ 48 hr Daphnia magna (ECHA)

- [Potassium chloride] : EC50 177 mg/ℓ 48 hr Daphnia magna (OECD SIDS)
- [Ammonium sulfate] : EC50 121.7 mg/ℓ 48 hr (Ceriodaphnia acanthina)
- [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : EC50 = 19.793 mg/ℓ 48 hr (Estimate)
- [Magnesium chloride] : EC50 140 mg/ℓ 48 hr Daphnia magna (ECOTOX)

○ **Algae**

- [Potassium chloride] : EC50 2500 mg/ℓ 72 hr (IUCLID)
- [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : EC50 = 163.053 mg/ℓ 96 hr (Estimate)
- [Magnesium chloride] : EC50 2200 mg/ℓ 72 hr Scenedesmus subspicatus (ECOTOX)

B. Persistence and degradability

○ **Persistence**

- [Glycerol] : Log Kow -1.76 (HSDB)
- [Potassium chloride] : log Kow -0.46 (OECD SIDS)
- [Ammonium sulfate] : log Kow 0.48
- [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : log Kow = -1.56 (HSDB)
- [Magnesium chloride] : log Kow 0.05 (Estimate)
- [4-[[4-(Ethylamino)-3-methylphenyl][4-(ethylimino)-3-methyl-2,5-cyclohexadien-1-ylidene]methyl]-1,3-benzenedisulfonic acid monosodium salt] : log Kow 3.57 (Estimate)

○ **Degradability**

- Not available

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Potassium chloride] : BCF 0.47 (IUCLID)
- [2-Amino-2-(hydroxymethyl)-1,3-propanediol] : BCF = 3 (HSDB)
- [Magnesium chloride] : BCF 3.162 (Estimate)
- [4-[[4-(Ethylamino)-3-methylphenyl][4-(ethylimino)-3-methyl-2,5-cyclohexadien-1-ylidene]methyl]-1,3-benzenedisulfonic acid monosodium salt] : BCF 3.162 (Estimate)

○ **Biodegradation**

- [Glycerol] : Biodegradability = 65 (%) 14 day (OECD TG 301C, OECD SIDS, OECD TG 301D, IUCLIDE), 94 % 24hr (TOC removal)(FCHA)

D. Mobility in soil

- Not available

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.
- Dispose by incineration.

B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 3288

B. Proper shipping name

- TOXIC SOLID, INORGANIC, N.O.S.

C. Hazard Class

- 6.1

D. IMDG CODE/IATA DGR Packing group

- III

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-A (Toxic substances)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

- **POPs Management Law**
 - Not applicable
- **Information of EU Classification**
 - * **Classification**
 - Not applicable
- **U.S. Federal regulations**
 - * **OSHA PROCESS SAFETY (29CFR1910.119)**
 - Not applicable
 - * **CERCLA Section 103 (40CFR302.4)**
 - Not applicable
 - * **EPCRA Section 302 (40CFR355.30)**
 - Not applicable
 - * **EPCRA Section 304 (40CFR355.40)**
 - Not applicable
 - * **EPCRA Section 313 (40CFR372.65)**
 - Not applicable
- **Rotterdam Convention listed ingredients**
 - Not applicable
- **Stockholm Convention listed ingredients**
 - Not applicable
- **Montreal Protocol listed ingredients**
 - Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2018-06-04

C. Revision number and Last date revised

- Not applicable

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).